LES FONDS MEUBLES DES LAGONS DE NOUVELLE-CALÉDONIE (SÉDIMENTOLOGIE, BENTHOS)

Volume III

Bertrand RICHER de FORGES
coordonnateur

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Avant-propos

Dans ce troisième volume de la série consacrée aux résultats des études sur les fonds meubles des lagons, nous présentons quatre articles sur les sédiments et la faune marine de Nouvelle-Calédonie.

Le premier article concerne les caractéristiques sédimentaires des fonds du lagon de la côte est de la Grande Terre. Il fait suite aux travaux déjà publié par C. CHEVILLON sur les sédiments du lagon nord et de l'atoll d'Ouvéa. Cette étude, réalisée dans le cadre du programme Lagon, apporte de nouvelles connaissances sur la propagation et le dépôt des particules fines terrigènes dans les zones littorales et en particulier sur la formation d'un «bouchon vaseux» dans les estuaires directement soumis aux influences des exploitations minières. La description analytique de ces sédiments aboutit à la proposition d'un modèle évolutif des sédiments lagonaires et à la production de trois cartes en couleur portant sur la granulométrie, la répartition des carbonates et celle des lutites. L'analyse des bioclastes montre que les composants dominants sont issus des foraminifères et des mollusques, le troisième composant étant produit par les algues du genre *Halimeda*.

Le deuxième article, par le Dr. J. OKUNO, est une révision pour le Pacifique sud-ouest du genre de crevettes Carides, *Cinetorhynchus*. Six espèces dont deux nouvelles sont signalées de cette région.

Les troisième et quatrième articles traitent d'une famille de crabes caractéristiques des milieux coralliens, les Trapeziidae. Il s'agit d'espèces vivant en association avec les coraux branchus pour lesquels de nombreuses confusions taxonomiques avaient été commises. Le Dr. P. CASTRO a parcouru de nombreux archipels de l'Indo-Pacifique pour récolter des spécimens des différentes espèces, faire des observations sur leur comportement et saisir leurs colorations sur le vivant. Il a également revu la quasi totalité du matériel de cette famille conservé dans les grands musées pour démêler les synonymies. Ce gros travail aboutit à une révision de cette famille pour deux régions du Pacifique : la mer du Corail (Nouvelle-Calédonie et côte est australienne) et la Polynésie. L'auteur a pu profiter de notes sur les Trapeziidae prises par le Dr. R. SERÈNE au cours de sa vie. Les notes de couleurs sur les espèces du Viet-Nam sous forme d'aquarelles sont publiées ici en hommage au travail de ce grand carcinologiste français.

A Nouméa le 12 mai 1997

Bertrand RICHER de FORGES

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Sédimentologie descriptive et cartographie des fonds meubles du lagon de la côte Est de Nouvelle-Calédonie

Christophe CHEVILLON

Océanographie Biologique, Centre ORSTOM de Nouméa
B.P. A5, 98 848 NOUMÉA
Nouvelle-Calédonie

RÉSUMÉ

Trois Campagnes de 12 jours chacune (août 1986, janvier et mai 1987) ont permis d'échantillonner à la drague les sédiments superficiels du lagon de la côte Est de Nouvelle-Calédonie selon une maille de 2 milles nautiques. Les 276 échantillons recueillis ont été étudiés du point de vue de leur type granulométrique, de leur teneur en vase et en carbonates ainsi que de leur couleur. Les résultats commentés ici, sont aussi présentés sous forme de cartes en couleurs (envasement, teneurs en carbonate et granulométrie) jointes à la fin de ce document.

Le lagon de la côte Est de Nouvelle-Calédonie apparaît soumis à une sédimentation mixte terrigène-organogène qui s'exprime essentiellement suivant un gradient côte-récif barrière bien marqué. Un second gradient, moins marqué, est mis en évidence entre les parties nord et sud du lagon. L'agencement de la zonation principale des différents faciès se fait suivant des ensembles successifs, sensiblement parallèles au trait de côte. Elle est perturbée çà et là par la présence de vallées sous-marines qui permettent, selon les cas, soit une extension vers les passes des faciès les plus envasés et terrigènes normalement limités à la zone littorale, soit une avancée vers l'intérieur du lagon des faciès les plus carbonatés habituellement liés à la proximité de la barrière récifale. Les teneurs moyennes en vase (39%) et en carbonates (62%) montrent que le lagon, pris dans son ensemble, apparaît modérément envasé et la sédimentation fortement carbonatée. Néanmoins, le faciès des sédiments très fortement envasés, qui occupe les baies et la frange littorale, est le mieux représenté et les vases ont pour la plupart une origine terrigène prépondérante. Une situation paradoxale est mise en évidence au niveau des estuaires les plus touchés par l'activité minière et qui, par un mécanisme d'accrétion deltaïque, bloquent le transit des apports terrigènes vers le lagon. La zonation granulométrique, elle aussi sensiblement parallèle au trait de côte, se fait selon trois ensembles principaux: une zone interne, côtière, qui est occupée par des vases pures ; une zone médiane, plus caractéristique de la plaine lagonaire s.s., occupée par des vases sableuses ou des sables vaseux ; et une zone externe, liée aux fonds sous influence de la barrière récifale, qui est plus

CHEVILLON, C., 1997. — Sédimentologie descriptive et cartographie des fonds meubles du lagon de la côte Est de Nouvelle-Calédonie. *in* : B. RICHER DE FORGES (ed.), Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). *Études & Thèses*, volume 3, ORSTOM : Paris : 7-30. ISBN 2-7099-1376-3

hétérogène, tant dans son schéma de répartition (en mosaïque) que dans les types sédimentaires qui y sont représentés (sables très fins à graviers sableux). La couleur des sédiments apparaît étroitement liée à l'intensité des apports terrigènes et les variations rencontrées reflètent assez bien la succession des différents faciès. Une modélisation du fonctionnement sous contrôle morpho-dynamique de la sédimentologie dans ce lagon est proposée en synthèse.

Les foraminifères (27,2 %) et les mollusques (21,8 %) sont les constituants dominants de la biophase sédimentaire, suivis de loin par les articles d'*Halimeda* (3.9 %). L'importance des apports terrigènes et de l'envasement sur la zonation sédimentaire du lagon apparaît ici encore très clairement, avec une partition très nette entre les biofaciès à foraminifères inféodés à la zone côtière et les biofaciès à mollusques sous influence de la barrière récifale.

ABSTRACT

Three cruises on board of R.V."Vauban" (August 1986, January and May 1987) have allowed to dredge superficial samples of sediments in the lagoon of the East coast of New Caledonia. 276 samples were collected according to a 2 nautical miles regular grid. The samples were studied for their textural classification, their mud and carbonate content as well as their colour. The results commented here, are also provided through 3 colour sedimentological maps enclosed at the end of this book.

The east coast lagoon of New Caledonia is submitted to a mixed terrigeneous-carbonated sedimentation, expressed essentially by a well marked coast-to-barrier reef gradient. A second gradient, less marked, is evidenced between the southern and northern parts of the lagoon. For the main, mud and carbonate facies are distributed according to patterns arranged successively from the coast to the barrier reef and parallel to the coast line. More complex pattern are produced by textural types, but are still parallell to the coast line. They fall within three main units : an internal coastal zone, including bays, that is occupied by pure muds ; a median zone, more characteristic of the lagoonal plain, occupied by sandy muds or muddy sands ; and an external zone, linked to bottoms under influence of the external barrier reef. The latter is more heterogeneous, both in its distribution pattern (mosaic) or in the textural types represented there (very fine sands to sandy gravels). The colour of the sediments appears closely linked to the terrigenous inputs and the colour variations reflect well enough the succession of the terrigenous to carbonated facies.

This main facies pattern is locally disrupted by the presence of sub-marine valleys. According to case, these sub-marine valleys allow, either the extension to passes of the muddiest and highest terrigenous facies - normally limited to the nearshore zone - or the extension in the lagoon of the highest carbonated and lowest mud facies usually linked to the vicinity of the external barrier reef. The average contents in mud (39%) and carbonates (62%) determine for the lagoon as a whole a moderate mud and high carbonate facies. Nevertheless, the very high mud facies, that occupies coastal bays and the littoral fringe, is the best represented and muds have, for most, a predominantly terrigenous origin.

In the estuaries most modified by mining activity a paradoxical situation is evidenced. A mechanism of deltaic accretion prevents terrigenous inputs from flowing in the open lagoon. To conclude, a functioning model of the sedimentology under morphology and dynamics control is proposed for this lagoon.

Foraminifera (27.2 %) and molluscs (21.8 %) are the main skeletal constituents of the sediments, far followed by *Halimeda* plates (3.9 %). The importance of terrigenous inputs and muds distribution on the sedimentary pattern appears clearly again, with a very marked partition between foraminifera facies, linked to the coastal zone, and molluscs facies which are under the influence of the outer barrier reef.

INTRODUCTION

La description sédimentologique des fonds, outre sa participation à l'acquisition de connaissances de base sur le milieu - les fonds meubles représentent, en Nouvelle-Calédonie, 90% de la superficie des lagons - est un facteur important de la distribution des espèces benthiques (CHARDY *et al.*, 1988 ; CHEVILLON & RICHER DE FORGES, 1988) et des poissons de lagons tropicaux (KULBICKI, 1988, 1995 ; LETOURNEUR *et al.*, sous presse ; WANTIEZ *et al.*, 1996) ; elle permet aussi d'estimer rapidement les conditions hydrodynamiques régnantes au niveau du fond, participe à la mise en valeur des ressources lagonaires (relations étroites entre la nature de l'environnement sédimentaire et certaines espèces exploitables, recensement des zones favorables à l'extraction de sables et agrégats pour l'industrie du bâtiment) et à la protection et à la gestion de l'environnement (extractions, aménagements littoraux et lagonaires pour l'industrie touristique).

Tous ces éléments ont logiquement conduit au développement d'une étude générale de la sédimentologie des lagons de Nouvelle-Calédonie incluant les lagons de l'île principale (Nord, Sud, Est et Ouest) ainsi que les lagons des atolls de Chesterfield, de Huon et Surprise et d'Ouvéa (CHEVILLON, 1990, 1992, 1996a ; CHEVILLON & CLAVIER, 1990). Cette vaste tâche - plus d'un millier de prélèvement ont été réalisés à la benne, à la drague ou en plongée selon une maille de 1 à 3 milles nautiques - comprend la réalisation de cartes sédimentologiques à grande échelle (granulométrie, envasement, teneur en carbonates), l'identification et la caractérisation des principaux environnements sédimentaires, ainsi que l'étude de la composition biogène des sédiments. Ces trois approches ont permis, dans une phase de synthèse, d'ouvrir des perspectives intéressantes dans la compréhension des processus de genèse des fonds meubles et des influences respectives du milieu terrestre, des récifs, et des peuplements benthiques sur l'élaboration des sédiments (CHEVILLON, 1996b).

Les fonds de la côte Est présentent un intérêt plus particulier dans la mesure où ils n'ont que peu ou pas été étudié jusqu'alors et qu'ils représentent un modèle original de lagon côtier à sédimentation mixte terrigène-carbonatée. Ce travail à pour but de présenter la méthodologie utilisée dans la réalisation des cartes et de commenter les résultats obtenus ; il comprend trois parties: présentation du domaine étudié, méthodologies mises en oeuvre, résultats et discussion. Un modèle du fonctionnement, sous contrôle morpho-dynamique, de la sédimentologie dans ce lagon est proposé en synthèse.

PRÉSENTATION ET CARACTÉRISTIQUES DE LA ZONE D'ÉTUDE

Située entre les longitudes 164°20' et 166°55' Est et les latitudes 20°10' et 22°05' Sud, la zone étudiée constitue la majeure partie du lagon de la côte Est de l'île principale de Nouvelle-Calédonie (Grande Terre). Ce lagon, dont la largeur varie de 2 à 15 km pour une longueur supérieure à 350 km, est orienté suivant un axe N E /S E (Fig.1) et couvre une superficie évaluée à 4 068 km^2 (TESTAU & CONAND, 1983).

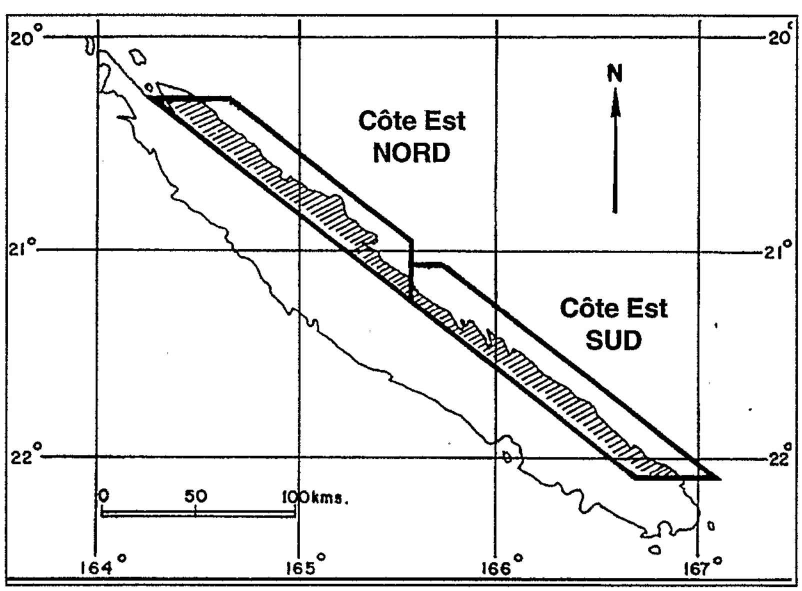


Fig. 1. — Carte de la Nouvelle-Calédonie avec situation des zones étudiées.

LE LITTORAL

Dans sa moitié sud et jusqu'à Ponérihouen, le littoral est constitué de petites falaises au pied desquelles se trouve, soit immédiatement un récif frangeant, soit une plage de coraux morts qui précède le récif frangeant. La plupart des cours d'eau finissent par des rias, parfois très vastes, au fond desquelles on observe souvent un petit delta.

A partir de Ponérihouen, en allant vers le nord, la côte Est présente une succession de portions saillantes tronquées par des escarpements et de petites plaines alluviales terminées par des plages. L'embouchure des principaux cours d'eau s'évase largement pour former de véritables estuaires dont l'extrémité est barrée par une flèche littorale (rivières Tchamba, Amoa, Tiwaka). A partir de Hienghène la côte devient plus abrupte et de nombreuses cascades arrivent à la mer. Ce n'est que plus au nord, entre Pouébo et Ballade qu'une petite plaine alluviale, en partie envahie par la mangrove, peut à nouveau se développer (ILTIS, 1980 ; CONAND, 1987).

LA BARRIÈRE RÉCIFALE EXTERNE

Le récif barrière de la côte orientale - en grande partie submergé - est sensiblement parallèle à l'allongement général de l'île et se situe à la limite externe de la plate-forme continentale qu'il sépare des grands fonds formant une pente abrupte.

Dans sa partie sud, de Ounia à Touho, la barrière orientale est pratiquement rectiligne et distante de la côte de 10 à 15 km. Entrecoupée de nombreuses et larges passes, toutes situées dans le prolongement d'une rivière importante, elle est par endroit dédoublée (Port Bouquet, Ilots d'Harcourt), voire triplée (récif Bogota).

Cette portion rectiligne prend fin à Touho où la barrière revêt une forme assez curieuse : très proche de la Grande-Terre au départ (2 km) elle s'en écarte très rapidement au récif Mengalia qui présente un arc convexe vers le large jusqu'au niveau de Hienghène où la barrière est brusquement ramenée vers la côte. L'arc du Grand Récif Mengalia englobe deux lignes de récifs intérieurs respectivement distants de 6 et 12 km de la côte.

Au nord de Hienghène, la barrière d'abord discontinue puis continue, redevient quasiment rectiligne. Beaucoup moins éloignée de la côte (4 à 5 km) que dans sa partie sud , elle enserre un lagon peu développé, et largement obstrué par un développement latéral inhabituel du récif frangeant (RISBEC, 1931 ; GUILCHER, 1965 ; CHEVALIER, 1973 ; COUDRAY, 1976, 1977 ; COUDRAY *et al.*, 1985).

Les traits marqués du tracé de la barrière orientale sont, outre la multiplicité des passes correspondant au prolongement des rivières, sa forme arquée très particulière au large de Touho qui se calque sur la forme de la côte et la présence d'éléments d'une double barrière, phénomène relativement rare dans le monde récifal (DAVIS, 1928 ; KUENEN, 1951; TAYAMA, 1952 ; GUILCHER, 1958, 1963 ; PICHON, 1977).

LE LAGON

Dans sa partie sud et jusqu'aux environs de Touho, la barrière récifale externe délimite un lagon assez large (9 à 10 km) et profond (60 m et plus dans les dépressions internes, jusqu'à 80 m au niveau de certaines passes).

Le long du littoral, les fonds descendent rapidement jusqu'à 20 et 30 m ; la pente est particulièrement abrupte au niveau des caps et de certaines portions de la côte, alors qu'elle s'adoucit en face des grandes baies et/ou de l'embouchure des rivières importantes. L'isobathe 30 m épouse pratiquement la forme du trait de côte dont il n'est distant que de quelques centaines de mètres là où la pente est la plus forte mais peut s'en éloigner de plusieurs kilomètres au niveau de baies et des embouchures.

La plaine centrale du lagon est occupée dans sa majeure partie par des fonds de 30 à 40 m desquels se détachent des plateaux isolés n'excédant pas 30 m et par des hauts-fonds pouvant émerger au niveau des récifs internes qui la parsèment. L'isobathe 50 m délimite par ailleurs deux vastes dépressions longitudinales au tracé tortueux, s'étendant sur prés de 50 km chacune (de Port Ounia à Port Cambiou et de Nakety au Cap Dumoulin) et dont la profondeur peut dépasser 70 m ; très proches de la côte par endroits (baie de Pourina, entre Ouinné et Kouakoué), elles s'en éloignent pour rejoindre les vallées sous-marines qui débouchent dans les principales passes (passes de Kouakoué, Ngoé, Thio et Nakety).

Du centre vers le large, les fonds remontent en pente douce jusqu'à l'isobathe 30 m qui entoure sous la forme d'auréoles restreintes les portions de récifs constituant la barrière récifale externe. Au niveau des passes, arrivent des vallées sous-marines étroites et encaissées, en forme de «Y» pour la plupart et dans lesquelles la profondeur augmente progressivement de 50 en aval à plus de 90 m au sortir de la passe ; elles peuvent communiquer entre elles par l'intermédiaire des grandes dépressions décrites plus haut (passes de Kouakoué et de Ngoé, passes de Thio et de Nakety).

L'origine de ces vallées sous-marines et des dépressions a été expliqué sur la côte Ouest par les variations eustatiques : lors de la dernière régression (Würm), il y a 18 000 ans environ (LALOU & DUPLESSY, 1977), le niveau marin est descendu jusqu'à 120 m en dessous du zéro actuel ; les cours d'eau existants ont alors entaillé le lagon émergé créant des vallées, des canyons et les passes du récif barrière (TAISNE, 1965 ; LAUNAY, 1972 ; DUGAS, 1974 ; COUDRAY, 1976). Nous serions donc en présence d'un ancien réseau hydrographique aujourd'hui ennoyé par la remontée du niveau marin.

Au nord de Touho et jusqu'à Hienghène le lagon atteint son développement le plus important (18 à 19 km de large au niveau de l'arc du récif Mengalia). Par contre sa profondeur va dès lors diminuer considérablement et ce jusqu'à son extrémité nord. Les fonds de 50 m disparaissent de la partie centrale du lagon pour ne plus rester localisés qu'au niveau des passes et de façon restreinte après Hienghène. Les vallées sous-marines dont la taille se réduit considérablement ne présentent d'ailleurs plus la forme en "Y" caractéristique rencontrée dans le sud.

Pratiquement inexistant entre Hienghène et la pointe sud du Grand Récif Colnett, le lagon s'élargit à nouveau mais dans de moindres proportions (6 à 7 km de large seulement) jusqu'à sa frontière nord marquée par le début du récif de Cook et le plateau de Tiari. Dans cette dernière partie, les profondeurs ne dépassent pratiquement plus 30 m. Les difficultés de navigation rencontrées dans cette dernière partie du lagon n'ont d'ailleurs pas toujours permis de respecter le plan d'échantillonnage initial.

PRÉCIPITATIONS ET HYDROGRAPHIE

La carte des isohyètes moyennes annuelles (Fig. 2) met en évidence une dissymétrie dans la répartition spatiale des précipitations qui est dû à l'orientation générale de l'île (les vents dominants soufflant d'un secteur N.E. à S.E., la côte Est se trouve "au vent") et à son relief (l'axe de la chaîne centrale est parallèle aux côtes et déporté vers la moitié est de l'île, ne laissant subsister qu'une étroite bande littorale qui subit directement les précipitations orographiques). Il en résulte finalement que la côte Est "au vent" enregistre des hauteurs pluviométriques qui sont a peu prés le double de celles de la côte Ouest "sous le vent".

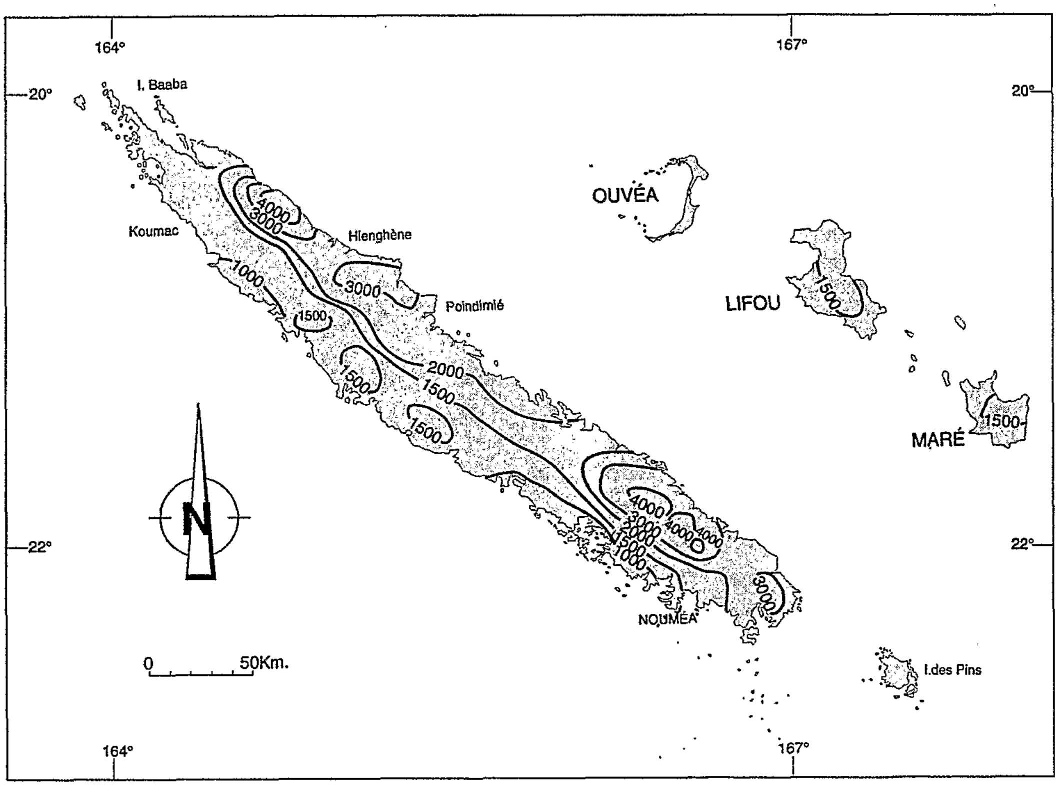


Fig. 2. — Précipitations en Nouvelle-Calédonie (d'après CONAND, 1987)

Ce phénomène se retrouve, logiquement, au niveau de l'écoulement sur les deux versants de l'île et les cours d'eau de la côte Est (Fig. 3) ont des débits spécifiques plus élevés que ceux de la côte Ouest. Les débits les moins importants sont de l'ordre d'une trentaine de litres par secondes et par kilomètres carrés (35 $l/s/km^2$ pour la rivière Houaïlou, 30 $l/s/km^2$ pour le Diahot, 39,4 $l/s/km^2$ pour la Tipindjé), tandis que la rivière Ouinné présente un des débits maximum avec 94 $l/s/km^2$. Citons encore la Tiwaka (56,1 $l/s/km^2$), la Tchamba (62,3 $l/s/km^2$) et la Ouaïème (40 à 63 $l/s/km^2$) (BAUDUIN & BRUNEL, 1981).

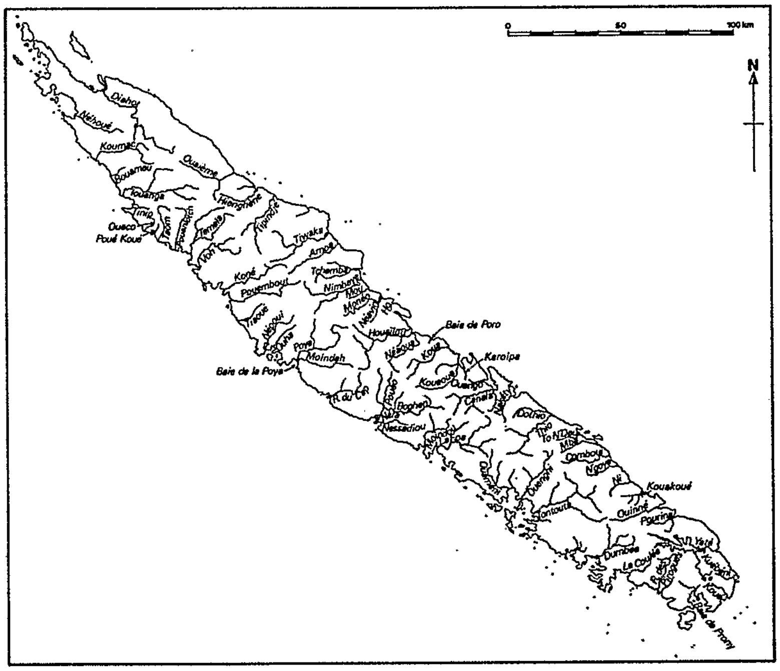


Fig. 3. — Principaux cours d'eaux de la Grande Terre (d'après BIRD *et al.*, 1984)

CONAND (1987) a estimé l'apport d'eau annuel des divers secteurs au lagon de Nouvelle-Calédonie ; il apparaît qu'il est plus de deux fois supérieur dans le lagon Est (Fig. 4).

Le climat confère au régime hydrologique une irrégularité saisonnière marquée, avec une période d'étiage de juillet à décembre et des crues entre décembre et avril. La violence de celles-ci entraîne un débit solide important, fortement accentué par la présence des nombreuses exploitations minières à ciel ouvert situées dans la chaîne (Fig. 5). BIRD *et al.* (1984) ont étudié l'impact de ces exploitations sur la charge solide des rivières et leur sédimentation deltaïque. Les embouchures les plus touchées sont celles des rivières Ho, Houaïlou, Kouaoua, Canala, Nakety, Thio et Ouinné. Ces apports sédimentaires se déposent dans les deltas ou au fond des rias. Seule une infime partie, constituée par les particules ultra-fines dont le diamètre médian est de l'ordre de 0.1mm, échappe au piégeage dans les deltas et peut atteindre le lagon et la mer ; d'autre part, du fait du transport par étapes successives du matériel prélevé sur les hauteurs (chaque crue remanie les dépôts de la crue précédente), la quantité de sédiment qui arrive au lagon ne représente qu'une faible partie du sédiment remis en mouvement par une crue donnée (BALTZER & TRESCASE, 1971a).

MATÉRIEL ET MÉTHODES

ÉCHANTILLONNAGE

Les échantillons ont été prélevés, après homogénéisation, sur le sédiment récolté à la drague Charcot lors de trois campagnes d'étude de la faune benthique (Fig. 6). Ces campagnes se sont déroulées du 05 au 13 août 1986, du 7 au 14 janvier 1987 et du 11 au 15 mai 1987. Les dragages, conduits à partir du N.O. "Vauban", ont été réalisés sur des stations régulièrement réparties selon une maille de 2 milles nautiques. La distance entre les prélèvements a été fixée de façon à optimiser la couverture de la zone (4 068 km^2) sans pour autant atteindre un

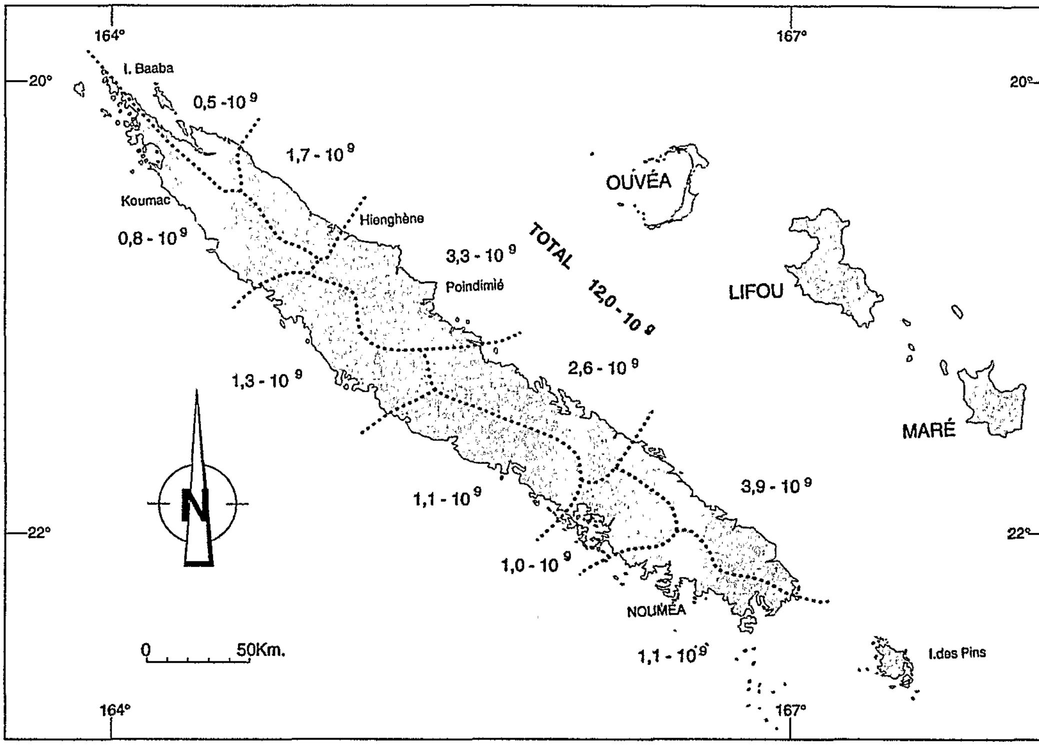


Fig. 4. — Apports d'eaux (en m³/an) dans les lagons de Nouvelle-Calédonie (d'après CONAND, 1987)

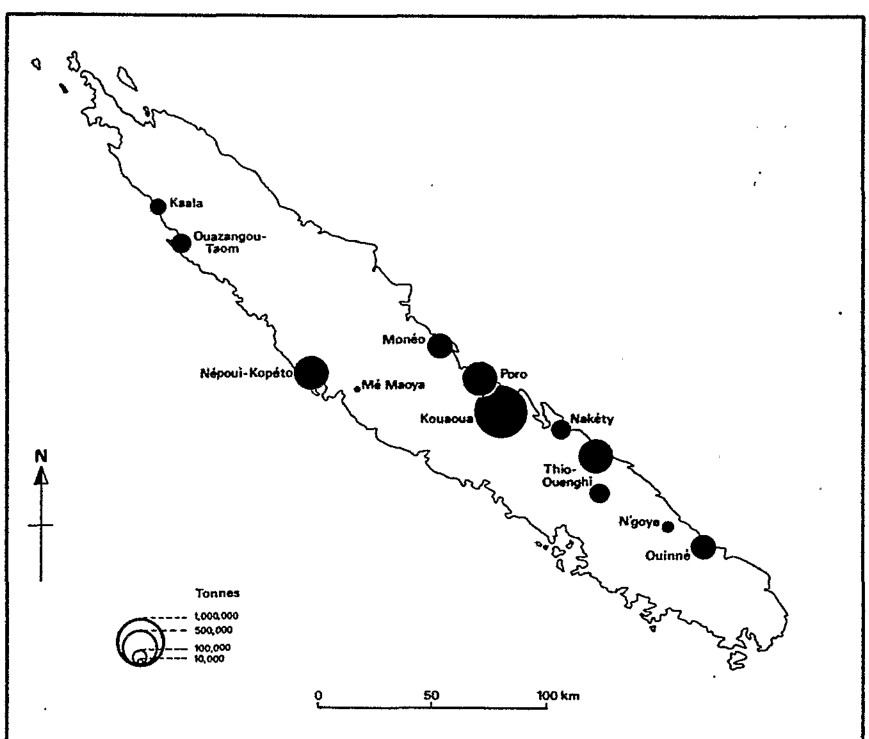


Fig. 5. — Localisation des principales exploitations minières en 1981 (d'après BIRD *et al.*, 1984)

trop grand nombre de prélèvements (354 au départ). Ce plan d'échantillonnage systématique a du parfois être adapté aux contraintes du terrain et de la navigation telles que la présence de récifs ou de zones non hydrographiées inaccessibles au navire ; ainsi, sur les 354 stations initialement prévues, seules 289 ont été échantillonnées et 276 prélèvements, numérotés de 1 à 47 et de 597 à 903, ont finalement pu être récoltés. Chaque échantillon recueilli (environ 500 g de sédiment humide) a été conservé en chambre froide, après un triple étiquetage sur papier plastifié, jusqu'au traitement au laboratoire.

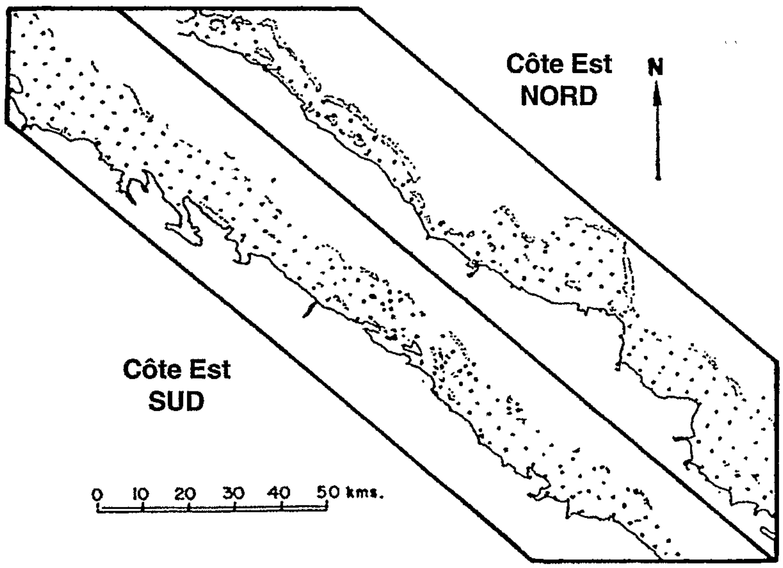


Fig. 6. — Localisation des prélèvements

TRAITEMENTS AU LABORATOIRE

Tamisage

Au laboratoire, les échantillons sont d'abord mis à sécher dans une étuve puis pesés. Ils sont ensuite tamisés à l'eau et manuellement sur un tamis de 63 µm afin de séparer la fraction fine (vases ou lutites) de la fraction sableuse. Une partie de cette fraction fine est conservée pour l'analyse de sa teneur en carbonates par calcimétrie. La fraction sableuse est remise à sécher puis pesée à nouveau. Le poids de la fraction fine contenue dans l'échantillon est ici déterminé par simple différence entre le poids sec total et le poids sec après séparation.

La fraction sableuse est alors introduite dans une colonne granulométrique vibrante qui comportait, pour cette étude, 6 tamis de mailles 0,063, 0,25, 0,5, 1, 2,5 et 20 mm. Le choix de ces tamis particuliers permet de d'obtenir directement la partition de la fraction sableuse selon les fractions théoriques de WEYDERT (1971), c'est à dire, respectivement, en sables très fins, sables fins, sables moyens, sables grossiers, graviers et débris grossiers. Une fois le tamisage mécanique achevé, la pesée de chacun des refus permet de calculer le pourcentage pondéral de chaque fraction.

Analyse de la teneur en carbonate

L'analyse de la teneur des sédiments marins en carbonate de calcium est un moyen simple de déterminer leur origine organogène ou terrigène lorsque les roches terrestres environnantes ne sont pas calcaires, comme c'est le cas en Nouvelle-Calédonie.

Les travaux de BALTZER (1968, 1969), TRESCASES (1969), BALTZER & TRESCASES (1971 a & b), LAUNAY (1972), DUGAS (1973), COUDRAY (1976) et BRUNEL (1980), en Nouvelle-Calédonie, ont montré que seule une infime partie des éléments d'origine terrigène parvenait jusqu'au lagon et qu'il s'agissait alors de particules largement inférieures à 63 µm, c'est à dire appartenant à la fraction fine. L'analyse de la teneur en carbonate a donc été réalisée uniquement à partir de cette fraction, sur laquelle la probabilité de déceler une influence continentale paraît maximale au vu des éléments qui précèdent. Ce procédé permet par ailleurs d'éviter un broyage préliminaire indispensable dans le cas des sédiments hétérométriques ou à fraction grossière importante, pour lesquels la marge d'erreur est beaucoup plus grande.

Le taux de carbonate dans le sédiment est déterminé par décarbonatation acide au calcimètre BERNARD selon la méthode décrite entre autres par CHAMLEY (1966) ou BONNEAU & SOUCHIER(1979) : une quantité de 0,2 à 0,4 g de sédiment est soumise à l'action de 10 ml d'acide chlorhydrique 5 N ; le dégagement de gaz carbonique est mesuré après étalonnage de l'appareil au carbonate de calcium pur.

CARTOGRAPHIE

En ce qui concerne la réalisation des cartes sédimentologiques, il a été décidé de réaliser des cartes simplifiées destinées à l'usage des écologistes (surtout des benthologues et des ichtyologues), c'est à dire plus facilement utilisables, dans l'étude des corrélations entre le type de sédiment et la distribution des espèces, que les cartes sédimentologiques classiques.

Cartes "simplifiées" signifie essentiellement que la granulométrie, l'envasement et la teneur en carbonate, sont présentées sur 3 feuilles distinctes. En outre, la classification des sables et graviers utilisée par DUGAS & DEBENAY (1978, 1980, 1981, 1982) pour le lagon Sud-Ouest de Nouvelle-Calédonie, a été remplacée par l'utilisation des Types Granulométriques ou Types Sédimentaires de WEYDERT (1971, 1973, 1976 *in* EHNY, 1987), qui permet d'obtenir rapidement une nomenclature simple en fonction des proportions des différentes fractions granulométriques théoriques. Il s'agit d'ailleurs d'une méthode de classification des sédiments meubles intéressante pour les écologistes car elle permet de s'affranchir du tracé des courbes cumulatives semi-logarithmiques et du calcul fastidieux des indices granulométriques. La classification en types granulométriques, qui intéresse la fraction comprise entre 0 et 20 mm, repose sur une typologie texturo-granulométrique binaire dont un résumé synoptique est présenté au tableau 1.

Les débris grossiers, c'est à dire le pourcentage de la fraction supérieure à 20 mm dans l'échantillon total, ont été représentés en 5 classes, superposées aux types granulométriques: moins de 5% (D1), 5 à 25% (D2), 25 à 50% (D3), 50 à 75 % (D4) et plus de 75% (D5).

Les coupures utilisées pour la cartographie des lutites sont les mêmes que celles utilisées par DUGAS & DEBENAY (*op. cit.*). Des noms de faciès ont en plus été attribués à chacune des classes cartographiées (Tab. 2).

Tab. 1. — Détermination des types granulométriques (**GV** : graviers, **SG** : sables grossiers, **SM** : sables moyens, **SF** : sables fins, **STF** : sables très fins, **VA** : vase)

	20 mm	2.5 mm	1 mm	0.5 mm	0.25 mm	0.063 mm
TYPES	**% GV**	**% SG**	**% SM**	**% SF**	**% STF**	**% VA**
Gravelo-sableux	50 - 75					
Sable graveleux	10 - 50					
Sable grossier		(SG + SM) > (SF + STF)				
Sable fin		(SG + SM) < (SF + STF)				
Sable très fin					> 50	
Sable vaseux						10 - 50
Vaso-sableux						50 - 75
Vase						> 75

La teneur en vase des sédiments est non seulement un indicateur précieux des conditions hydrodynamiques mais aussi, en écologie, un paramètre important dans la composition et la distribution des peuplements benthiques (CHARDY *et al.*, 1988 ; CHEVILLON & RICHER DE FORGES, 1988).

Tab. 2. — Limites et nomenclature utilisée dans la cartographie des lutites

Limites (%)	Faciès
< 5	Très faiblement envasé
5 - 25	Faiblement envasé
25 - 50	Moyennement envasé
50 - 75	Fortement envasé
> 75	Très fortement envasé

Pour la représentation des carbonates, jugée insuffisamment détaillée dans les travaux antérieurs avec une seule coupure à 50%, les limites adoptées pour la cartographie sont celles utilisées par Maxwell (1968) dans ses travaux sur la Grande Barrière Australienne (Tab. 3). Comme pour les lutites, un nom de faciès a été associé à chacune des classes.

Tab. 3. — Limites et nomenclature utilisée dans la cartographie des carbonates

Limites (%)	Faciès	*Terminologie anglo-saxone*
< 20%	Très faiblement carbonaté	*High terrigenous*
20 - 40%	Faiblement carbonaté	*Terrigenous*
40 - 60%	Moyennement carbonaté	*Transitional*
60 - 80%	Fortement carbonaté	*Impure carbonate*
> 80%	Très fortement carbonaté	*High carbonate*

Les cartes, d'un format de 60 x 80 cm, ont été réalisées en couleur, à l'échelle du 1/200 000^{e}. Elles figurent en annexe à ce document.

Des difficultés de navigation n'ont pas permis la cartographie complète de la zone située au nord de Hienghène. Les données disponibles ont toutefois été portées sur la carte à titre indicatif, sous la forme d'un cercle de 1 mille nautique de rayon centré sur le point de prélèvement (1/2 pas d'échantillonnage), mais ne seront pas commentées.

BIOPHASE SÉDIMENTAIRE

L'étude de la biophase sédimentaire a été réalisée sur une portion de côte comprise entre Thio et Houaïlou, représentant environ 45 km linéaires de lagon (Fig. 7). Cette portion de lagon, jugée bien représentative de la structure sédimentaire du lagon de la côte Est, englobe 46 des 276 stations du plan d'échantillonnage initial.

Les constituants du sédiment (bioclastes et lithoclastes) sont identifiés et comptés sous une loupe binoculaire en utilisant une cuve de STRATMANN qui comporte 45 cellules de 1 cm^2 chacune. Pour chaque échantillon et chacun des refus de tamis issus de la granulométrie, une cellule de la cuve est choisie au hasard et tous les grains qu'elle contient sont identifiés et comptés ; une autre cellule est ensuite comptée et ainsi de suite jusqu'à ce qu'au moins 100 grains par refus aient été identifiés (1 300 grains par échantillons), sachant que toute cellule entamée doit être comptée dans sa totalité. Les valeurs des comptages obtenus sont ensuite ramenées à des pourcentages par catégories d'organismes et par refus (pourcentage numéral). Le pourcentage pondéral de chaque refus est ensuite affecté aux pourcentages numéraux puis le cumul est réalisé par catégories d'organismes sur l'ensemble des refus de l'échantillon. Le tout est finalement ramené à un pourcentage sur l'ensemble de l'échantillon qui donne la contribution de chaque catégories d'organismes à la composition globale du sédiment (MASSE, 1970 ; CHEVILLON, 1992, 1996a & b).

Un agencement quantitatif ordonné, bi- ou tri-nominale des constituants majeurs permet ensuite de définir un biofaciès (ou faciès biogène) caractérisant l'échantillon examiné.

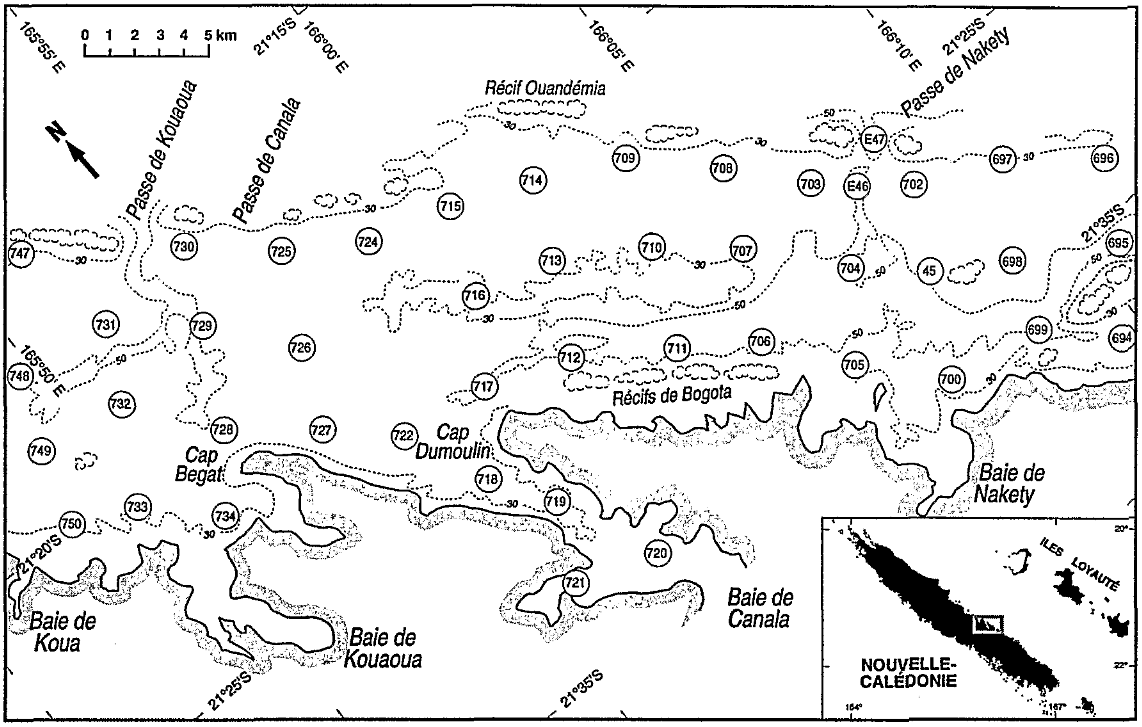


Fig. 7. — Localisation des échantillons analysés par comptage de bioclastes

RÉSULTATS ET DISCUSSION

ENVASEMENT (Carte de répartition des lutites)

La distribution des lutites (fraction < 63 µm) dans le lagon de la côte Est se fait selon un gradient très net décroissant depuis la côte vers la barrière. Les différents faciès d'envasement, répartis longitudinalement dans le lagon et parallèlement à la ligne de côte, se succèdent ainsi assez régulièrement depuis le faciès des sédiments très fortement envasés - qui occupe toutes les baies et la frange côtière - jusqu'aux faciès des sédiments très faiblement envasés, qui se rencontrent du côté interne de la barrière récifale (fonds d'arrière-récif).

A ce schéma général, s'ajoute une particularité qui est l'écoulement préférentiel des lutites le long des principales vallées sous-marines. Ces vallées sous-marines sont les vestiges du lit fossile des rivières qui ont entaillées le lagon et creusées les passes dans la barrière récifale lors de la dernière glaciation ; elles mettent ainsi en communication les principales passes avec les embouchures des rivières les plus importantes. A leur hauteur, le dessin de répartition des faciès présente des flèches pointant vers les passes et dont la base se situe au niveau des grandes embouchures. Ce cas de figure est bien visible pour les passes de Nakety, Toupeti, N'Goé, Kouaké et du Cap Bayes. Il en résulte une teneur en vase plus importante dans les vallées sous-marines que dans la plaine lagonaire environnante et de la même façon, une teneur en vase en général plus importante au niveau des passes que pour les fonds situés en arrière du récif.

L'importance des différents faciès dans l'occupation des fonds, basé sur les résultats de la cartographie, est présenté figure 8. Le faciès des sédiments très fortement envasés (TFOE) est le mieux représenté, suivi de près par le faciès des sédiments faiblement envasés (FAE). La valeur moyenne de la teneur en lutites sur l'ensemble du lagon (n = 276) est de 39 et correspond à un envasement modéré. La valeur la plus faible rencontrée est de 1,46% et la valeur maxi de 99,55%.

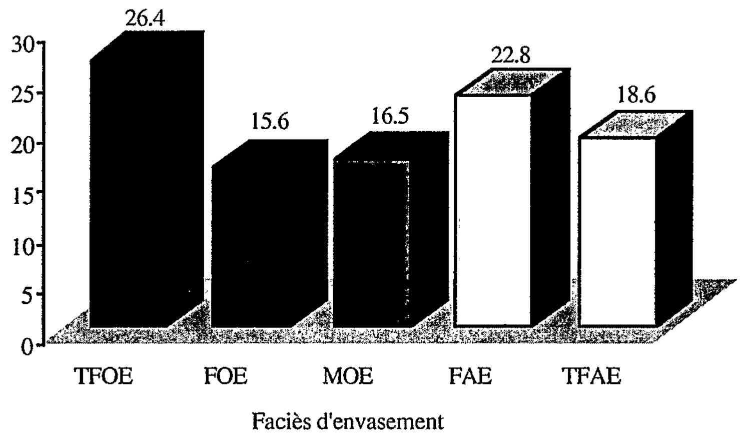


Fig. 8. — Fréquence de distribution des différents faciès d'envasement (**TFOE** : très fortement envasé ; **FOE** : fortement envasé ; **MOE** : modérément envasé **FAE** : faiblement envasé ; **TFAE** : très faiblement envasé)

Anomalies de répartition

Dans la région de Thio, le cas de figure décrit précédemment pour les vallées sous-marines est inversé et les faciès les moins envasés tendent au contraire à s'étendre vers l'intérieur du lagon (flèche pointant vers l'intérieur du lagon) ; la seule hypothèse qui puisse être ici avancée est celle d'un flux entrant (courant de marée, vents dominants de sud-est) qui serait particulièrement puissant dans cette zone du lagon. Un cas similaire est observé en face de Houaïlou mais il peut être aussi attribué, dans ce cas, à la plus grande largeur du lagon. Enfin, un autre cas particulier est observé à hauteur de Touho, probablement dû, dans cette zone, à la morphologie particulière du lagon qui est très étroit et largement ouvert sur l'océan. Toutefois, seule une étude hydrodynamique et courantologique détaillée permettrait d'étayer et de confirmer les hypothèses avancées ci-dessus.

TENEUR EN CARBONATE DE LA FRACTION FINE DES SÉDIMENTS (Carte de répartition des carbonates)

Comme dans le cas de l'envasement, les différents faciès carbonatés sont répartis longitudinalement dans le lagon et se succèdent de façon régulière parallèlement au trait de côte, mais cette fois suivant un gradient inverse, c'est à dire côte-large positif. Cette zonation longitudinale met bien en évidence la double origine terrigène et organogène des sédiments du lagon de la côte Est.

L'examen simultané de la distribution des vases et des carbonates, montre que les lutites ont une part importante d'origine terrigène. En effet, les faciès des sédiments fortement à très fortement envasés (>50% de lutites) se superposent étroitement aux faciès des sédiments moyennement à très faiblement carbonatés (moins de 60% de carbonates). Ces faciès correspondent, dans la terminologie anglo-saxonne, aux faciès de transition terrigène-carbonaté (40 à 60% de CO_3Ca), terrigène (20 à 40%) et hautement terrigène (moins de 20% de CO_3Ca). Il apparaît ainsi très nettement que, dans le lagon de la côte Est, plus la teneur en vase des sédiments est importante, plus ces vases ont une forte teneur en éléments terrigènes. Contrairement à ce que nous avons observé dans d'autres lagons calédoniens, il n'existe donc pas dans le lagon de la côte Est de sédiments constitués de vases carbonatées pures.

L'augmentation progressive de la teneur en carbonates à l'approche de la barrière récifale ne signifie pas que seul le récif est la source de particules carbonatées ; en effet, le lagon lui-même est le siège d'une production carbonaté importante d'origine benthique (CHEVILLON, 1992) qui est masquée, dans le lagon de la côte Est, par les apports côtiers terrigènes.

Un deuxième gradient, sud-est/nord-est négatif peut-être observé dans la répartition des carbonates. Celui-ci se traduit par un accroissement progressif de l'importance des aires sous influence terrigène lorsque l'on se dirige vers le nord du lagon. En effet, les faciès moyennement à très faiblement carbonaté (faciès de transition à hautement terrigène), quasiment inexistants dans le quart sud du lagon (sud de Port Bouquet), tendent à occuper progressivement toute la plaine lagonaire jusqu'aux fonds d'arrière-récif de Ponérihouen à Hienghène.

Deux raisons peuvent être avancées à la présence de ce second gradient :

- les rivières de la côte Est qui présentent les débits moyens annuels spécifiques les plus important (Ouaïème, Hienghène, Tipindjé, Tiwaka, Tchamba, Ponérihouen et Houaïlou) sont toutes situées au nord de Houaïlou (BAUDUIN, 1979) ;
- selon DUGAS (1974) et BIRD *et al.* (1984), les fortes pluies et crues saisonnières et/ou cycloniques entraînent un débit solide important, fortement accentué par les nombreuses exploitations minières à ciel ouvert situées dans la chaîne. L'accumulation de ce matériel détritique arraché en amont provoquerait, au niveau des estuaires les plus touchés, un phénomène d'accrétion deltaïque. Il en résulterait une sorte de «bouchon» qui, en obstruant au moins partiellement l'estuaire, limiterait le déversement des apports terrigènes plus en avant dans le lagon. Or, l'activité minière est pour l'essentiel regroupée au sud de Houaïlou, ce qui concorde bien avec nos propres données et l'hypothèse avancée ci-dessus. Ainsi, on observe une situation paradoxale où ce sont les estuaires les plus affectés par la pollution minière qui protégeraient le lagon des apports terrigènes.

Il est intéressant de constater que la partition observée dans la sédimentologie du lagon entre les zones situées au nord et au sud de Houaïlou se retrouve, à terre, pour un certain nombre d'autres caractères. Ces différences sont extraites des données de DUBOIS (1977), LATHAM (1978), MORAT *et al.* (1978), ANTHEAUME (1979), BAUDUIN (1979), PARIS (1979) et ILTIS (1980) figurant dans l'Atlas de la Nouvelle-Calédonie, sont regroupées dans le tableau 4.

Tab. 4. — Caractéristiques physiques des bassins versants de la côte Est au nord et au sud de Houaïlou

	Nord de Houaïlou	Sud de Houaïlou
Oro-Hydrographie	Pas de différence essentielle	
Géologie	Terrains sédimentaires et métamorphiques (Prisme sédimentaire indifférencié, formations volcano-sédimentaires et dépôts terrigènes)	Roches éruptives (Péridotites)
Pluviométrie	2514 mm/an	2411 mm/an
Hydrologie	Débit moyen annuel spécifique plus important entre Houaïlou et Hienghène. Rivières les plus importantes toutes situées au nord de Houaïlou (Ouaïème, Hienghène,Tipindjé,Tiwaka,Tchamba, Ponérihouen, Houaïlou)	
Géomorphologie	Versants réguliers en pentes fortes	Versants multifaces en pentes très fortes partiellement issus de processus de dissolution par «Karst péridotitique»
Pédologie	Sols bruns dessaturés, ferruginisés sur roches métamorphisées associées à des sols fersialitiques désaturés non lessivés et à des sols ferrallitiques fortement désaturés, pénévolués	Sols ferritiques et sols magnésiens sur roches ultrabasiques
Végétation	Végétation de type humide Forêt dense sempervirente et mosaïque forêt-savane et/ou savane herbeuse ou arborée	Végétation de type édaphique Maquis sur péridotites ou serpentinites
Activité minière	Néant	Principaux centres entre Houaïlou et Thio (Monéo, Poro, Kouaoua-Koua, Canala, Nakety, Thio-Ouenghi)

La fréquence de distribution des différents faciès carbonatés dans le lagon de la côte Est est présentée sur la figure 9. Les teneurs en carbonates varient de 1,3% à 94,4% pour une moyenne de 62% (n = 276) qui correspond au faciès des sédiments fortement carbonatés.

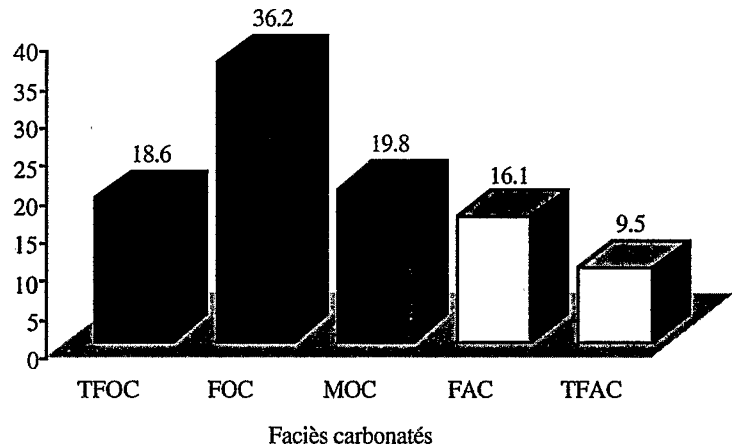


Fig. 9. — Fréquence de distribution des différents faciès carbonatés. (**TFOC** : très fortement carbonaté ; **FOC** : fortement carbonaté ou carbonate inpure ; **MOC** : modérément carbonaté ou transition ; **FAC** : faiblement carbonaté ou terrigène ; **TFAC** : très faiblement carbonaté ou fortement terrigène).

La cartographie met en évidence de fortes teneurs en carbonates (> 80%) dans la plupart des vallées sous-marines (passes de Nakety, Toupeti, N'Goé, Solitaire, Kouakoué). Ces vallées ne doivent donc plus être interprétées seulement comme le chemin d'écoulement préférentiel des apports terrigènes mais aussi comme une zone d'accumulation des fractions fines plus ou moins indépendamment de leur origine terrigène ou organogène. Dans certains cas, le dessin de répartition des faciès (flèches pointant vers l'intérieur du lagon) tendrait même à montrer qu'il s'agirait de l'accumulation de fines organogènes produites au niveau de la barrière récifale et accumulée dans les vallées sous-marines sous l'action, d'une part de houles et de courants entrants au niveau des passes, et d'autre part de transferts latéraux agissant au niveau des fonds d'arrière-récif.

COULEUR DES SÉDIMENTS (non cartographiée)

Bien que la couleur n'ait pas été systématiquement déterminée sur chaque échantillon lors des campagnes de prélèvement, les quelques éléments dont nous disposons permettent toutefois de tirer certains enseignements.

Dans les sédiments du lagon de la côte Est, la couleur de fond dominante est le marron (brown en référence à la "MUNSELL Soil Color Chart").

Au niveau des baies et de la frange côtière, zones fortement à très fortement envasée et moyennement à très faiblement carbonatée, s'ajoute une coloration rouge liée aux apports terrigènes latéritiques (particules fines issues du ruissellement le long des bassins versants et des activités minières) ; les sédiments présentent alors une couleur marron-rouge (red ou reddish brown) très caractéristique et sont d'ailleurs communément appelés «vases rouges». Ces vase rouges sont identiques à celles rencontrées dans les baies du lagon Sud-Ouest (DEBENAY, 1985) mais elles s'étendent d'avantage vers la barrière par rapport au lagon de la côte Ouest. Cela s'explique par différents facteurs tels que les bassins versants plus abruptes et plus proches du littoral (pas de plaines alluviales), des précipitations plus importantes, une activité minière très développée et la moindre largeur du lagon. Ces vases rouges se concentrent aussi le long des vallées sous-marines et ont peut alors les rencontrer à proximité des passes.

En arrière du récif, les fonds présentent une teinte plus claire, blanc sale ou jaunâtre (reddish brown, yellowish brown ou brownish yellow). A hauteur des passes, en dehors de l'influence des vallées sous-marines, les sédiments prennent une teinte plus franchement orangée (reddish yellow). Cette teinte est d'ailleurs typique des sédiments de passes sur l'ensemble des lagons de Nouvelle-Calédonie.

Dans la zone intermédiaire, la composante rouge laisse la place à une teinte gris-vert du fait de la dilution des apport latéritiques et les sédiments prennent une teinte olive (Olive brown). Cette zone intermédiaire est l'équivalent des fonds gris du lagon Sud-Ouest (CHARDY *et al.*, 1988) bien qu'elle soit ici plus réduite, en superficie, du fait des apports terrigène plus importants dans ce lagon et de sa largeur plus faible.

Ainsi, la couleur des sédiments dans le lagon de la côte Est semble être directement en relation avec la teneur en vases terrigènes des sédiments : de la côte vers la barrière les variations de couleurs suivent assez fidèlement le gradient négatif d'envasement et le gradient positif de teneur en carbonate. La zonation déterminée par la couleur est similaire à celle décrite par CHARDY *et al.* (1988) dans le lagon Sud-Ouest, à cette variation près que les couleurs originelles sont ici "polluées" par les apports latéritiques plus importants. Pour cette même raison, la zone des vases côtières s'étend plus en avant dans le lagon jusqu'à, parfois, disparition de la zone intermédiaire des fonds gris. Les fonds "blancs" quant à eux, s'ils présentent les mêmes associations faunistiques que les fonds blancs d'arrière récif du lagon Sud-Ouest (RICHER DE FORGES, 1991) n'ont pas la même couleur blanche caractéristique, toujours en raison de l'influence plus importante des apports terrigènes.

GRANULOMÉTRIE (Carte de répartition des types granulométriques)

De façon très générale, les différents types granulométriques se répartissent suivant trois zones longitudinales:
- une zone interne, constituée par les baies et la frange côtière, occupée par des vases ;
- une zone médiane, que représente en partie la plaine lagonaire au sens strict, occupée par des sables vaseux ou des vases sableuses ;
- une zone externe incluant, en plus des fonds d'arrière-récif, une partie de la plaine lagonaire ; cette zone, plus hétérogène, est occupée par des sédiments allant du type sable très fin à gravier sableux et qui se distribuent de façon plus complexe, dessinant une sorte de mosaïque.

Les vases

Répartition

Les vases représentent le type granulométrique le plus fréquent dans le lagon de la côte Est (Fig.10) ; elles se rencontrent dans toutes les baies (Pourina, Ouinné, Kouakoué, Nakety, Canala, Kouaoua) et forment une frange côtière de largeur variable (≈1 à 10 km) qui s'étend sur la quasi totalité du lagon (de Port Ounia à Touho).

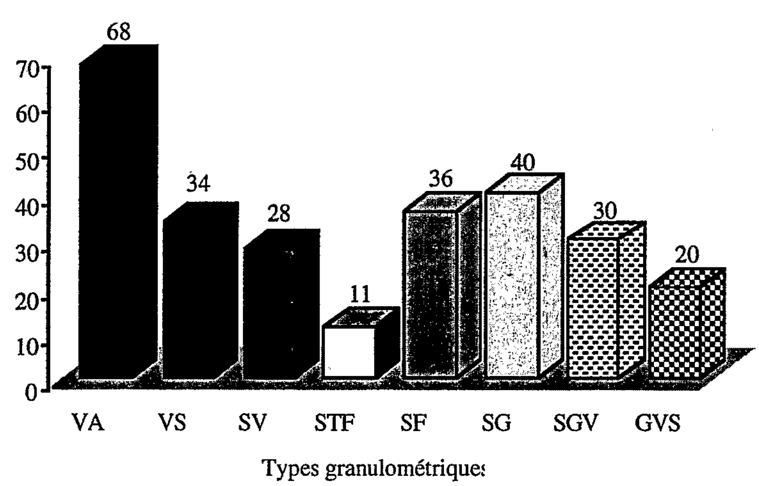


Fig. 10. — Fréquence de distribution des différents types granulométriques.(**VA** : vase ; **VS** : vase sableuse ; **SV** : sable vaseux ; **STF** : sable très fin ; **SF** : sable fin ; **SG** : sable grossier ; **SGV** : sable graveleux ; **GVS** : gravier sableux)

Au sud de Port Ounia et au nord de Touho elles disparaissent pour laisser la place à des sédiments du type sable vaseux (sud de Port Ounia) ou vaso-sableux (nord de Touho). Leur extension maximum vers le récif barrière est observée à hauteur de la baie de Kouakoué, en face de la rivière Thio et dans la région de Ponérihouen. On les rencontre alors, respectivement et approximativement, jusqu'à 7 km, 8,5 km et 12 km du rivage. Dans les deux derniers cas, leur "débordement" plus en avant dans le lagon semble liée à la présence de vallées sous-marines situées dans l'alignement de rivières et passes importantes ; ceci est particulièrement net en face de Thio. Dans le premiers cas, c'est à dire a hauteur de la baie de Kouakoué, la présence d'une zone non-hydrographiée ne permet pas de vérifier la présence, cependant très probable, d'une telle vallée sous-marine.

Les anomalies dans la répartition des vases sont les suivantes :

- présence de deux tâches de vases isolées de la frange côtière ; la première, de taille réduite, se trouve dans une vallée sous-marine à la forme typique en "Y", en face de la presqu'île de Neumeni et au niveau de la passe de Toupeti ; la deuxième tâche, beaucoup plus importante en superficie, occupe la partie centrale du lagon entre Touho et l'arc du Grand Récif Mengalia ;
- présence de tâches de sédiments d'un autre type granulométrique isolées au sein des vases côtières ; il s'agit de vases sableuses (à proximité de la baie de Kouakoué et des îlots d'Harcourt), de sables graveleux avec 5 à 25% de débris grossiers (> 20 mm) et de sables très fins (accolés à la côte un peu au nord de Poindimié).

Variations texturales observées au sein du type

Les vases de la frange côtière apparaissent comme un groupe de sédiments très homogène puisque seules quelques variations texturales mineures et peu fréquentes sont observées au sein de ce type granulométrique (Fig. 11). Ces quelques variations consistent en la présence de sédiments hétérométriques, c'est à dire du type vase auquel s'ajoute des débris grossiers dans les proportions de 0 à 5% (au large de l'embouchure de la rivière Thio et à proximité des récifs Bogota) ou de 5 à 25% (proximité de Port Bouquet).

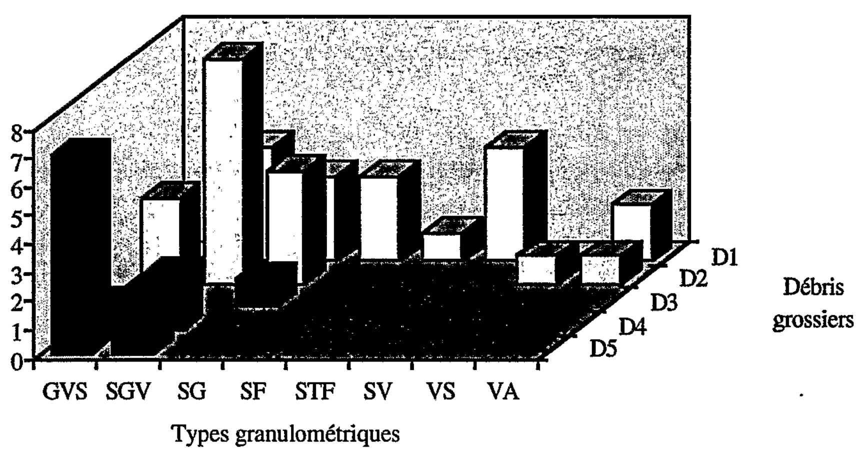


Fig. 11. — Variations texturales observées au sein des types granulométriques.(**GVS** : gravier sableux ; **SGV** : sable graveleux ; **SG** : sable grossier ; **SF** : sable fin ; **STF** : sable très fin ; **SV** : sable vaseux ; **VS** : vase sableuse ; **VA** : vase ; D5 : + de 75 % de débris grossiers ; D4 : 50 à 75 % ; D3 : 25 à 50 % ; D2 : 5 à 25 % ; D1 : < 5 %)

Sables vaseux et vases sableuses

Répartition

Les sédiments du type sable vaseux ou vaso-sableux s'intercalent assez régulièrement entre la bande des vases côtières et les autres types granulométriques. Ceci est particulièrement vrai dans toute la moitié sud du lagon, où ils forment une bande relativement régulière de 2 à 5 km de large, située en position médiane. Il arrive toutefois que cette bande se rétrécisse jusqu'à disparaître (baie de Kouakoué, îlots d'Harcourt, Touho), du moins à l'échelle d'observation induite par notre maille de prélèvement de 2 milles nautiques (rien n'indique en effet que cette bande ne soit pas présente mais qu'il n'est pas été possible de la détecter en raison de sa faible largeur) ; les vases sont alors directement mises en contact avec des sédiments du type sable grossier, sable graveleux ou gravelo-sableux. Au nord de Touho et de la Grande Passe de Touho, la bande des sables vaseux et vases sableuses se divise en deux branches assez larges (jusqu'à 7 km de largeur) : l'une épouse l'arc du Grand Récif Mengalia, l'autre la bordure de côte depuis Touho jusqu'aux abords de Hienghène. Au sud de Port Ounia, les sédiments vaso-sableux passent d'une position médiane à côtière et ils se substituent alors aux vases ; dans cette extrême sud, le lagon, plus étroit, n'est d'ailleurs plus occupé que par deux types granulométriques : les sédiments vaso-sableux à la côte et les sables graveleux côté récif. Signalons encore la présence, au large du Cap Koua, d'une tâche de sables vaseux isolés au sein de sables grossiers ; cette anomalie de répartition est liée à l'existence d'une dépression délimitée par l'isobathe 50 m.

La différence de répartition entre les sables vaseux et les sédiments vaso-sableux apparaît difficile à analyser. De façon générale il semble cependant que la présence des sédiments vaso-sableux soit plus fréquente à proximité des principales passes alors que l'on trouve plutôt les sables vaseux dans les zones plus proches de la côte. Cette différence de répartition pourrait s'expliquer par la présence des fines : cet apport de matériel fin provoquerait une augmentation de l'importance de la composante vase par rapport à la composante sableuse avec comme conséquence le passage d'un type sablo-vaseux à un type vaso-sableux.

Variations texturales au sein du type

Comme dans le cas des vases, les variations texturales par ajout de débris grossiers restent assez limitées (Fig. 11). Un seul échantillon, situé entre Touho et Hienghène, contient 5 à 25% de débris grossiers, et 4 échantillons en contiennent moins de 5% (au large du Cap Koua et au sud de Hienghène).

Autres types granulométriques

Les autres types granulométriques, s'il restent presque exclusivement localisés aux fonds du lagon situés du côté de la barrière récifale, présentent une répartition en mosaïque beaucoup plus irrégulière et "chaotique" que dans le cas des deux types décrits précédemment. Nous trouvons ainsi, pêle-mêle et sans qu'il soit possible de dégager à première vue une règle de distribution précise, des sables fins et très fins, des sables grossiers et des sédiments du type sable-graveleux ou gravelo-sableux.

Les sables graveleux et les graviers sableux sont les plus fréquent dans la partie du lagon comprise entre l'extrême sud de la zone cartographiée (Port Ounia) et Port Bouquet ; ils occupent alors presque exclusivement les fonds compris entre la bande médiane des sable vaseux et vases sableuses et la barrière récifale (extension des fonds d'arrière-récif). En remontant vers le nord, leur importance diminue progressivement au profit des sables très fins, fins ou grossiers, au sein desquels ils se présentent le plus souvent sous forme de tâches isolées de la barrière récifale ; ils ne retrouvent un développement important que vers la limite nord de la zone cartographiée, c'est à dire entre la pointe nord du Grand Récif Mengalia et Hienghène. Ce sont aussi les sédiments à la texture la plus hétérogène (Fig. 11) du fait de la présence fréquente de débris grossiers (> 20 mm) dans des proportions importantes (le plus souvent > 25% et jusqu'à plus de 75%).

Les sables fins et très fins sont les seuls pour lesquels une règle de répartition pourrait être dégagée. Ils apparaissent en effet souvent liés à la présence des principales passes qui entrecoupent le récif barrière. Deux hypothèses peuvent être avancées à cette répartition :

- l'absence de production de particules grossières au niveau des passes comme pourrait en attester la faible proportion de débris grossiers dans ce type de sédiment (le plus souvent nulle et jamais plus de 5%) ;
- l'action à ce niveau d'un brassage permanent du sédiment du fait du caractère alternatif des courants de marée, entraînant d'une part, l'élimination de la fraction fine et d'autre part, une évolution poussée du sédiment (grano-classement achevé).

De la conjonction de ces deux éléments résulterait la présence d'un sédiment "épuré" constitué essentiellement de particules appartenant à la fraction des sables fins à très fins.

Les sables grossiers se rencontrent aussi bien directement en arrière du récif qu'en position plus interne, séparés alors de la barrière par une frange de sables fins ou très fins. Leur extension est particulièrement importante antre le Cap Bégat et la Grande Passe de Touho. Ils se rencontrent aussi, isolés au sein d'autres types granulométriques, dans certaines parties centrales du lagon et sont alors presque toujours liés à la présence de récifs internes (4 cas sur 5). La présence de débris grossiers y est relativement rare (4 échantillons) et le plus souvent comprise entre 5 et 25% avec une exception à 25-50% (Fig. 11). Un examen plus minutieux de la carte peut laisser penser que leur localisation immédiatement en arrière de la barrière soit liée à l'absence de structures émergées le long de la ligne marquant la limite externe du lagon. En présence de ces structures, dont le démantèlement par les agents hydrodynamiques (houles de sud-est dominantes se brisant sur la barrière) produit une fraction grossière qui se dépose in situ, les sables grossiers seraient alors remplacés par des sédiments du type gravelo-sableux ou sable graveleux ; dans les zones soumises à l'influence des passes, et en tenant compte des hypothèses avancées plus haut, ils seraient remplacés par des sables fins ou très fins.

MODÉLISATION

A la suite des enseignements tirés de l'examen des cartes sédimentologiques, nous proposons ci-dessous (Fig. 12) un modèle de fonctionnement du contrôle morpho-dynamique de la sédimentologie qui, s'il ne reflète pas la totalité des phénomènes observés, permet d'en expliquer la plus grande part.

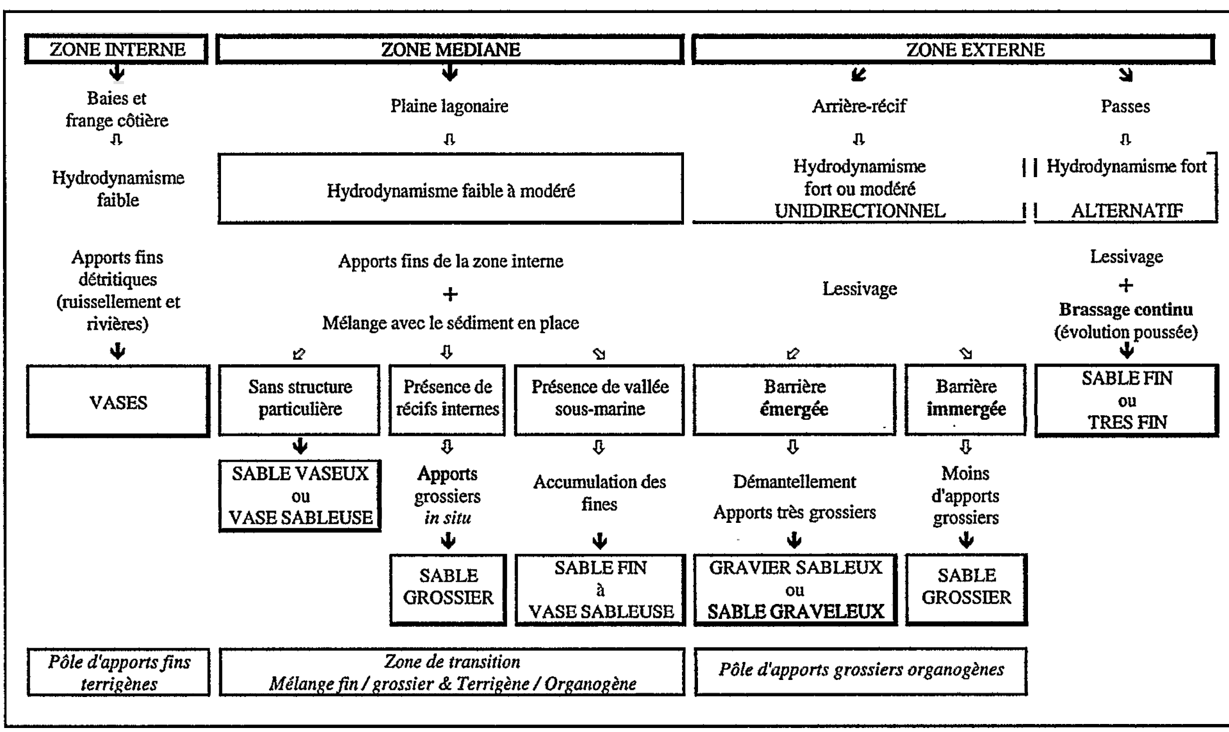


Fig. 12. — Modélisation du fonctionnement, sous contrôle morpho-dynamique, de la sédimentologie dans le lagon de la côte Est.

BIOPHASE SÉDIMENTAIRE

La biophase sédimentaire du lagon de la côte Est est dominée par les foraminifères (27,2%) et les débris de mollusques (21,8%), avec une proportion équivalente de coquilles de bivalves (10,6%) et de gastéropodes (9,9%) (valeurs moyennes sur n = 46). Le troisième constituant, nettement moins abondant, est représenté par les articles d'*Halimeda* (3,9%), le total des algues calcifiées (*Halimeda* & Rhodophycées) atteignant 6,4%. Les débris coralliens n'arrivent qu'au 8 ème rang (0,7%), derrière les ptéropodes (2,8%), les échinodermes (2,5%), les bryozoaires (2,4%) et les crustacés (1,3%). La valeur maximum rencontrée pour les débris coralliens atteint seulement 7,7%. Les grains réduits noirs ou gris représentent 9,7% des constituants, les aggrégats 2,6% et les lithoclastes (particules de la fraction sableuse d'origine terrigène) 1,6%. Il faut noter que c'est le seul lagon de Nouvelle-Calédonie ou des lithoclastes ont été identifiés dans la fraction sableuse des sédiments lagonaires, les apports terrigènes n'étant, en général, décelable qu'à travers la décarbonatation de la fraction fine. La valeur moyenne de débris indéterminés (particules non-identifiables car de trop petite taille ou trop altérées par abrasion, micro-perforation ou diagénèse) est de 17,7% (Fig. 13 a, b & c).

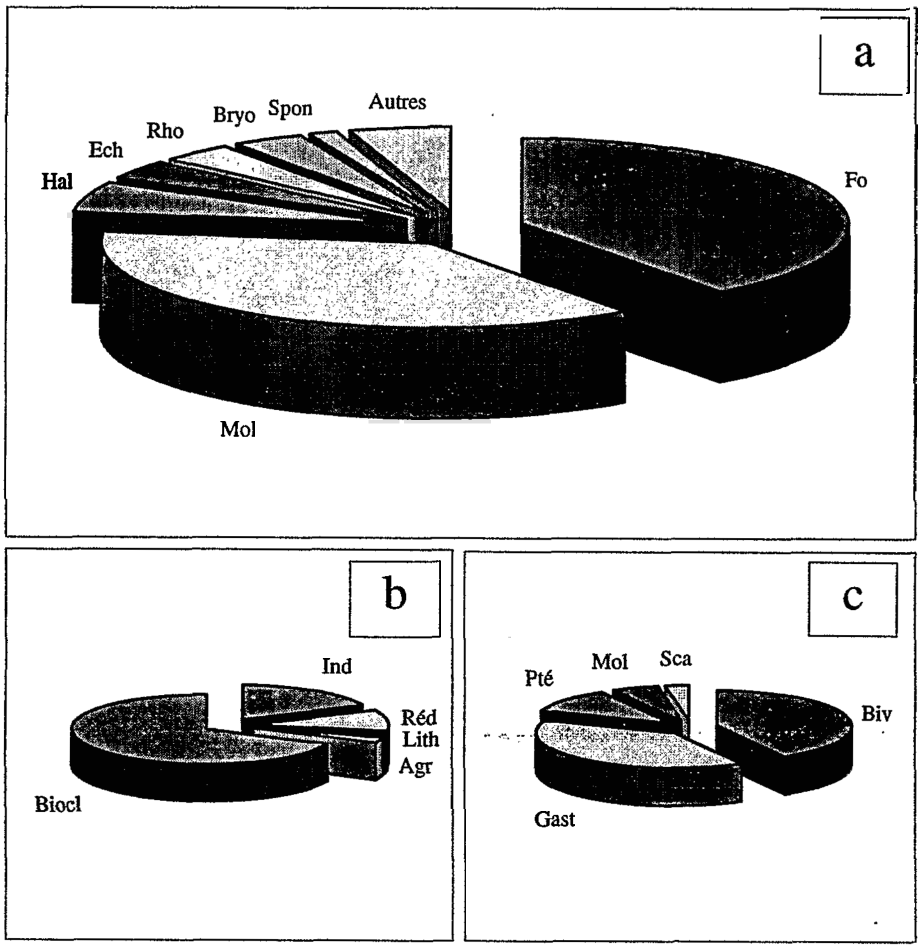


Fig. 13. — Proportions des différents constituants du sédiment **a** : Constituants majeurs (Fo : foraminifères, Mol : mollusques, Hal : *Halimeda*, Ech : échinodermes, Rho : rhodophycées, Bryo : bryozoaires, Spon : spongiaires). **b** : Bioclastes et autres types de constituants (Ind : indéterminés, Réd : débris réduits, Lith : lithoclastes, Agr ; agrégats, Biocl : bioclastes). **c** : Mollusques (Gast : gastéropodes, Pté : pétropodes, Mol : mollusques indifférenciés, Sca : scaphopodes, Biv : bivalves)

D'un point de vue global ce lagon correspond donc à un biofaciès ForaMol et se distingue ainsi des autres lagons de Nouvelle-Calédonie étudiés, qui sont décrits par les biofaciès MolFor (lagon Nord et atoll d'Ouvéa) et HaliFor (Chesterfield) (CHEVILLON, 1992, 1996 a & b, CHEVILLON & CLAVIER, 1990).

Plus en détail, ce sont 6 biofaciès majeurs qui ont été identifiés (Fig. 14), les biofaciès ForaMol (35,5%) et MolFor (33,3%) étant de loin les mieux représentés. L'importance des lithoclastes dans ce lagon apparaît clairement puisque ces derniers interviennent à deux reprises comme deuxième constituants et figurent ainsi dans la nomination du biofaciès MoLitho.

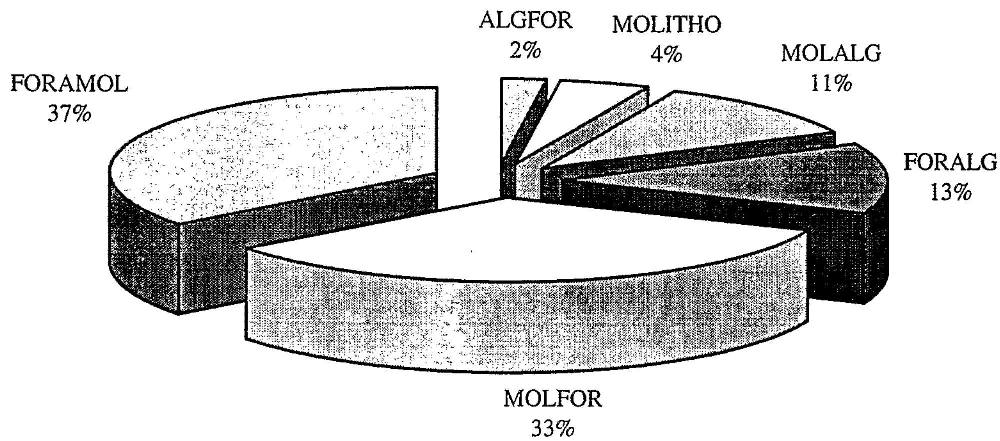


Fig. 14. — Proportions relatives des différents biofaciès

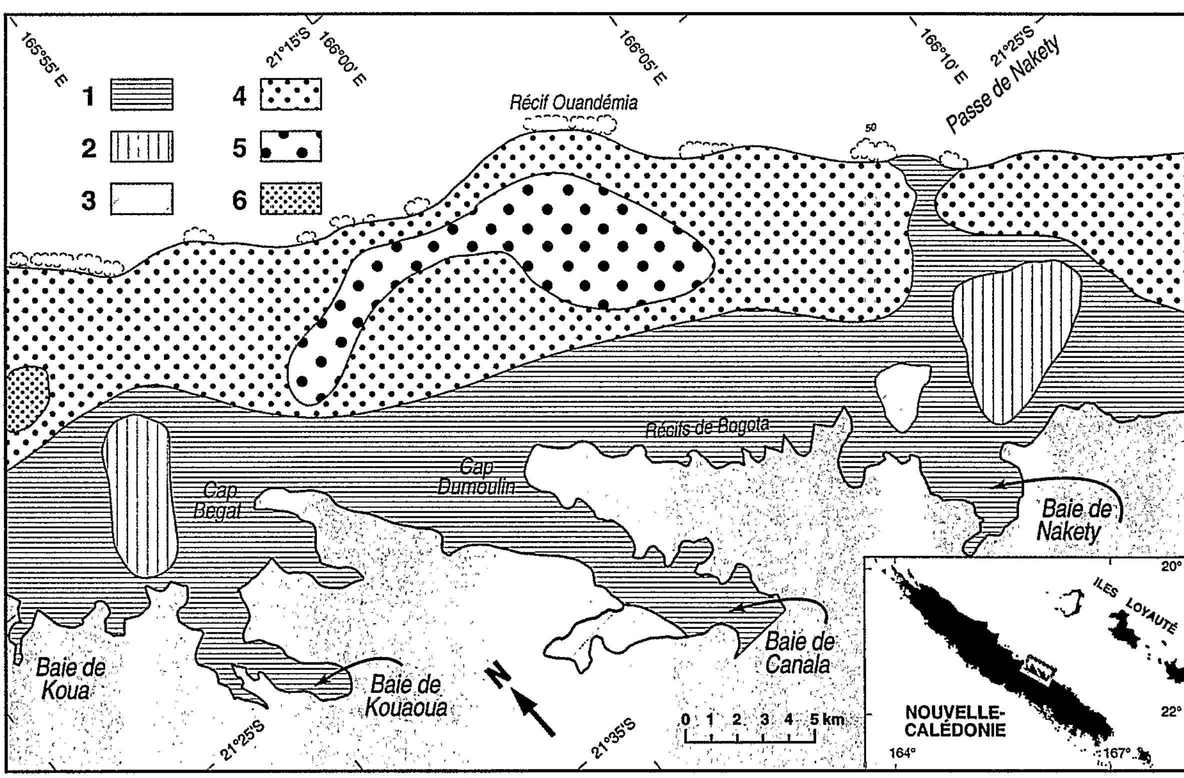


Fig. 15. — Carte de répartition des biofaciès majeurs (1 : MolFor, 2 : MolAlg, 3 : MoLitho, 4 : ForaMol, 5 : ForAlg, 6 : AlgFor)

La distribution spatiale des biofaciès (Fig. 15) montre clairement une partition entre les biofaciès inféodés à la zone côtière, à dominante exclusive de mollusques (essentiellement MolFor) et ceux qui sont sous influence de la barrière récifale (plaine lagonaire externe et fonds d'arrière-récif) largement dominés par les foraminifères

(ForaMol et ForAlg) à l'exception d'une station qui présente un biofaciès AlgFor. Par le biais des vallées sous-marines, les faciès inféodés à la zone côtière peuvent toutefois déborder, localement, jusqu'aux passes (Passe de Nakety). Cette partition dans la zonation des biofaciès correspond remarquablement à la limite entre les sédiments très fortement à moyennement envasés et très faiblement à moyennement carbonatés d'une part, et les sédiments faiblement à très faiblement envasés et fortement à très fortement carbonatés d'autre part. Nous retrouvons ici l'importance essentielle des apports terrigènes et de l'envasement dans la zonation sédimentaire de ce lagon de la côte Est de Nouvelle-Calédonie.

CONCLUSION

La côte Est de Nouvelle-Calédonie nous offre un modèle de lagon à sédimentation mixte terrigène-carbonatée. Cette double influence s'exprime essentiellement suivant un gradient côte-récif barrière; ce gradient est négatif pour les apports en vases terrigènes déversés dans le lagon par les nombreuses rivières et les eaux de ruissellement qui drainent des bassins versants abruptes ; il est positif pour les apports carbonatés d'origine organogène, en général plus grossiers. L'accroissement de la teneur en carbonate dans le sédiment au fur et à mesure que l'on s'approche de la barrière récifale externe, ne doit pas estomper la production carbonatée d'origine benthique de la plaine lagonaire elle-même dont l'importance est ici sous-évaluée du fait du mélange avec les apports terrigènes côtiers.

Un second gradient dans la sédimentation, plus discret, se traduit par un accroissement progressif des aires sous influence terrigène au fur et à mesure que l'on se dirige vers le nord du lagon. Ce deuxième gradient est attribué en premier lieu, à un débit moyen annuel spécifique plus important pour les rivières de la moitié nord du lagon et en second lieu, à un phénomène pour le moins paradoxal : les activités minières, concentrées dans le sud, entraînent un accroissement de la charge solide des rivières ; il s'ensuit un phénomène d'accrétion deltaïque avec comme conséquence une obturation au moins partielle des estuaires, ce qui limite le déversement des éléments terrigènes dans le lagon.

Un cas de figure particulier a été rencontré au niveau des structures originales que sont les vallées sous-marines qui mettent en continuité passes et estuaires. Les teneurs en vases élevées à hauteur de ces vallées on toujours laisser penser qu'il s'agissait d'un chemin d'écoulement préférentiel des lutites terrigènes, comme s'il continuait d'exister un flux sous-marin depuis les estuaires vers les passes. Or, notre étude du lagon de la côte Est montre que les vases accumulées dans les vallées sous-marines peuvent avoir une forte part d'éléments carbonatés ; ceci nous a conduit à considérer ces vallées sous-marines comme étant, plus simplement, des aires de piégeage, d'accumulation, des sédiments fins, indépendamment de leur origine terrigène (côtière) ou carbonatée (récifale ou benthique). Il est même probable que ces passes et vallées associées ne fonctionnent pas toutes de la même façon. En effet, les contours dessinés à ce niveau par les faciès d'envasement et de teneur en carbonates (avancées pointant vers l'intérieur ou l'extérieur du lagon) pourraient être le reflet de bilans courantologiques entrants (dominance de fines carbonatées) ou sortants (dominance de fines terrigènes). Seule une étude courantométrique permettrait toutefois de préciser ces hypothèses.

La sédimentation est gouvernée par deux pôles, un pôle côtier producteur de matériel fin et terrigène et un pôle récifal ou sont élaborées des particules plus grossières et exclusivement carbonatées. Les fines produites dans la zone récifale par abrasion de l'édifice corallien et par biodestruction, ne restent pas en place et tendent à s'accumuler au fond des vallées sous-marines. La plaine lagonaire elle-même apparaît comme un milieu de transition subissant l'influence des deux types de sédimentation qui s'y mélangent.

D'un point de vue hydrodynamique sédimentaire, l'examen de la distribution des lutites permet ici de déceler très nettement la présence des passes actives au niveau sédimentologique (présence de flèches marquées) et par la même au niveau des échanges lagon-océan.

Très globalement, les teneurs moyennes en vase (39%) et en carbonates (62%) désignent un lagon modérément envasé à la sédimentation fortement carbonatée. Si le faciès des sédiments fortement carbonatés (60 à 80% de Co_3Ca) domine effectivement l'occupation des fonds, en ce qui concerne l'envasement, c'est le faciès des sédiments très fortement envasé (vase > 75%) qui est le mieux représenté.

La biophase est essentiellement constituée de débris de foraminifères (27%) et de mollusques (22%). La répartition des biofaciès montre une partition longitudinale très nette du lagon en deux unités qui traduisent le rôle majeur des apports terrigènes et de l'envasement sur la zonation sédimentaire de ce lagon. La première unité rassemble les biofaciès à mollusques (MolFor, MolAlg et MoLitho) ; inféodée à la zone côtière, elle marque bien la partie du lagon soumise à l'influence terrestre : sédiments très faiblement à moyennement carbonatés et très fortement à moyennement envasés ; cette unité peut localement s'étendre jusqu'au récif barrière en épousant le tracé des vallées sous-marines. La seconde unité regroupe les biofaciès à foraminifères (ForaMol et ForAlg essentiellement) et correspond clairement à la zone d'influence de la barrière récifale (sédiments fortement à très fortement carbonatés et faiblement à très faiblement envasés). Le lagon de la côte Est est enfin le seul lagon de Nouvelle-Calédonie ou des lithoclastes (grains minéraux) ont été dénombrés (1,6%) parmi les constituants du sédiment.

RÉFÉRENCES BIBLIOGRAPHIQUES

ANTHEAUME, B., 1979. — Extraction minière et métallurgie depuis les origines. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances.* Paris, 1981, planche 41.

BALTZER, F., 1969. — Les formations végétales associées au delta de la Dumbéa (Nouvelle-Calédonie) et leurs indications écologiques, géomorphologiques et sédimentologiques. *Cah. ORSTOM, Sér. Géol.*, Nouméa, **1** (1) : 59-84.

BALTZER, F., 1968. — Quelques effets sédimentologiques du cyclone "BRENDA" dans les plaines alluviales de la Dumbéa (côte Ouest de la Nouvelle-Calédonie). Etude préliminaire. *Pub. ORSTOM,* Nouméa ; 28 p., 3 cartes.

BALTZER, F., TRESCASES, J. J., 1971a. — Erosion, transport et sédimentation liés aux cyclones tropicaux dans les massifs d'ultrabasites de Nouvelle-Calédonie. Première approche du bilan général de l'érosion et de la sédimentation sur péridotite en zone tropicale. *Cah. ORSTOM, Sér. Géol.*, **3** (2) : 221-244.

BALTZER, F., TRESCASES, J. J., 1971b. — Première estimation du bilan de l'altération, de l'érosion et de la sédimentation, sur péridotites, sous le climat tropical de la Nouvelle-Calédonie. *C.R. Acad. Sci.*, Paris, **273** (D) : 2034-2037.

BAUDUIN, D., 1979. — Hydrologie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances.* Paris, 1981, planche 12.

BAUDUIN, D. & BRUNEL, J. P., 1981. — Hydrologie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances.* Paris, 1981, planche 12.

BIRD, E. C. F., DUBOIS, J-P., ILTIS, J. A., 1984. — *The impacts of opencast mining rivers and coasts of New Caledonia.* The United Nations University, Tokyo ; 53p.

BONNEAU, M., SOUCHIER, B., 1979. — Méthodes pratiques d'analyses des sols. *In :* Masson (ed), *Pédologie : constituants et propriétés des sols.* Paris, **2** : 440-454.

BRUNEL, J. P., 1980. — Régime hydrologique et transports solides en suspension de la rivière OUENGHI. Résultats de la campagne 1979. *Rapp. ORSTOM,* Nouméa ; 18 p.

CHAMLEY, H., 1966. — Guide des techniques du laboratoire de Géologie Marine de Luminy. *Pub. Lab. Géol. Mar., Fac. Sci. Luminy, Univ. Aix- Marseille II,* Marseille ; 198 p.

CHARDY, P., CHEVILLON, C., CLAVIER, J., 1988. — Major benthic communities of the south-west lagoon of New Caledonia. *Coral Reefs,* **7** : 69-75.

CHEVALIER, J. P., 1973. — Coral reefs of New Caledonia. *In* : Jones, O. A. & Endean, R. (eds), *Biology and geology of coral reefs.* Academic Press Inc., New York, Vol. 1 : Geol., **1** (1): 143-166.

CHEVILLON, C., 1996a. — Texture, granulométrie et composition bioclastique des sédiments actuels de l'atoll d'Ouvéa (Iles Loyauté, Nouvelle-Calédonie). *In* : Richer de Forges, B. (ed), Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, benthos). *Etudes & Thèses*, ORSTOM, Paris, **2** : 7- 43.

CHEVILLON, C., 1996b. — Skeletal composition of lagoonal modern sediments in New Caledonia : Coral, a minor constituent. *Coral Reefs,* **15** : 199-207.

CHEVILLON, C., 1992. — Biosédimentologie du Grand Lagon Nord de la Nouvelle-Calédonie. *Etudes & Thèses,* ORSTOM (ed), Paris ; 224 p.

CHEVILLON, C., 1990. —Biosédimentologie du Grand Lagon Nord de la Nouvelle-Calédonie : caractérisation des faciès sédimentaires par l'Analyse en Composantes Principales. *Proc. 8th Int. Soc. Reef Studies Congres*, Nouméa (Nouvelle-Calédonie), Nov. 14-18, 1990 : 165-172.

CHEVILLON, C. & CLAVIER, J., 1990. — Résultats préliminaires sur la sédimentologie du lagon des Chesterfield (Nouvelle-Calédonie). *Proc. 8th Int. Soc. Reef Studies Congres*, Nouméa (Nouvelle-Calédonie), Nov. 14-18, 1990 : 173-178.

CHEVILLON, C., RICHER DE FORGES, B., 1988. — Sediments and bionomic mapping on soft bottoms in the south-western lagoon of New Caledonia. *Proc. 6th Coral Reef Symp.*, Townsville (Australia), Aug. 8-12, 1988, **2** : 589-594.

CONAND, F., 1987. — *Biologie et écologie des poissons pélagiques du lagon de Nouvelle-Calédonie.* Thèse Doct., Univ. Bretagne Occidentale ; 233 p.

COUDRAY, J., 1977. — Recherches sur le quaternaire marin de la Nouvelle-Calédonie : contribution de l'étude des récifs coralliens et des éolianites associées à la reconstitution de l'histoire climatique et structurale. *Suppl. Bull. AFEQ*, **1**(50) : 331-340.

COUDRAY, J., 1976. — Recherches sur le Néogène et le Quaternaire marin de la Nouvelle-Calédonie. Contribution de l'étude sédimentologique à la connaissance de l'histoire géologique post-éocène. *In* : Fond. Singer-Polignac (ed), *Expédition Française sur les récifs coralliens de la Nouvelle-Calédonie.*Paris, **8** : 5-278.

COUDRAY, J., THOMASSIN, B. A. & VASSEUR, P., 1985. — Géomorphologie comparée des récifs barrières de Nouvelle-Calédonie et de Mayotte (Province Indo-Pacifique). *Proc. 5th Int. Coral Reef Symp.*, Tahiti (Polynésie Francaise), May 27-June 01, 1985, **6** : 427-431.

DAVIS, W. M., 1928. — The coral reefs problem. *Am. Geog. Soc.*, Spec. Pub. n° **9** ; 596 p.

DEBENAY, J. P., 1985. — *Recherches sur la sédimentation actuelle et les thanatocoénoses des Foraminifères de grande taille dans le lagon Sud-Ouest et sur la marge insulaire sud de Nouvelle-Calédonie.* Thèse Doct., Univ. Aix-Marseille II, 200 p + annexes.

DUBOIS, J. P., 1977. — Oro-hydrographie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances.* Paris, 1981, planche 7.

DUGAS, F., 1974. — La sédimentation en baie de Saint-Vincent (côte Ouest de la Nouvelle Calédonie). *Cah. ORSTOM, Sér. Géol*, Nouméa, **6** (1) : 1-62.

DUGAS, F., 1973. — La sédimentation dans le sud du lagon de la Nouvelle-Calédonie (du Mont Dore au canal de la Havannah). *Rapp. ORSTOM*, Nouméa ; 13 p.

DUGAS, F., DEBENAY, J. P., 1982. — Carte sédimentologique et carte annexe du lagon de Nouvelle-Calédonie au 1/50000e, feuille «Nouméa». *Notice explicative n°95*, ORSTOM, Paris ; 45 p.

DUGAS, F., DEBENAY, J. P., 1981. — Carte sédimentologique et carte annexe du lagon de Nouvelle-Calédonie au 1/50000e, feuille «Prony». *Notice explicative n°91*, ORSTOM, Paris ; 35 p.

DUGAS, F., DEBENAY, J. P., 1980. — Carte sédimentologique et carte annexe du lagon de Nouvelle-Calédonie au 1/50000e, feuille «Tontouta». *Notice explicative n°86*, ORSTOM, Paris ; 44 p.

DUGAS, F., DEBENAY, J. P., 1978. — Carte sédimentologique et carte annexe du lagon de Nouvelle-Calédonie au 1/50000e, feuille «Mont Dore». *Notice explicative n°76*, ORSTOM, Paris ; 20 p.

EHNY, F., 1987. — *Sédimentologie et diagénèse précoce en milieu périrécifal : les pentes de quelques îles volcaniques coralliennes Ouest-Indopacifique : I. Mayotte, Bancs du Geyser-Zélé et du Leven (N.O. canal de Mozambique, O.Indien) et I. Chesterfield (Mer de Corail, O. Pacifique).* Thèse Doct., Univ. Aix-Marseille II ; 349 p.

GUILCHER, A., 1965. — Grand récif Sud, récifs et lagon de Tuo (Nouvelle-Calédonie). *In* : Fond. Singer-Polignac (ed), *Expédition française sur les récifs coralliens de la Nouvelle-Calédonie.* Paris, **1** : 133-240.

GUILCHER, A., 1963. — Quelques caractères des récifs barrières et de leur lagons. *Bull. Ass. Géogr. Fr.*, n° 314-315 : 2-15.

GUILCHER, A., 1958. — *Coastal and submarine morphology.* Methuen & Wiley (eds), Londres, New York ; 274p.

ILTIS, J., 1980. — Géomorphologie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances.* Paris, 1981, planche 13.

KUENEN, P. H., 1951. — An argument in favor of glacial control of coral reefs. *Journ. Geol.*, **59** : 503-507.

KULBICKI, M., 1995. — The marine resources of Ouvéa Atoll (New Caledonia), a summary of the work performed by ORSTOM from 1991 to 1994. *In* : South Pacific Commission (ed), SPC/FFA Workshop on the Management of South Pacific Inshore Fisheries, Noumea (New Caledonia). *Integrated Coastal Fisheries Management Project, Tech. Doc.*, **12** (2) : 569-652.

KULBICKI, M., 1988. — Correlation between catch data from bottom longlines and fish census in the south-west lagoon of New Caledonia. *Proc.6th Int. Coral Reef Symp.*, Townsville (Australia), Aug. 8-12, 1988, **2** : 305-312.

LALOU, C. & DUPLESSY, J., 1977. — Sea-level variations, interest for neotectonic studies. *Int. Symp. Geodyn. in the SW Pacific*, Noumea, 27 Aug - 2 Sept. 1976 : 405-412.

LATHAM, M., 1978. — Pédologie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances*. Paris, 1981, planche 14.

LAUNAY, J., 1972. — La sédimentation en baie de Dumbéa (côte Ouest, Nouvelle Calédonie). *Cah. ORSTOM, Sér. Géol.*, Nouméa, 4 (1) : 25-51.

LETOURNEUR, Y., KULBICKI, M. & LABROSSE, P. (in press). — Spatial structure of commercial reef fish communities along a terrestrial gradient in the Northern lagoon of New Caledonia. *Proc. 8th Int. Coral Reef Symp.*, Panama, June 24-29, 1996.

MASSE, J. P., 1970. — Contribution à l'étude des sédiments bioclastiques actuels du complexe récifal de l'île de Nossi-Bé (N.O. Madagascar). Rec. Trav. St. Mar. Endoume, Marseille (France), 10 : 229-251.

MAXWELL, W. G. H., 1968. — *Atlas of the Great Barrier Reef.* Elsv. Publ. Comp., Amsterdam, London, New York ; 258 p.

MORAT, P. H., JAFFRÉ, T., VEILLON, J. M. & MCKEE, H. S., 1978. Végétation. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances*. Paris, 1981, planche 15.

NAIR, R. R., HASHIMI, N. H., 1986. — Influence of estuaries on shelf sediment texture. *Journ. Coast. Res.*, **2** (2) : 199-203.

PARIS, J. P., 1979. — Géologie. *In* : ORSTOM (ed), *Atlas de la Nouvelle-Calédonie et dépendances*. Paris, 1981, planche 9.

PICHON, M., 1977. — Physiography, morphology and ecology of the double barrier reef of North Bohol (Philippines). *Proc. 3th Int. Coral Reef Symp.*, Miami, May 1977 : 261-267.

RICHER DE FORGES, B., 1991. — Les fonds meubles des lagons de Nouvelle-Calédonie : généralités et échantillonnages par dragages. *In* : RICHER DE FORGES, B. (ed), Le benthos des fonds meubles des lagons de Nouvelle-Calédonie. *Etudes & Thèses*, ORSTOM, Paris, **1** : 8-148.

RISBEC, J., 1931. — Quelques remarques sur l'allure des récifs frangeants en Nouvelle-Calédonie. *Pub. Inst. Océanog. Indochine* : 335-343.

TAISNE, B., 1965. — Organisation et hydrographie. *In* : Fond. Singer-Polignac (ed), *Expédition Française sur les récifs coralliens de la Nouvelle-Calédonie*. Paris, **1**: 1-132.

TAYAMA, R., 1952. — Coral reefs of the South Seas. *Bull. Hydrogr. Office*, Tokyo, **11** (941) : 1-292.

TESTAU, J. L., CONAND, F., 1983. — Estimation des surfaces des différentes zones du lagon de Nouvelle-Calédonie. *Rapp. ORSTOM*, Nouméa ; 5 p.

TRESCASES, J. J., 1969. — Premières observations sur l'altération des péridotites en Nouvelle-Calédonie. *Cah. ORSTOM, Sér. Géol.*, Nouméa, **1** (1) : 27-57.

WANTIEZ, L., HARMELIN-VIVIEN, M. & KULBICKI, M., 1996. — Spatial and temporal variations of the soft bottom fish community structure in St Vincent Bay, New Caledonia. *Marine Biology*, 125 : 801-812.

WEYDERT, P., 1976. — Manuel de sédimentologie et d'arénologie. *Pub. Lab. Géol. Mar., Fac. Sci. Luminy, Univ. Aix-Marseille II*, Marseille ; 61 p.

WEYDERT, P., 1973. — *Morphologie et sédimentologie des formations récifales de la région de Tuléar (SW de Madagascar).* Thèse Sciences, Univ. Aix-Marseille II ; 640 p.

WEYDERT, P., 1971. — Sédimentologie et hydrodynamique d'une coupe de la partie médiane du grand récif de tuléar (SW Madagascar). *Tethys*, suppl.1 : 237-280.

2

Crustacea Decapoda : Review on the genus *Cinetorhynchus* Holthuis, 1995 from the Indo-West Pacific (Caridea : Rhynchocinetidae)

JUNJI OKUNO

Natural History Museum and Institute, Chiba, 955-2
Aoba-cho, Chuo-ku, Chiba, 260, Japan

ABSTRACT

Cinetorhynchus Holthuis, 1995 established as a subgenus of the genus *Rhynchocinetes* H. Milne Edwards, 1837, is elevated to the generic rank. In addition to the definitions pointed out by HOLTHUIS (1995), this genus is distinguished from the type genus by having two rows of spines on the ischia and meri of the third to fifth pereiopods. *Cinetorhynchus* is composed of *C. rigens* (Gordon, 1936), the type species, from the Madeira Islands, eastern Atlantic, and the following six species from the Indo-West Pacific : *C. concolor* (Okuno, 1994), *C. erythrostictus* sp. nov., *C. hendersoni* (Kemp, 1925), *C. hiatti* (Holthuis & Hayashi, 1967), *C. reticulatus* sp. nov. and *C. striatus* (Nomura & Hayashi, 1992). The key for the morphological characters and the color photographs of the live-coloration of each species are provided for the identification of the species.

INTRODUCTION

The caridean family Rhynchocinetidae has been composed of the single genus, *Rhynchocinetes* H. Milne Edwards, 1837 (HOLTHUIS, 1993), which contains 15 species. Most shrimps are inhabitant of tropical to temperate reefs, and commonly known as hinge-beak shrimp in having the typically movable rostrum which is articulated with the carapace.

Recently, the rhynchocinetid shrimps were clearly divided into two subgenera based on the following morphological characters (HOLTHUIS, 1995). The subgenus *Rhynchocinetes* has two acute teeth at median carina of carapace behind the distinct rostral articulation, a supraorbital spine and no spine on the posterolateral margins of fourth and fifth abdominal somites, whereas the subgenus *Cinetorhynchus* Holthuis, 1995 has three teeth at

OKUNO, J., 1997. — Crustacea Decapoda : Review on the genus *Cinetorhynchus* Holthuis, 1995 from the Indo-West Pacific (Caridea : Rhynchocinetidae). *in* : RICHER DE FORGES, B. (ed.), Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). *Études & Thèses*, volume 3, Paris, ORSTOM : 31-58. ISBN 2-7099-1376-3

median carina of carapace behind the indistinct articulation, no supraorbital spine and one spine each at the posterolateral margins of fourth and fifth abdominal somites.

During the revisional study of these shrimps, I could find another significant difference between two subgenera, which was the meristic difference of the spines on the ischia and meri of the third to fifth pereiopods. I warrant to elevate *Cinetorhynchus* as the generic rank on account of the several morphological differences and the absence of intermediate species between them.

In the most recent taxonomic study on the *Cinetorhynchus* species, OKUNO (1994b) recognized the following five species as the member of the group : *R. hendersoni* Kemp, 1925, *R. rigens*, Gordon, 1936, *R. hiatti* Holthuis & Hayashi, 1967, *R. striatus* Nomura & Hayashi, 1992 and *R. concolor* Okuno, 1994. In this review, I added two species in the genus *Cinetorhynchus*, as mentioned below.

Cinetorhynchus rigens (= *R. rigens*) was originally described by GORDON (1936) on the basis of the specimens from Madeira, eastern Atlantic. FUJINO (1975) recorded three specimens from the Ryukyu Islands as *R. rigens* and concluded that there was no evidence to deal with the specimens from the isolated localities as each subspecies by his direct comparison. I could scrutinize several specimens of *rigens* from the Atlantic Ocean and the western Pacific. As the result of the careful comparison, it was considered that the western Pacific population was distinguished from *rigens* at the specific rank. Thus, the western Pacific species are given a new specific name, *Cinetorhynchus erythrostictus*.

During the efforts to collect the rhynchocinetid shrimps in southern Japan, I obtained an uncertain species from Hachijo-jima Island of the southern Izu Islands and Amami-Ohshima Island of the northern Ryukyu Islands. Furthermore, among the samples collected by MUSORSTOM cruise and the collections deposited at NTM were several specimens corresponding to the species in question. The shrimp closely resembles *hendersoni* in the number of claws on the dactyli of the third to fifth pereiopods and in having the stylocerite falling distinctly short of the distal end of the antennular peduncle and the mottled coloration in life. However, the former is readily distinguishable from the latter by the form of the coxae of first and third pereiopods and the spination of the carpi of third and fourth pereiopods. The species related to *hendersoni* is described herein as new to science based on 26 males, 13 ovigerous females and 10 females, under the name of *Cinetorhynchus reticulatus*.

Therefore, the new genus from the Indo-West Pacific contains four described species, *C. concolor* (Okuno, 1994), *C. hendersoni* (Kemp, 1925), *C. hiatti* (Holthuis & Hayashi, 1967) and *C. striatus* (Nomura & Hayashi, 1992) and two new species, *C. erythrostictus* and *C. reticulatus*. These species are reviewed herein in view of the taxonomic study, with some comments of their distributional patterns.

MATERIALS AND METHODS

The material examined in this study were originated mainly from the samples collected by MUSORSTOM, the collections deposited in the Museum of the Northern Territory, Darwin, Australia and the specimens collected from the shallow water on the coast of southern Japan by myself. They were listed in order of the northern to the southern localities in Material Examined of each species.

The selected measurements were taken in accordance with Fig. 1.

Distribution maps were based only on the materials examined directly and the records from literatures were not incorporated on the maps.

The institutional names are abbreviated as follows :

AMNH- American Museum of Natural History, New York.
BPBM- Bernice Pauahi Bishop Museum, Honolulu.
CBM- Natural History Museum and Institute, Chiba.
KMNH- Kitakyushu Museum of Natural History, Kitakyushu.
KUMB- Kagoshima University, Marine Biological Laboratory, Kagoshima.
MNHN- Muséum National d'Histoire Naturelle, Paris.
NSMT- National Science Museum, Tokyo.
NTM- Museum of the Northern Territory, Darwin.
QM- Queensland Museum, Brisbane.

SMF- Natur-Museum und Forshungs-Institut Senckenberg, Frankfurt-Main.
SUF- Shimonoseki University of Fisheries, Shimonoseki.
USNM- National Museum of Natural History, Smithsonian Institution, Washinton, D. C.
YCM- Yokosuka City Museum, Yokosuka.

For comparison, the following specimens were also examined :

Cinetorhynchus rigens (Gordon, 1936) : 3 ♂ (USNM 156441, 14.9-15.8 mm CL) ; 1 ♂ & 3 ovig. ♀ (MNHN-Na 1847, 12.4-18.3 mm CL), Madeira, eastern Atlantic. 1 ♂ (USNM 104744, 9.1 mm CL), Florida. 2 ♂ & 1 ovig. ♀ (USNM 189007, 14.0-16.4 mm CL) ; 6 ♂ (USNM 189009, 9.4-10.8 mm CL), Bahamas. 3 ♂ (USNM 189004, 9.4-13.5 mm CL), Virgin Islands.

Rhynchocinetes australis Hale, 1941 : 2 ♂ (NTM. Cr. 006932, 8.3 & 6.7 mm CL), Port Turton, Jetty, South Australia.

R. balssi Gordon, 1936 : 1 ♂ (NTM. Cr. 000545, 4.0 mm CL), Load Howe Island, Australia.

R. brucei Okuno, 1994 : 1 ♂ (NTM. Cr. 003618, holotype, 10.0 mm CL), Long Ke Wan, Hong Kong. 1 ♂ (NTM. Cr. 000678, paratype, 9.3 mm CL), Lizard Island, Queensland, Australia.

R. conspiciocellus Okuno & Takeda, 1992 : 1 ♂ (NSMT-Cr 1670, 5.7 mm CL), Hachijo-jima Island, Izu Islands, Japan. 1 ♂ (NSMT-Cr 2190, 12.3 mm CL), Okinawa Island, Ryukyu Islands, Japan.

R. durbanensis Gordon, 1936 : 1 ♂ (NSMT-Cr 2173, 15.0 mm CL), Ie-shima Island, Ryukyu Islands, Japan.

R. ikatere Yaldwyn, 1971 : 1 ♀ (Dom. Mus. Z. Cr 1871, holotype, 11.0 mm CL) ; 1 ♀ (Dom. Mus. Z. Cr 2183, paratype, 11.0 mm CL), Bay of Plenty, North Island, New Zealand (examined by Dr. J. C. YALDWYN).

R. kuiteri Tiefenbacher, 1983 : 1 ♂ (NSMT-Cr 1958, 14.7 mm CL), southern Australia, detailed collection site unknown.

R. rugulosus Stimpson, 1860 : 1 ovig. ♀ (NTM. Cr. 003616, 12.0 mm CL), Manly, Sydney, New South Wales, Australia.

R. typus H. Milne Edwards, 1837 : 1 ♂ (MNHN-Na 1843, «type», 23.2 mm CL), Indian Ocean.

R. uritai Kubo, 1942 : 1 ♂ (NSMT-Cr 1681, 10.6 mm CL), Kuzura, Izu Peninsula, Japan. 1 ♀ (NSMT-Cr 11106, 8.6 mm CL), Hachijo-jima Island, Izu Islands, Japan.

SYSTEMATIC ACCOUNT

Family Rhynchocinetidae Ortmann, 1890

Cinetorhynchus Holthuis, 1995

TYPE SPECIES. — *Rhynchocinetes rigens* Gordon, 1936.

DIAGNOSIS. — Body subcylindrical. Carapace and abdomen covered with numerous transverse striae, bearing a sharply acute antennal spine directed forwards, not supported by carina ; three acute teeth on median carina of carapace behind to rostral articulation, posterior two teeth indistinctly articulated with carapace ; supraorbital spine absent. Rostrum well developed, dentate, usually elongated beyond tip of scaphocerite, jointed with carapace by an indistinct articulation, feeble lateral carina running proximal to midlength of rostrum, continuous with upper orbital margin. Fifth abdominal somite with an acutely pointed spine posterolaterally, directed posteriorly ; sixth somite with distoventral spine. Telson armed dorsally with three pairs of small spines, midpoint of posterior margin prominent, bearing three pairs of spinules at each side. Antennule with developed stylocerite tapering to acute tip. Scaphocerite well developed, with an acute spine distolaterally ; antennal basicerite covered with numerous striae resembling those of carapace and abdomen. Mandible with three segmented palp. First maxilla with two rows of spines on mesial margin of distal lacinia. First maxilliped with elongate, three-segmented palp, intermediate segment longest of all, distal segment very small. Third maxilliped with dark horny claws at tip of ultimate segment. First and second pereiopods with chela, the former stouter and shorter than the latter. Ischia of third to fifth pereiopods armed each with articulated spines on outer surface and on ventral margin, but ischium of fifth pereiopod rarely unarmed. Meri of third to fifth pereiopods bearing two rows of articulated spines on outer surface and on ventral margin. Endopod of male first pleopod with slender, distally narrow appendix interna. Endopod of male second pleopod with both appendices interna and masculina ; the former slightly longer than the latter.

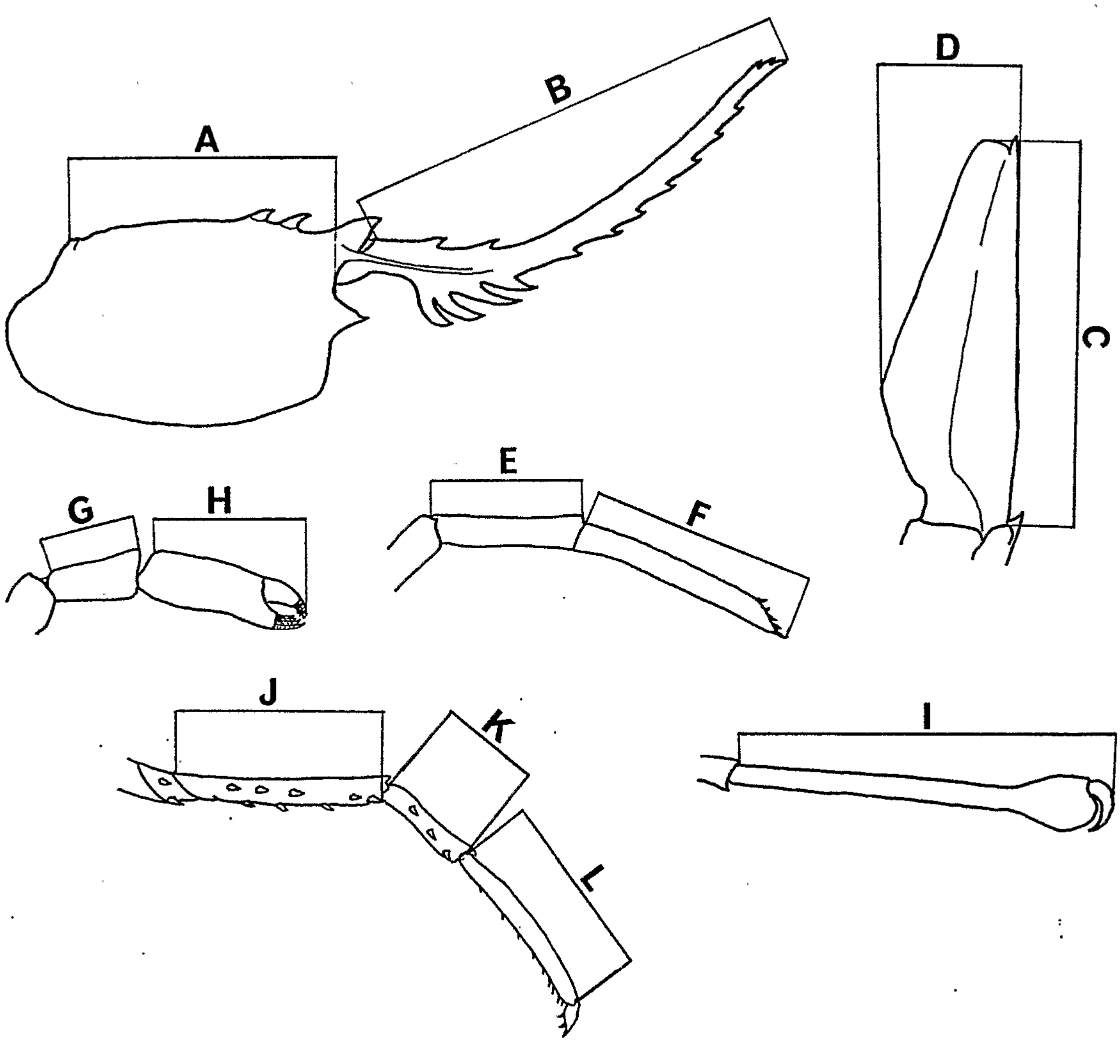


Fig. 1. — Measurements as used in the present publication. **A**, length of carapace ; **B**, rostral length ; **C**, length of scaphocerite ; **D**, width of scaphocerite ; **E**, length of penultimate segment of third maxilliped ; **F**, length of ultimate segment of third maxilliped ; **G**, carpal length of first pereiopod ; **H**, length of first chela ; **I**, length of first chela of mature male (in *C. hendersoni* and *C. reticulatus*) ; **J**, meral length of third pereiopod ; **K**, carpal length of third pereiopod ; **L**, propodal length of third pereiopod.

SYSTEMATIC POSITION. —The family Rhynchocinetidae proposed by ORTMANN (1890) has been considered as a monogeneric family of the caridean shrimps. YALDWYN (1960) reestablished the taxonomic status of the Rhynchocinetidae including *Eugonatonotus* Schmitt, 1926 and *Lipkius* Yaldwyn, 1960, but the subsequent investigators regarded that the present family contained a single genus *Rhynchocinetes*, and thus *Eugonatonotus* was returned to the Eugonatonotidae and *Lipkius* was related to the Nematocarcinidae (THOMPSON, 1966 ; FOREST, 1977 ; CHRISTOFFERSEN, 1990 ; CHACE, 1992 ; HOLTHUIS, 1993).

Therefore, I regard that the Rhynchocinetidae is composed of two genera, the type genus, *Rhynchocinetes*, and the genus, *Cinetorhynchus*.

ECOLOGY. — The shrimps of *Cinetorhynchus* usually occur in shallow waters from temperate to tropical regions. As mentioned by BURKENROAD (1939) and OKUNO (1993,1994b), they inhabit in the deeper crevices and the submarine caves of coral and rocky reefs. They completely hide in these places during day time, and actively move to feed on the surfaces of coral head and rock at night.

REMARKS. — This genus is closely related to the genus *Rhynchocinetes*, but readily distinguished from the latter by the differences noticed by HOLTHUIS (1995), and the additional difference established in this paper. The species of *Cinetorhynchus* are armed each with ischial spine on outer surface and on ventral margin, and two rows of the meral spines, one on outer surface and the other on ventral margin in third to fifth pereiopods, whereas the species of *Rhynchocinetes* have the single ischial spine and a row of the meral spines on third to fifth pereiopods (Fig. 2). All the differences are summarized in Table 1.

Tab. 1. — Comparisons between *Rhynchocinetes* H. Milne Edwards, 1837 and *Cinetorhynchus* Holthuis, 1995.

	Rhynchocinetes	***Cinetorhynchus***
Rostral articulation	distinct	indistinct
Numbers of teeth on median carina of carapace	2	3
Supraorbital spine	present	absent
Posterolateral spine of 5th abdominal somite	absent	present
Spines on ischia and meri of 3rd to 5th pereiopods	1 row	2 rows
Numbers of species	10	7

Rhynchocinetes ikatere described by YALDWYN (1971) based on the specimens from deep water at New Zealand represented the intermediate structure between two genera of the Rhynchocinetidae in having the combined characters of two teeth on the median carina of the carapace and no supraorbital spine. Through the personal communication with Dr. J. C. YALDWYN, I was able to confirm that the arrangement of spines on ischia and meri of the third to fifth pereiopods of *R. ikatere* agreed well with those of the members of the typical genus. Furthermore, judging from the figure of the species shown by RICHARDSON & YALDWYN (1958), I recognized that the supraorbital spine of *R. ikatere* was rudimentaly present rather than absent. On account of the above characters, *R. ikatere* is definitively contained to the type genus.

The present study represented that the meristic characters were usually overlapped with each species of *Cinetorhynchus*, and three species, *C. hiatti*, *C. hendersoni* and *C. reticulatus* revealed the intraspecific variability in the presence or absence of the pterygostomial spine, which was considered as one of the distinguishing characters. Although the best diagnosis is the live-coloration, which is constant in each species, the species may be distinguished by the following key based on the morphological characters.

Key to species of *Cinetorhynchus*

1. Dactyli of third to fifth pereiopods with two claws posterior to terminal claw 2

— Dactyli of third to fifth pereiopods with three claws posterior to terminal claw 4

2. Second maxilliped typically without podobranch ; carpi of third and fourth pereiopods

usually with a single spine .... *C. rigens* (Gordon, 1936)

— Second maxilliped with podobranch 3

3. Carpi of third and fourth pereiopods usually with 3 spines ; stylocerite subequal to, or slightly exceeding distal end of antennular peduncle .... *C. erythrostictus* sp. nov.

— Carpi of third and fourth pereiopods usually with a single spine ; stylocerite distinctly exceeding distal end of antennular peduncle .... *C. hiatti* (Holthuis & Hayashi, 1967)

4. Ventral margin of rostrum with 4-5 proximal teeth distinctly isolated from distal series ; inner margin of antennular proximal segment with 2-4 teeth ventrally ....
.... *C. concolor* (Okuno, 1994)

— Ventral margin of rostrum with equidistant teeth, decreasing in size distally ; inner margin of antennular proximal segment with a single tooth ventrally 5

5. Stylocerite reaching distal end of antennular peduncle ; distolateral spine of scaphocerite not reaching tip of lamella ; fifth pereiopod overreaching midlength of scaphocerite ....
.... *C. striatus* (Nomura & Hayashi, 1992)

— Stylocerite not reaching distal end of antennular peduncle ; distolateral spine of scaphocerite reaching or overreaching tip of lamella ; fifth pereiopod not reaching midlength of scaphocerite 6

6. Coxae of first and third pereiopods with distinct corneous projections ; carpi of third and fourth pereiopods usually with 2 spines .... *C. hendersoni* (Kemp, 1925)

— Coxae of first and third pereiopods without corneous projections ; carpi of third and fourth pereiopods usually with 3 spines .... *C. reticulatus* sp. nov.

Cinetorhynchus erythrostictus sp. nov.
(Pl. 1 A, B & Figs. 2 A, 3, 4 A-C)

Rhynchocinetes rigens ; FUJINO, 1975 : 297, figs. 1-2. — TIEFENBACHER, 1976 : 317 (in part). — HIRATA *et al*, 1988 : 59, fig. unnumbered. — KAMEZAKI *et al*, 1988 : 72, fig. unnumbered. — NOMURA & MATSUKUBO, 1992 : 22, figs. 1, 3. — OKUNO, 1994b : 69 (in part), figs. 3 D, 4 H (not GORDON, 1936).

TYPE SERIES. — Holotype, 1 ovig. ♀ 16.0 mm CL (NSMT-Cr 2155), Ryukyu Islands, Aka Harbor, Aka-jima Islet, Kerama Group, 26°11.2'N, 127 °17.1'E, 3 m, May 17, 1993.

PARATYPES. — 36 spécimens. **Japan.** — Honshu, Sabiura, Kushimoto, southern point of Kii Peninsula, 33°28.3'N, 135°47.0'E, 1-2 m, January 8, 1993 : 1 ♂ 9.1 mm CL (NSMT-Cr 2586), 1 ♂ 11.4 mm CL (NSMT-Cr 2584) ; February 5, 1993 : 1 ♂ 10.8 mm CL (NSMT - Cr 2585). — Izu Islands, Sokodo, Hachijo-jima Island, 33°07.3'N, 139°49.2'E, 15 m, August 2, 1995 : 1 ♂ 11.3 mm CL, 2 ovig. ♀ 14.0 & 15.2 mm CL (CBM-ZC 1981). — Submarine cave at Occho-ga-hama, Hachijo-jima Island, 33°03.5'N, 139°47.9'E, 10 m, June 17, 1993 : 1 ♂ 11.4 mm CL (NSMT-Cr 2620), 1 ♂ 11.4 mm CL (NSMT-Cr 2621). — Ohsumi Islands, Anbo, Yaku-shima Island, 30°19.0'N, 130°39.9'E, February 26, 1965 : 1 ♀ 15.0 mm CL (KMNH, uncatalogued). — Amami Islands, Tidepool on Keraji, Kikai-shima Island, 26°16.9'N, 129°59.1'E, March 28, 1979 : 2 ♂ 11.4 & 15.2 mm CL, (SUF 530-2-489).

Ryukyu Islands. — Submarine cave at Ie-shima Island, 26°42.9'N, 127°50.1'E, 25 m, June 17, 1990 : 1 ♂ 7.3 mm CL (NSMT-Cr 1421). — Okinawa Island, Naha Harbor, 26°14.2'N, 127°40.2'E, 1 m, May 23, 1993 : 1 ♂ 12.2 mm CL (NSMT-Cr 2071), 1 ♂ 17.3 mm CL (CBM-ZC 1980). — Aka Harbor, Aka-jima Islet, Kerama Group, 26°11.2'N, 127 °17.1'E, 3 m, May 17, 1993 : 1 ovig. ♀ 13.0 mm CL (NSMT-Cr 2156). — Hizushi-hama, Aka-jima Islet, Kerama Group, 26°11.2'N, 127°16.8'E, 3 m, May 20, 1993 : 1 ♂ 10.7 mm CL (NSMT-Cr 2146), 1 ♂ 10.3 mm CL (NSMT-Cr 2158), 1 ♂ 9.4 mm CL (NSMT-Cr 2165). — Hiyajo, Kume-jima Island, 26°23.2'N, 126°47.7'E, 5 m, November 23, 1992 : 1 ♀ 13.7 mm CL (NSMT-Cr 2572). — Kuroishi, Kume-jima Island, 26°17.6'N, 126°47.8'E, 5 m, November 24, 1992 : 1 ♂ 10.9 mm CL

(NSMT-Cr 2573), 1 ♂ 11.0 mm CL (NSMT-Cr 2574).

New Caledonia. — Récif externe de Taenia, 20°00.4'S, 163°56.3'E, 8 m, March 25, 1990 : 2 ♂ 9.8 & 10.0 mm, 1 ♀ 10.5 mm CL (MNHN-Na 12939). — Côte Est, Récif Ana, 21°22.2'S, 165°56.4'E, 3-10 m, September 11, 1989 : 1 ♀ 15.4 mm & 2 ovig. ♀ 14.6 & 15.1 mm CL (MNHN-Na 12946). — Passe de Saint Vincent, 22°05.1'S, 165°58.0'E, 5 m, March 21, 1990 : 2 ♂ 8.4 & 8.6 mm, 1 ovig. ♀ 12.0 mm CL (MNHN-Na 12937).

Loyalty Islands. — Uvea Island, 20°29.2'S, 166°14.4'E, Haute Islet, 11 m, November 19, 1991 : 4 ♂ 9.7-11.5 mm CL, 1 ovig. ♀ 13.3 mm CL (MNHN-Na 12938). — Passe de la Meurthe, 22°36.5'S, 166°16.8'E, 6-10 m, November 16, 1991 : 1 ovig. ♀ 13.0 mm CL (MNHN-Na 12947).

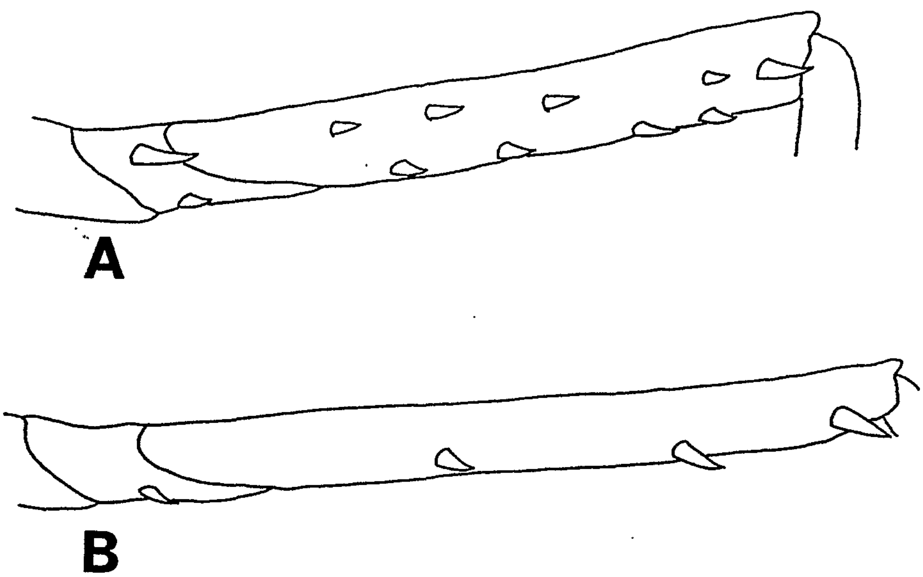


Fig. 2. — Comparison of ischium and merus of third pereiopod. **A**, *Cinetorhynchus erythrostictus* sp. nov. (male paratype, NSMT-Cr 2165, 9.4 mm CL) ; **B**, *Rhynchocinetes conspiciocellus* Okuno & Takeda, 1992 (male, NSMT-Cr 2190, 12.3 mm CL).

DESCRIPTION. — Carapace with pterygostomial angle rounded, without spine.

Rostrum upturned distally, 1.2-2.0 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 1) small teeth subterminally, armed ventrally with 10-12 (rarely 9) acute teeth decreasing in size distally.

Antennular peduncle reaching proximal quartor of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite strongly acute, subequal to, or slightly overreaching distal end of ultimate segment ; thickened part of upper flagellum not reaching series of rostral teeth distodorsally.

Scaphocerite falling slightly short of level of midlength of rostrum, 0.6-0.9 times as long as carapace, 2.8-4.0 times as long as its maximum width, distolateral spine exceeding slightly beyond tip of lamella.

Mouthparts typical. Second maxilliped with a small podobranch at proximal upper margin of epipod. Third maxilliped reaching proximal two thirds of scaphocerite, exceeding slightly beyond distal margin of antennular terminal segment ; ultimate segment 0.4-0.5 times as long as carapace, 1.2-1.5 times as long as penultimate segment, with 7-8 dark horny claws distally.

First pereiopod reaching proximal third of scaphocerite, chela 0.3-0.4 times as long as carapace, 1.5-1.9 times as long as carpus. Second pereiopod reaching midlength of scaphocerite, chela 0.3 times as long as carapace, carpus 0.4 times as long as carapace, 1.3-1.5 times as long as chela.

Ambulatory pereiopods slender, each dactylus with small 2 horny claws posterior to terminal claw. Third pereiopod exceeding slightly beyond tip of scaphocerite ; ischium with each articulated spine on outer surface and ventral margin ; merus 0.7-0.8 times as long as carapace, 2.2-2.5 times as long as carpus, with 4-8 (usually 5)

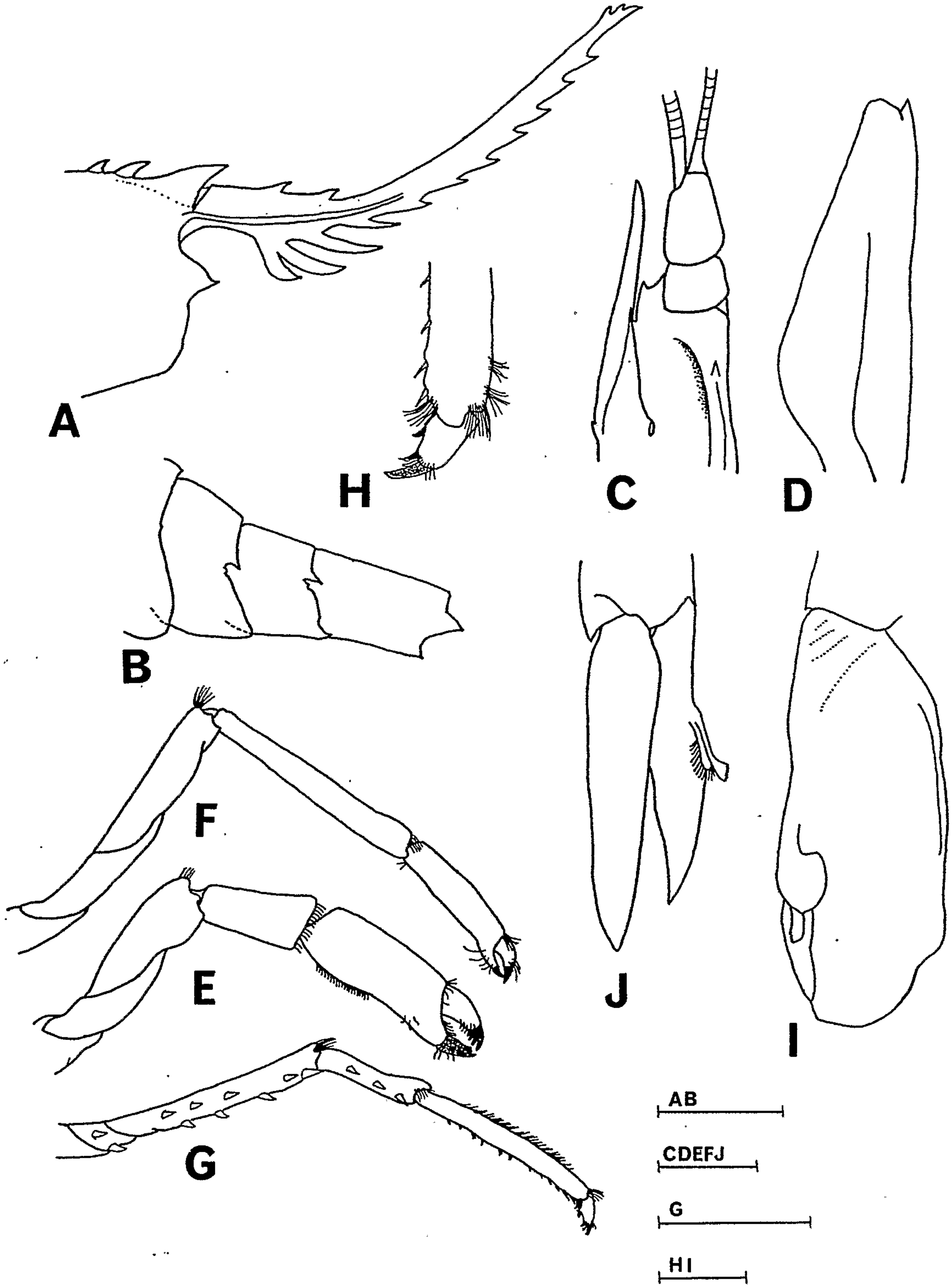


Fig. 3. — *Cinetorhynchus erythrostictus* sp. nov. Male paratype (NSMT-Cr 2574, 11.0 mm CL). **A**, anterior part of carapace with rostrum ; **B**, fourth to sixth abdominal somites ; **C**, antennular peduncle, ventral view ; **D**, scaphocerite ; **E**, first pereiopod ; **F**, second pereiopod ; **G**, third pereiopod ; **H**, dactylus of third pereiopod ; **I**, endopod of first pleopod ; **J**, second pleopod. Scales for A, B, G = 5 mm ; C-F = 2 mm ; H-J = 1 mm.

articulated spines on outer surface, 2-6 (usually 2-4) similar spines on ventral margin ; carpus 0.3 times as long as carapace, with 2-4 (usually 3) articulated spines on outer surface ; propodus 0.5-0.6 times as long as carapace, 1.8-1.9 times as long as carpus. Fourth pereiopod reaching proximal two thirds of scaphocerite ; spination of ischium agrees with that of third pereiopod ; merus 0.6-0.7 times as long as carapace, 2.0-2.3 times as long as carpus, with 4-7 (usually 5-6) articulated spines on outer surface, 2-5 (usually 2-3) similar spines on ventral margin ; proportion of carpus resembling that of third pereiopod, with 2-3 (usually 3) articulated spines on outer surface ; propodus 0.5-0.6 times as long as carapace, 1.8-2.0 times as long as carpus. Fifth pereiopod reaching midlength of scaphocerite ; merus 0.5-0.6 times as long as carapace, 1.6-2.0 times as long as carpus, with 3-6 (usually 4-5) articulated spines on outer surface, 1-3 similar spines on ventral margin ; proportion of carpus resembling above two pereiopods, with 1-3 (usually 2-3) articulated spines on outer surface ; proportion of propodus similar to that of fourth pereiopod.

Endopod of male first pleopod with distal end slightly truncated.

COLORATION. — Ground color of whole body pale, mottled with numerous red spots and patches densely on carapace and abdomen, except for anterolateral part of carapace ; third abdominal somite with conspicuously large red patch dorsolaterally. Rostrum red, with white apex. Chelae of first and second pereiopods and carpi, propodi and dactyli of third to fifth pereiopods pinkish.

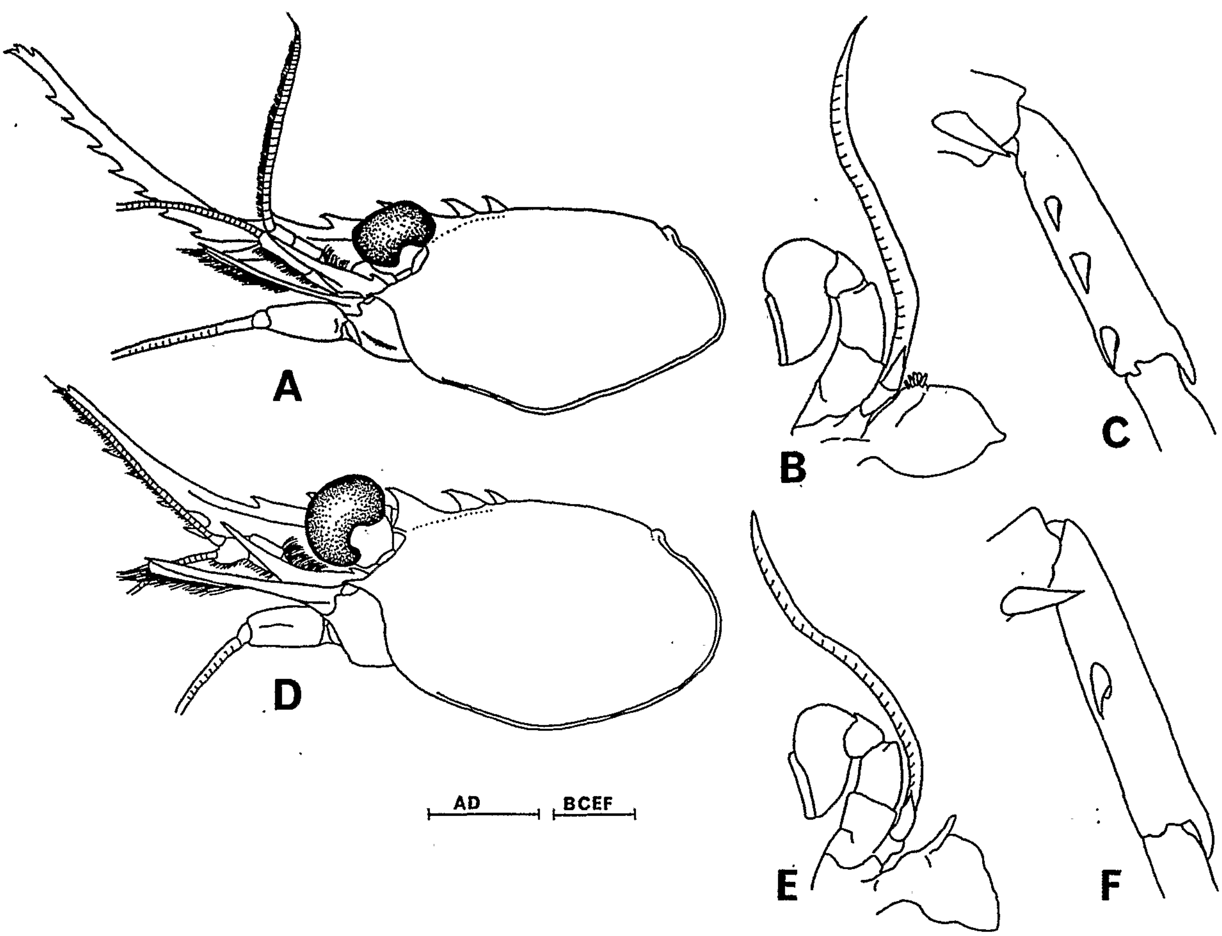


Fig. 4. — Comparisons of *C. erythrostictus* sp. nov. (A-C, male paratype, NSMT-Cr 2574, 11.0 mm CL) and *C. rigens* (Gordon, 1936)(D-F, male, USNM 189009, 10.8 mm CL). **A** & **D**, anterior part of body ; **B** & **E**, second maxilliped ; **C** & **F**, carpus of third pereiopod. Scales for A, D = 5 mm ; B, C, E, F = 1 mm.

DISTRIBUTION. — The present species is known from southern Japan, New Caledonia and the Loyalty Islands in the western Pacific. The closely allied species, *C. rigens*, is recorded from several localities on the Atlantic Ocean (GORDON, 1936 ; BURKENROAD, 1939 ; FIGUEIRA, 1960 ; MANNING, 1961 ; TIEFENBACHER, 1976 ; WIRTZ *et al*,1988 ; MANNING & CHACE, 1990). Both species have not been known from the eastern Pacific.

ETYMOLOGY. — The specific name *erythrostictus* is coined from two Greek words, *erythros* meaning red and *stiktos* meaning the dapple, in allusion to many red spots on the body in alive.

REMARKS. — As identified with *rigens* by previous authors (cf. synonymous list), *C. erythrostictus* strongly resembles that species. They are differentiated from each other by the following characters.

1) The thickened part of the upper antennular flagellum is falling distinctly short of the distal series of the rostral dorsal teeth in *C. erythrostictus* (Fig. 4 A), whereas it reaches the distal series of the teeth in *C. rigens* (Fig. 4 D).

2) *C. erythrostictus* has a small podobranch on the epipod of the second maxilliped (Fig. 4 B) ; *C. rigens* has the rudimental podobranch at the maxilliped typically, and possesses an accessory lobe on the epipod (Fig. 4 E), except two specimens from Madeira, which has an indistinct podobranch on the tip of the accessory lobe.

3) *C. erythrostictus* nearly always possesses three spines on the carpi of the third and fourth pereiopods (Fig. 4 C), whereas the normal complement for *C. rigens* appears to be a single spine (Fig. 4 F).

4) In alive, *C. erythrostictus* is not covered with the red spots at the carapace anterolaterally, coloring pale uniformly, whereas *C. rigens* is uniformly covered with the numerous red spots and patches on the whole surface of the carapace.

5) In alive, the sixth abdominal somite is covered with the red spots in the present new species, while in *C. rigens*, the somite has a longitudinal red and white bands.

The characters of 1) and 5) are originally indicated by FUJINO (1975), and 3) has been previously suggested by TIEFENBACHER (1976).

The present comparisons revealed that the other distinctions proposed by FUJINO (1975) were unavailable to determine, because they were strongly variable within each species.

Tab. 2. — Frequency distribution of rostral ventral teeth counts of *Cinetorhynchus*. * : Including the counts of the holotype.

No. of teeth	7	8	9	10	11	12	13	14
Species								
C. erythrostictus			1	9	12*	7		
C. rigens			1	10	4			
C. hiatti		4	4*	1		2		
C. concolor			2	2*	13	3	1	
C. striatus					1	5	5	3
C. hendersoni	5	8	18	5	5			
C. reticulatus		1	8	13	13*			

Cinetorhynchus hiatti (Holthuis & Hayashi, 1967) comb. nov.
(Pl. 1 C & Fig. 5)

Rhynchocinetes rigens ; HIATT, 1948 : 78. — HIATT, 1954 : 25, pl. 5, fig. 5 (not GORDON, 1936).
Rhynchocinetes hiatti Holthuis, 1953 : 54 (*nomen nudum*). — MORRISON, 1954 : 18 (*nomen nudum*).
Rhynchocinetes hiatti Holthuis & Hayashi, 1967 : 162, figs. 1-2 (Type locality : Taiwan). — TIEFENBACHER, 1976 : 318 (in part). — BRUCE, 1984 : 209, fig. 1. — OKUNO, 1993 : 5, fig. 5. — OKUNO, 1994b : 69 (in part), figs. 3C & 4G. — OKUNO, 1995 ; 2, fig. 3.
Not *Rhynchocinetes hiatti* ; MONOD, 1972 : 15, figs. 27-64. — MIYAKE, 1975 : 105, fig. unnumbered. — TAKEDA, 1982 : 35, fig. unnumbered [= *C. hendersoni* (Kemp, 1925)].

Rhynchocinetes, Hawaiian species; Anonymous, 1982 : 404, fig. unnumbered.
Not *Rhynchocinetes hiatti* ; KAMEZAKI *et al*, 1988 : 71, fig. unnumbered [= *C. concolor* (Okuno, 1994)].
Not *Rhynchocinetes hiatti* ; COLEMAN, 1991 : 104, fig. unnumbered [= *C. striatus* (Nomura & Hayashi, 1992)].

MATERIAL EXAMINED. — 14 specimens. - **Japan. Ogasawara Islands.** Chichi-jima Island : 1 ♀ (NSMT-Cr 2133, 7.8 mm CL). — Ani-jima Island : 1 ♂ (SUF 530-2-1681, 10.0 mm CL). — Ryukyu Islands. Iriomote-jima Island : 1 ovig. ♀ (SUF 530-2-1680, 12.0 mm CL).

Taiwan. Kosho Bay : 1 ♂ (KMNH, uncatalogued, holotype of *Rhynchocinetes hiatti*, 13.3 mm CL).

Hawaii. Oahu Island : 1 ♀ (BPBM, uncatalogued, 13.6 mm CL), 1 ♂ (NSMT-Cr 2419, 17.1 mm CL).

Mariana Islands. Guam Island : 1 ovig. ♀ (NSMT-Cr 1723, 10.6 mm CL), 1 ♀ (NSMT-Cr 1756, 12.7 mm CL).

Marshall Islands. Enewetok Atoll : 1 ♂, 2 ovig. ♀ (MNHN-Na 2775, 8.7-10.9 mm CL).

Marquesas Islands. Nuku Hiva : 2 ovig. ♀ (BPBM S11280, 11.0 & 11.7 mm CL).

Loyalty Islands. Uvea Island : 1 ovig. ♀ (MNHN-Na 12948, 14.2 mm CL).

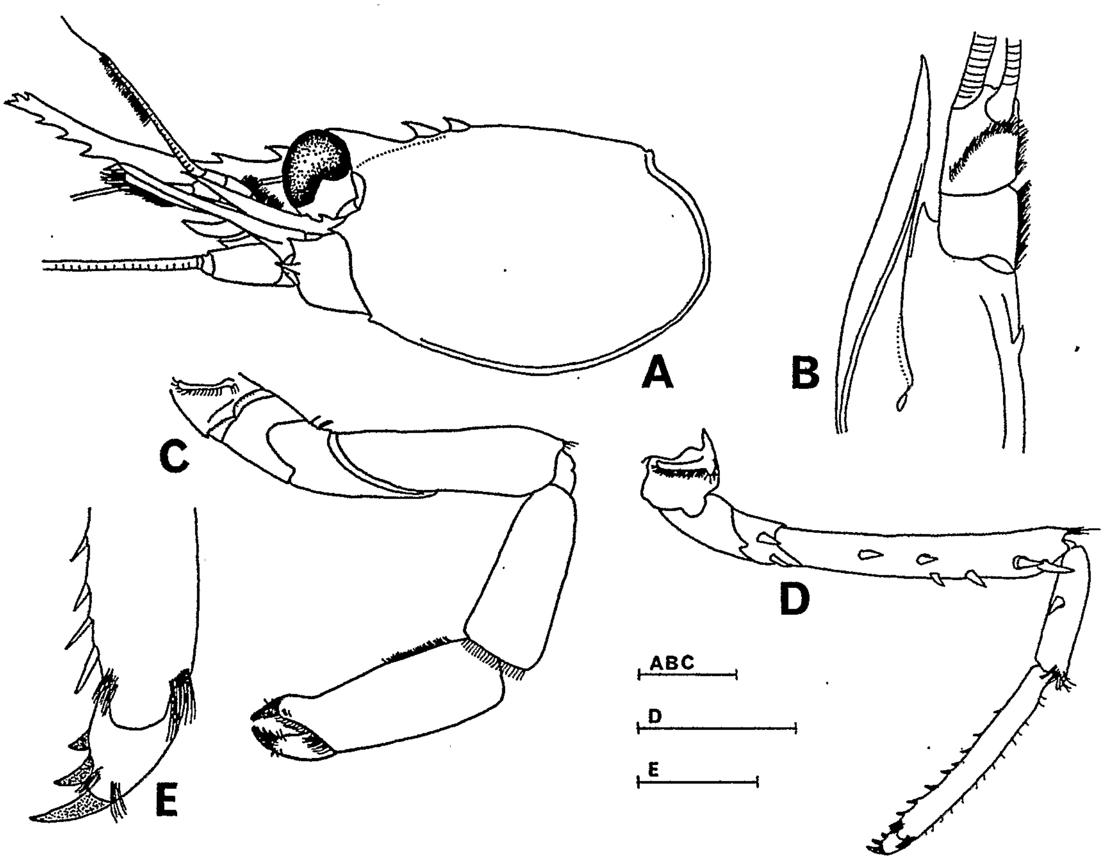


Fig. 5. — *Cinetorhynchus hiatti* (Holthuis & Hayashi, 1967). Ovigerous female (MNHN-Na 12948, 14.2 mm CL). **A**, anterior part of body ; **B**, antennular peduncle, ventral view ; **C**, first pereiopod ; **D**, third pereiopod ; **E**, dactylus of third pereiopod. Scales for A, D = 5 mm ; B, C = 2 mm ; E = 1 mm.

DESCRIPTION. — Carapace with pterygostomial angle usually with a blunt spine, rarely without spine, rounded. Rostrum curved dorsad, 0.8-1.6 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 8-12 teeth decreasing in size distally.

Antennular peduncle reaching, or slightly overreaching midlength of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite considerably exceeding distal end of ultimate segment.

Scaphocerite slightly overreaching midlength of rostrum, 0.6-0.8 times as long as carapace, 2.7-3.4 times as long as its maximum width, with distolateral spine overreaching tip of lamella ; basicerite typically with two acute spines, directed anteriorly, rarely with a single spine just below a rounded lobe anterodorsally.

In female and small male, third maxilliped subequal to, or slightly over reaching tip of scaphocerite, falling short of rostral apex, ultimate segment armed with 5-7 dark corneous claws at apex ; in mature male, the maxilliped overreaching rostral apex by midlength of ultimate segment armed with 3 claws at its apex.

First pereiopod reaching distal end of scaphocerite, coxa with small, blunt spine anterolaterally. Second pereiopod reaching midlength of scaphocerite.

Ambulatory pereiopods considerably stouter than those of the congeners, with carpi typically armed with a single spine on outer surface, situated at level of the midlength ; dactyli with 2 small claws posterior to terminal claw. Third pereiopod reaching midlength of scaphocerite ; merus with 2-4 (usually 4) spines on outer surface, 1-2 (usually 1) spines on ventral margin. Fourth pereiopod reaching midlength of scaphocerite ; merus with 4 (rarely 2) spines on outer surface, 1-2 (usually 1) spines on ventral margin. Fifth pereiopod reaching base of scaphocerite ; ischium usually without spine ; merus with 2-4 (usually 3) spines on outer surface, usually with a single spine (rarely unarmed) on ventral margin.

COLORATION. — Ground color of whole body deep orange. Carapace with three oblique pale bands fringing with red lines on posterolateral surface, the posterior band continuous with that on the first abdominal somite. Rostrum uniformly pale orange except white apex. Each somite of abdomen with transverse white band bordering by red lines ; the band of the sixth somite usually broken, forming two white spots circumscribing with red circle, rarely forming a complete band.

DISTRIBUTION. — Western and central Pacific within an area bounded by the Ogasawara Islands in the north and the Loyalty Islands in the south. Usually occurs in 1-10 m depths. The deepest record is 24 m of the specimens from Nuku Hiva of the Marquesas Islands. Records now available suggest that this species mainly occurs in the oceanic islands of the central Pacific rather than in the continental islands.

Tab. 3. — Frequency distribution of number of spines on outer surface of meri of 3rd to 5th pereiopods. * : Including the counts of the holotype.

Pereiopods	3rd										4th						5th				
No. of spines	2	3	4	5	6	7	8	9	10	11	2	3	4	5	6	7	2	3	4	5	6
Species																					
C. erythrostictus			5	21*	7	2	2						2	14	17*	4		4	18*	13	1
C. rigens			5	13	1								7	13				10	6	3	
C. hiatti	1	2	11*								1		12*				1	10*	3		
C. concolor			2	23*	2	1	1					1	1	25*	1			16	12	1*	
C. striatus				11	6	2	1			1				11	9	1			4	14	3
C. hendersoni		2	17	21	3	3						3	29	13	1		8	31	3	1	
C. reticulatus		3	21	15*	1							2	33*	6			2	31*	6	2	

REMARKS. — The holotype of *hiatti*, a male specimen from Taiwan, is housed at the collection of KMNH on account of the transference from the Zoological Laboratory of Kyushu University.

Cinetorhynchus hiatti is morphologically characterized by the combination of the stylocerite distinctly overreaching the distal end of the antennular peduncle (Fig. 5 B), and the carpi of the ambulatory pereiopods nearly always armed with a single spine (Fig. 5 D), the lower number of the spines on the meral ventral margin of the third and fourth pereiopods and the dactyli bearing two small claws posterior to the terminal claw in the ambulatory pereiopods (Fig. 5 E). This species has the antennal basicerite typically armed with two acute spines (HOLTHUIS & HAYASHI, 1967). Although this character reveals the intraspecific variation noted in the above lines, it may be available to determine it from the other congeners having the basicerite constantly armed with a single spine anteriorly. TIEFENBACHER (1976) compared the forms of the coxal spine of the first pereiopod between *C. hiatti* and *C. hendersoni*. The indistinctive spine, as bearing in *C. hiatti*, is appeared in all the congeners except *C. hendersoni*, which possesses a lobate corneous projection on the coxa.

HIATT (1948, 1954) recorded the Hawaiian specimens identified with *R. rigens*. I could not examine these specimens which were not designated as the type series of *hiatti*. Because the morphological characters between *C. hiatti* and *C. rigens* closely resemble each other and *C. hiatti* is not uncommon in the Hawaiian waters, I regarded that HIATT's specimens may belong to *C. hiatti*. In the popular publications with the color photographs were several records under the name of *hiatti* (MIYAKE, 1975 ; TAKEDA, 1982 ; KAMEZAKI *et al*, 1988 ; COLEMAN, 1991). These specimens were not identical with *C. hiatti* but with the other congeners (cf. synonymous list).

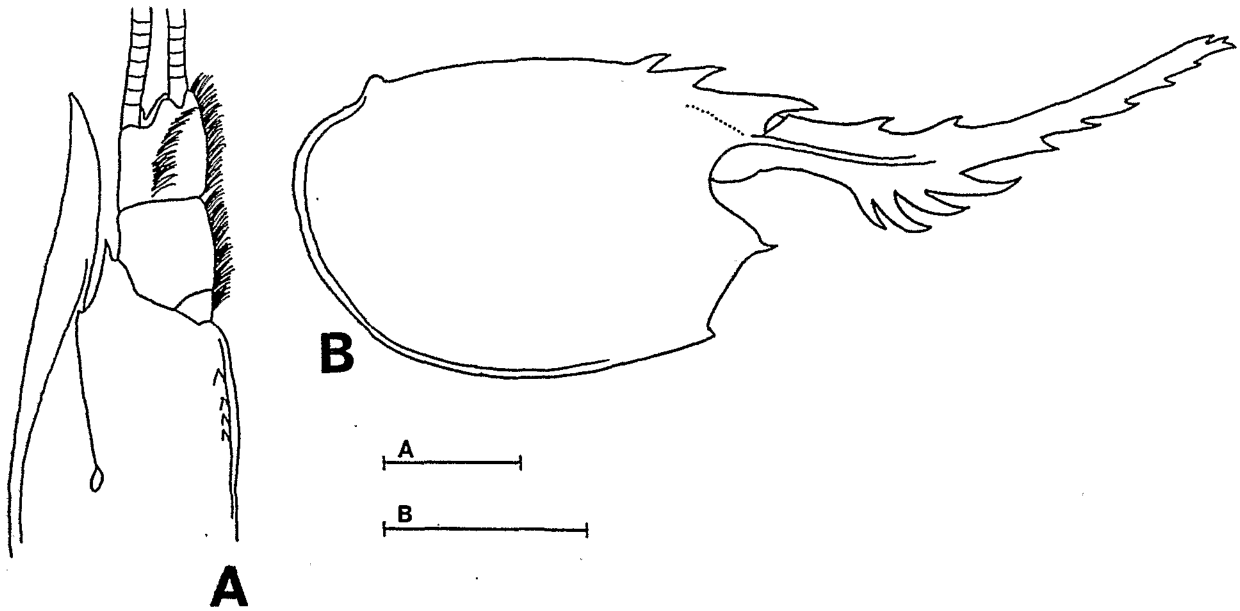


Fig. 6. — *Cinetorhynchus concolor* (Okuno, 1994). **A**, male (MNHN-Na 12941, 11.6 mm CL), antennular peduncle, ventral view ; **B**, juvenile (NSMT-Cr 3316, 3.2 mm CL), carapace with rostrum. Scales 2 mm.

Cinetorhynchus concolor (Okuno, 1994) comb. nov.
(Pl. 1 D & Fig. 6)

Rhynchocinetes hiatti ; Kamezaki *et al*, 1988 : 71, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).
Rhynchocinetes sp. STEENE, 1990 : 76, fig. unnumbered.
Rhynchocinetes concolor Okuno, 1994b : 65, figs. 1-2, 3A, 4A-D. — OKUNO, 1995 : 2, figs. 1-2.

MATERIAL EXAMINED. — In addition to the type series, the following 20 specimens were examined in the present study :

Japan. Izu Islands. Hachijo-jima Island : 1 juv. (NSMT-Cr 3315, 4.3 mm CL), 1 juv. (NSMT-Cr 3316, 3.2 mm CL).

Chesterfield Islands. 1 ♂ (MNHN-Na 12940, 8.3 mm CL).

New Caledonia. Récif Taenia : 2 ♀ (MNHN-Na 12942, 8.2 & 9.1mm CL), 1 ♂, 1 ♀ (MNHN-Na 12943, 5.7 & 8.3 mm CL). — Récif Anna : 2 ♂ (MNHN-Na 12963, 11.7 & 13.7 mm CL). — Baie de Canala : 1 ♂ (MNHM-Na 12941, 11.6 mm CL).

Loyalty Islands. Uvea Island : 2 ♂ (MNHN-Na 12959, 12.7 & 14.4 mm CL), 1 ♀ (MNHN-Na 12960, 11.4 mm CL), 1 ovig. ♀ (MNHN-Na 12961, 10.9 mm CL), 1 ovig. ♀ (MNHN-Na 12962, 11.8 mm CL), 3 ♂, 1 ovig. ♀ & 1 juv. (MNHN-Na 12944, 4.4-14.4 mm CL).

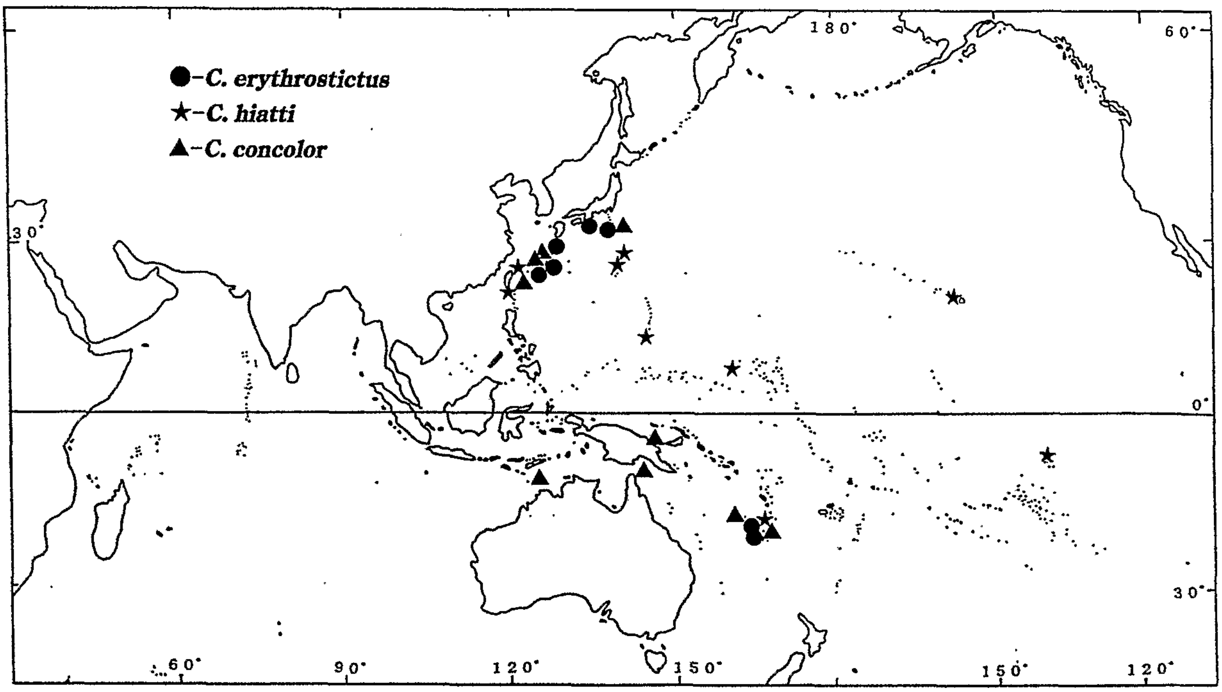


Fig. 7. — Distributions of *Cinetorhynchus erythrostictus*, *C. hiatti* and *C. concolor*.

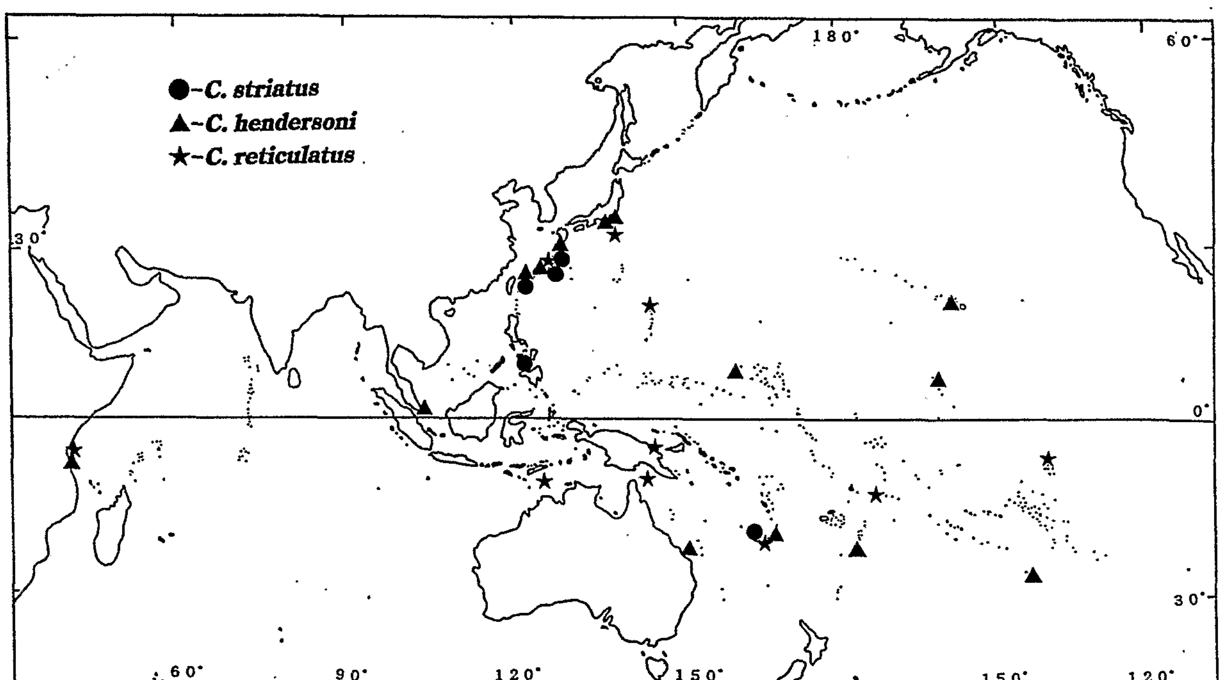


Fig. 8. — Distributions of *Cinetorhynchus striatus*, *C. hendersoni* and *C. reticulatus*.

DESCRIPTION. — Carapace without pterygostomial spine. Rostrum distinctly upturned distally, 1.3-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 small teeth subterminally, armed ventrally with 9-13 (usually 11) teeth, proximal 4 (rarely 5) teeth acutely pointed, directed anteriorly, separated by the distinct interval from proximal tooth of distal series, distal 5-9 (usually 7) teeth small, equidistant, ultimate tooth subterminally.

Antennular peduncle reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with 2-4 (usually 2) acute teeth ; stylocerite over reaching distal end of ultimate segment ; upper flagellum not reaching distal series of rostral dorsal teeth.

Scaphocerite reaching midlength of rostrum, 0.7-0.9 times as long as carapace, 2.8-3.9 times as long as width, with distolateral spine overreaching tip of lamella ; basicerite armed with an acute spine anteriorly.

Third maxilliped reaching midlength of rostrum, subequal to tip of scaphocerite, ultimate segment armed with 5-7 dark corneous claws at its apex.

First pereiopod reaching midlength of scaphocerite. Second pereiopod reaching slightly beyond midlength of scaphocerite.

Ambulatory pereiopods with coxae with indistinctive spines, external margin rounded ; dactyli with 3 small claws posterior to terminal claw. Third pereiopod overreaching tip of scaphocerite ; merus with 4-8 (usually 5) spines on outer surface, 2-4 (usually 2) spines on ventral margin ; carpus with 1-4 (usually 2) spines on outer surface. Fourth pereiopod reaching distal third of scaphocerite ; merus with 3-6 (usually 5) spines on outer surface, 1-3 (usually 2) spines on ventral margin ; carpus with 2 (rarely 3) spines on outer surface. Fifth pereiopod reaching midlength of scaphocerite ; merus with 3-4 (rarely 5) spines on outer surface, 1-2 (rarely 3) spines on ventral margin ; carpus with 2 (rarely 1) spines on outer surface.

COLORATION. — The coloration of the additional materials agree quite well with those of the type specimens (OKUNO, 1994b).

Tab. 4. — Frequency distribution of number of spines on ventral margin of meri of 3rd to 5th pereiopods. * : Including the counts of the holotype.

Pereiopods	3rd						4th					5th			
No. of spines	1	2	3	4	5	6	1	2	3	4	5	0	1	2	3
Species															
C. erythrostictus		9*	18	8	1	1		18*	16	2	1		8*	18	10
C. rigens	4	14	1				5	15					15	4	
C. hiatti	11*	3					11*	3				1	12*		
C. concolor		21*	5	3			2	20*	6				9	19*	1
C. striatus		1	11	7		2	1	4	15	1			1	14	6
C. hendersoni		5	30	9	1		1	7	29	8			13	22	9
C. reticulatus		3	27*	8	2	1		14	24*	4			10	19*	12

DISTRIBUTION. — In addition to the previously known localities, viz., the Amami and Ryukyu Islands of the southern Japan, Papua New Guinea and the northern Australian waters, this species has been collected from Hachijo-jima Island of the Izu Islands, Japan and the New Caledonian waters including the Chesterfield and the Loyalty Islands.

REMARKS. — In the further examination on this species, I additionally found the diagnostic character of *C. concolor* ; the inner margin of the antennular proximal segment is armed ventrally with 2-4 acute teeth (Fig. 6 A) instead of a single tooth in the other congeners.

The present study represented that three juveniles (3.2-4.4 mm CL) have a small pterygostomial spine (Fig. 6 B) and the stylocerite falling distinctly short of the distal end of the antennular peduncle. Although these morphological characters vary due to the development, there is no difference in the live-coloration through the development.

Cinetorhynchus striatus (Nomura & Hayashi, 1992) comb. nov.
(Pl. 1 E)

Rhynchocinetes sp. DEBELIUS, 1983 : 68, fig. unnumbered. — DEBELIUS, 1984 : 68, fig. unnumbered. — KAMEZAKI *et al*, 1988 : 74, fig. unnumbered.
Rhynchocinetes hiatti ; COLEMAN, 1991 : 104, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).
Rhynchocinetes striatus Nomura & Hayashi, 1992 : 199, figs. 1-4 (Type locality : Ryukyu Is.). — OKUNO, 1994b : 69 (in part), figs. 3E, 4F. — OKUNO, 1995 : 3, fig. 4.

MATERIAL EXAMINED. — 21 specimens. **Japan.** Amami Islands. Amami-Ohshima Island : 1 ♂ (YCM-CM 977, 8.7 mm CL). — Ryukyu Islands. Ie-shima Island : 1 ♂ (NSMT-Cr 2170, 16.9 mm CL), 1 ♂ and 2 ovig. ♀ (NSMT-Cr 2171, 19.3-20.7 mm CL). — Okinawa Island : 1 ♂ (NSMT-Cr 2037, 20.3 mm CL), 3 ovig. ♀ (NSMT-Cr 2192, 21.0-22.5 mm CL). — Aka-jima Islet : 1 ovig. ♀ (NSMT-Cr 2159, 18.8 mm CL). — Kuro-shima Islet : 1 ♂ (SUF 530-2-1360, paratype of *Rhynchocinetes striatus*, 16.5 mm CL), 1 ♀ (SUF 530-2-1361, paratype of *R. striatus*, 18.3 mm CL), 1 ♀ (SUF 530-2-1362, paratype of *R. striatus*, 13.2 mm CL). — Iriomote- jima Island : 2 ♂ (SUF 530-2-1682, 11.5 & 13.2 mm CL).
Philippines. Cebu Island, Sumilon Island : 1 ovig. ♀ (BPBM S11283, 18.5 mm CL).
New Caledonia. East coast, Récif Ana : 1 ♂ and 4 ovig. ♀ (MNHN-Na 12955, 10.8-19.4 mm CL).

DESCRIPTION. — Carapace with pterygostomial angle rounded, without spine. Rostrum strongly upturned distally, 1.4-2.1 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 11-14 (usually 12-13) sharply acute teeth decreasing in size distally.

Antennular peduncle reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite subequal to distal end of ultimate segment.

Scaphocerite broad, 0.7-0.8 times as long as carapace, 2.4-3.2 times as long as its maximum width, distolateral spine falling distinctly short of tip of lamella.

Third maxilliped reaching distal third of scaphocerite. First pereiopod reaching base of scaphocerite. Second pereiopod subequal to midlength of scaphocerite.

Ambulatory pereiopods very slender, with dactyli with 3 small claws posterior to terminal claw. Third pereiopod overreaching tip of scaphocerite by distal third of propodus ; merus with 5-8 (usually 5-6, rarely 11) spines on outer surface, 2-6 (usually 3-4) spines on ventral margin ; carpus slender, with 2-4 (usually 2) spines on outer surface. Fourth pereiopod slightly overreaching tip of scaphocerite ; merus with 5-7 (usually 5-6) spines on outer surface, 1-4 (usually 3) spines on ventral margin ; carpus with 2-3 spines on outer surface. Fifth pereiopod subequal to tip of scaphocerite ; merus with 4-6 (usually 5) spines on outer surface, 1-3 (usually 2) spines on ventral margin ; carpus with 2-3 (usually 2) spines on outer surface, rarely unarmed.

COLORATION. — The coloration of the additional specimens agrees well with the description and the figure 1 by NOMURA and HAYASHI (1992) and no further description is necessary.

DISTRIBUTION. — Presently known from the Ryukyu Islands, the Philippines and New Caledonia. Usually found at rocky reef of 1-20 m depths.

Cinetorhynchus hendersoni (Kemp, 1925) comb. nov.
(Pl. 1 F & Figs. 9, 12 D-F)

Rhynchocinetes rugulosus ; HENDERSON, 1893 : 438. — THURSTON, 1895 : 120. — FUJINO, 1975 : 300 (not STIMPSON, 1860).
Rhynchocinetes hendersoni Kemp, 1925 : 265, figs. 3-5, 7 (Type locality : Gulf of Manaar). — GORDON, 1936 : 82. — HOLTHUIS, 1947 : 80. — BRUCE, 1976 : 4. — TIEFENBACHER, 1976 : 318 (in part). — DEBELIUS, 1983 : 76, fig. unnumbered. — DEBELIUS, 1984 : 76, fig. unnumbered. — KAMEZAKI *et al*, 1988 : 70, fig. unnumbered. — OKUNO, 1993 : 4, figs. 1-4. — OKUNO, 1994b : 69 (in part), figs. 3B, 4E.
? *Rhynchocinetes hendersoni* ; BOONE, 1935 : 109, pls. 28-29.
Not *Rhynchocinetes hendersoni* ; ARMSTRONG, 1941 : 12 [= *C. reticulatus* sp. nov.].

Rhynchocinetes intermedius Edmondson, 1952 : 72, fig. 3.
Rhynchocinetes marshallensis Edmondson, 1952 : 75, figs. 4-6.
Rhynchocinetes hiatti ; MONOD, 1972 : 15, figs. 27-64. — MIYAKE, 1975 : 105, fig. unnumbered. — TAKEDA, 1982 : 35, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).
Rhynchocinetes rigens ; TIEFENBACHER, 1976 : 317 (not GORDON, 1936).
Rhynchocinetes sp. DEBELIUS, 1983 : 68, fig. unnumbered.

MATERIAL EXAMINED. — 47 specimens. **Japan.** Sagami Bay : 3 ♂ (NSMT-Cr 1702, 10.8-12.3 mm CL), 2 ♂ (NSMT-Cr 1717, 10.3 & 12.4 mm CL), 1 ♂ (NSMT-Cr 1755, 9.5 mm CL), 1 ♂ (NSMT-Cr 1812, 10.9 mm CL). — Suruga Bay : 1 ♂ (SUF, uncatalogued, 12.0 mm CL). — Kagoshima Bay : 2 ♂, 5 ♀ (KUMBcr 1046-1052, 9.9-14.0 mm CL). — Ryukyu Islands, Okinawa Island : 5 ♂, 2 ♀ , 2 ovig. ♀ (NSMT-Cr 2191, 6.8-13.2 mm CL), 1 ovig. ♀ (NSMT-Cr 2193, 10.5 mm CL). — Kuro-shima Islet. 1 ♀ (NSMT-Cr 1939, 6.2 mm CL).

Hawaii. Oahu Island : 1 ♂ (BPBM 5766, syntype of *Rhynchocinetes intermedius*, 12.6 mm CL), 1 ovig. ♀ (BPBM S5635, syntype of *R. intermedius*, 10.2 mm CL).

Marshall Islands. Enewetok Atoll : 1 ♂ (BPBM 5637, holotype of *Rhynchocinetes marshallensis*, 8.8 mm CL).

Line Islands. Fanning Island : 1 ♂ (BPBM S8481, 5.0 mm CL).

Singapore : 1 ♂ (SMF, uncatalogued, 11.3 mm CL).

New Caledonia. Recif Larégnère : 1 ovig. ♀ (MNHN-Na 12952, 8.8 mm CL). — Récif Anna : 1 ♂ (MNHN-Na 12954, 10.6 mm CL), 2 ♂, 1 ovig. ♀ (MNHN-Na 12951, 7.4-8.9 mm CL). — Baie Laugier : 1 ♂ (MNHN-Na 12949, 8.4 mm CL).

Loyalty Islands. Uvea Island : 1 ♂ (MNHN-Na 12950, 9.6 mm CL), 1 ovig. ♀ (MNHN-Na 12953, 9.6 mm CL).

Australia. Heron Island : 3 ♂ (NTM. Cr. 003619, 7.0-7.7 mm CL).

Tonga. Tongatapu Island : 1 ovig. ♀ (NTM. Cr. 004252, 12.3 mm CL).

Austral Islands. Rapa Island : 2 ♂ (BPBM S8590, 7.8 & 8.5 mm CL), 1 ♂ (MNHN-Na 12964, 11.7 mm CL).

Zanzibar : 1 ♂ (NTM. Cr. 003621, 8.9 mm CL).

DESCRIPTION. — Carapace usually with small pterygostomial spine, rarely absent. Rostrum usually straight, slightly upward obliquely, 1.0-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 1-2 (usually 2) small teeth subterminally, armed ventrally with 7-11 (usually 8-9) acute teeth decreasing in size distally ; lateral carina indistinct, reaching proximal quartor of rostrum, continuous with upper orbital margin through the level of the mid-depth of rostrum proximally.

Fourth abdominal somite usually armed with an acute spine posterolaterally, directed posteriorly, rarely unarmed. Fifth somite constantly with an acute spine posterolaterally, directed posteriorly.

Antennular peduncle usually reaching midlength of rostrum, rarely proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite falling slightly short of distal end of ultimate segment.

Scaphocerite 0.7-0.9 times as long as carapace, 3.1-4.1 times as long as its maximum width, distolateral spine reaching or overreaching tip of lamella.

In female and small male, third maxilliped reaching proximal two thirds of scaphocerite ; in large male, third maxilliped reaching rostral apex.

In female and small male, first pereiopod usually reaching midlength of scaphocerite, coxa with a corneous projection acutely pointed or bifid distally ; in large male, first pereiopod distinctly elongated and stout, overreaching rostral apex by carpopropodial articulation, coxa with a lobate corneous projection, chela with palm more or less arched, strongly compressed distally, covered with fine granules at lower margin, 2.1-2.3 times as long as carapace, dactylus strongly curved directed ventrally, forming subchela. Second pereiopod usually reaching mid-length of scaphocerite.

Ambulatory pereiopods slender, meri slightly compressed, each dactylus with 3 horny claws posterior to dark terminal claw. Third pereiopod reaching proximal two thirds of scaphocerite ; coxa with an acutely pointed spine distally ; merus with 3-7 (usually 4-5) articulated spines on outer surface, 2-5 (usually 3) articulated spines on ventral margin ; carpus with 2 (rarely 1) articulated spines on outer surface. Fourth pereiopod usually reaching mid-length of scaphocerite ; coxa without spine ; merus with 3-6 (usually 4) articulated spines on outer surface, 1-4 (usually 3) articulated spines on ventral margin ; carpus with 2-3 (rarely 0 or 1) articulated spines on outer surface. Fifth pereiopod reaching proximal third of scaphocerite ; coxa without spine ; merus with 2-5 (usually 3) articulated spines on outer surface, 1-3 (usually 2) articulated spines on ventral margin ; carpus with 2 articulated spines on outer surface.

COLORATION. — Background color pale gray, covered with reddish brown mottles on carapace and with irregular lines of the same color of mottles on abdominal somites ; intermediate space between mottles on carapace usually wide, but narrow in some specimens. Rostral apex white, marked with red-white-red bands subterminal to distal third of rostral length ; all the pereiopods colored with reddish brown uniformly.

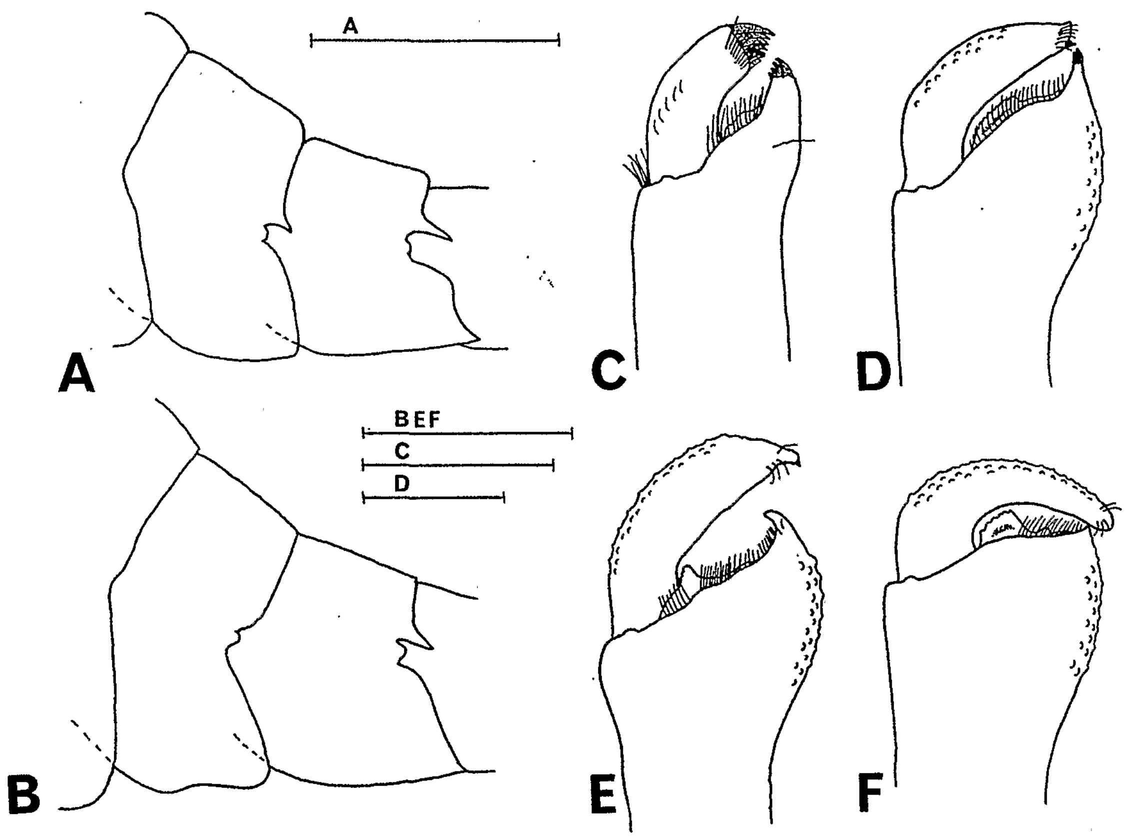


Fig. 9. — *Cinetorhynchus hendersoni* (Kemp, 1925). Fourth and fifth abdominal somites (A, B) and development of chelae of male first pereiopod (C-F). **A** & **D**, NSMT-Cr 1717, 10.3 mm CL ; **B** & **F**, NSMT-Cr 2191, 13.1 mm CL ; **C**, NSMT-Cr 1755, 9.5 mm CL ; **E**, NSMT-Cr 2191, 13.2 mm CL. Scales for A, B, E, F = 5 mm ; C, D = 2 mm.

DISTRIBUTION. — Known throughout the Indo-Pacific region from Zanzibar on the East coast of Africa to Rapa Island of the Austral Islands. This species is commonly found in littoral zone at depths of 1-10 m. I have often observed the specimens which are living on the breakwaters at night. Its deepest record is from off Oahu at the depth of 30 m (EDMONDSON, 1952).

REMARKS. — This species was originally described by KEMP (1925) on the basis of a male and a female specimens from Pamban and Kilakarai of the Gulf of Mannar, central Indian Ocean. The present materials can be identical with *hendersoni* by the combination of the shorter rostrum, the shorter stylocerite and the carpal spination of the third pereiopod. MONOD (1972) recorded 3 males, a female and 2 ovigerous females from the New Caledonian waters as *R. hiatti*. TIEFENBACHER (1976) re-examine these specimens and the Fijian specimen recorded by KEMP (1925), and indicated that they have a corneous projection on the coxa of the first pereiopod. All the specimens of *hendersoni* examined herein have this projection (Fig. 12 D), and I additionally found an acute corneous spine on the coxa of third pereiopod of *hendersoni* (Fig. 12 E). However, these projection and spine were absent in any of the congeners. Although I could not confirm the presence or absence of them in the type specimens, which have been deposited in the Calcutta Museum (BOONE, 1935), I regard these characters as the best diagnosis of *hendersoni* (Fig. 12 E).

The pterygostomial angle is typically armed with a small spine, but some specimens are lacking of it. The form of the posterolateral spine of the fourth abdominal somite is also variable, typically acute (Fig. 9 A), but completely absent in some specimens (Fig. 9 B). These differences were without reference to the sex, the development and the geographic form, and the sexual dimorphism appeared within the mature male specimens was represented by the distinctly elongated first pereiopod with subchela (Fig. 9 D-F), described above. The specimens from the lower latitude form the dimorphism in smaller size than those from the higher latitude.

EDMONDSON (1952) proposed two new species, *Rhynchocinetes intermedius* from off Oahu of Hawaii and *R. marshallensis* from Enewetok Atoll of the Marshall Islands.Through the courtesy of Dr. L. G. ELDREDGE, I could re-examine the type specimens while I visited the Bernice P. Bishop Museum, and found they have the coxal projection and spine discussed just above. Therefore, my identifications agreed quite well with the indication that two species described by EDMONDSON (1952) were junior synonym of *hendersoni* by HOLTHUIS and HAYASHI (1967).

Cinetorhynchus reticulatus sp. nov.
(Pl. 1 G, H & Figs. 10, 11, 12 A-C)

Rhynchocinetes hendersoni; ARMSTRONG, 1941 : 12 (not KEMP, 1925).
Rhynchocinetes sp. DEBELIUS, 1984 : 68, fig. unnumbered. — BAENSCH & DEBELIUS, 1992 : 545, figs. unnumbered. — HAYASHI *et al*, 1994 : 268.

TYPE SERIES. — Holotype, Male, 8.0 mm CL (MNHN-Na 12957), Loyalty Islands, Banya Islet, Uvea Island, 20°35.8'S, 166°16.7'E, 27 m, November 18, 1991.

PARATYPES. 48 specimens. **Japan**. Izu Islands, Nazumado, Hachijo-jima Island, 33°08.5'N, 139°44.4'E, 13 m, September 28, 1993 : 2 ♂ 4.7 & 5.1 mm CL (NSMT-Cr 2626) ; September 8, 1994 : 1 ♂ 7.0 mm & 1 ♀ 10.0 mm CL (NSMT-Cr 3317). — Occho-ga-hama, Hachijo-jima Island, 33°03.5'N, 139°47.9'E, 15 m, September 28, 1993 : 1 ovig. ♀ 10.0 mm CL (NSMT-Cr 2625). — Amami Islands, Fukaura, Amami-Oshima Island, 28°13.8'N, 129°17.4'E, 20 m, September 2, 1993 : 1 ♂ 10.0 mm CL (YCM-CM 979). — Sakinome, Amami-Ohshima Island, 28°11.2'N, 129°16.0'E, 28 m, September 2, 1993 : 1 ♂ 5.3mm CL (YCM-CM 978).

Mariana Islands. Pagan Island, 18°04.8'N, 145°27.6'E, 4-10 m, May 27, 1992 : 2 ovig. ♀ 7.6 & 8.1 mm CL (CBM-ZC 1467, 1469), 1 ♂ 6.0 mm CL (CBM-ZC 1468). — Pagan Island, shore, May 24, 1992 : 1 ♂ 4.8 mm CL (CBM-ZC 1466).

Papua New Guinea. Madang, northern end of Kranket Island, 5°09.6'S, 145°49.7'E, 23 m, October 27, 1991 : 1 ♂ 8.6 mm CL (NTM. Cr. 009895). — Rasch Passage, 5°10.0'S, 145°50.0'E, 22 m, October 26, 1991 : 1 ♂ 9.1 mm CL (NTM. Cr.010236). — Pik Island, 5°08.5'S, 145°49.7'E, 12-17 m, October 31, 1991 : 8 ♂ 5.0-9.8 mm, 6 ovig. ♀ 6.7-8.6 mm & 5 ♀ 3.7-4.9 mm CL (NTM. Cr. 011320).

Marquesas Islands. Nuku Hiva, west side of Sentinelle de l'Ouest, 8°33.6'S, 140°00.0'W, 24 m, May 1, 1971 : 1 ovig. ♀ 9.1 mm (BPBM S 11281) & 1 ♀ 11.1 mm CL (BPBM S 11282).

Australia. Coral Sea, Queensland, Ashmore Reef, 10°13.2'S, 144°24.9'E, 20-30 m, January 22, 1993 : 1 ♀ 8.9 mm CL (NTM. Cr. 010300).

Western Samoa. Savaii, Eastern Reef, 13°26.4'S, 177°10.8'W, October 17, 1936 : 1 ♂ 4.7 mm & 1 ovig. ♀ 4.6 mm CL (AMNH. 9312).

Loyalty Islands. Uvea Island, Banya Islet, 20°35.8'S, 166°16.7'E, 27 m, November 18, 1991 : 1 ♂ 6.8 mm & 1 ovig. ♀ 8.9 mm CL (MNHN-Na 12945).

New Caledonia. Grotte Merlet, St. 250, 22°42.4'S, 166°41.2'E, 30 m, January 20, 1993 : 1 ovig. ♀ 10.3 mm CL (MNHN-Na 12956).

Timor Sea. Western Australia, Hibernia Reef, 12°00.0'S, 123°18.0'E : 2 ♂ 5.4 & 6.3 mm CL (QM W17809). —

Western Australia, Asmore Reef, east side of West Pass, 12°14.0'S, 123°10.0'E, 20-21 m, September 26, 1987 : 1 ♀ 6.8 mm CL (NTM. Cr. 006368).

Zanzibar. Pange Reef, 6°02.0'S, 39°24.0'E, 10 m, June 6, 1974 : 4 ♂ 8.1-11.8 mm, 1 ♀ 10.4 mm & 1 ovig. ♀ 9.8 mm CL (NTM. Cr. 010749).

DESCRIPTION. — Carapace with pterygostomial angle usually unarmed, rarely armed with small blunt spine. Rostrum slightly upturned gradually, 1.3-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 8-11 (usually 10-11) acute teeth decreasing in size distally ; lateral carina continuous with supraorbital margin through the ventral margin of rostrum proximally.

Fourth abdominal somite usually armed with a posterolateral spine directed posteriorly, rarely unarmed. Fifth somite constantly with a posterolateral protrution directed posteriorly.

Antennular peduncle usually reaching midlength of rostrum, rarely reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite falling slightly short of distal end of ultimate segment ; thickened part of upper flagellum usually reaching subterminal of rostrum.

Scaphocerite slightly overreaching midlength of rostrum, 0.8-0.9 times as long as carapace, 2.9-3.8 times as long as its maximum width, with distolateral spine subequal or slightly overreaching tip of lamella.

Mouthparts typical. Second maxilliped with a distinct podobranch at proximal upper margin of epipod. In female and small male, third maxilliped reaching proximal two thirds of scaphocerite, ultimate segment 0.5 times as long as carapace, 1.3-1.6 times as long as penultimate segment, with 7-8 dark horny claws at apex. In large male, third maxilliped reaching rostral apex ; ultimate segment distinctly elongated, 0.6-0.7 times as long as carapace, 1.6-1.8 times as long as penultimate segment.

In female and small male, first pereiopod usually reaching midlength of scaphocerite, chela 0.3-0.6 times as long as carapace, 1.3-1.8 times as long as carpus, carpus 0.2-0.3 times as long as carapace ; in large male, first pereiopod developed and stout, forming subchela, beyond rostral apex by carpopropodial articulation, chela with palm strongly compressed distally, covered with sparse tubercles at ventral margin, 1.7-2.4 times as long as carapace, 2.3-3.5 times as long as carpus, dactylus strongly curved directed ventrally, carpus 0.6-0.7 times as long as carapace.

Second pereiopod usually reaching mid-length of scaphocerite, chela 0.3-0.4 times as long as carapace, carpus 0.4-0.6 times as long as carapace, 1.4-2.0 times as long as chela.

Ambulatory pereiopods slender, coxae without spine, each dactylus with 3 horny claws posterior to terminal claw. Third pereiopod reaching proximal two thirds of scaphocerite ; merus 0.7-0.8 times as long as carapace, 2.0-2.8 times as long as carpus, with 3-6 (usually 4-5) spines on outer surface, 2-6 (usually 3) spines on ventral margin ; carpus 0.3-0.4 times as long as carapace, with 3 (rarely 2 or 4) spines on outer surface ; propodus 0.6-0.7 times as long as carapace, 1.8-2.5 times as long as carpus. Fourth pereiopod reaching mid-length of scaphocerite ; merus 0.6-0.8 times as long as carapace, 1.7-2.4 times as long as carpus, with 3-5 (usually 4) spines on outer surface, 2-4 (usually 3) spines on ventral margin ; carpus 0.3-0.4 times as long as carapace, with 1-3 (usually 3) spines on outer surface ; propodus 0.6-0.8 times as long as carapace, 1.7-2.3 times as long as carpus. Fifth pereiopod reaching proximal third of scaphocerite ; merus 0.6-0.8 times as long as carapace, 1.6-2.3 times as long as carpus, with 2-5 (usually 3) spines on outer surface, 1-3 spines on ventral margin ; proportion of carpus resembling that of two former pereiopods, with 0-3 (usually 2) spines on outer surface ; proportion of propodus resembling that of fourth pereiopod.

Endopod of male first pleopod with distal end moderately pointed.

COLORATION. — Ground color of carapace red, posterior margin pale, with distinct white spots ventrolaterally. Rostral apex red, white-red-white bands at subterminal to distal third of rostral length, proximal two thirds more or less transparent. Abdomen mottled with red and white, with broad white area at anterior part of third somite. All pereiopods with red and white bands, except for chela of the mature male first pereiopod, uniformly reddish, dactylus and tip of palm dark brownish.

ETYMOLOGY. — The specific name *reticulatus* is Latin, meaning netted, in reference of the live-coloration of the present new species.

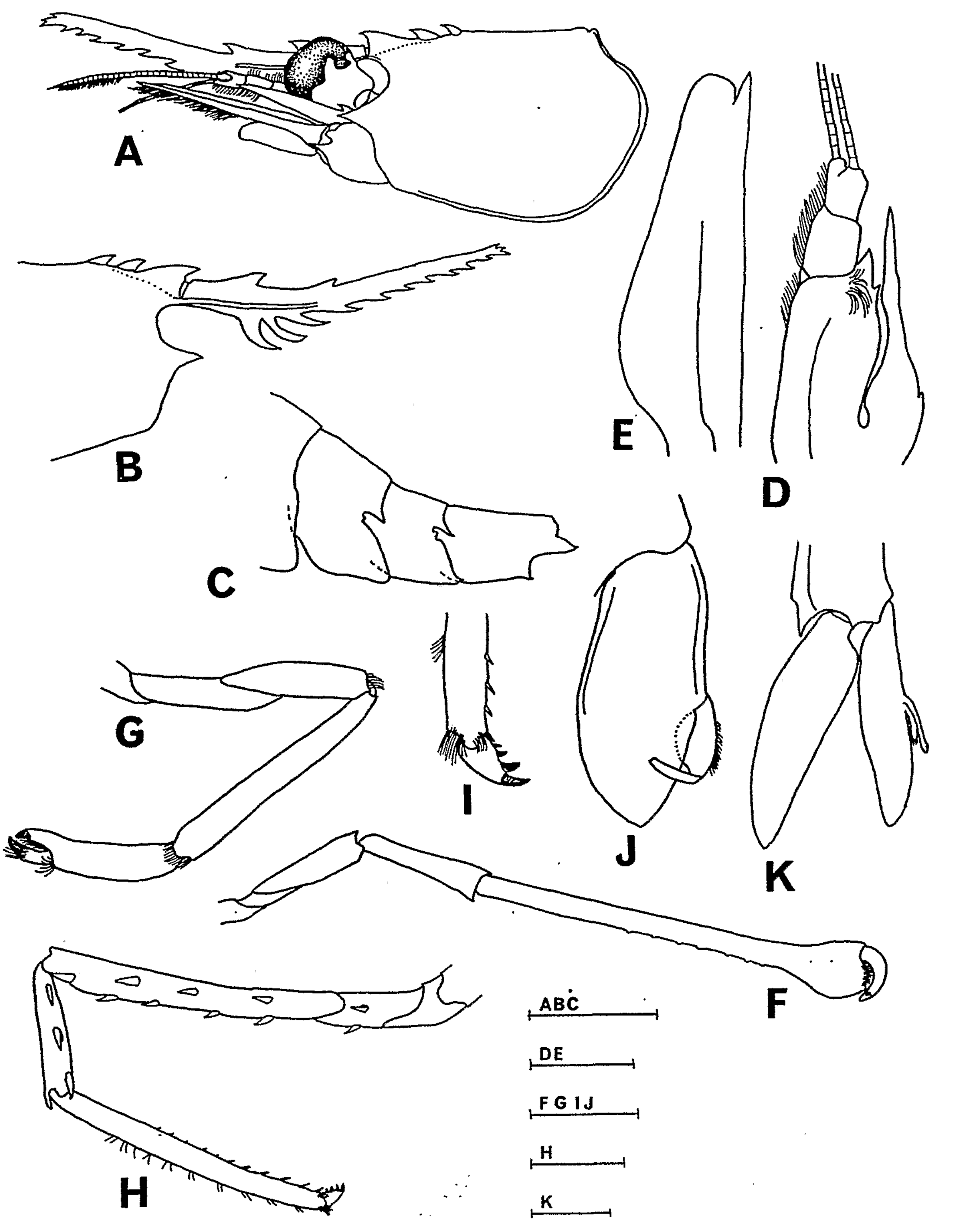


Fig. 10. — *Cinetorhynchus reticulatus* sp. nov. Male paratype (NTM. Cr. 010749, 8.1 mm CL). **A**, anterior part of body ; **B**, anterior part of carapace with rostrum ; **C**, fourth to sixth abdominal somites ; **D**, antennular peduncle, dorsal view ; **E**, scaphocerite ; **F**, first pereiopod ; **G**, second pereiopod ; **H**, third pereiopod ; **I**, dactylus of third pereiopod ; **J**, endopod of first pleopod ; **K**, second pleopod. Scales for A-C, F = 5 mm ; D, E, G, H = 2mm ; I-K = 1 mm.

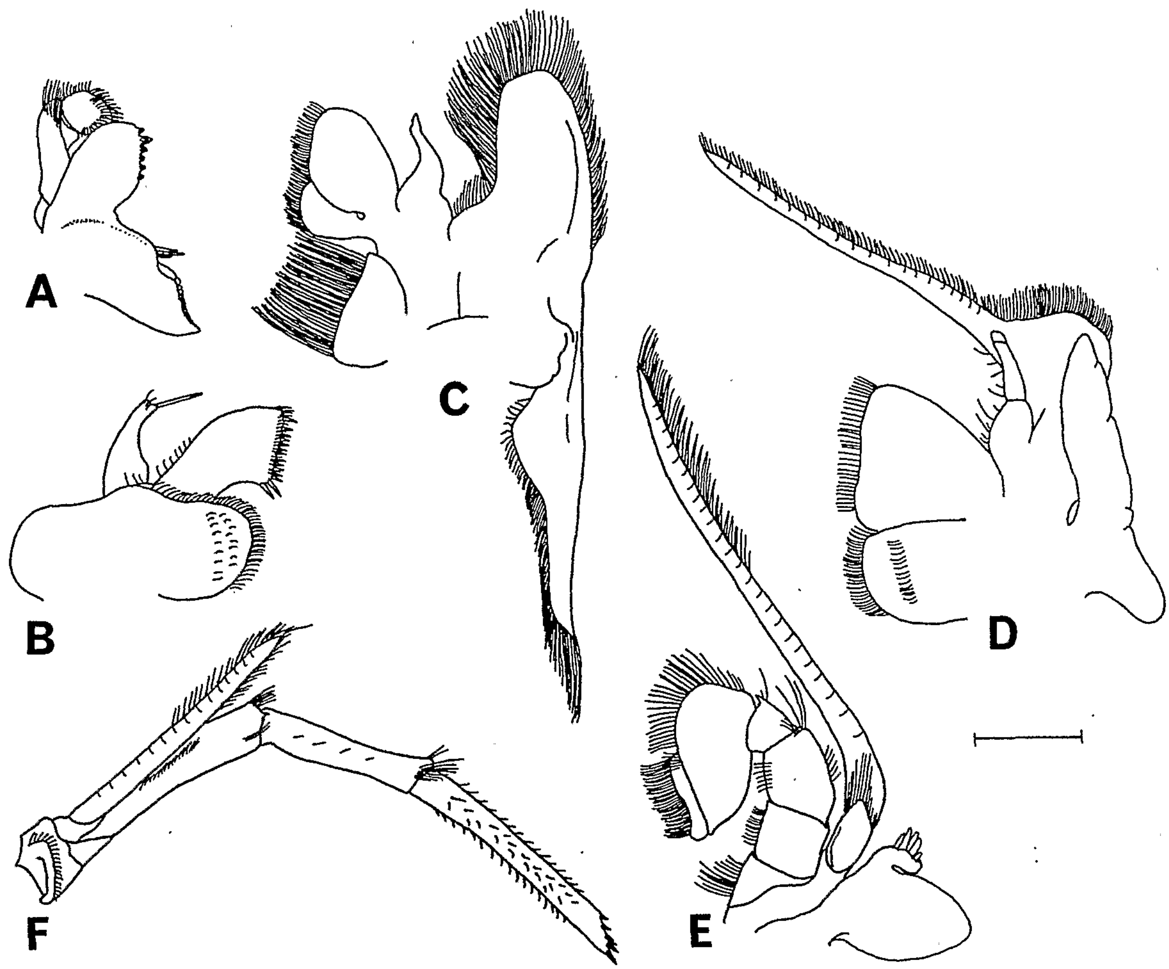


Fig. 11. — *Cinetorhynchus reticulatus* sp. nov. Female paratype (NSMT-Cr 3317, 10.0 mm CL). A. Mandible ; **B**, first maxilla ; **C**, second maxilla ; **D**, first maxilliped ; **E**, second maxilliped ; **F**, third maxilliped. Scales for A-E = 1 mm ; F = 2 mm.

DISTRIBUTION. — Known from various localities on the Indo-Pacific, from Zanzibar, the eastern coast of Africa to the Marqueseas Islands, northward to Hachijo-jima Island, the Izu Islands, Japan. Commonly captured at rocky bottom in 15-30 m depths.

REMARKS. — This new species most resembles *C. hendersoni* (KEMP, 1925) from which it mainly differes in lacking the corneous projection on the coxa of the first pereiopod (Fig. 12 A) and the spine on the coxa of the third pereiopod (Fig. 12 B), and in having nearly always three spines on the carpi of third and fourth pereiopods (Fig. 12 C).

The horizonal ranges of the new species and *C. hendersoni* are overlapped, however, the habitat of the former may be deeper than that of the latter ; *C. reticulatus* commonly inhabits at the depths of 15-30 m, instead of 1-15 m depths in *C. hendersoni.*

The first pereiopods of small male and female specimens are not distinctly elongated, thus, the external feature of them are closely related to that of *C. erythrostictus* sp. nov., described above. However, the present new species is readily distinguished from the latter in having the dactyli of the ambulatory pereiopods armed with three horny claws posterior to the terminal claw (Fig. 10 I), whereas the dactyli of *C. erythrostictus* bear two claws posterior to the terminal claw (Fig. 2 H).

It was represented that the specimens previously recorded from Savaii, Western Samoa (ARMSTRONG, 1941) and from Pagan Island, the northern Mariana Islands (HAYASHI *et al*, 1994) were identified with *C. reticulatus* as the result of the re-examinations.

Tab. 5. — Frequency distribution of number of spines on outer surface of carpi of 3rd to 5th pereiopods. * : Including the counts of the holotype.

Pereiopods	3rd				4th				5th			
No. of spines	1	2	3	4	0	1	2	3	0	1	2	3
Species												
C. erythrostictus		3	32*	2			4	33*		5	19	12*
C. rigens	14	4	1			14	6			17	2	
C. hiatti	14*					13*	1			14*		
C. concolor	1	26*		1			27*	1		1	27*	
C. striatus		18	1	2			14	7	1		18	2
C. hendersoni	1	45			1	1	42	2		2	42	
C. reticulatus		4	35*	1		1	6	34*	1	2	36*	2

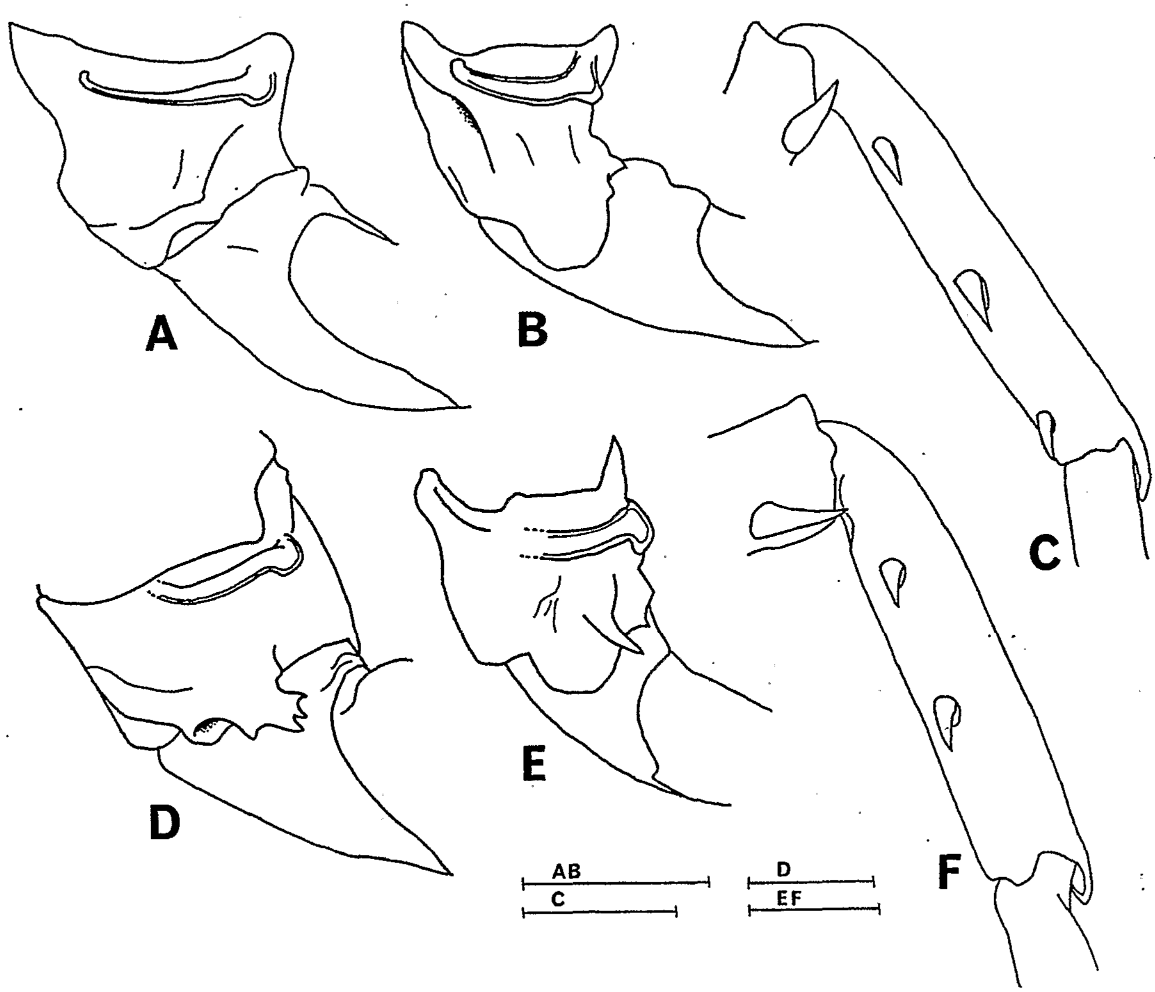
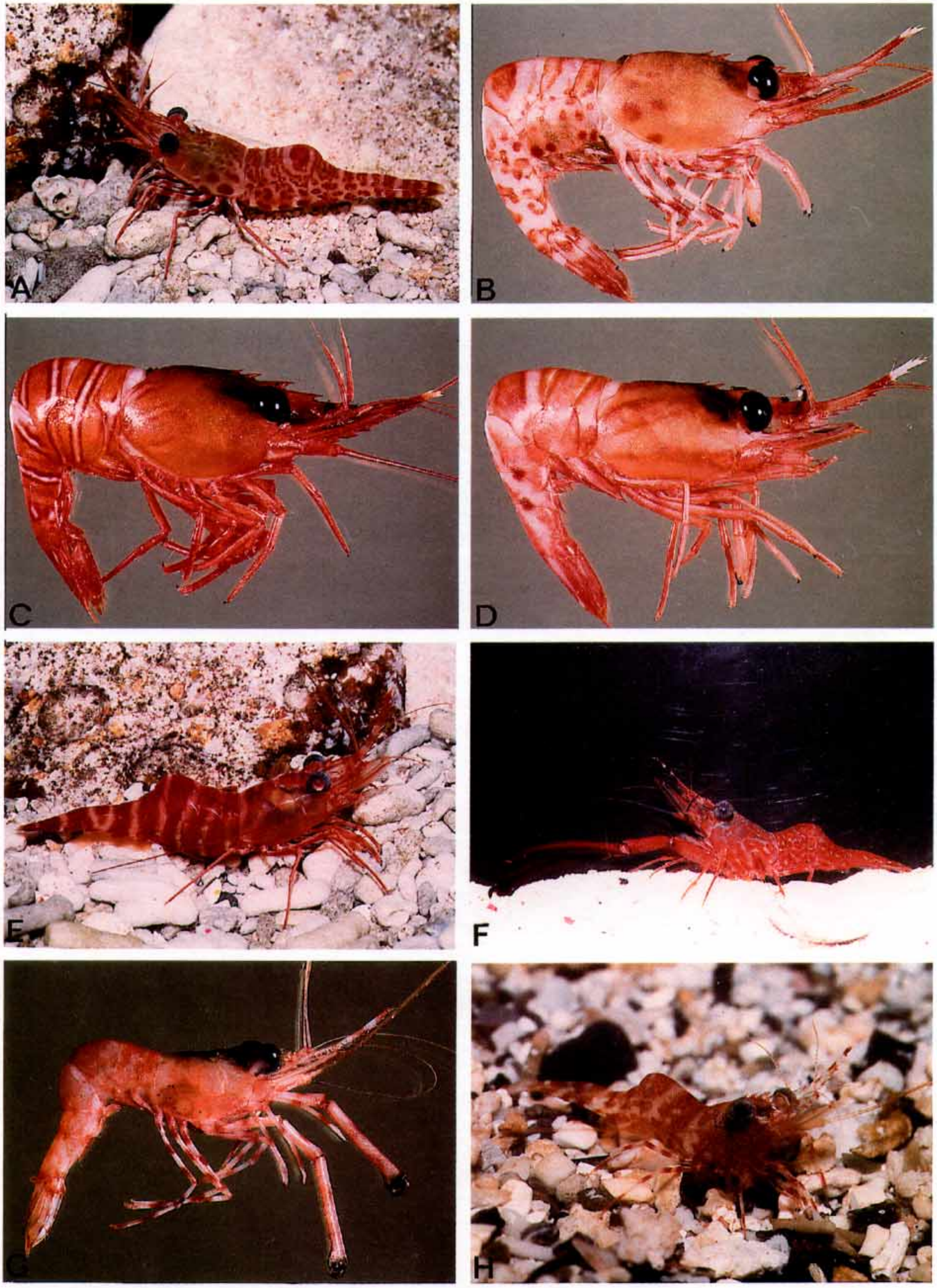


Fig. 12. — Comparisons between *Cinetorhynchus reticulatus* sp. nov. (A-C, holotype, MNHN-Na 12957, 8.0 mm CL) and *C. hendersoni* (Kemp, 1925)(D-F, male, NSMT-Cr 1717, 10.3 mm CL). **A** & **D**, coxa of first pereiopod ; **B** & **E**, coxa of third pereiopod ; **C** & **F**, carpus of third pereiopod. Scales 1 mm.

Pl 1. — **A.** *Cinetorhynchus erythrostictus* sp. nov. Holotype, female (NSMT-Cr 2155, 16.0 mm CL), alive in aquarium. Photograph J. OKUNO. — **B.** *Cinetorhynchus erythrostictus* sp. nov. Ovigerous female paratype (MNHN-Na 12947, 13.0 mm CL), fresh, lateral view. Photograph J. L. MENOU (ORSTOM). — **C.** *Cinetorhynchus hiatti* (Holthuis & Hayashi, 1967). Ovigerous female (MNHN-Na12948, 14.2 mm CL), fresh, lateral view. Photograph J. L. MENOU (ORSTOM). — **D.** *Cinetorhynchus concolor* (Okuno, 1994). Male (MNHN-Na 12959, 12.7 mm CL), fresh, lateral view. Photograph J. L. MENOU (ORSTOM). — **E.** *Cinetorhynchus striatus* (Nomura & Hayashi, 1992). Ovigerous female (NSMT-Cr 2159, 18.8 mm CL), alive in aquarium. Photograph J. OKUNO. — **F.** *Cinetorhynchus hendersoni* (Kemp, 1925). Male (NSMT-Cr 1812, 10.9 mm CL), alive in aquarium. Photograph J. OKUNO. — **G.** *Cinetorhynchus reticulatus* sp. nov. Holotype, male (MNHN-Na 12957, 8.0 mm CL), fresh, lateral view. Photograph J. L. MENOU (ORSTOM). — **H.** *Cinetorhynchus reticulatus* sp. nov. Male paratype (YCM-CM 978, 5.3 mm CL), alive in aquarium. Photograph J. OKUNO.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EDMONDSON, C. H., 1952. — Additional central Pacific crustaceans. *Occ. Pap. B. P. Bishop Mus.*, **21** (6) : 67-86, 11 figs.

FIGUEIRA, A. J. G., 1960. — On a small collection of decapod crustaceans from the Azores. *Bocagiana*, **6** : 1-13.

FOREST, J., 1977. — Un groupement injustifié : la superfamille des Bresilioida. Remarques critiques sur le statut des familles réunies sous ce nom (Crustacea Decapoda Caridea). *Bull. Mus. Nat. Hist. Nat.*, (3), **475**, zoologie 332 : 869-888, 14 figs.

FUJINO, T., 1975. — Occurrence of *Rhynchocinetes rigens* Gordon, 1936 (Crustacea, Decapoda, Rhynchocinetidae) in the Indo-Pacific region. *Publ. Seto Mar. Biol. Lab.*, **22** (5) : 297-302, 2 figs.

GORDON, I., 1936. — On the macruran genus *Rhynchocinetes*, with the description of a new species. *Proc. zool. Soc. Lond.*, **1936** : 75-88, 7 figs.

HALE, H. H., 1941. — Decapoda Crustacea. *B. A. N. Z. Antarc. Res. Exp. Rep.*, (B), **4** : 257-285, 16 figs, 1 pl.

HENDERSON, J. R., 1893. — A contribution to Indian carcinology. *Trans. Linn. Soc. Lond., Zool.*, (2) **5** : 325-458, pls. 36-40.

HAYASHI, K.-I., KOMAI, T. & ASAKURA, A., 1994. — Macrura (Crustacea : Decapoda : Stenopodidea, Caridea and Palinulidea) collected from the Northern Mariana Islands, Micronesia. *In* : ASAKURA, A. & FURUKI, T. (eds.), Biological Expedition to the Northern Mariana Islands, Micronesia. *Nat. Hist. Res., Special Issue*, **1** : 267-273.

HIATT, R. W., 1948. — Records of rare Hawaiian decapod crustacea. *Pac. Sci.*, **2** (2) : 78-80.

HIATT, R. W., 1954. — *Hawaiian marine invertebrates : A guide to their Identification.* University of Hawaii, Honolulu, i-viii + 1-140 pp.

HIRATA, Y., NAKASONE ,Y. & SHOKITA, S., 1988. — *Okinawan decapods and shells in color.* Revised ed. Fudokisha, Okinawa. 1-144 pp., many unnumbered photos (in Japanese).

HOLTHUIS, L. B., 1947. — The Decapoda of the Siboga Expedition part IX. The Hippolytidae and Rhynchocinetidae collected by the Siboga and Snellius Expeditions with remarks on other species. *Siboga Exped. Monogr.*, **39**a : 1-100, 15 figs.

HOLTHUIS, L. B., 1953. — Enumeration of the decapod and stomatopod Crustacea from Pacific coral islands. *Atoll Res. Bull.*, (24) : 1-66, 2 maps.

HOLTHUIS, L. B., 1993. — *The recent genera of the caridean and stenopodidean shrimps (Crustacea, Decapoda) with an appendix on the order Amphionidacea.* Nationaal Natuurhistorisch Museum, Leiden. 1-328 pp., 312 figs.

HOLTHUIS, L. B., 1995. — Notes on Indo-West Pacific Crustacea Decapoda III to IX. *Zool. Meded.*, **69** (13) : 139-151, 2 figs.

HOLTHUIS, L. B. & HAYASHI, K.-I., 1967. — A new species of shrimp, *Rhynchocinetes hiatti* (Crustacea, Decapoda). *Annot. zool. Japon.*, **40** (3) : 161-170, 2 figs.

KAMEZAKI, N., NOMURA, K., HAMANO ,T. & MISAKI, H., 1988. Crustacea. *In* : Marine Park Center (ed.). *Illustrated marine organisms in Okinawa Islands*, **8**. Southern Press, Okinawa, 1-232 pp., many unnumbered photos in color (in Japanese).

KEMP, S., 1925. — Notes on Crustacea Decapoda in the Indian Museum XVII. On various Caridea. *Rec. Ind. Mus.*, **27** (4) : 249-343, 24 figs.

KUBO, I., 1942. — On two new species of Decapoda Macrura. *Annot. zool. Japon.*, **21** (1) : 30-38, 5 figs.

MANNING, R. B., 1961. — Notes on the caridean shrimp, *Rhynchocinetes rigens* Gordon (Crustacea, Decapoda), in the western Atlantic. *Notulae Nat. Philad.*, (348) : 1-7, 2 figs.

MANNING, R. B. & CHACE, F. A. Jr., 1990. — Decapod and stomatopod Crustacea from Ascention Island, South Atlantic Ocean. *Smithson. Contrib. Zool.*, **503** : 1-91, 47 figs.

MILNE EDWARDS, H., 1837. — *Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux*, **2**. Paris. 1-532 pp.

MIYAKE, S., 1975. — Macrura and Anomura. *In* : *The aquatic lower animals of Japan.* Gakushu-kenkyusha, Tokyo : 98-119, unnumbered photos in color (in Japanese).

MONOD, T., 1972. — Sur quatre crevettes du Pacifique Sud. *Cah. Pac.*, **16** : 7-29, 87 figs.

MORRISON, J. P. E., 1954. — Animal ecology of Raroia Atoll, Tuamotus. Part 1. Ecological notes on the mollusks and other animals of Raroia. *Atoll Res. Bull.*, **34** : 1-20.

NOMURA, K. & HAYASHI, K.-I., 1992. — *Rhynchocinetes striatus*, a new species (Decapoda, Caridea, Rhynchocinetidae) from southern Japan. *Zool. Sci.*, **9** (1) : 199-206, 4 figs.

NOMURA, K. & MATSUKUBO, K., 1992. — *Rhynchocinetes rigens* Gordon from Susami, Wakayama Prefecture, central Japan. *Nanki Seibutsu*, **34** (1) : 22-24, 3 figs. (in Japanese with English summary).

OKUNO, J., 1993. — New record of a hinge-beak shrimp, *Rhynchocinetes hendersoni* from eastern coast of Izu Peninsula, Japan. *I. O. P. Div. News*, **4** (3) : 4-5, 5 figs. (in Japanese with English abstract).

OKUNO, J., 1994a. — A new species of hinge-beak shrimp from the western Pacific (Crustacea, Decapoda, Rhynchocinetidae). *Beagle, Rec. Mus. Arts Gall. North. Territ.*, **11** : 29-37, 4 figs.

OKUNO, J., 1994b. — *Rhynchocinetes concolor*, a new shrimp (Caridea : Rhynchocinetidae) from the Indo-west Pacific. *Proc. Japan. Soc. Syst. Zool.*, **52** : 65-74, 4 figs.

OKUNO, J., 1995. — Notes on three rhynchocinetid shrimps, *Rhynchocinetes concolor* Okuno, 1994, *R. hiatti* Holthuis et Hayashi, 1967 and *R. striatus* Nomura et Hayashi, 1992. *I. O. P. Div. News*, **6** (8) : 2-3, 4 figs. (in Japanese).

OKUNO, J. & TAKEDA, M., 1992. — Description of a new hinge-beak shrimp, *Rhynchocinetes conspiciocellus*, from southern Japan, with designation of the lectotype of *R. uritai* Kubo, 1942. *Bull. Nat. Sci. Mus.*, (A), **18** (2) : 63-72, 5 figs., 1 pl. in color.

ORTMANN, A., 1890. — Die Decapoden-Krebse des Strassburger Museums, mit besunderer Berucksichtigung der von Herrn Dr Döderlein bei Japan und bei Liu-kiu-Inslen gesammelten und z. Z. im strassburger Museum auf bewahrten Formen. *Zool. Jahrb. Syst.*, **5** : 437-542, pls. 36-37.

RICHARDSON, L. R. & YALDWYN, J. C., 1958. — A guide to the natant decapod crustacea (shrimps and prawns) of New Zealand. *Tuatara*, **7** (1) : 17-41, 50 figs.

STEENE, R., 1990. — *Coral reefs : Nature's richest realm.* Crawford House Press, NSW. 1-336 pp., many unnumbered photos in color.

STIMPSON, W., 1860. — Prodromus descriptionis animalium evertebratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit. *Proc. Acad. Nat. Sci. Philad.*, **1860** : 22-47.

TAKEDA, M., 1982. — *Key to the Japanese and foreign crustaceans fully illustrated in colors.* Hokuryukan, Tokyo. i-vi+1-284 pp., many unnumbered figs. (in Japanese).

THOMPSON, J. R., 1966. — The caridean superfamily Bresilioidea (Decapoda Natantia). A revision and a discussion of its validity and affinities. *Crustaceana*, **11** (2) : 129-140, 5 figs.

THURSTON, E., 1895. — Ramesvaram Island and fauna of the Gulf of Manaar. *Madras Govt. Mus. Bull.*, **3** : 79-138, pls. 4-7.

TIEFENBACHER, L., 1976. — Einige Bemerkungen zu *Rhynchocinetes rigens* Gordon, 1936, und Seiner Verbreitung (Decapoda). *Crustaceana*, **31** (3) : 317- 320.

TIEFENBACHER, L., 1983. — A new species of *Rhynchocinetes* from South-Australia (Crustacea, Decapoda, Rhynchocinetidae). *Rev. fr. Aquariol.*, **9** (4) : 121-124, 3 figs.

WIRTZ, P., MULLER, B. & NAHKE, P. 1988. — The caribbian shrimp, *Tureariocaris neglecta* Chace, 1969 found in association with *Diadema antillarum* at Madeira, and two new records of decapod crustaceans from the Cape Verde Islands. *Cour. Forsh.- Inst. Senckenb.*, **105** : 169-171, 3 figs.

YALDWYN, J. C., 1960. — Crustacea Decapoda Natantia from the Chatham Rise : A deep water bottom fauna from New Zealand. *New Zealand Dept. Sci. Indust. Bull.*, **139** : 13-53, 10 figs.

YALDWYN, J. C., 1971. — Prelimiary descriptions of a new genus and twelve new species of natant decapod crustacea from New Zealand. *Rec. Dominion Mus.*, **7** (10) : 85-94.

3

Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of New Caledonia, eastern Australia, and the Coral Sea

Peter CASTRO

Biological Sciences Department
California State Polytechnic University
Pomona, California 91768-4032
U.S.A.

ABSTRACT

An examination of extensive collections made in New Caledonia and nearby islands by the ORSTOM Center in Nouméa, New Caledonia, of collections kept at various museums, and collections of live material made by the author in New Caledonia and in Queensland, Australia, has revealed that a total of 20 species belonging to five genera of trapeziid crabs inhabit the Coral Sea region. Two of the species belonging to the genus *Trapezia* are described as new. The taxonomic status of several species, particularly *Trapezia cymodoce* (Herbst, 1801), is also revised.

RÉSUMÉ

Crabes Trapeziidae (Brachyura : Xanthoidea : Trapeziidae) de Nouvelle-Calédonie, de la côte est d'Australie et de la mer du Corail.

L'étude des récoltes intensives faites en Nouvelle-Calédonie et dans les îles voisines par le centre ORSTOM de Nouméa, du matériel se trouvant dans les collections des divers musées, ainsi que des collections de matériel vivant faites par l'auteur en Nouvelle-Calédonie et au Queensland, Australie, permettent de montrer que 20 espèces de crabes appartenant à cinq genres de la famille des Trapeziidae vivent dans les eaux de la mer du Corail. Deux de ces espèces appartenant au genre *Trapezia* sont nouvelles. La position systématique de quelques espèces et en particulier de *Trapezia cymodoce* (Herbst, 1801), est aussi révisée.

CASTRO, P., 1997. — Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of New Caledonia, eastern Australia, and the Coral Sea. *In* : RICHER DE FORGES, B. (ed.), Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). *Études & Thèses*, volume 3, Paris : ORSTOM : 59-107. ISBN 2-7099-1376-3

INTRODUCTION

All trapeziid crabs are obligate associates of cnidarians. They establish obligate and close associations with their hosts and as such are here referred to as symbionts, members of close heterospecific associations irrespective of harm or benefit to the partners (CASTRO, 1988). They are restricted to the Indo-west Pacific and eastern Pacific regions. Most common and best known are species of *Trapezia* Latreille and *Tetralia* Dana, symbionts of reef corals. Their taxonomy has been in a state of confusion since color pattern rather than morphology best characterizes the species, many of which are sympatric in their respective coral hosts. This investigation thus stresses the importance of recognizing differences in the color pattern of live individuals before attempting the identification of museum material.

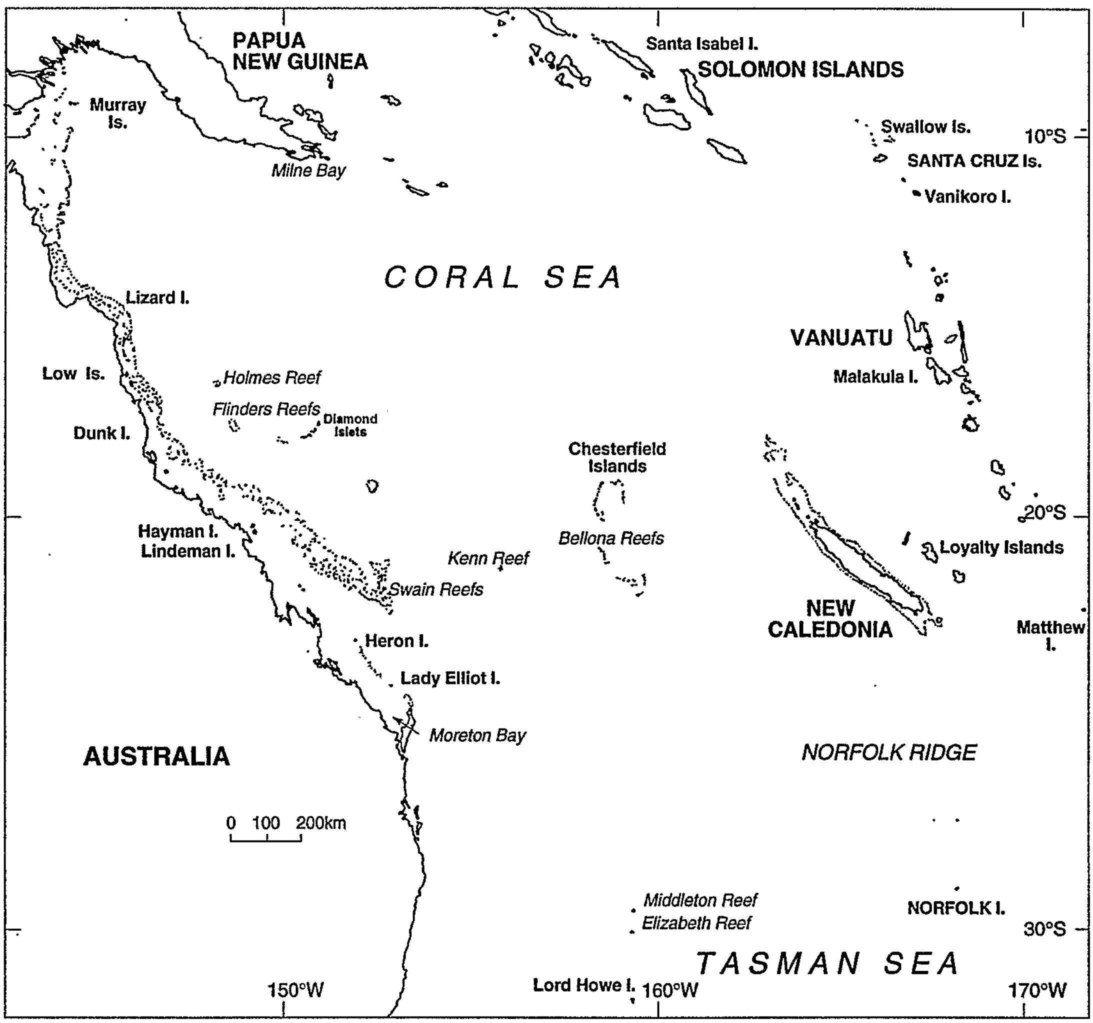

Fig. 1. — Map of the Coral Sea region indicating the locations where the material examined was collected.

There are relatively few reports of trapeziids from the eastern and northern Coral Sea. A. MILNE EDWARDS (1873) was the first to record New Caledonian species, followed by reports on small collections by SERÈNE (1973b) and TAKEDA and NUNOMURA (1976). GALIL and CLARK (1990) described the trapeziids from several ORSTOM collections in New Caledonia.

Records of trapeziids from the Coral Sea coast of Australia were included in the general surveys of HASWELL (1882), CALMAN (1900), GRANT and McCULLOUGH (1906), RATHBUN (1923), WARD (1933), as well as in the results of the Great Barrier Reef Expedition (McNEILL, 1968). Additional Australian records were given by BOONE (1934), PATTON (1966), SERÈNE (1984), GALIL and LEWINSOHN (1985b), and GALIL(1988a) ; photographs or illustrations by HEALY and YALDWYN (1970), JONES and MORGAN (1994), and DAVIE (1993). Work on the ecology of trapeziids in Australia has been undertaken by PATTON (1974, 1994), LASSIG (1977), AUSTIN *et al.* (1980), and ABELE (1984).

The synonymy given here for each of the species is generally restricted to the most important synonyms and references. References, however, include all records known for the Coral Sea region. Since color pattern is of crucial importance in the identification of *Trapezia* and *Tetralia*, an effort has been made to include references with color photographs and illustrations. Reexamination of material from outside the Coral Sea has been included in order to reflect the more recent revisions of GALIL (1986a, 1986c, 1988a), GALIL and CLARK (1988), GALIL and LEWINSOHN (1984, 1985a, 1985b), and CASTRO (1982, 1996).

Geographical names in English follow their spelling in the 1993 edition of the *Times Atlas of the World* (Fig. 1). Measurements given for specimens refer to carapace width (cw) and carapace length (cl).

Specimens examined are deposited in the Australian Museum (AM), Sydney, Australia ; Muséum national d'Histoire naturelle (MNHN), Paris, France ; United States National Museum of Natural History, Smithsonian Institution (USNM), Washington, D.C., U.S.A ; Natural History Museum (former British Museum (Natural History), BMNH), London, United Kingdom ; Osaka Museum of Natural History (OMNH), Osaka Japan ; Queensland Museum (QM), Brisbane, Australia ; and Western Australian Museum (WAM), Perth, Australia.

LIST OF SPECIES

Calocarcinus africanus Calman, 1909
Quadrella coronata Dana, 1852
Quadrella maculosa Alcock, 1898
Tetralia cinctipes Paulson, 1875
Tetralia fulva Serène, 1984
Tetralia nigrolineata Serène & Dat, 1957
Tetralia rubridactyla Garth, 1971
Tetraloides heterodactyla (Heller, 1861)
Tetraloides nigrifrons (Dana, 1852)
Trapezia cymodoce (Herbst, 1801)
Trapezia digitalis Latreille, 1828
Trapezia ferruginea Latreille, 1828
Trapezia flavopunctata Eydoux & Souleyet, 1842
Trapezia formosa Smith, 1869
Trapezia guttata Rüppell, 1830
Trapezia lutea **new species**
Trapezia punctipes **new species**
Trapezia rufopunctata (Herbst, 1799)
Trapezia septata Dana, 1852
Trapezia serenei Odinetz, 1984

SYSTEMATIC ACCOUNT

TRAPEZIIDAE Miers, 1886

CALOCARCINUS Calman, 1909

Only four species of *Calocarcinus* are known : *C. africanus* Calman 1909, *C. habei* Takeda, 1980, *C. lewinsohni* Takeda & Galil, 1980, and *C. crosnieri* Galil & Clark, 1990. They all appear to be obligate symbionts of deep-water cnidarians. *C. habei* was recorded from precious coral (TAKEDA, 1980).

The inclusion of *Calocarcinus* in the Trapeziidae has never been critically examined. The morphology of the carapace, abdomen, and male gonopods differs from that of other trapeziids. Furthermore, the similarities in the shape of the chelipeds and the presence of rows of setae on the walking legs may have been the result of convergence. Differences between the structure of the spermatozoon of *Calocarcinus* and that of *Trapezia* have been reported by JAMIESON *et al.* (1993).

Calocarcinus africanus Calman, 1909

Pls. 1 A & 1 B.

Calocarcinus africanus Calman, 1909 : 31, unnumbered figure. — SERÈNE, 1984 : 291, figs 198, 200, pl. 42, fig. F. — GALIL & CLARK, 1990 : 370, fig. 1 (New Caledonia).

MATERIAL EXAMINED. — **New Caledonia.** SMIB 1 : st. DW 10, 22°54'S, 167°12'E, 410 m, 6.2.1986 : 1 ♂, 1 ♀ (MNHN-B 25194). — SMIB 3 : st. DW 12, 23°37.70'S, 167°41.50'E, 470 m, 22.5.1987 : 5 ♂, 10 ♀ (MNHN-B 25203). — St. DW 13, 23°38'S, 167°42'E, 448 m, 22.5.1987 : 1 ♂ (MNHN-B 25204). — BATHUS 2 : st. CP 736, 23°03.38'S, 168°58.96'E, 452-464 m, 13.5.1993 : 1 ♀ (MNHN-B 25210). — St. CP 760, 23°18.87'S, 166°10.55'E, 455 m, 16.5.1993 : 1 ♂ (MNHN-B 25211). — HALIPRO 1 : st. CP 877, 23°02.76'S, 166°57.91'E, 464-480 m, 31.3.1994 : 1 ♀ (MNHN-B 25202).

Norfolk Ridge. BERYX 11 : st. DW 27, 23°37'S, 167°41'E, 460-470m, 18.10.1992 : 2 ♂, 4 ♀ (MNHN-B 25206). — St. DW 31, 23°39'S, 167°44'E, 430-440 m, 18.10.1992 : 2 ♂, 3 ♀ (MNHN-B 25205). — St. CH 49, 23°45'S, 168°17'E, 400-460 m, 21.10.1992 : 1 ♀ (MNHN-B 25207). — St. CH 49, 23°45'S, 168°17'E, 400-460 m, on antipatharian (*Antipathes* sp.), 21.10.1992 : 1 ♀ (MNHN-B 25208). — St. CP 51, 23°44'S, 168°17'E, 390-400 m, on gorgonian (*Fanellia* sp.), 21.10.1992 : 3 ♂, 25 ♀ (MNHN-B 25209). — SMIB 8 : st. DW 166, Stylaster bank, 23°37.80'S, 167°42.70'E, 433-450 m, on scleractinian coral (?), 29.1.1993 : 6 ♂, 6 ♀ (MNHN-B 25195). — St. DW 167, Stylaster bank, 23°38.10'S, 168°43.10'E, 430-552 m, on scleractinian coral (?), 29.1.1993 : 4 ♂, 2 ♀ (MNHN-B 25196). — St. DW 168, Stylaster bank, 23°37.70'S, 168°42.50'E, 433-450 m, 29.1.1993 : 4 ♂, 3 ♀ (MNHN-B 25197). — St. DW 169, Stylaster bank, 23°37.70'S, 167°42.50'E, 447-550 m, 29.1.1993 : 3 ♂, 1 ♀ (MNHN-B 25198). — St. DW 178, East Jumeau Bank, 23°45.10'S, 168°17'E, 400 m, 30.1.1993 : 2 ♂, 3 ♀ (MNHN-B 25199). — St. DW 179, East Jumeau Bank, 23°45.90'S, 168°17'E, 400-405 m, 30.1.1993 : 2 ♂, 3 ♀ (MNHN-B 25200). — St. DW 180, East Jumeau Bank, 22°47.70'S, 168°18.10'E, 460-525 m, 30.1.1993 : 1 ♂, 5 ♀ (MNHN-B 25201). — BATHUS 3 : st. DW 811, 23°41'S, 168°15'E, 383-408 m, on gorgonian (*Fanellia* sp.), 28.11.1993 :19 ♂, 32 ♀ (MNHN-B 25212). — St. DW 812, 23°43.38'S, 168°15.98'E, 391-440m, 28.11.1993 : 11 ♂, 25 ♀ (MNHN-B 25213). — St. DW 813, 23°45'S, 168°17'E, 410-415 m, 28.11.1993 : 10 ♂, 23 ♀ (MNHN-B 25214). — St. DW 814, 23°48'S, 168°17'E, 444-530 m, 28.11.1993 : 5 ♂, 4 ♀ (MNHN-B 25215). — St. DW 815, 23°47'S, 168°17'E, 460-470 m, 28.11.1993 : 1 ♀ (MNHN-B 25216). — St. DW 817, 23°42'S, 168°16'E, 405-410 m, 28.11.1993 : 7 ♂, 9 ♀ (MNHN-B 25217). — St. DW 818, 23°44'S, 168°16'E, 394-401 m, 28.11.1993 : 14 ♂, 27 ♀ (MNHN-B 25218). — St. CH 820, 23°43'S, 168°16'E, 405-411 m, 28.11.1993 : 1 ♂, 1 ♀ (MNHN-B 25219). — St. CP 846, 23°03'S, 168°58'E, 500-514 m, 1.12.1993 : 2 ♂, 1 ♀ (MNHN-B 25220).

Loyalty Is. MUSORSTOM 6 : st. DW 472, 21°08.60'S, 167°54.70'E, 300 m, on alcyonacean (*Siphonogorgia* sp.), 22.2.1989 : 1 ♂ (MNHN-B 25221, photographed). — CALSUB : st. PL 5A, west of Lifou I., 20°47'S, 167°01'E, 130-954 m., on dendrophyllid coral, 24.2.1989 : 1 ♀ (MNHN-B 22637).

REMARKS. — None of the 301 specimens examined from the recent New Caledonia collections agrees with the description of *C. crosnieri* Galil & Clark, which was described from nine specimens collected from one station in northern New Caledonia. *C. crosnieri* was distinguished from *C. africanus* by the longer merus of its chelipeds and the shape of the male pleopods. Examination of the holotype (MNHN-B 18186) and three paratypes (MNHN-B 18187) shows that *C. crosnieri* is very close to *C. africanus*. There is a slight but significant difference ($P < 0.001$, MANN-WHITNEY U-test) between the ratio of the total length of the cheliped merus to that of the propodus in the two species (0.88 for *C. crosnieri*, $N = 4$; 0.77 for *C. africanus*, $N = 8$) but the most noticeable differences are in the greater total length of the chelipeds and the shorter and stouter first male pleopod of *C.crosnieri*.

In large specimens (cw = 18 mm or more) of *C. africanus* the two pairs of epibranchial teeth are as prominent as in *C. habei* Takeda, another closely related species. In *C. habei*, however, the carapace and chelipeds are noticeably tuberculate.

Some of the specimens dredged from New Caledonian waters were obtained from an antipatharian (probably a species of *Antipathes*), a gorgonian (*Fanellia* sp.), and an alcyonacean (*Siphonogorgia* sp. ; pl. 1 A). One specimen was collected from a dendrophyllid coral, while others were in samples dredged together with fragments of an unidentified ahermatypic scleractinian coral.

Live animals are light orange in color (pl. 1 A). Preserved specimens are creamy white.

In contrast to other trapeziids, which are typically found in heterosexual pairs and the numbers collected are about equal for each sex, a much larger number of females was collected in *C. africanus*. Another difference is that while in other trapeziids most females collected are gravid, in *C. africanus* the number of ovigerous females is very low.

C. africanus was described from the western Indian Ocean and recorded from Indonesia, New Caledonia, and the Chesterfield Islands (GALIL & CLARK, 1990).

QUADRELLA Dana, 1851

All eight species of *Quadrella* so far known (GALIL, 1986c) are symbionts of alcyonaceans, antipatharians, and ahermatypic scleractinian corals. Species are distributed throughout the Indo-west Pacific ; one is endemic to the eastern Pacific. In all species the frontal border of the carapace is divided into four prominent, teeth-like triangular lobes. The slender walking legs are provided with teeth, spines, and rows of setae that are most probably involved in the gathering of mucus from the host (GALIL, 1987).

Quadrella coronata Dana, 1852
Pl. 7 A

Quadrella coronata Dana, 1852a : 84. — GALIL, 1986c : 282, figs 3 E, 4 C-E (full synonymy).

MATERIAL EXAMINED. — **Vanuatu.** MUSORSTOM 8 : st. DW 966, 20°18.8'S, 169°51.91'E, 128-150 m, 21.9.1944 : 1 ♀ (MNHN-B 25765).

REMARKS. — This is the first time this species, known from locations across the Indo-west Pacific region, is recorded from the Coral Sea.

Quadrella maculosa Alcock, 1898
Pl. 7 B

Quadrella coronata var. *maculosa* Alcock, 1898 : 226.

Quadrella maculosa – SERÈNE, 1973a : 204, figs 4, 9, 20-22, pl. 3 ; 1984 : 288, fig. 194, pl. 41, fig. E. — GALIL, 1986c : 285, figs 5 C-F (full synonymy). — GALIL & CLARK, 1990 : 372 (New Caledonia). — ALLEN & STEENE, 1994 : 162 (color photograph). — COLIN & ARNESON, 1995 : 214, fig. 1007 (color photograph).

MATERIAL EXAMINED. — **New Caledonia.** LAGON, east lagoon : st. 601, 22°18.0'S, 167°02.50'E, 47-48 m, on unidentified antipatharian (*Antipathes* sp.), 5.8.1986 : 1 ♂, 1 ♀ (MNHN-B 25190). — EXPEDITION MONTROUZIER : Koumac barrier reef, Deverd Pass, 20°45.20'S, 164°15.20'E, 55-70 m, 22.10.1993 : 1 ♀ (MNHN-B 25187).

Vanuatu. MUSORSTOM 8 : st. DW 988, 19°16.04'S, 169°24.12'E, 372-466 m, 23.9.1994 : 1 ♀ (MNHN-B 25766).

Papua New Guinea. Wall, Madang, on antipatharian, 1985, coll. M. HUBER : 3 ♂, 1 ♀,1 postlarva (USNM 277640).

Belau (Palau). 16 m, on *Parantipathes* sp., 4.7.1974, coll. P. CASTRO : 1 ♂ (USNM 277639).

COLOR. — A live specimen collected in Belau had a light-brown carapace and chelipeds and dark-brown walking legs. The eyes, eyestalks, finger and dactylus of the chelipeds, and the tips of the walking legs were yellow. Specimens shown in ALLEN & STEENE (1994) and COLIN & ARNESON (1995) are dark reddish brown. The dorsal surface of the carapace in preserved specimens is ornamented with a sinuous light-orange pattern (see plate 41, fig. E *in* SERÈNE, 1984).

REMARKS. — This species can be differentiated from the other species of *Quadrella* by having very slender and long walking legs, a conspicuous epibranchial spine that projects from each side of the carapace (two on each side in juveniles), and a cheliped merus that is armed with acute tubercles, spine-like in juveniles.

The type locality of *Q. maculosa* is the Andaman Islands in the Indian Ocean. It is also known from the Red Sea, several locations throughout the Indian Ocean, and Indonesia, the Philippine Islands, Papua New Guinea, Okinawa, New Caledonia, and French Polynesia (SERÈNE, 1973a ; GALIL, 1986c ; GALIL & TAKEDA, 1985 ; GALIL & CLARK, 1990 ; POUPIN, 1996 ; CASTRO, 1997). It is reported here for the first time from Belau (Palau).

TETRALIA Dana, 1851

The taxonomic status of the species of *Tetralia* was for a long time in a state of confusion. Two major species were recognized, each consisting of several subspecies or forms that were defined mostly by color (PATTON, 1966 ; SERÈNE, 1984). A comprehensive revision by GALIL (1986a, 1986b, 1988a, 1988b) and GALIL & CLARK (1988) resulted in nine species distributed among two genera, *Tetralia* and *Tetraloides*. These species are defined by morphology as well as by color pattern.

Most of the seven species that currently comprise the genus *Tetralia* were originally placed in one species, *T. glaberrima* Herbst. The type material is unfortunately lost (GALIL, 1988a). The correct identity of material recorded in the literature by this name is not always possible since in most cases no diagnostic color information was given. In some instances the material in no longer extant.

Tetralia is characterized by two very dissimilar chelipeds, the largest of which has a setae-filled depression at its dorsal, proximal surface. The thoracic sternum has a suture along its middle portion.

All species of *Tetralia* are symbionts of *Acropora*, reef corals of circumtropical distribution. *Tetralia*, however, is only known from the Indo-west Pacific region. Little is know of their biology (CASTRO, 1976). They form heterosexual pairs and feed on mucus produced by their coral host. Mucus is gathered be the setae on the large cheliped and walking legs (KNUDSEN, 1967 ; GALIL, 1987). Crevice-like modifications in the skeleton of the coral host have been reported by ELDREDGE & KROPP (1982).

Tetralia cinctipes Paulson, 1875

Tetralia cinctipes Paulson, 1875 : 60, pl. 7, fig.8. — GALIL, 1986b : 97, figs 1-3 ; 1987 : fig. 3 ; 1988b : 171, fig. 7. — GALIL & CLARK, 1988 : 138, figs 1 A, 3 A, 4 A, 4 F, 5 A, 6 A (full synonymy). — PATTON, 1994 : 195 (Queensland, Australia).

Tetralia glaberrima forma *pullidactyla* Patton, 1966 : 287. — SERÈNE, 1984 : 282, pl. 40, fig. C.

Tetralia glaberrima pullidactyla Garth, 1971 : 185.

Tetralia glaberrima – TAKEDA & NUNOMURA, 1976 : 78 (New Caledonia, part). — JONES & MORGAN, 1994 : 179 (color photograph).

MATERIAL EXAMINED. — **New Caledonia.** LAGON, east lagoon : st. 801, 21°02.0'S, 165°29.30'E, 29 m, 9.1.1987 : 1 ♂ (MNHN-B 25104). — Northwest lagoon : st. DW 946, 20°34.80'S, 164°07.80'E, 16-17m, 28.4.1988 : 3 ♂, 6 ♀ (MNHN-B 25105). — st. DW 947, 20°33.20'S, 164°07.10'E, 17-18 m, 28.4.1988 : 1 ♂ (MNHN-B 25106). — North lagoon : st. DW 1196, 19°32.50'S, 163°21.0'E, 30m, 1.11.1989 : 4 ♂ (MNHN-B 25107).

New Caledonia. Material identified by M. TAKEDA & N. NUNOMURA as *Tetralia glaberrima* : Ile des Pins, Melanesia Expedition, 6-13.11.1958 : 1 ♂, 1 ♀ (OMNH-Ar 1383-1893).

Solomon Islands. Santa Cruz Is., 1926 ?, coll. E. TROUGHTON & A. A. LIVINGSTONE : 1 ♂, 1 juvenile (AM P9165).

Papua New Guinea. Wahoo reef, Milne Bay, 2 m, 23.12.1981, coll. N. COLEMAN : 1 ♀ (AM P39691).

Chesterfield Is. CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 2 ♂ (MNHN-B 25108).

Holme's Reef. 16°55'S, 145°46'E, 27.9.1960, coll. D. F. McMICHAEL : 3 ♂, 3 ♀ (AM P17031).

Diamond Islets. West Cay, 13°11'S, 143°43'E, 26.10.1964, coll. D. F. McMICHAEL & J. C. YALDWIN : 1 ♂ (AM P17235).

Lord Howe I. Malabar, 31°33'S, 159°05'E, 15 m, 23.2.1980, coll. N. COLEMAN : 1 ♀ (AM P39687).

Niue I. BNIUE-365, Namui area, south of Makapu Pt., outer reef slope, *Acropora*, 4-18 m, 21.10.1991, coll. B. V. HOLTHUIS & G. PAULAY : 1 ♂, 1 ♀ (USNM 277641).

Philippine Islands. MUSORSTOM 2 : st. 73, 13°55.50'N, 120°22.30'E, 20-21 m, 30.11.1980 : 1 ♀ (MNHN-B 16924).

Japan. Material collected and identified by W. K. PATTON as *Tetralia glaberrima* forma *pullidactyla* Patton : Kabira Bay, Ishigaki I., Ryukyu Is., on *Acropora corymbosa*, 19.7.1977 : 3 ♂, 1 ♀ (MNHN-B 8167).

Western Indian Ocean. Material identified by R. SERÈNE as *Tetralia glaberrima pullidactyla* Patton : Réunion, on *Acropora* sp., coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 8168). — Zélée Bank, coll. A. J. BRUCE : 1 ♂, 1 ♀ (MNHN-B 8169). — Réunion, lagoon, on *Acropora* sp., coll. S. RIBES, 30.7.1977 : 1 ♂, 1 ♀ (MNHN-B 14044).

COLOR. — Although live material was not collected, the diagnostic color pattern of *T. cinctipes* was evident in the preserved specimens. A color photograph of a specimen identified as *T. glaberrima* by JONES & MORGAN (1994) is actually *T. cinctipes*. The carapace of the specimen is almost white anteriorly, light tan posteriorly.

In small preserved specimens the carapace is light brown ; it is much lighter in large ones. The very edge of the minute teeth along the frontal border of the carapace is red-brown, followed by a thin light-brown band. The anterior portion of the carapace immediately below contains numerous brown granules in small specimens. These granules become less numerous and gray in larger specimens. A brown band extends ventrally across the carapace between the eyestalks. The chelipeds are light tan ventrally and brown dorsally. The merus, carpus, and propodus of the chelipeds have irregular brown spots. The spots become much darker and arranged in a reticulated pattern in larger specimens. The walking legs are light tan with the proximal portion of the carpus, propodus, and dactylus brown, thus giving the legs a banded appearance. The smallest individuals (cw 6 mm and less) show small orange-brown spots on all segments of the walking legs. Spots eventually coalesce and the largest specimens show the characteristic dorsal dark color. Small dots that are observed mostly on the walking legs of small individuals is also characteristic of *Tetralia fulva*.

REMARKS. — In addition to its color pattern, diagnostic to *T. cinctipes* is the presence of abundant small tubercles on the chelipeds. The lower margin of the cheliped propodus is bordered by heavy triangular tubercles. The endopod of the first maxilliped ends at a right angle on its inner side, while the outer side is rounded and lower than the inner side. The distal edge of the endopod is thus slightly concave.

T. cinctipes is known across the Indo-west Pacific region : the Red Sea, Indian Ocean, and from Japan to French Polynesia (GALIL & CLARK, 1988).

Tetralia fulva Serène, 1984
Pl. 1 C

Tetralia glaberrima – A. MILNE EDWARDS, 1873 : 262 (New Caledonia). — TAKEDA & NUNOMURA, 1976 : 78 (New Caledonia, part). — BOONE, 1934 : 174 (part).
Tetralia glaberrima forma *fulva* Patton, 1966 : 286 (Queensland, Australia).
Tetralia glaberrima fulva Serène, 1984 : 282 (Queensland, Australia ; part).
Tetralia fulva – GALIL, 1988a : 62, figs 1b, 2c, 2d (Queensland, Australia ; full synonymy). — PATTON, 1994 : 195, fig. 2 D (Queensland, Australia).
Tetralia sanguineomaculata Galil & Clark, 1990 : 375, figs 4, 5, 6b (New Caledonia).

MATERIAL EXAMINED AND TYPE. — **Queensland, Australia.** Neotype herein designated : Heron I., 23°26'S, 151°55'E, on *Acropora* sp., coll. W. K. PATTON, 23.4.1971 : 1 ♂ neotype, cw 8.4 mm, cl 7.3 mm (MNHN-B 25234).

New Caledonia. LAGON, north lagoon : st. 483, 19°01'S, 163°32'E, 33 m, 2.3.1985 : 1 ♂ (MNHN-B 25109). — St. DW 1088, 19°45.50'S, 163°57.70'E, 23 m, 24.10.1989 : 2 ♂, 2 ♀ (MNHN-B 25110). — St. DW 1105, 19°40.0'S, 163°57.0'E, 25.10.1989, 25 m, 25.10.1989 : 1 ♀ (MNHN-B 25111). — St. DW 1128, 19°31.20'S, 163°52.20'E, 26 m, 26.10.1989 : 2 ♂, 1 ♀ (MNHN-B 25112). — St. DW 1139, 19°23.60'S, 163°47.0'E, 39 m, 27.10.1989 : 1 ♀ (MNHN-B 25113). — St. DW 1189, 19°32.10'S, 163°34.20'E, 20 m, 1.11.1989 : 1 ♂, 1 ♀ (MNHN-B 25114). — East lagoon : st. 625, 21°59.20'S, 166°53.60'E, 34-40 m, 6.8.1986 : 2 ♂, 1 ♀ (MNHN-B 25115). — St. 641, 21°53.0'S, 166°4.0'E, 50-52 m, 7.8.1986 : 1 ♀ (MNHN-B 25116). — St. 659, 21°45.30'S, 166°33.40'E, 46-48 m, 8.8.1986 : 1 ♂ (MNHN-B 25117). — St. 668, 21°40.50'S, 166°29.10'E, 40 m, 8.8.1986 : 1 ♂ (MNHN-B 25118). — St. 799, 20°58.50'S, 165°31.70'E, 32 m, 9.1.1987 : 1 ♂ (MNHN-B 25119). — St. 895, 20°15.50'S, 164°26.80'E, 16 m, 14.1.1987 : 1 ♀ (MNHN-B 25120). — St. 899, 20°14.20'S, 164°25.15'E, 16 m, 14.1.1987 : 1 ♀ (MNHN-B 25121). — Northwest lagoon : st. DW 946, 20°34.80'S, 164°07.80'E, 16-17 m, 28.4.1988 : 5 ♂, 2 ♀ (MNHN-B 25122). — St. DW 1006, 20°12.50'S, 163°54.60'E, 18-25 m, 2.5.1988 : 1 ♂, 1 ♀ (MNHN-B 25123). — St. DW 1046, 20°05.0'S, 164°06.60'E, 6-7 m, 4.5.1988 : 1 ♂, 1 ♀ (MNHN-B 25124).

New Caledonia. St. 140, Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Acropora* spp., 26.4.1995, coll. P. CASTRO : 4 ♂, 3 ♀ (MNHN-B 25125). — St. 107, Boulari Pass, 22°29.90'S, 166°26.55'E, 10-20 m, on *Acropora* spp., 28.4.1995, coll. P. HAMEL : 3 ♂, 5 ♀ (MNHN-B 25126), 1 ♂, 2 ♀ (USNM 277636). — Récif M'bere, pente externe, 25-30 m, 7.1.1993 : 2 ♂, 1 ♀ (MNHN-B 25364). — Récif M'bere, pente externe, 10-15 m, 7.1.1993 : 1 ♂, 1 ♀ (MNHN-B 25369). — Récif M'bere, pente externe, 10 m, 5.5.1993 : 1 ♂ (MNHN-B 25368).

New Caledonia. Material identified by A. MILNE EDWARDS as *Tetralia glaberrima* (Herbst) : 1 ♂ (MNHN-B 2907). — 3 ♂, 3 ♀ (MNHN-B 4346). — Material identified by M. TAKEDA & N. NUNOMURA as *Tetralia glaberrima* (Herbst) : Ile des Pins, Melanesia Expedition, 6-13.11.1958 : 5 ♂, 4 ♀ (OMNH-Ar 1383-1393). — Material identified by B. GALIL & P. CLARK as *Tetralia sanguineomaculata* Galil & Clark : st. 436, 27.2.1985 : 1 ♂, holotype (MNHN-B 20670). — St. 436, 27.2.1985 : 1 ♀, paratype (MNHN-B 20773). — St. 463, 1.3.1985 : 1 ♂, 1 ♀, paratype (MNHN-B 20779). — LAGON : st. 6, 21.5.1984 : 2 ♂, 2 ♀ (MNHN-B 20663). — St. 77, 21.8.1984 : 1 ♂, 2 ♀ (MNHN-B 20776). — St. 159, 24.8.1984 : 1 ♀ (MNHN-B 20775). — St. 82, 28.8.1984 : 1 ♂, 1 ♀ (MNHN-B 20779). — St. 341, 28.11.1984 : 1 ♂, 1 ♀ (MNHN-B 20771). — St. 459, 1.3.1985 : 1 ♂ (MNHN-B 20669). — St. 460, 1.3.1985 : 1 ♂ (MNHN-B 20668). — St. 461, 1.3.1985 : 2 ♀ (MNHN-B 20778). — St. 480, 2.3.1985 : 3 ♂, 1 ♀ (MNHN-B 20667). — St. 483, 2.3.1985 : 1 ♂ (MNHN-B 20665). — St. 489, 3.3.1985 : 1 ♂ (MNHN-B 20774). — St. 521, 5.3.1985 : 1 ♂, 1 ♀ (MNHN-B 20777). — St. 551, 15.7.1985 : 1 ♂, 1 ♀ (MNHN-B 20772). — St. 588, 18.7.1985 : 1 ♂, 2 ♀ (MNHN-B 20666). — St. 412, 24.10.1985 : 1 ♂ (MNHN-B 20664).

Loyalty Is. MUSORSTOM 6 : st. DW 431, 20°22.25'S, 166°10.0'E, 21 m, 18.2.1989 : 1 ♂, 1 ♀ (MNHN-B 25127). — PLOUVEAL : st.1226, Ouvéa lagoon, 20°32.0'S, 166°24.0'E, 21 m, 9.9.1992, coll. R. LEBORGNE : 2 ♂, 3 ♀ (MNHN-B 25130). — St. 1229, Ouvéa lagoon, 20°37.10'S, 166°22.90'E, 16 m, 9.9.1992, coll. R. LEBORGNE : 1 ♂ (MNHN-B 25132). — St. 1231, Ouvéa lagoon, 20°31.20'S, 166°22.90'E, 23 m, 9.9.1992, coll. R. LEBORGNE : 1 ♂, 3 ♀ (MNHN-B 25134). — St. 1219, Ouvéa lagoon, 20°30.0'S, 166°28.0'E, 15 m, 11.9.1992, coll. R. LEBORGNE : 1 ♂ (MNHN-B 25128). — St. 1222, Ouvéa lagoon, 20°28.0'S, 166°30.0'E, 15 m, 12.9.1992, coll. R. LEBORGNE : 2 ♂, 2 ♀ (MNHN-B 25129). — St. 1227, Ouvéa lagoon, 20°36.90'S, 166°25.0'E, 12 m, 15.9.1992, coll. R. LEBORGNE : 1 ♂, 1 ♀ (MNHN-B 25131). — St. 1230, Ouvéa lagoon, 20°35.0'S, 166°22.90'E, 18 m, 15.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25133).

Chesterfield Is. CHALCAL 1 : st. D 24, 19°10.78'S, 158°37.10'E, 38 m, 18.7.1984 : 1 ♀ (MNHN-B 25135). — CORAIL 2 : st. DW 35, 19°21.65'S, 158°52.69'E, 52 m, 23.7.1988 : 1 ♀ (MNHN-B 25136). — St. DW 46, 19°18.54'S, 158°20.0'E, 21 m, 23.7.1988 : 2 ♂ (MNHN-B 25137). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 1 ♂ (MNHN-B 251138). — St. DW 88, 19°05.98'S, 158°55.85'E, 32 m, 26.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25139). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 4 ♂, 3 ♀ (MNHN-B 25140). — St. CP 90, 19°02.83'S, 158°56.26'E, 44-48 m, 26.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25141). — St. DW 97, 19°06.0'S, 158°38.43'E, 32 m, 27.8.1988 : 1 ♂, 2 ♀ (MNHN-B 25142). — St. DW 99, 19°06.03'S, 158°38.95'E, 52 m, 27.8.1988 : 1 ♂ (MNHN-B 25143). — St. DW 105, 19°08.91'S, 158°39.19'E, 35 m, 27.8.1988 : 2 ♂ (MNHN-B 25144). — St. DW 115, 19°22.01'S, 158°37.62'E, 44 m, 28.8.1988 : 1 ♀ (MNHN-B 25145). — St. DW 116, 19°23.09'S, 158°34.68'E, 52 m, 28.8.1988 : 1 ♂ (MNHN-B 25146). — St. DW 126, 19°28.07'S, 158°27.0'E, 46 m, 29.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25147). — St. DW 127, 19°27.73'S, 158°27.30'E, 44-45 m, 29.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25148). — St. DW 137, 19°34.0'S, 158°14.60'E, 32 m, 30.8.1988 : 1 ♀ (MNHN-B 25149). — St. DW 143, 19°37.40'S, 158°25.16'E, 45 m, 30.8.1988 : 1 ♂ (MNHN-B 25150). — St. DW 144, 19°27.73'S, 158°23.28'E, 50 m, 30.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25151). — St. DW 145, 19°37.0'S, 158°19.12'E, 54 m, 30.8.1988 : 1 ♀ (MNHN-B 25152). — St. DW 153, 19°52.0'S, 159°23.20'E, 45 m, 1.9.1988 : 2 ♂ (MNHN-B 25153). — St. DW 163, 19°41.46'S , 158°15.62'E, 23 m, 2.9.1988 : 1 ♂, 1 ♀ (MNHN-B 25154). — St. DW 165, 19°41.41'S, 158°21.85'E, 45 m, 2.9.1988 : 2 ♀ (MNHN-B 25155). — St. DW 166, 19°41.49'S, 158°25.24'E, 56 m, 2.9.1988 : 1 ♂ (MNHN-B 25156).

Bellona Reefs. St. DE 9, 21°23.70'S, 158°54.20'E, 47-51 m, 20.10.1985 : 1 ♂ (MNHN-B 25157).

Vanuatu. 1 ♂, 2 ♀ (BMNH 1896.1.2.29-33). — 2 ♂, 1 ♀ (BMNH 1896.1.2.54-7).

Solomon Islands. Santa Cruz Is., 1926 ?, coll. E. TROUGHTON & A. A. LIVINGSTONE : 1 ♀ (AM P46260). — Carlisle Bay, Santa Cruz (= Ndeni) I., Santa Cruz Is., 20.7.1926, coll. E. TROUGHTON & A. A. LIVINGSTONE : 1 ♂ (AM P9181). — Tanabula Harbor, Santa Isabell., coll. N.S. HEFFEMAN : 2 ♂, 2 ♀ (AM P8079).

Queensland, Australia. Cairns Reef, Cooktown, 15°28'S, 145°15'E, 1905, coll. A. R. McCULLOCH : 2 ♂, 3 ♀ (AM P3733). — Murray I., Torres Strait, 09°56'S, 144°04'E, 8.1907, coll. A. R. McCULLOCH & C. HADLEY : 1 ♂, 2 ♀ (AM

P2865). — One Tree I., Capricorn Group, 23°30'S, 152°05'E, on *Acropora hyacinthus*, 11-12.1966, coll. J. C. YALDWYN : 1 ♂, 2 ♀ (AM P15966). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Acropora* spp., 9.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 4 ♂, 1 ♀ (AM P44621, photographed). — Granite Bluff, Lizard Island, 14°40'S, 145°28'E, 4 m, on *Acropora* sp., 11.6.1995, coll. P. CASTRO, R. SPRINGTHORPE & K. BUCKLEY : 2 ♂ (AM P44630). — Hayman I., 20°03'S, 148°53'E, coll. E. H. RAINFORD : 2 ♂, 2 ♀ (AM P7293).

Queensland, Australia. Material collected and identified by W. K. PATTON as *Tetralia glaberrima* forma *fulva* Patton : Heron I., on *Acropora* sp., 22.4.1971 : 1 ♂, 1 ♀ (MNHN-B 8170). — Heron I., on *Acropora* sp., 23.4.1971 : 1 ♂, 1 ♀ (MNHN-B 8171). — Heron I., on *Acropora* sp., 23.4.1971 : 1 ♀ (MNHN-B 8173). — Heron I., on *Acropora* sp., 24.4.1971 : 1 ♂, 1 ♀ (MNHN-B 8172).

DESCRIPTION OF NEOTYPE. — Carapace smooth, shiny, and slightly broader than long. Posterolateral borders straight. Frontal border arched, armed with minute teeth, and demarcated from equally denticulate supraorbital angle by slight break.

Chelipeds markedly unequal, larger one with proximal shallow depression filled with short setae. Carpus with denticulate anterior border slightly raised above distal edge. Left merus with two minute spines on anterior margin ; right with one. First pleopod short and stout, with symmetrical, pointed apex, and bordered distally with short setae. Distal margin of endopod of first maxilliped with few setae ; inner margin square, outer margin slightly round.

Frontal border of carapace slightly darker in color ; thin, colorless stripe immediately below teeth. Anterolateral border of carapace slightly darker. Anterior border of merus and carpus slightly reddish. Dark spot on distal joint of propodus of walking legs.

COLOR. — The carapace of live individuals (pl. 1 C) varies from orange-brown to light pink-brown (peach). A thin orange to red-orange line, bordered in most individuals by a wider light-gray band, extends along the anterior border of the carapace. A faint gray band is usually present along the anterolateral borders of the carapace. The chelipeds are orange brown, slightly darker on the dorsal surface. A dark-orange line extends along the distal edge of the carpus and the anterior border of the merus. A black spot may be found at both articulations of the carpus in some individuals. The walking legs are orange brown, with a black spot at the distal end of the merus and another, much larger, at the propodal joint. The merus, carpus, and propodus have minute black dots ; the dactylus orange-red spots, some elongated. Small red dots may be present on the carpus, propodus, and dactylus of the walking legs of small individuals, and on the propodus of a few larger ones.

One of the three color plates given by SAKAI (1976) as *T.glaberrima* (pl. 183, fig. 4) may actually represent *T. fulva.*

REMARKS. — The species name takes the authorship of SERÈNE (1984), not of PATTON (1966), since the latter referred to it as a "form" and as such is invalid as it was published after 1960 (article 45 (g) of the International Code of Zoological Nomenclature).

No type material was ever designated. A specimen from material collected and identified by W. K. PATTON was selected as the neotype. It was collected at Heron I., Queensland, one of the Australian locations where PATTON (1966) obtained material used in the description of his color form.

T. fulva is the most common species of *Tetralia* in the Coral Sea region (also see PATTON, 1994). It can be easily identified by its color pattern. The color markings, however, may be lost after several years of preservation so that specimens can be confused with *T. nigrolineata*, with which it co-inhabits. Preserved specimens of *T. fulva* may show a dark band along the anterior border of the carapace. This band, however, is diagnostic for *T. nigrolineata*, where it is much darker and followed by a lighter band. In addition, preserved specimens of *T. fulva* will rarely show a distinct dark band along the anterolateral sides of the carapace, which is generally present in preserved *T. nigrolineata*. There are two distinctive black dots on each of the walking legs of *T. fulva*, while there may be only one in *T. nigrolineata*.

One diagnostic morphological character is the shape of the endopod of the first maxilliped. The inner side ends at a right angle and the outer edge is round in *T. fulva*, while it is rounded on both sides in *T. nigrolineata* (see fig. 2 *in* GALIL, 1988a). The posterolateral sides of the carapace are straight, thus giving it a trapezoidal shape. The straight shape, however, is obscured in large females. *T. nigrolineata*, in contrast, has slightly rounded posterolateral sides. Both these characters are unfortunately reversed in the key to the species of *Tetralia* given by GALIL (1988a).

Although GALIL (1988a) characterized *T. fulva* as lacking a "crest", a definite denticulate extension of the anterior border of the cheliped merus is observed in all members of the species, particularly in small individuals. The development of the crest varies, even between the right and left cheliped of the same individual. The crest of *T. fulva* is nevertheless not as prominent as in *T. rubridactyla* (see discussion of *T. rubridactyla*).

Populations of *T. fulva* from the southwestern Indian Ocean share diagnostic morphological features with the western Pacific populations of the same species. The Madagascar specimens that were examined (MNHN-B 8179), however, may have lost any distinctive color pattern that could have identified them as a different species.

The endopod of the first maxilliped of only two of the seven dried specimens from New Caledonia (MNHN-B 2907, 4346) identified by A. MILNE EDWARDS (1873) as *T. glaberrima* could be examined. It is thus possible that this material may include *T. nigrolineata* as no trace of color remains and the shape of the endopod of the first maxilliped is the most reliable morphological difference between the two species. The New Caledonia material identified by SERÈNE (1973b) as *T. glaberrima* most probably included *T. fulva*.

T. sanguineomaculata Galil & Clark (1990), described from New Caledonia, is a junior synonym of *T. fulva*. It was recognized as "similar" to *T. fulva* except for the presence of "reddish spots on pereiopods" (GALIL & CLARK, 1990). Red spots were observed on the propodus, carpus, and dactylus of the walking legs of the holotype (MNHN-B 21670) and in three paratype specimens (MNHN-B 20773 & 20779) of *T. sanguineomaculata*. In the additional New Caledonia material of the new species examined by B. GALIL & P. CLARK (MNHN-B 20663-20669, 206671, 206672, 206674-206678, 206680), red spots occur on the dactylus of the walking legs of most specimens but extend to the carpus and propodus only in small individuals such as the ones included in the type material. Some spots can be seen on the carpus in a photograph of the holotype, a very small individual (GALIL & CLARK, 1990 ; fig. 6b). A similar spotting of the walking legs in only young individuals is also found in *T. cinctipes*. The remaining New Caledonia material as well as seven individuals collected live at Lizard Island, Queensland, Australia (AM P44621 & P44630) show characteristics similar to the *T. sanguineomaculata* material examined by GALIL & CLARK (1990).

T. fulva is known from locations between Indonesia and French Polynesia (GALIL, 1988a) as well as from the western Indian Ocean (SERÈNE, 1984).

Tetralia nigrolineata Serène & Dat, 1957
Pl. 1 D

Tetralia glaberrima – CALMAN, 1900 : 20 (Queensland, Australia ; part). — WARD, 1933 : 255 (Queensland, Australia). — BOONE, 1934 : 174, pl. 89 (Queensland, Australia ; part). — TAKEDA & NUNOMURA, 1976 : 78 (New Caledonia, part). — MIYAKE, 1983 : 139, pl. 47, fig. 4 (color photograph).
Tetralia glaberrima forma *nigrolineata* Serène & Dat, 1957 : 120.
Tetralia glaberrima forma *obscura* Patton, 1966 : 287 (Queensland, Australia).
Tetralia glaberrima obscura – SERÈNE, 1984 : 283, pl. 40, fig. E (Queensland, Australia).
Tetralia nigrolineata – GALIL, 1988a : 63, figs 1c, 2e, 2f (Queensland, Australia ; full synonymy). — PATTON, 1994 :195 (Queensland, Australia).

MATERIAL EXAMINED AND TYPE. — **Queensland, Australia.** Neotype herein designated : Heron I., 23°26'S, 151°55'E, on *Acropora* sp., coll. W. K. PATTON, 21.4.1971 : 1 ♂ neotype, cw 8.8 mm, cl 7.8 mm (MNHN-B 25235).

New Caledonia. LAGON, east lagoon : st. 651, 21°48.0'S, 166°36.40'E, 48 m, 7.8.1986 : 2 ♂ (MNHN-B 25158). — Northwest lagoon : st. DW 946, 20°34.80'S, 164°07.80'E, 16-17 m, 28.4.1988 : 4 ♂, 2 ♀ (MNHN-B 25159). — St. DW 971, 20°25.80'S, 163°59.50'E, 25-26 m, 29.4.1988 : 1 ♂ (MNHN-B 25189). — North lagoon : st. DW 1088, 19°45.50'S, 163°57.70'E, 24.10.1989 : 1 ♀ (MNHN-B 25160). — St. DW 1139, 19°23.60'S, 163°47.0'E, 39 m, 27.10.1989 : 1 ♂ (MNHN-B 25161). — St. DW 1196, 19°32.50'S, 163°21.0'E, 30 m, 1.11.1989 : 1 ♂ (MNHN-B 25162). — St. 140 , Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Acropora* spp., 26.4.1995, coll. P. CASTRO : 2 ♂, 2 ♀ (MNHN-B 25163), 2 ♂, 1 ♀ (USNM 277637). — St. 107, Boulari Pass, 22°29.90'S, 166°26.55'E, 10-20 m, 28.4.1995, on *Acropora* sp., coll. P. HAMEL : 1 ♂, 1 ♀ (MNHN-B 2564).

Loyalty Is. MUSORSTOM 6 : st. DW 431, 20°22.25'S, 166°10.0'E, 21 m, 18.2.1989 : 1 ♀ (MNHN-B 25165). — PLOUVEAL : st. 1219, Ouvéa lagoon, 20°30.0'S, 166°28.0'E, 15 m, 11.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25166). — St. 1227, Ouvéa lagoon, 20°36.90'S, 166°25.0'E, 12 m, 15.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25167). — Ouvéa lagoon, 1992 : 1 ♂ (MNHN-B 25168).

Solomon Islands. Peu, Vanikoro I., Santa Cruz Is., 16.8.1926, coll. E. TROUGHTON & A. A. LIVINGSTONE : 2 ♂, 1 ♀ (AM P 9194).

Chesterfield Is. CHALCAL 1 : st. D 34, 19°52.10'S, 158°20.10'E, 33-37 m, 21.7.1984 : 1 ♀ (MNHN-B 25169). — CORAIL 2 : st. DW 43, 19°21.49'S, 158°25.98'E, 52 m, 23.7.1988 : 1 ♀ (MNHN-B 25170). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 2 ♂, 1 ♀ (MNHN-B 25171). — St. DW 85, 19°12.85'S, 158°56.26'E, 32 m, 26.8.1988 : 1 ♂ (MNHN-B 25172). — St. DW 88, 19°05.98'S, 158°55.85'E, 32 m, 26.8.1988 : 1 ♂ (MNHN-B 25173). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 5 ♂, 1 ♀ (MNHN-B 25174). — St. DW 116, 19°23.09'S, 158°34.68'E, 52 m, 28.8.1988 : 1 ♂ (MNHN-B 25175). — St. DW 128, 19°27.89'S, 158°30.44'E, 38 m, 29.8.1988 : 1 ♂ (with bopyrid) (MNHN-B 25176). — St. DW 144, 19°27.73'S, 158°23.28'E, 50 m, 30.8.1988 : 1 ♂ (MNHN-B 25177). — St. DW 148, 19°54.08'S, 158°27.12'E, 34 m, 1.9.1988 : 1 ♀ (MNHN-B 25178). — St. DW 159, 19°46.04'S, 158°19.98'E, 52 m, 1.9.1988 : 1 ♂, 1 ♀ (MNHN-B 25179).

Bellona Reefs. St. 4 DE, 21°19.0'S, 158°48.0'E, 66 m, 19.10.1985 : 1 ♂, 1 ♀ (MNHN-B 25180). — CORAIL 1 : 10.8.1988 : 1 ♂ (MNHN-B 25181).

Queensland, Australia. High I., Frankland Group, 17°11'S, 146°04'E, 7.1924, coll. W. E. G. PARADICE : 2 ♀ (AM P7978). — North West I., Capricorn Group, 23°18'S, 151°42'E, 1926, coll. M. WARD : 2 ♀ (AM P45434). — Moreton Bay, 22.8.1941 : 1 ♀ (QM W12316). — Gillett Cay, Swain Reefs, Swain Reefs Expedition, 21°43'S, 152°25'E, 17.10.1962 : 1 ♀ (AM P17211, photographed). — Wistari Reef, Capricorn Group, on *Pocillopora* sp., 6.10.1979, coll. L. OWENS : 1 ♀ (QM W11018). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Acropora* sp., 8.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♂, 1 ♀ (AM P44626, photographed). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Acropora* sp., 9.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♂, 1 ♀ (AM P44620, photographed). — Granite Bluff, Lizard Island, 14°40'S, 145°28'E, 4 m, on *Acropora* sp., 11.6.1995, coll. P. CASTRO, R. SPRINGTHORPE & K. BUCKLEY : 1 ♂, 1 ♀ (AM P44623). — Granite Bluff, Lizard Island, 14°40'S, 145°28'E, 4 m, on *Acropora* sp., 11.6.1995, coll. P. CASTRO, R. SPRINGTHORPE & K. BUCKLEY : 2 ♂, 1 ♀ (AM P44624).

Queensland, Australia. Material collected and identified by W. K. PATTON as *Tetralia glaberrima* forma *obscura* Patton : Heron I., on *Acropora* sp., 21.4.1971 : 1 ♀ (MNHN-B 8175). — Heron I., on *Acropora* sp., 22.4.1971 : 1 ♂, 1 ♀ (MNHN-B 13915). — Heron I., on *Acropora* sp., 23.4.1971 : 1 ♂, 1 ♀ (MNHN-B 8176). — Heron I., on *Acropora* sp., 23.4.1971 : 1 ♂, 1 ♀ (MNHN-B 8177).

Malaysia. Material collected and identified by R. SERÈNE as *Tetralia glaberrima nigrifrons* Dana, 1852 : Perhentian I., 6°55'N, 102°45'E, 21.7.1965 : 5 ♀ (MNHN-B 21390), 1 ♂, 1 ♀ (MNHN-B 21391)., 1 ♂ (MNHN-B 21392), 1 ♀ (MNHN-B 21393)., 1 ♂ 1 ♀ (MNHN-B 21394). — 23.7.1965 : 7 ♂, 8 ♀ (MNHN-B 21388). — 23.7.1965 : 4 ♂, 7 ♀ (MNHN-B 21389).

DESCRIPTION OF NEOTYPE (see pl. 40, fig. E of SERÈNE, 1984). — Carapace smooth, shiny, and slightly broader than long. Posterolateral borders slightly rounded. Frontal border arched, armed with minute teeth, and demarcated from equally denticulate supraorbital angle by very slight break.

Chelipeds markedly unequal, larger one with proximal shallow depression filled with short setae. Carpus with denticulate anterior border. Right merus with two spines on anterior margin ; none on left. First pleopod short and stout, with symmetrical, pointed apex and bordered distally with short setae. Distal margin of endopod of first maxilliped bordered by setae ; inner and outer margins rounded.

Frontal border of carapace dark brown ; thin, colorless dark stripe immediately below. Anterolateral borders also much darker than rest of carapace and bordered by light line along inner boundary. Walking legs uniform dark brown except lighter dactylus.

COLOR. — Carapace, chelipeds, and walking legs of live individuals varies from orange-brown to light pink-brown (peach). The anterior border has a thin orange-brown to red-orange stripe followed by a broad dark-brown to black band that extends across the anterior edge of the eyestalks to the eyes. The black band is followed by a thin blue-green stripe that also extends to the eyes. The sides of the carapace also have a broad black band followed by a thin blue-green stripe. The cheliped propodus often shows dark-brown reticulations ; its proximal edge is red-brown. The edges of the merus and carpus are ornamented with an orange-red line. The walking legs show minute dark orange-brown dots and a larger dot at the distal joint of the propodus.

Significant variations in the color of live individuals were observed. One from New Caledonia (MNHN-B 25163) had a much darker carapace, almost black, while another from Queensland, Australia (AM P 44620, see pl. 1 D) had a very light carapace, almost white and light-gray chelipeds and legs. Both were males paired with females that showed the normal color pattern.

One of three color plates given by SAKAI (1976) as *T. glaberrima* (pl. 183, fig. 2) may be in fact *T. nigrolineata.*

REMARKS. — This species must retain the name given by SERÈNE & DAT (1957), even if referred to as a "form" by them, since the name was published before 1960 and as such it has a valid subspecific rank (article 45 (g) of the International Code of Zoological Nomenclature). The color characteristics given by SERÈNE & DAT (1957) are accurate enough to consider the description valid (see GALIL, 1988a).

A specimen from material collected and identified by W. K. PATTON and also used by SERÈNE (1984) to illustrate the species was selected as the neotype. No type was ever designated and the material used in the original description of the color form by PATTON (1966) is no longer extant. The neotype was collected at Heron I., Queensland, one of the Australian locations where W. K. PATTON collected material used in his description.

T. nigrolineata is morphologically very close to *T. fulva*. They can be differentiated by their color pattern. Live *T. nigrolineata* show a conspicuous dark band, followed by a thinner and lighter one, along the anterior as well as the anterolateral sides of the carapace. The dark bands, and sometimes the light ones as well, will remain visible in material that has been preserved for decades. The dark band is thinner, not followed by a light band, and is present only along the anterior border of the carapace in *T. fulva*. Darker, thinner anterolateral borders, however, may be observed in live *T. fulva*, rarely in specimens preserved for several years. Each walking leg usually has one conspicuous black dot, while there are two in *T. fulva*.

One diagnostic morphological character is the shape of the endopod of the first maxilliped. It is spatulate, with rounded edges along both inner and outer margins (see fig. 2 *in* GALIL, 1988a). The posterolateral borders of the carapace are slightly rounded, giving the carapace a rounded shape. The borders are more straight in *T. fulva*, particularly in males, hence the trapezoidal shape of the carapace (characters reversed in the key given by GALIL, 1988a).

As in *T. fulva*, the anterior border of the cheliped merus is armed with a row of teeth that is usually prolonged outward and takes the form of a crest. Although not as prominent as in *T. rubridactyla*, the crest varies in shape, even between the merus of both chelipeds in some. It is also relatively much larger in the smaller individuals.

Specimens from New Caledonia reported as *T. glaberrima* by SERÈNE (1973b) may have included *T. nigrolineata.*

T. nigrolineata was the second most common species of *Tetralia* after *T. fulva* in all collections made by this author in New Caledonia and Australia. Similar results were obtained by PATTON (1994) in Australia.

T. nigrolineata is known from localities stretching from the western Indian Ocean (SERENE, 1984) to Japan, Thailand and New Caledonia (GALIL, 1988a).

Tetralia rubridactyla Garth, 1971

Pl. 1 E

Tetralia glaberrima forma *rubridactyla* Patton, 1966 : 287 (Queensland, Australia).
Tetralia glaberrima rubridactyla Garth, 1971 : 185.
Tetralia glaberrima laevissima – SERÈNE, 1984 : 282, fig. 188, pl. 40, figs A, B (Queensland, Australia).
Tetralia rubridactyla – GALIL, 1988a : 65, figs 1d, 2g, 2h (Queensland, Australia ; full synonymy). — PATTON, 1994 : 195 (Queensland, Australia).

MATERIAL EXAMINED. — **Chesterfield Is.** CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 3 ♂, 1

♀ (MNHN-B 25182).

Queensland, Australia. Cairns Reef, Cooktown, 15°42'S, 145°34'E, 8.1913, coll. A. R. McCULLOCH : 2 ♂ (AM P38477). — Capre Cay, Swain Reefs, 22°09'S, 152°46'E, Swain Reefs Expedition, 10.1962 : 1 ♂, 1 ♀ (AM P17214). — Granite Bluff, Lizard Island, 14°40'S, 145°28'E, 4 m, on *Acropora* sp., 10.6.1995, coll. P. CASTRO, R. SPRINGTHORPE & K. BUCKLEY : 1 ♂ with cirriped, 1 ♀ (AM P44617, photographed).

COLOR. — The anterior half of the carapace is pink-purple to lavender, while the posterior half is very light brown or tan (pl. 1 E). A thin, dark-brown line extends along the anterior border of the carapace, followed by a broad band of diffuse dark-purple or gray dots. The postorbital angle is also dark brown followed by a diffuse band of dark dots extending along the anterolateral margins below. The chelipeds are light brown, with the dorsal surface darker brown. The distal portion of the dorsal surface of the dactylus is orange-red ; the proximal portion dark brown in some individuals. Dark-brown patches extend along the distal border of the merus (beginning at the edge of the crest), the distal edge of the carpus, and at the proximal portion of the propodus. The walking legs are pink-purple dorsally ; the carpus, propodus, and dactylus have a distinctive red spot at their distal end.

REMARKS. — The species name takes the authorship of GARTH (1971) not of PATTON (1966) since the latter referred to it as a "form" and as such is invalid as it was published after 1960 (article 45 (g) of the International Code of Zoological Nomenclature).

The species can be easily identified by its distinctive color pattern, most of which (including the striking colors of the chelipeds) can still be observed in preserved specimens. One diagnostic morphological character is the prominent crest on the cheliped merus. The endopod of the first maxilliped is rectangular in shape, both the inner and outer borders ending at nearly right angles (see fig. 2 *in* GALIL, 1988a).

T. rubridactyla is known from the western Indian Ocean (SERENE, 1984) and in the Pacific Ocean from Taiwan and the Mariana Islands to the Coral Sea and the Marshall Islands (GALIL, 1988a).

TETRALOIDES Galil, 1986

The genus *Tetraloides* was created by GALIL (1986a) to accommodate one species, *Tetraloides nigrifrons* (Dana), material of which was previously included among several species of *Tetralia*. *T. nigrifrons* was eventually found to actually consist of two different species (GALIL & CLARK, 1988).

Tetraloides, like *Tetralia*, can be readily differentiated from other trapeziids by the presence of two very unequal chelipeds. Unlike *Tetralia*, however, the posterolateral margins of the carapace of *Tetraloides* are strongly convergent posteriorly, there is no setae-filled depression on the largest cheliped, and the thoracic sternum has no median suture. While the dorsal surface of the carapace of *Tetralia* is smooth, in *Tetraloides* it has small tubercles and short setae, particularly in *Tetraloides heterodactyla*. The two species of *Tetraloides*, like *Tetralia*, are symbionts of *Acropora* in the Indo-west Pacific.

Tetraloides heterodactyla (Heller, 1861)

Tetralia heterodactyla Heller, 1861 : 14 (part).
Tetralia heterodactyla fusca Serène, 1959 : 153, fig. 5 C, 6 B (part). — 1984 : 283, pl. 42, fig. B (part).
Tetraloides nigrifrons – GALIL, 1986a : 72, figs 1-3 (part) ; 1987 : fig. 4 (?).
Tetraloides heterodactyla – GALIL, 1988b : 174, fig. 8 (part). — GALIL & CLARK, 1988 : 147, figs 1 D, 3 D, 4 D, 4 I, 6 D (full synonymy).

MATERIAL EXAMINED. — **Gemini Seamount.** GEMINI : st. PLG 54, 21°00.70'S, 170°03.20'E, 40 m, 5.7.1989 : 1 juvenile ♀ (MNHN-B 25183).

Solomon Islands. Peleni I. or Swallow I., Santa Cruz Is., 7.1926, coll. E. TROUGHTON & A. A. LIVINGSTONE : 1 ♂, 1 ♀ (AM P 9161).

Chesterfield Is. CORAIL 2 : st. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 1 ♀ (MNHN-B 25184). —

St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 1 ♀ (MNHN-B 25185).

Western Indian Ocean. Material identified by R. SERÈNE as *Tetralia glaberrima* (Herbst) : Mombasa I., on *Acropora*, coll. A. J. BRUCE, 14.3.1972 : 1 ♂, 1 ♀ (MNHN-B 12798). — Material identified by R. SERÈNE as *Tetralia heterodactyla fusca* Serène & Dat, 1957 : Réunion, La Saline, on *Acropora humilis*, coll. S. RIBES, 4.1.1977 : 1 ♂, 1 ♀ (MNHN-B 8187).

COLOR. — No live specimens were collected during the course of this investigation. Preserved specimens have a light-brown carapace. A very thin red-brown line, followed by a thin, light-brown band, marks the anterior border. In one specimen, a few dark-brown spots, almost black, are scattered through the anterior portion. The posterior portion is of a slightly lighter brown. The carapace of a juvenile individual was light brown with irregular brown dots on its dorsal surface. Chelipeds are also light brown, with a few scattered dark-brown dots. The walking legs are light brown with dark-brown spots on the dorsal surface (see fig. 6 D *in* GALIL & CLARK, 1988). In the available specimens, these dark spots were in the form of aggregations of black granules.

This color pattern may be confused with that of preserved specimens of *Tetralia cinctipes*, particularly small ones. The brown spots on the chelipeds of *T. cinctipes*, however, are much darker and larger than those in *Tetraloides heterodactyla.*

REMARKS. — GALIL (1986a) originally included *T. heterodactyla* with *T. nigrifrons* as the only species in the genus but the two were eventually separated (GALIL & CLARK, 1988). *T. heterodactyla* was described by Heller (1861) from the Red Sea. Only part of the type material was found to belong to *T. heterodactyla* (GALIL, 1988a) before the species was divided so the existence of an actual holotype remains unclear.

Different color patterns and the presence of conspicuous triangular tubercles along the lower margin of the small cheliped distinguish *T. heterodactyla* from *T. nigrifrons*. *T. nigrifrons* is conspicuously dark brown with the central portion of the carapace cream in color. In addition, the anterior portion of the carapace of *T. heterodactyla* is relatively wider than its posterior portion when compared to *T. nigrifrons*. The anterior portion is also provided with more tubercles and setae than in *T. nigrifrons*.

T. heterodactyla has been recorded from the Red Sea, the western Indian Ocean, Christmas Island (GALIL & CLARK, 1988) and here for the first time from the Coral Sea. Its actual distribution across the Pacific Ocean remains unknown. At least some of the material from the Mariana Islands to French Polynesia that was first attributed to *T. nigrifrons* by GALIL (1986a) may actually represent *T. heterodactyla* (GALIL, 1988b).

Tetraloides nigrifrons (Dana, 1852)
Pl. 1 F

Tetralia nigrifrons Dana, 1852a : 83. — A. MILNE EDWARDS, 1873 : 272 (New Caledonia).
Tetralia heterodactyla forma *fusca* Patton, 1966 : 290 (Queensland, Australia).
Tetralia heterodactyla fusca Serène, 1984 : 283 (part).
Tetralia heterodactyla lissodactyla Serène, 1984 : 283, pl. 42, fig. C
Tetralia heterodactyla – TAKEDA & NUNOMURA, 1976 : 78 (New Caledonia, part). — JONES & MORGAN, 1994 : 178 (color photograph).
Tetraloides nigrifrons – GALIL, 1986a : 72 (part). — GALIL & CLARK, 1988 : 149, figs 1 E, 3 E, 4 E, 4 J, 5 B, 6 E (full synonymy). — PATTON, 1994 : 195 (Queensland, Australia).

MATERIAL EXAMINED. — **Chesterfield Is.** CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25186).

New Caledonia. Material identified by M. TAKEDA & N. NUNOMURA as *Tetralia glaberrima* (Herbst) : Ile des Pins, Melanesia Expedition, 6-13.11.1958 : 2 ♂, 3 ♀ (OMNH-Ar 1394-1398).

Vanuatu. 1 ♀ (BMNH 1896.1.2.54-7).

Niue I. BNIUE-365, Hikutavake, reef flat at church, *Acropora* and *Pocillopora*, 15.10.1991, coll. G. PAULAY : 1 ♀ (USNM 277638).

Western Indian Ocean. Material identified by R.SERÈNE as *Tetralia heterodactyla fusca* Serène & Dat, 1957 : Îles Glorieuses, intertidal zone, 9.1958, coll. A. CROSNIER : 3 ♂, 3 ♀ (MNHN-B 8204). — Intertidal zone, 9.1958, coll. A.

CROSNIER : 1 ♂ (MNHN-B 8184). La Réunion, on *Acropora*, 30.7.1977, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 13943). — Réunion, 4 m, on *Acropora*, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 13944). — Material identified by R. SERÈNE as *Tetralia heterodactyla lissodactyla* Serène & Dat, 1957 : Seychelles, Mahé, 10°08'S, 50°59'E, coll. A. J. BRUCE : 1 ♂, 1 ♀ (MNHN-B 8186). — Réunion, La Saline, 12.9.1977, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 8185). — Réunion, La Saline, 12.9.1977, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 8185). — Réunion, on *Acropora*, 24.8.1977, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 24924).

COLOR. — No live material was examined but the distinctive color pattern of the species keeps well in alcohol (pl. 1 F). The anterior and anterolateral edges of the carapace are dark brown, while the rest of the carapace is almost white (cream). The ventral surface is light brown with small dark-brown dots on the abdomen. The chelipeds are light brown. The large cheliped is ornamented with brown square reticulations along the inner and outer dorsal surface of its propodus. The walking legs are dark brown with large light-brown to cream spots on the dorsal surface. The dactylus and ventral surface are light brown.

A color photograph of a live specimen identified as *Tetralia heterodactyla* was given by JONES & MORGAN (1994). One of three color plates given by SAKAI (1976) as *Tetralia glaberrima* (pl. 183, fig. 1) most probably belongs to *T. nigrolineata.*

REMARKS. — *T. nigrifrons* can be morphologically distinguished from *T. heterodactyla* by the non-serrated ventral border of the propodus of the smaller cheliped, the narrower width of the anterior portion of the carapace in relation to the posterior portion, and the smaller number of tubercles and setae on the dorsal surface of the carapace.

T. nigrifrons has been reported from the western Indian Ocean and Christmas Island (GALIL & CLARK, 1988) and from locations across the Pacific Ocean (GALIL, 1986a). Records from the Pacific Ocean most probably include *T. heterodactyla* (GALIL, 1988b).

TRAPEZIA Latreille, 1828

The taxonomy of the estimated twenty-one known species of *Trapezia* has been a most perplexing one. Since color rather than morphology best distinguishes many species, much confusion and ambiguity has been created in efforts to identify material that lost its color during preservation. The importance of color eluded taxonomists who until recently considered these species, which can be defined by very small morphological features, as color varieties. A further complication is that the species of a particular region live sympatrically on their coral hosts and as a consequence they are collected together. Recent revisions of the taxonomy of *Trapezia* by CASTRO (1982, 1996), GALIL (1988b), and GALIL & LEWINSOHN (1984, 1985a, 1985b) have stressed the importance of color, even when small morphological differences can be used in their diagnosis.

Significant work has been undertaken on the ecology, behavior, and nutrition of *Trapezia*. Crabs depend on their host for food and shelter, and they have also been reported as defending corals from predation. Pocilloporid corals (*Pocillopora, Seriatopora*, and *Stylophora*) are the usual hosts. Reviews of work on the biology of *Trapezia* has been summarized by CASTRO (1976, 1988).

Trapezia cymodoce (Herbst, 1801)
Figs 2 A & 2 B, pls 2 A & 3 A

Cancer cymodoce Herbst, 1801 : 22, pl. 51, fig. 5.

Trapezia cymodoce – A. MILNE EDWARDS, 1873 : 260 (New Caledonia, part). — HASWELL, 1882 : 76 (Queensland, Australia). — CALMAN, 1900 : 20 (Queensland, Australia). — GRANT & MCCULLOUGH, 1906 : 118 (Queensland, Australia). — RATHBUN, 1923 : 129 (Queensland, Australia). — WARD, 1933 : 254 (Queensland, Australia). — MCNEILL, 1968 : 68 (Queensland, Australia). — PATTON, 1966 : 285 (Queensland, Australia) ; 1974 : 223, figs 1, 2 E (Queensland, Australia). — SAKAI, 1976 : 507, pl. 181, fig. 1 (color), pl. 184, fig. 1 (color photograph). — MIYAKE,

1983 : 139, pl. 47, fig. 1 (color photograph). — ABELE, 1984 : 128, 131 (Queensland, Australia). — ODINETZ, 1984 : 432, figs 1 C, 2 (part). — SERÈNE, 1984 : 272, fig. 179, pl. 38, fig. B (part). — GALIL, 1987 : fig. 2 ; 1988b : 161, fig. 1. — GALIL & CLARK, 1990 : 378 (New Caledonia ; full synonymy ; part). — DAVIE, 1993 : fig. 40-23 (Queensland, Australia). — TAKEDA, 1994 : 212, fig. 10 (color photograph). — PATTON, 1994 : 203 (Queensland, Australia).
Trapezia coerulea Rüppell, 1830 : 27, pl. 5, fig.7. — ODINETZ, 1984 : 438, figs 3 A, 3a, 4 A, 4a.
Trapezia dentata – A. MILNE EDWARDS, 1873 : 261 (New Caledonia).
Trapezia ferruginea – BOONE, 1934 : pl. 88
non *Trapezia cymodoce* – ODINETZ, 1983 : photograph 2 (color) ; = *Trapezia ferruginea* Latreille. — JONES & MORGAN, 1994 : 178 (color photograph) ; = *Trapezia lutea* sp. nov.

MATERIAL EXAMINED. — **New Caledonia**. St. B3, (T. P). dredgings, 22°17.60'S, 166°30.06'E, 15 m, 11.2.1985 : 1 ♂, 1 ♀ (MNHN-B 24925). — St. B6, T. P. dredgings, 22°18.15'S, 166°29.50'E, 15 m, 11.2.1985 : 1 ♂, 1 ♀ (MNHN-B 24926). — Saint Vincent Bay, 22°25'S, 166°50'E, dredging 2, 20.8.1985, coll. M. KULBICKI : 1 ♂ (MNHN-B 24927). — Saint Vincent Bay, 22°25'S, 166°50'E, dredging 4, 20.8.1985, coll. M. KULBICKI : 1 ♂ (MNHN-B 24928). — Renaurd I., 26.7.1986 : 1 ♂ (MNHN-B 24929). — 5-Milles Channel, 22°34'S, 166°05'E, 20-30 m, 6.11.1989 : 1 ♂ (MNHN-B 24930). — LAGON : various stations, 6-45 m, 5.1984-7.1985 : 91 ♂, 87 ♀ (MNHN-B 18195). — East lagoon : st. 625, 21°59.20'S, 166°53.60'E, 34-40m, 6.8.1986 : 3 ♂, 3 ♀ (MNHN-B 24931). — St. 671, 21°38.1'S, 166°25.50'E, 36-39 m, 8.8.1986 : 1 ♂ (MNHN-B 24932). — St. 702, 21°26.70'S, 166°08.20'E, 37 m, 10.8.1986 : 1 ♂, 2 ♀ (MNHN-B 24933). — St. 702, 21°26.70'S, 166°08.20'E, 37 m, 10.8.1986 : 1 ♂ (MNHN-B 24934, photographed). — St. 735, 22°05.10'S, 166°57.20'E, 15-34 m, 12.8.1986 : 2 ♂ (MNHN-B 24935). — North lagoon : dredging 74, 19°55'S, 161°24'E, 30 m, 6.12.1986, coll.P. LABOUTE, 1 ♀ (MNHN-B 924936, photographed). — St. 899, 20°14.20'S, 164°25.15'E, 16 m, 14.1.1987 : 1 ♂ (MNHN-B 24937). — North lagoon : st. DW 1088, 19°45.50'S, 163°57.70'E, 23 m, 24.10.1989 : 1 ♀ (MNHN-B 24938). — St. DW 1128, 19°31.20'S, 163°52.20'E, 26 m, 26.10.1989 : 3 ♂, 1 ♀ (MNHN-B 24939). — St. DW 1139, 19°23.60'S, 163°47.0'E, 39 m, 27.10.1989 : 1 ♀ (MNHN-B 24940). — St. DW 1156, 19°09.50'S, 163°12.60'E, 55 m, 30.10.1989 : 1 ♂ (MNHN-B 24941). — St. DW 1159, 19°13.0'S, 163.06.90'E, 50 m, 30.10.1989 : 1 ♂ (MNHN-B 24942). — St. DW 1189, 19°32.10'S, 163°34.20'E, 20 m, 1.11.1989 : 3 ♂, 2 ♀ (MNHN-B 24943). — St. DW 1190, 19°34.20'S, 163°30.80'E, 40 m, 1.11.1989 : 1 ♂, 1 ♀ (MNHN-B 24944). — Northwest lagoon : st. DW 1014, 20°08.70'S, 163°53.40'E, 22-23 m, 3.4.1988 : 1 ♂, 1 ♀ (MNHN-B 24945). — St. DW 1017, 20°07.50'S, 163°51.0'E, 21 m, 3.4.1988 : 1 ♂, 1 ♀ (MNHN-B 24946). — St. DW 916, 20°55.50'S, 164°28.30'E, 13 m, 26.4.1988 : 2 ♂, 2 ♀ (MNHN-B 24947). — St. DW 921, 20°51.20'S, 164°26.60'E, 10-11 m, 27.4.1988 : 2 ♀ (MNHN-B 24948). — St. DW 923, 20°48.70'S, 164°24.20'E, 9 m, 27.4.1988 : 1 ♂ (MNHN-B 24949). — St. DW 934, 20°43.0'S, 164°16.80'E, 10 m, 27.4.1988 : 1 ♂ (MNHN-B 24950). — St. DW 940, 20°38.10'S, 164°15.50'E, 10 m, 27.4.1988 : 1 ♂, 2 ♀ (MNHN-B 24951). — St. DW 955, 20°29.90'S, 164°05.0'E, 19 m, 28.4.1988 : 1 ♀ (MNHN-B 24952). — St. DW 957, 20°27.90'S, 164°08.60'E, 17-18 m, 28.4.1988 : 1 ♂ (MNHN-B 24953).— St. DW 958, 20°26.20'S, 164°07.40'E, 18-19 m, 28.4.1988 : 1 ♂ (MNHN-B 24954). — St. DW 959, 20°27.50'S, 164°05.50'E, 20 m, 28.4.1988 : 1 ♀ (MNHN-B 24955). — St. DW 960, 20°28.40'S, 164°03.60'E, 20 m, 28.4.1988 : 1 ♂, 1 ♀ (MNHN-B 24956). — St. CP 967, 20°21.60'S, 164°06.70'E, 12-16 m, 29.4.1988 : 1 ♀ (MNHN-B 24957). — St. DW 982, 20°22.0'S, 163°58.50'E, 34-48 m, 29.4.1988 : 1 ♂, 1 ♀ (MNHN-B 24958). — Southwest lagoon : coll. P. TIRARD : 1 ♂ (MNHN-B 24959). — EXPEDITION MONTROUZIER : Koumac barrier reef, between Infernet reef and land, 13 m, 5.10.1993 : 1 ♂, 1 ♀ (MNHN-B 24960). — Récif M'bere, pente externe, 25-30 m, 7.1.1993 : 1 ♂ (MNHN-B 25363). — Ilot Goeland, 10 m, 16.4.1993 : 1 ♂, 1 ♀ (MNHN-B 25370). — Récif Larégnère, 12-16 m, 3.5.1993 : 3 ♂, 3 ♀ (MNHN-B 25371).

New Caledonia. 1 ♀ (MNHN-B 2918). — St. 127, Maître I., 22°19.80'S, 166°25.10'E, 5 m, on *Pocillopora* spp., 24.4.1995, coll. P. CASTRO : 7 ♂, 4 ♀ (MNHN-B 24961), 1 ♂, 2 ♀ (USNM 277634). — St. 127, Maître I., 22°19.80'S, 166°25.10'E, 5 m, on *Pocillopora* spp., 24.4.1995, coll. P. CASTRO : 2 ♂, 2 ♀ (MNHN-B 24962, photographed). — St. 140, Sèche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Pocillopora* spp., 26.4.1995, coll. P. CASTRO : 3 ♂, 5 ♀ (MNHN-B 24963). — St. 542, Larégnère reef, west side, 22°20.0'S, 166°14.80'E, 7 m, on *Acropora* sp., 26.4.1995, coll. P. CASTRO : 2 ♂, 2 ♀ (MNHN-B 24964, photographed). — St. 107, Boulari Pass, 22°29.90'S, 166°26.55'E, 10-20 m, on *Pocillopora* spp. and *Acropora* spp., 28.4.1995, coll. P. HAMEL : 2 ♂, 4 ♀ (MNHN-B 24965).

New Caledonia. Material identified by A. MILNE EDWARDS as *Trapezia dentata* (Macleay, 1838) : 5 ♂, 3 ♀ (MNHN-B 2919). — 3 ♂, 3 ♀ (MNHN-B 2920).

Loyalty Is. MUSORSTOM 6 : st. DW 431, Beautemps-Beaupré lagoon, 20°22.25'S, 166°10.0'E, 21 m, 18.2.1989 : 1 ♂, 1 ♀ (MNHN-B 24966). — St. DW 433, 20°20.24'S, 166°09.04'E, 24 m, 18.2.1989 : 1 ♀ (MNHN-B 24967). — St. DW 434, 20°21.21'S, 166°08.64'E, 23 m, 18.2.1989 : 1 ♀ (MNHN-B 25188). — PLOUVEAL : st. 1226, Ouvéa lagoon, 20°32.0'S, 166°24.0'E, 21 m, 9.9.1992, coll. R. LEBORGNE : 2 ♂, 3 ♀ (MNHN-B 24969). — St. 1222, Ouvéa lagoon, 20°28.0'S, 166°30.0'E, 15 m, 12.9.1992, coll. R. LEBORGNE : 2 ♂, 3 ♀ (MNHN-B 24968). — St. 1228, Ouvéa lagoon, 20°36.0'S, 166°24.0'E, 18 m, 15.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 24970). — St. 1229, Ouvéa lagoon, 20°37.10'S, 166°22.90'E, 16 m, 15.9.1992, coll. R. LEBORGNE : 1 ♂, 1 ♀ (MNHN-B 24971). — St. 1230, Ouvéa lagoon, 20°35.0'S, 166°22.90'E, 18 m, 15.9.1992, coll. R. LEBORGNE : 2 ♂, 1 ♀ (MNHN-B 24972). — Ouvéa lagoon : 1 ♂ (MNHN-B 24973).

Vanuatu. Port Patterson : 1 ♂, 1 ♀ (BMNH 1896.1.2.21-23).

Chesterfield Is. CHALCAL 1 : st. D 34, 19°52.10'S, 158°20.10'E, 33-37 m, 21.7.1984 : 2 ♂, 3 ♀ (MNHN-B 24974). — CORAIL 2 : st. DW 11, 20°50.19'S, 161°40.56'E, 58 m, 20.7.1988 : 1 ♀ (MNHN-B 24975). — St. DW 12, 20°47.74'S, 161°36.32'E, 59 m, 20.7.1988 : 1 ♀ (MNHN-B 24976). — St. DW 46, 19°18.54'S, 158°20.0'E, 21 m, 23.7.1988 : 1 ♂, 3 ♀ (MNHN-B 24977). — St. DW 70, 19°15.0'S, 158°26.60'E, 54 m, 25.8.1988 : 1 ♀ (MNHN-B 24978). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 3 ♂, 2 ♀ (MNHN-B 24979). — St. DW 88, 19°05.98'S, 158°55.85'E, 32 m, 26.8.1988 : 3 ♂, 2 ♀ (MNHN-B 24980). — St. DW 89, 19°03.02'S, 158°57.83'E, 40 m, 26.8.1988 : 1 ♂ (MNHN-B 24981). — St. CP 90, 19°02.83'S, 158°56.26'E, 44-48 m, 26.8.1988 : 2 ♂, 1 ♀ (MNHN-B 24982). — St. DW 94, 19°06.0'S, 158°50.0'E, 36-56 m, 27.8.1988 : 2 ♂, 1 ♀ (MNHN-B 24983). — St. DW 97, 19°06.0'S, 158°38.43'E, 32 m, 27.8.1988 : 2 ♀ (MNHN-B 24984). — St. DW 101, 19°08.99'S, 158°26.24'E, 37 m, 27.8.1988 : 1 ♂, 1 ♀ (MNHN-B 24985). — St.104, 19°08.95'S, 158°35.67'E, 49 m, 27.8.1988 : 1 ♂ (MNHN-B 24986). — St. DW 105, 19°08.91'S, 158°39.19'E, 35 m, 27.8.1988 : 1 ♂, 1 ♀ (MNHN-B 24987). — St. DW 115, 19°22.01'S, 158°37.62'E, 44 m, 28.8.1988 : 1 ♂, 2 ♀ (MNHN-B 24988). — St. DW 126, 19°28.07'S, 158°27.0'E, 46 m, 29.8.1988 : 1 ♂, 1 ♀ (MNHN-B 24989). — St. DW 127, 19°27.73'S, 158°27.30'E, 44-45 m, 29.8.1988 : 3 ♂, 2 ♀ (MNHN-B 24990). — St. DW 132, 19°31.0'S, 158°28.64'E, 38-50 m, 30.8.1988 : 1 ♀ (MNHN-B 24991). — St. DW 136, 19°31.28'S, 158°16.0'E, 37 m, 30.8.1988 : 1 ♀ (MNHN-B 24992). — St. DW 137, 19°34.0'S, 158°14.60'E, 32 m, 30.8.1988 : 1 ♂ 1 ♀ (MNHN-B 24993). — St. DW 138, 19°33.85'S, 158°17.57'E, 31 m, 30.8.1988 : 2 ♂ (MNHN-B 24994). — St. DW 151, 19°54.0'S, 158°23.0'E, 35 m, 1.9.1988 : 1 ♂ (MNHN-B 24995). — St. 155, 19°49.08'S, 158°24.85'E, 42 m, 1.9.1988 : 1 ♀ (MNHN-B 24996). — St. DW 159, 19°46.04'S, 158°19.98'E, 52 m, 1.9.1988 : 1 ♂ (MNHN-B 24997). — St. DW 163, 19°41.46'S , 158°15.62'E, 23 m, 2.9.1988 : 1 ♀ (MNHN-B 24998). — St. DW 165, 19°41.41'S, 158°21.85'E, 45 m, 2.9.1988 : 1 ♂, 1 ♀ (MNHN-B 24999).

Bellona Reefs. St. 11 DE, 21°51.0'S, 159°32.0'E, 27-30 m, 22.10.1985 : 1 ♂ (MNHN-B 25000).

Queensland, Australia. Low Is., Great Barrier Reef Expedition, 13.2.1928 : 1 ♀ (BMNH 1937.9.21.170-179). — Low Is., Great Barrier Reef Expedition, 1929 : 8 ♂, 7 ♀ (BMNH 1937.9.21.170-179). — St. 10, Satellite Reef, Great Barrier Reef Expedition, 22.2.1929 : 1 ♂, 1 ♀ (BMNH 1937.9.21.170-179). — St. 23, Turtle Is., Great Barrier Reef Expedition, 12.3.1929 : 1 ♀ (BMNH 1937.9.21.170-179). — Great Barrier Reef Expedition, 1928-29 : 2 ♂, 2 ♀ (BMNH 1937.9.21.170-179). — Thomas Cay, 11.1960, coll. L. R. THOMAS : 2 ♂, 2 ♀ (AM P16989). — Gillet Cay, 10.1962, 21°43'S, 152°25'E, Swain Reefs Expedition : 1 ♀ (AM P17212). — Swain Reefs, 15.9.1974, coll. N. COLEMAN : 1 ♀ (AM P89693). — Cook I., 8.1985, coll. J. JOHNSON & J. SHORT : 1 ♂, 1 ♀ (QM W11938). — Seaforth I., 24.3.1987, coll. P. DAVIE & J. SHORT : 6 ♂, 2 ♀ (QM W14395). — Home Beach, Lindeman I., 25.3.1987, coll. P. DAVIE & J. SHORT : 1 ♂, 1 ♀ (QM W14450). — Mudjimba I., 26°36.80'S, 153°06.80'E, 5 m, 9.2.1994, coll. J. SHORT : 2 ♂, 3 ♀ (QM W19851). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Pocillopora* sp., 8.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 2 ♀ (AM P44625, photographed). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Pocillopora* sp., 9.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♂, 1 ♀ (AM P44622, photographed).

Middleton Reef. Lagoon, 29°27.1'S, 159°06.8'E, 7.12.1987, coll. J. LOWRY : 3 ♂, 2 ♀ (AM P38233).

Elizabeth Reef. Reef flat, 29°55.8'S, 159°01.3'E, 14.12.1987, coll. J. LOWRY : 6 ♂, 2 ♀ (AM P38234).

Western Australia. Shore reef, 14 milles north of Pellortes, 8.9.1968, Mingaloo Expedition : 1 ♂, 2 ♀ (WAM 514-86). — Monkey Rock, Shark Bay, 11.3.1986 : 2 ♂, 2 ♀ (WAM 169-90). — Kendrew I., Dampier Archipelago, 20.5.1974, Crown-of-Thorns Survey : 4 ♂, 5 ♀ (WAM 504-86). — Condillac I., Kimberley Is., 10 m., 16.7.1988 : 2 ♂, 3 ♀ (WAM 998-88).

Belau (Palau). Bebelthuap I., 3 m, on *Pocillopora cespitosa*, 29.6.1974, coll. P. CASTRO : 4 ♂, 5 ♀ (MNHN-B 22942).

COLOR. — The dorsal surface of the carapace of live individuals has a color perhaps best described as purplish blue (pl. 2 A). The intensity of the color varies, however, sometimes taking a brownish blue or, rarely, turning into light violet. Two transversal rows of orange-red dots (usually eight on each side) radiate

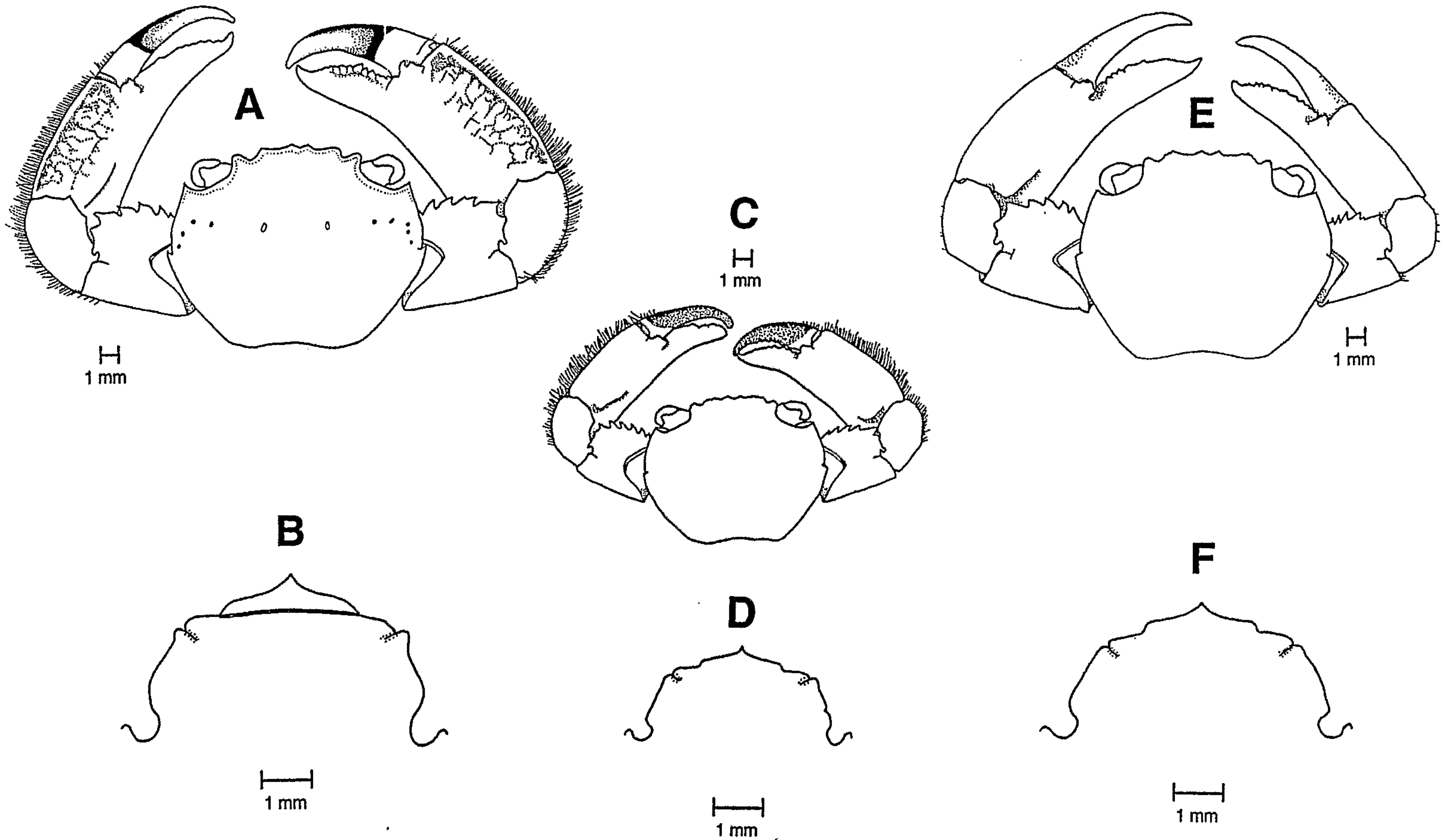

Fig. 2. — *Trapezia cymodoce* (Herbst, 1801), New Caledonia, ♀ (MNHN-B 24961) : **A.** dorsal aspect of the carapace, **B.** anterior sternal region ; *Trapezia lutea* sp. nov., ♀ paratype, Chesterfield Is. (MNHN-B 25223) : **C.** dorsal aspect of the carapace, **D.** anterior sternal region ; *Trapezia ferruginea* Latreille, 1828, Chesterfield Is., ♀ (MNHN-B 25004) : **E.** dorsal aspect of the carapace, **F** anterior sternal region.

symmetrically across the upper half of the carapace from two (sometimes one) larger dots on the center of the gastric region, curving downwards to just above the epibranchial teeth. The anterior edge of the carapace is ornamented with a thin, red or red-orange line, particularly between the eyes. The base of the epibranchial teeth is often red. Chelipeds are orange, often with a thin red-orange and pink line along the edges ; red-orange square reticulations are usually found on the upper surface of the propodus. The dactylus has a dark-brown band that reaches distally to only about two-thirds of its total length. The tomentum of the chelipeds is typically colorless but the presence of filamentous cyanobacteria can give it a greenish or greenish brown color. In one specimen the base of the setae was colorless but the outer half was bright orange. Ventrally, the body is orange ; the anterior portion of the carapace is blue-violet with two longitudinal red-orange lines and a light-violet band below.The eyes are black.

In preserved specimens, the dorsal surface of the carapace, particularly the anterior portion, typically remains brownish in contrast with the orange of the rest of the body. The dots, particularly the two large central ones, may remain visible after many decades of preservation, even in dry specimens.

Color photographs of *T. cymodoce* were given by SAKAI (1976), MIYAKE (1983), and TAKEDA (1986, 1994).

REMARKS. — The separation between *T. cymodoce* and *T. ferruginea*, another species characterized by its large size, has been much debated. Both species have been recorded as sympatric through most of the Indo-west Pacific. *T. cymodoce*, however, is absent from the eastern Pacific (CASTRO, 1996).

Descriptions of the two species were too brief and the type specimen of *T. cymodoce*, like that of *T. ferruginea*, was "displaced or destroyed" (H. E. GRUNER, *in litt.*, June 6, 1994). A photograph of the type of *T. cymodoce* in RATHBUN (1906 ; pl. 11, fig. 6), however, shows features characteristic of the species : almost parallel anterolateral borders, a pointed tooth on the carpus of right cheliped, and epibranchial teeth that are spine-like, acute, and pointed upwards. The illustration given in the description (HERBST, 1801) also shows these features. Disagreements as to the validity of the characters used to separate the two species, however, led to misidentifications and to the description of separate species and varieties, even when DE MAN (1880) clearly outlined the differences between the two species (also see ALCOCK, 1898, BOONE, 1934, GALIL & CLARK, 1990). ORTMANN (1893) relegated *T. ferruginea* to a variety of *T. cymodoce* but treated them as separate species in a subsequent review (ORTMANN, 1897). RATHBUN (1907, 1930) reduced *T. ferruginea* to subspecies status under *T. cymodoce*.

Examination of numerous Indo-west Pacific specimens previously identified as *T. ferruginea* or *T. cymodoce*, as well as live material, confirmed that in addition to color, several morphological characters separate the two species. *T. cymodoce* is characterized by : **1**) a carapace that is purplish blue and ornamented with a transversal row of orange-red spots (fig. 2 A, pls 2 A & 3 A) that remain in preserved specimens (it is uniformly orange to brownish orange in *T. ferruginea*), **2**) a well developed tomentum (fig. 2 A, pls 2 A & 3 A) that consists of numerous plumose setae is always present along the entire upper and outer surface of the chelipeds (few microscopic setae or, sometimes, a conspicuous tomentum that is restricted to the cheliped carpus in *T. ferruginea* (fig. 3 E), **3**) a keeled, subacute upper edge of the cheliped propodus (rounded in fully grown *T. ferruginea*), **4**) the dark portion of the dactylus extends distally to only about two-thirds of the length of the dactylus (fig. 2 A) (it extends almost to the base in *T. ferruginea* ; see fig 3.A *in* CASTRO, 1996), **5**) a conspicuous suture between the second and third thoracic sternites that is always present (fig. 2 B), sometimes marked by a thin, dark-orange line in the largest individuals (fused suture in adult *T. ferruginea* ; fig. 2 F), **6**) acute tooth on the distal margin of the cheliped carpus (fig. 2 A) except in most of the largest specimens (rounded, blunt tooth in juvenile and adult *T. ferruginea* ; fig. 2 E), **7**) the epibranchial teeth of the carapace are acute, taking the shape of a spine (fig. 2 A), and slightly more posterior (obtuse and slightly more anterior in fully grown *T. ferruginea* ; fig. 2 E ; also see figs 26 & 27 *in* SERÈNE, 1971), **8**) the anterolateral borders of the carapace are almost parallel to each other at the base (fig. 2 A, pls 2 A & 3 A), although anteriorly more curved in the largest specimens (incurved or convex, except in juveniles, in *T. ferruginea* ; fig. 2 E), **9**) the inner suborbital teeth are long and acute, particularly in small individuals, so that they clearly reach the full extension of the supraorbital angles of the carapace (shorter and subacute in *T. ferruginea*, barely reaching the length of the supraorbital angles), **10**) six to eight transversal rows of setae on the inner margin of the last walking leg (five to six in *T. ferruginea*), **11**) the apex of the first male pleopod is wider (more slender in *T. ferruginea* ; see figs 30-33 *in* SERÈNE, 1971 and figs 179 & 180 *in* SERÈNE, 1984), and **12**) the merus of the fourth pair of walking legs is slightly longer, with a total length to maximum width ratio of 2.4 to 2.5 (shorter in *T. ferruginea*, with a length to width ratio of 2.1 to 2.2). Differences in color and morphology are summarized in table 1.

Table. 1. — Summary of diagnostic characters of *Trapezia cymodoce*, *T. lutea*, and *T. ferruginea*.

Diagnostic characters	***Trapezia cymodoce***	***Trapezia lutea***	***Trapezia ferruginea***
color of carapace	bluish purple with two rows of orange-red spots	orange to yellow-orange	orange to brown-orange
color of dactylus	distally dark 2/3 of length	dark almost from the base	dark almost from the base
tomentum on cheliped propodus	present	present	absent or much reduced
cheliped propodus	subacute	subacute	rounded
thoracic suture 2/3	present	present only in smaller individuals	present only in juveniles
tooth on cheliped carpus	usually acute	blunt	blunt
epibranchial teeth	acute	obtuse in larger individuals	obtuse
anterolateral borders of carapace	usually parallel	rounded	rounded
inner suborbital teeth	longer and acute	shorter and subacute	shorter and subacute
rows of setae on 4th walking leg	6-8	4-5	5-6
merus of 4th walking leg	longer	shorter	shorter

Of all the diagnostic characters, color pattern, the development of tomentum on the chelipeds, and the presence of a suture between the second and third thoracic sternites (found in all 381 Coral Sea and Western Australia specimens studied) are the most reliable in separating fully grown individuals of *T. cymodoce* from *T. ferruginea*. Color and the presence of an acute tooth on the cheliped carpus are most useful in juveniles and small adults.

The same identical color pattern of *T. cymodoce* was described by ODINETZ (1984) in her reinstatement of *T. coerulea* Rüppell as a separate species. This has been the source of considerable confusion. *T. cymodoce* was referred to by ODINETZ (1983, 1984) as *T. coerulea*, while material belonging to *T. ferruginea* and possibly *T. lutea* sp. nov., were identified as *T. cymodoce*. The examination of Rüppell's type material by GALIL (1988 b), however, showed that *T. coerulea* is a junior synonym of *T. cymodoce* (GALIL & CLARK, 1990). The description of the distinctive "orange variety" of *T. cymodoce* as a separate species (*T. lutea* sp. nov.) should clarify this problem.

A. MILNE EDWARDS (1873) identified specimens of *T. cymodoce* from New Caledonia (MNHN-B 2919 & 2920) as *T. dentata* (Macleay). It was described as the most common species in New Caledonia. Specimens were light brown (*brun clair*), with acute lateral teeth and short pubescence on the chelipeds. Examination of these specimens confirms the conclusion of GALIL and CLARK (1990) that this material actually represents *T. cymodoce*. Traces of the color spots on the dorsal surface of the carapace that are characteristic of *T. cymodoce* can still be seen on a few of the dried specimens.

T. cymodoce was the most common species of *Trapezia* in the New Caledonia and Australia coral reefs that were sampled. Although it primarily inhabits colonies of *Pocillopora*, it was occasionally found in *Acropora* (PATTON, 1994).

T. cymodoce is known throughout the Indo-west Pacific region, including Japan and perhaps French Polynesia but excluding the Hawaiian Islands (GALIL & CLARK, 1990). Many of these records, however, are questionable.

Trapezia digitalis Latreille, 1828
Pl. 3 B

Trapezia digitalis Latreille, 1828 : 696. — WARD, 1933 : 254 (Queensland, Australia). — SERÈNE, 1959 : 129, figs 1, 2 A, pl. 1. — PATTON, 1966 : 286 (Queensland, Australia). — SAKAI, 1976 : 510, pl. 182, fig. 3 (color). — SERÈNE, 1984 :

277, fig. 185, pl. 38, fig. D. — GALIL, 1988b : 163, fig. 2. — CASTRO, 1996 : 536, fig. 2.

MATERIAL EXAMINED. — **Chesterfield Is.** CORAIL 2 : st. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 4 ♂, 4 ♀ (MNHN-B 25001). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 4 ♂, 4 ♀ (MNHN-B 25002).

Flinders Reefs. 26°59'S, 159°29'E, 6-20 m, 10.3.1989, coll. P. DAVIE, J. SHORT & P. LAWLESS : 3 ♂, 4 ♀ (QM W16227).

Queensland, Australia. Shag Rock, off Stradbroke I., 27°25'S, 153°31'E, 15 m, on *Pocillopora* sp., 5.2.1992, coll. J. SHORT : 1 ♂, 1 ♀ (QM W19404).

Elizabeth Reef. Lagoon, 4.5.1987, coll. J. SHORT : 1 ♂ (QM W12977).

COLOR. — The carapace and dorsal surface of the chelipeds are of a dark-brown color unique in *Trapezia* (pl. 3 B). A thin, light-brown line is usually found along the anterior border of the carapace and cheliped merus. The ventral portion of the cheliped propodus and fingers are light brown or dark orange-white (cream), with an orange-white, node-like tubercle at the base of the dactylus. The dorsal portion of the cheliped propodus is typically ornamented with square and rectangular reticulations that are light brown in color. Walking legs are light to reddish brown. Postlarvae and juveniles often have a broad orange-white band across the posterior portion of the carapace. The live color pattern remains remarkably well preserved in alcohol.

A color photograph of *T. digitalis* was given by NAGAI & NOMURA (1988).

REMARKS. — *T. digitalis* can be easily identified by its dark-brown color, small size, and by a carapace with a frontal border that has minute teeth and very slight emarginations. The anterolateral borders of the carapace are always parallel to each other. The acute epibranchial teeth of small individuals are reduced to a notch and eventually disappear in the largest individuals. The posterolateral borders of the carapace converge posteriorly more abruptly than in the other species of *Trapezia* very much as in *Tetraloides nigrifrons*, which also has a dark-brown color. A suture between the second and third thoracic somites is found only in juveniles and small adults.

T. digitalis is one of the most widely distributed species of *Trapezia*. It has been recorded throughout the Indo-west Pacific and eastern Pacific regions (SERÈNE, 1984). No significant morphological differences were found among specimens collected in the Indian Ocean and the west coast of North and South America (CASTRO, 1996).

Trapezia ferruginea Latreille, 1828
Figs 2 E & 2 F

Trapezia ferruginea Latreille, 1828 : 695. — SAKAI, 1976 : 507, pl. 182, fig. 2 (color). — SERÈNE, 1984 : 273, fig. 180, pl. 38, fig. C. — GALIL, 1987 : fig. 1 ; 1988b : 164, fig. 3 (full synonymy). — CASTRO, 1996 : 539, fig. 3.

Trapezia cymodoce – A. MILNE EDWARDS, 1873 : 260 (New Caledonia, part). — ODINETZ, 1983 : 30, 85, 87, 96, 107, 114, 134, 205, 211, 216, photograph no. 2 (part ; color). — ODINETZ, 1984 : 432, figs 1 A, 1 B, 2 (part).

non *Trapezia ferruginea* – JONES & MORGAN, 1994 : 178 ; = *Trapezia serenei* Odinetz.

MATERIAL EXAMINED. — **New Caledonia.** Material identified by A. MILNE EDWARDS as *Trapezia cymodoce* (Herbst, 1801) : 2 ♂, 1 ♀ (MNHN-B 2918).

Gemini Seamount. GEMINI : st. PLG 62, 21°00.7'S, 170°03.20'E, 40 m, 6.7.1989 : 1 ♀ (MNHN-B 25003).

Chesterfield Is. CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 1 ♂, 6 ♀ (MNHN-B 25004).

Guam. Material collected and identified by O. ODINETZ as *Trapezia cymodoce* aff. *ferruginea* : on *Pocillopora* sp., 3.1981 : 1 ♂, 1 ♀ (MNHN-B 9676). — On *Pocillopora* sp., 3.1981 : 1 ♂, 1 ♀ (MNHN-B 9677). — On *Pocillopora* sp., 6.1981 : 1 ♂, 1 ♀ (MNHN-B 9678).

COLOR. — No live Indo-west Pacific specimens were examined during the course of this investigation. In the eastern Pacific populations the carapace and chelipeds are orange to brownish orange, with anterior border of the carapace and merus of chelipeds slightly lighter in color (CASTRO, 1996).

Preserved Indo-west Pacific specimens are uniformly orange. The anterior borders of the carapace and the merus and carpus of the chelipeds are darker orange. A diagnostic feature is the orange-red spot on the distal end of the propodus of the walking legs. It has remained in specimens preserved for over fifteen years.

Color differences have been recorded for *T. ferruginea* throughout its range : "bright orange red, with brownish black eyes and wood brown fingers" in live specimens from French Polynesia and Bali (BOONE, 1934), "uniformly yellowish or light brownish" from southern Japan but illustrated in a plate as light orange-brown with darker reticulations on the chelipeds (SAKAI, 1976), "yellowish bluish-grey" carapace and walking legs "ocher-yellow with red dot distally on propod" in live specimens from the Red Sea (GALIL, 1988b), "uniform orange yellow" in the western Indian Ocean (SERÈNE, 1984), and "yellowish" with brown carapace borders and cheliped joints in a preserved specimen from the South China Sea (DAI & YANG, 1991). It is possible, however, that some of these records were the result of erroneous identifications. The two specimens in a photograph in BOONE (1934) most probably represent *T. cymodoce.*

REMARKS. — Morphological similarities between *T. ferruginea* and *T. cymodoce* have been the source of much confusion (see discussion of *T. cymodoce*). Individuals of both species reach a large size and are found throughout the Indo-west Pacific region. *T. ferruginea* is also found in the eastern Pacific (CASTRO, 1996). The two species are best differentiated by color : carapace of a uniform color in *T. ferruginea* but with two transversal rows of orange-red dots only in *T. cymodoce* (fig. 2 A, pls 2 A & 3 A).

The most reliable morphological diagnostic features of *T. ferruginea* are the absence of a conspicuous tomentum along the outer margin of the cheliped (in contrast to *T. cymodoce* and *T. lutea* sp. nov.) and the absence of a suture between the second and third thoracic somites (fig. 2 F). This suture is always present in *T. cymodoce* but it may be absent in the larger specimens of *T. lutea* and *T. serenei,* both of which reach a size comparable to that of medium-size *T. ferruginea.* The upper edge of the cheliped propodus is rounded, the distal margin of the cheliped carpus is marked by a rounded tooth (fig. 2 E), even in juveniles, the epibranchial teeth are always obtuse in adults (fig. 2 E), the anterolateral borders of the carapace are convex in adults (fig. 2 E), there are five to six transversal rows of setae on the last pair of walking legs (fig. 1 *in* GALIL, 1987), and the first male pleopod is slender (figs 31 & 33 *in* SERÈNE, 1971, fig. 180 *in* SERÈNE, 1984, and figs 3 D & 3 E *in* CASTRO, 1996). Table 1 summarizes differences between *T. ferruginea*, *T. cymodoce*, and *T. lutea.*

The development of tomentum varies in *T. ferruginea,* which explains in part some of the "intermediate" individuals of ODINETZ (1984). In most specimens it consists of microscopic setae restricted to the carpus and the proximal portion of the propodus. A conspicuous tomentum restricted to the joints of the carpus have been found in a few eastern Pacific specimens (CASTRO, 1996). In one individual the conspicuous tomentum was present in only one cheliped.

Variations in some of the characters traditionally used in the diagnosis of *T. ferruginea* and *T. cymodoce,* a claim that some of morphological differences previously used were not valid, and the finding of seemingly intermediate specimens from Guam and French Polynesia led ODINETZ (1984) to erroneously consider *T. ferruginea* a junior synonym of *T. cymodoce.*

Three of four dry specimens from New Caledonia identified by A. MILNE EDWARDS (1873) as *T. cymodoce* (MNHN-B 2918) and described as having a uniform yellowish color and lateral teeth that were *obtuse et peu visibles,* were found to be *T. ferruginea.* These specimens also have a complete ventral sternum, slightly curved anterolateral sides, and a rounded tooth on the distal margin of the cheliped carpus.

Together with *T. digitalis*, *T. ferruginea* is the most widely distributed species of *Trapezia.* It has been recorded across the Indo-west Pacific region (including the Hawaiian Islands and Easter Island) and the eastern Pacific (GARTH, 1973 ; SERÈNE, 1984 ; HUBER & COLES, 1986). Closer examination of live color and morphological characters, however, may demonstrate the existence of more than one species.

Trapezia flavopunctata Eydoux & Souleyet, 1842

Trapezia flavopunctata Eydoux & Souleyet, 1842 : 230, pl. 2, fig. 3. — SAKAI, 1976 : 510, pl. 182, fig. 4 (color). — SERÈNE, 1984 : 276, fig. 183, pl. 42, fig. A. — GALIL & LEWINSOHN, 1985a : 210 (full synonymy).
Trapezia latifrons A. Milne Edwards, 1867 : 281 ; 1873 : 259, pl. 10, fig. 7 (New Caledonia).

MATERIAL EXAMINED. — **New Caledonia.** coll. M. BALANSA : 1 ♂ (MNHN-B 2954).

COLOR. — GALIL & LEWINSOHN (1985a) described the color pattern of the species as "reticulated pattern of red lines circumscribing large yellow spots". A color photograph was given by NAGAI & NOMURA (1988) and a color figure by SAKAI (1976).

REMARKS. — Although not collected during this investigation, a dried specimen from New Caledonia (MNHN-B 2954) identified as *Trapezia latifrons* A. Milne Edwards clearly shows the morphological features that characterize *T. flavopunctata*. As in *T. rufopunctata*, the inner margin of the cheliped propodus is armed with two rows of thick tubercles that give the appearance of a serrated border. In contrast, the frontal teeth are rounded, not acute as in *T. rufopunctata* (GALIL & LEWINSOHN, 1985a). Individuals of both of these species reach the largest size among all species of *Trapezia*.

T. flavopunctata is known from numerous locations in the Indo-west Pacific region, including the Hawaiian Islands and French Polynesia (see SERÈNE, 1984, GALIL & LEWINSOHN, 1985a, and HUBER & COLES, 1986), but apparently excluding the Red Sea.

Trapezia formosa Smith, 1869

Trapezia formosa Smith, 1869 : 286. — CASTRO, 1982 : 12 ; 1996 : 544 , fig. 4 (full synonymy).

MATERIAL EXAMINED. — **Chesterfield Is.** CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 4 ♂, 4 ♀ (MNHN-B 25191).

COLOR. — Preserved specimens from the Coral Sea are uniformly orange with the borders of the carapace and segments of the chelipeds and walking legs a slightly darker orange. There is no evidence of any distinctive color dots, spots, lines, or bands on the carapace and chelipeds. Most specimens, however, show irregular and faint orange reticulations on the walking legs. No live specimens, however, were examined.

Live *T. formosa* from the eastern Pacific are bright reddish orange, with the inner surface of the cheliped propodus reddish orange dorsally and orange-yellow ventrally ; dark-orange reticulations are often present on the inner surface of the cheliped propodus (CASTRO, 1982 ; 1996).

REMARKS. — There are no morphological differences between the specimens from the present collection and *T. formosa*, which has been presumed to be endemic to the eastern Pacific (CASTRO, 1982 ; 1996). All available specimens are of a homogeneous small size. The carapace width of the four males vary between 6.5 mm and 7.0 mm, carapace length between 5.0 mm and 5.5 mm ; the four females have a carapace width of 6.8 mm to 8.5 mm and a carapace length of 5.0 mm to 6.5 mm. All females were ovigerous, which precludes the possibility that the Chesterfield Islands specimens represent the immature or juvenile stage of a large-size species. As in *T. formosa*, the anterolateral borders of the carapace are curved, the anterior border is divided into two rounded supraorbital angles and four lobes, the epibranchial teeth are reduced to slight notches or absent (particularly in the larger females), there is no suture between the second and third thoracic sternites, the chelipeds are thick with short fingers, the last pair of walking legs has three transversal rows of setae, and the first pair of male pleopods is relatively short with a stout, symmetrical apex.

Several records of *T. formosa* in the Indo-west Pacific region may have been erroneous identifications that resulted from the use of a key by SERÈNE (1971) (CASTRO, 1996). Specimens from the South China Sea identified as *T. formosa* (DAI *et al.*, 1983, 1986 ; DAI & YANG, 1991) seems such a case. The anterior border of the carapace is only divided into two lobes, in contrast to four in *T. formosa*. Preserved specimens were orange ("orange-red" *in* DAI *et al.*, 1983) with a dark "meshwork pattern" on chelipeds and legs.

The French Polynesia specimens identified by ODINETZ (1983) as *T. formosa* is being described as a new species (CASTRO, 1997).

T. formosa is close to several other species characterized by their small size, globose appearance, reduced or absent epibranchial teeth, and thick chelipeds. These species can be best differentiated by their color pattern.

One such small-size species is *T. cheni* Galil, which was described from Taiwan. Its carapace is orange-yellow with anterior and lateral portions brownish red (GALIL, 1983). The chelipeds are deep red, with a white tubercle on the upper proximal portion of the dactylus. There is no tooth or notch on the sides of the carapace and the distal end of the cheliped carpus has only one tooth. The carapace of *T. garthi* Galil, also from Taiwan, has "irregular rounded areolae enclosed in thick net of magenta" on the dorsal surface of the carapace (GALIL, 1983).

T. bella Dana and *T. speciosa* Dana, known from several locations in the Indo-west Pacific, also have a small, rounded carapace. The carapace, chelipeds, and walking legs, however, have many small red dots in the case of *T. bella* and a network of irregular red-brown lines in *T. speciosa* (CASTRO, 1997). The color patterns of these species, which can be discerned in preserved specimens, is absent in the uniform orange color of the preserved *T. formosa* from this collection.

T. formosa has also been reported from Enewetak, Marshall Islands (HUBER, 1985) and Taiwan (CHANG *et al.*, 1987). Enewetak populations, however, were shown to be genetically different from those in the eastern Pacific.

Although collected at only one station in the Chesterfield Islands, *T. formosa* may be more common elsewhere. It may have been overlooked due to its small size or assumed to be young individuals of another species. In the eastern Pacific *T. formosa* inhabits areas deep in coral colonies, very small colonies, and live coral fragments (CASTRO, 1996).

Trapezia guttata Rüppell, 1830
Pls 2 B & 4

Trapezia guttata Rüppell, 1830 : 27. — FOREST & GUINOT, 1961 : 136, figs 134, 139 a, b. — SAKAI, 1976 : 508, fig. 270, pl.183, fig. 3 (color). — MIYAKE, 1983 : 139, pl. 47, fig. 2 (color photograph). — SERÈNE, 1984 : 271, fig. 178, pl. 38, fig. A. — GALIL, 1988b : 166, fig. 4. — GALIL & CLARK, 1990 : 381 (New Caledonia ; full synonymy). — JENG, 1994 : 317, fig. 6 B (color photograph). — TAKEDA, 1994 : 212, fig. 4 (color photograph).
Trapezia davaoensis Ward, 1941 : 14, fig. 27.
Trapezia ferruginea forma *guttata* – PATTON, 1966 : 285 (Queensland, Australia) ; 1974 : 223 (Queensland, Australia).
Trapezia sp. COLIN & ARNESON, 1995 : 214, fig. 1009 (color photograph).

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. 23, Nouméa, 23.5.1984, 22°24'S, 166°25'E, 10-18 ♂ : 1 ♂ (MNHN-B 25080). — East lagoon : st. 612, 22°08.90'S, 167°00.50'E, 46-48 m, 5.8.1986 : 1 ♂ (MNHN-B 25005). — St. 613, 22°07.30'S, 166°59.50'E, 45-50 m, 5.8.1986 : 2 ♀ (MNHN-B 25006). — St. 625, 21°59.20'S, 166°53.60'E, 34-40 m, 6.8.1986 : 8 ♂, 3 ♀ (MNHN-B 25007). — St. 625, 21°59.20'S, 166°53.60'E, 34-40 m, 6.8.1986 : 1 ♂, 1 ♀ (MNHN-B 25008, photographed). — St. 642, 21°54.20'S, 166°42.20'E, 44-47 m, 7.8.1986 : 1 ♀ (MNHN-B 25009). — St. 651, 21°48.0'S, 166°36.40'E, 48 m, 7.8.1986 : 1 ♀ (MNHN-B 25010). — St. 671, 21°38.1'S, 166°25.50'E, 36-39 m, 8.8.1986 : 3 ♂, 2 ♀ (MNHN-B 25011). — St. 702, 21°26.70'S, 166°08.20'E, 37 m, 10.8.1986 : 1 ♂, 1 ♀ (MNHN-B 25013). — St. 710, 21°24.0'S, 166°02.50'E, 30-31 m, 10.8.1986 : 3 ♂, 1 ♀ (MNHN-B 25012). — St. 738, 22°09.80'S, 167°00.20'E, 59-61 m, 12.8.1986 : 1 ♀ (MNHN-B 25014). — St. 800, 21°00.0'S, 165°30.65'E, 33 m, 9.1.1987 : 2 ♂, 1 ♀ (MNHN-B 25015). — Northwest lagoon : st. DW 1014, 20°08.70'S, 163°53.40'E, 22-23 m, 3.4.1988 : 1 ♀ (MNHN-B 25016). — St. DW 917, 20°55.60'S, 164°26.80'E, 25-27 m, 26.4.1988 : 1 ♂ (MNHN-B 25017). — St. DW 921, 20°51.20'S, 164°26.60'E, 10-11 m, 27.4.1988 : 1 ♂, 1 ♀ (MNHN-B 25018). — St. DW 940, 20°38.10'S, 164°15.50'E, 10 m, 27.4.1988 : 1 ♂ (MNHN-B 25019). — North lagoon : st. DW 1088, 19°45.50'S, 163°57.70'E, 23 m, 24.10.1989 : 1 ♂, 1 ♀ (MNHN-B 25020). — St. DW 1128, 19°31.20'S, 163°52.20'E, 26 m, 26.10.1989 : 1 ♀ (MNHN-B 25021). — St. DW 1139, 19°23.60'S, 163°47.0'E, 39 m, 27.10.1989 : 1 ♂, 1 ♀ (MNHN-B 25022). — St. DW 1159, 19°13.0'S, 163.06.90'E, 50 m, 30.10.1989 : 1 ♂ (MNHN-B 25023). — Ile des Pins, 22°32'S, 167°26'E, 32 m, 18.7.1985 : 1 ♂, 1 ♀ (MNHN). — Barrier reef, Dumbéa Pass, 30 m, on *Seriatopora* sp. & *Stylophora* sp., coll. J. L. MENOU : 1 ♂ (MNHN-B 25024). — Récif M'bere, pente externe, 10 m, 5.5.1993 : 1 ♂ (MNHN-B 25365). — St. 127, Maître I., 22°19.80'S, 166°25.10'E, 5 m, on *Pocillopora* spp., 24.4.1995, coll. P. CASTRO : 4 ♂, 4 ♀ (MNHN-B 25025). — St. 140, Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Pocillopora* sp., 26.4.1995, coll. P. CASTRO : 1 ♀ (MNHN-B 25026). — St. 140, Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Acropora* sp., 26.4.1995, coll. P. CASTRO : 2 ♂, 1 ♀ (MNHN-B 25027, photographed).

Loyalty Is. MUSORSTOM 6 : st. DW 431, 20°22.25'S, 166°10.0'E, 21 m, 18.2.1989 : 1 ♂, 1 ♀ (MNHN-B 25028). —

St. DW 432, 20°20.95'S, 166°10.75'E, 21 m, 18.2.1989 : 1 ♀ (MNHN-B 25030). — St. DW 434, 20°21.21'S, 166°08.64'E, 23 m, 18.2.1989 : 1 ♂ (MNHN-B 25029). — PLOUVEAL : st. 1226, Ouvéa lagoon, 20°32.0'S, 166°24.0'E, 21 m, 9.9.1992, coll. R. LEBORGNE : 2 ♀ (MNHN-B 25033). — St. 1231, Ouvéa lagoon, 20°31.20'S, 166°22.90'E, 23 m, 9.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25035). — St. 1219, Ouvéa lagoon, 20°30.0'S, 166°28.0'E, 15 m, 11.9.1992, coll. R. LEBORGNE : 1 ♂ (MNHN-B 25031). — St. 1222, Ouvéa lagoon, 20°28.0'S, 166°30.0'E, 15 m, 12.9.1992, coll. R. LEBORGNE : 1 ♂ (MNHN-B 25032). — St. 1230, Ouvéa lagoon, 20°35.0'S, 166°22.90'E, 18 m, 15.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25034). — St.1227, Ouvéa lagoon, 20°36.90'S, 166°25.0'E, 12 m, 15.9.1992, coll. R. LEBORGNE : 1 ♀ (MNHN-B 25036).

Vanuatu. Port Patterson : 1 ♀ (BMNH 1896.1.2.21-23).

Chesterfield Is. CHALCAL 1 : st. D 24, 19°10.78'S, 158°37.10'E, 38 m, 18.7.1984 : 1 ♂, 1 ♀ (MNHN-B 25037). — St. D 39, 20°28.90'S, 158°40.70'E, 40 m, 23.7.1984 : 6 ♂, 5 ♀ (MNHN-B 25038). — St. D 51, 21°13.21'S, 158°42.50'E, 55 m, 24.7.1984 : 1 ♂, 1 ♀ (MNHN-B 25039). — CORAIL 2 : st. DW 12, 20°47.74'S, 161°36.32'E, 59 m, 20.7.1988 : 2 ♂, 1 ♀ (MNHN-B 25040). — St. DW26, 20°21.98'S, 161°04.87'E, 62 m, 22.7.1988 : 1 ♂ (MNHN-B 25041). — St. DW 38, 19°21.62'S, 158°42.50'E, 61 m, 23.7.1988 : 1 ♂, 1 ♀ (MNHN-B 25042). — St. 44, 19°21.82'S, 158°22.95'E, 48m, 23.7.1988 : 1 ♂, 1 ♀ (MNHN-B 25043). — St. DW 59, 19°18.50'S, 158°56.55'E, 50 m, 24.8.1988 : 1 ♀ (MNHN-B 25044). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 5 ♂, 4 ♀ (MNHN-B 25045). — St. DW 88, 19°05.98'S, 158°55.85'E, 32 m, 26.8.1988 : 3 ♂, 1 ♀ (MNHN-B 25046). — St. CP 90, 19°02.83'S, 158°56.26'E, 44-48 m, 26.8.1988 : 4 ♂, 5 ♀ (MNHN-B 25047). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 7 ♂, 12 ♀ (MNHN-B 25048). — St. DW 94, 19°06.0'S, 158°50.0'E, 36-56 m, 27.8.1988 : 2 ♂, 1 ♀ (MNHN-B 25049). — St. DW 97, 19°06.0'S, 158°38.43'E, 32 m, 27.8.1988 : 1 ♂ (MNHN-B 25050). — St. DW 98, 19°04.32'S, 158°31.66'E, 39 m, 27.8.1988 : 1 ♀ (MNHN-B 25051). — St. DW 99, 19°06.03'S, 158°38.95'E, 52 m, 27.8.1988 : 4 ♂, 3 ♀ (MNHN-B 25052). — St. DW 101, 19°08.99'S, 158°26.24'E, 37 m, 27.8.1988 : 4 ♂, 2 ♀ (MNHN-B 25053). — St. DW 103, 19°01.01'S, 158°31'94'E, 58 m, 27.8.1988 : 2 ♂ (MNHN-B 25054). — St. DW 105, 19°08.91'S, 158°39.19'E, 35 m, 27.8.1988 : 5 ♂, 4 ♀ (MNHN-B 25055). — St. DW115, 19°22.01'S, 158°37.62'E, 44 m, 28.8.1988 : 3 ♂, 2 ♀ (MNHN-B 25056). — St. DW 127, 19°27.73'S, 158°27.30'E, 44-45 m, 29.8.1988 : 5 ♂, 1 ♀ (MNHN-B 25057). — St. DW 128, 19°27.89'S, 158°30.44 'E, 38 m, 29.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25058) — St. DW132, 19°31.0'S, 158°28.64'E, 38-50 m, 30.8.1988 : 1 ♂ (MNHN-B 25059). — St. DW 136, 19°31.20'S, 158°16.0'E, 37 m, 30.8.1988 : 4 ♀ (MNHN-B 25060). — St. DW 137, 19°34.0'S, 158°14.60'E, 32 m, 30.8.1988 : 1 ♂, 2 ♀ (MNHN-B 25061). — St. DW 138, 19°33.85'S, 158°17.57'E, 31 m, 30.8.1988 : 1 ♀ (MNHN-B 25062). — St. DW 144, 19°27.73'S, 158°23.28'E, 50 m, 30.8.1988 : 2 ♂, 2 ♀ (MNHN-B 25063). — St. DW 145, 19°37.0'S, 158°19.12'E, 54 m, 30.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25064). — St. DW 148, 19°54.08'S, 158°27.12'E, 34 m, 1.9.1988 : 3 ♂, 2 ♀ (MNHN-B 25065). — St. DW 150, 19°54.0'S, 158°25.20'E, 39 m, 1.9.1988 : 1 ♀ (MNHN-B 25066). — St. DW 153, 19°52.0'S, 159°23.20'E, 45 m, 1.9.1988 : 2 ♂, 1 ♀ (MNHN-B 25068). — St. DW 159, 19°46.04'S, 158°19.98'E, 52 m, 1.9.1988 : 2 ♂, 1 ♀ (MNHN-B 25067). — St. DW 163, 19°41.46'S, 158°15.62'E, 23 m, 2.9.1988 : 3 ♂, 6 ♀ (MNHN-B 25069). — St. DW 165, 19°41.41'S, 158°21.85'E, 45 m, 2.9.1988 : 4 ♂, 3 ♀ (MNHN-B 25070).

Bellona Reefs. St. 4 DE, 21°19.0'S, 158°48.0'E, 66 m, 19.10.1985 : 2 ♂, 1 ♀ (MNHN-B 25071). — St. 8 DE, 21°22.60'S, 158°52.0'E, 48-54 m, 19.10.1985 : 1 ♂, 1 ♀ (MNHN-B 25072). — St. 9 DE, 21°23.70'S, 158°54.20'E, 47-51 m, 20.10.1985 : 6 ♂ (one with bopyrid), 5 ♀, 1 juvenile (MNHN-B 25073). — St. 10 DE, 21°24.30'S, 158°56.80'E, 52 m, 22.10.1985 : 1 ♀ (MNHN-B 25074). — St. 12 DE, 21°49.70'S, 159°30.30'E, 47-50 m, 22.10.1985 : 2 ♂, 2 ♀ (MNHN-B 25075). — CORAIL 1 : 10.8.1988 : 1 ♀ (MNHN-B 25076).

Queensland, Australia. Old Tree I., Capricorn Group, 23°30'S, 152°05'E, on *Seriatopora hystrix*, 11-12.1966. coll. Y. C. YALDWYN : 1 ♂, 1 ♀ (AM P15956). — 80 km east Dunk I., 17°53'S, 146°53'E, *Soela*, cr. 6, st. 89, 9.12.1985 : 1 ♀ (QM W12304).

Middleton Reef. Site 12 A, patch reef near channel, 29°27.6'S, 159°06.7'E, 6.12.1987 : 1 ♂ (AM P38188). — Site 19 A, 29°27.6'S, 159°06.8'E, 12.1987 : 6 ♂, 11 ♀ (AM P38187).

Elizabeth Reef. Reef flat near *Yoshida Maru Iwaki* wreck, 29°55.8'S, 159°01.3'E, on *Acropora valida*, *Pocillopora damicornis* & *Stylophora pistillata*, 14.12.1987, coll. J. LOWRY : 12 ♂, 9 ♀ (AM P38195).

Lord Howe I. Erscott's Hole, 31°33'S, 159°04'E, 13.12.1979, coll. N. COLEMAN : 2 ♂, 1 ♀ (AM P38702). — Malabar, 31°33'S, 159°05'E, 15 m, 23.2.1980 : 1 ♂ (AM P38944).

COLOR. — *T. guttata* can be easily identified by its characteristic color. Live specimens have a white to orange-white (cream) carapace with a brown line crossing along the anterior borders between the eyes (pls 2 B & 4). The brown line is typically bordered anteriorly by a thin red-brown to dark-pink line. The acute tips of the supraorbital angle and epibranchial teeth are red-brown or brown. The chelipeds are orange brown to light brown with brown reticulations along the dorsal portion of the propodus. The walking legs are light brown with brown-red spots. Spots are mostly in the form of elongate streaks along the propodus and dactylus.

Preserved specimens can be readily identified by the reddish spots on the walking legs, particularly in larger specimens. The anterior brown band of the carapace may be visible, particularly when seen in contrast with the opaque whitish color that remains on the dorsal surface of the carapace for some time. Also visible in preserved specimens is a brown line across the anterior portion of the sternum and often a faint network of circular lines on the anterior portion of the ventral surface of the carapace.

Color photographs of *T. guttata* were given by NAGAI & NOMURA (1988), JENG (1994), TAKEDA (1994), and COLIN & ARNESON (1995). A color illustration in SAKAI (1976) does not depict the true colors of the species.

REMARKS. — In addition to its diagnostic color pattern, *T. guttata* can be easily identified by its long and slender fingers (when closed, the dactylus crosses and extends beyond the immovable finger), slender chelipeds (narrow propodus and merus that is usually longer than broad), anterolateral borders that are almost parallel to each other, and supraorbital angles and epibranchial teeth in the form of acute spines. There is no suture between the second and third thoracic sternites.

Members of the species are small in size, reaching a maximum carapace width of 12.0 mm among the many specimens examined during the course of this investigation. It is very common in the eastern Coral Sea, typically second only to *T. cymodoce*.

T. guttata has been recorded from many locations in the Indo-west Pacific region (GALIL, 1988b) except the Hawaiian Islands and Easter Island.

Trapezia lutea sp. nov.

Figs 2 C, 2 D & 3 A-C, pls 2 C & 5 A

Trapezia cymodoce – BOONE, 1934 : 168, pl. 87 (Queensland, Australia). — HWANG & YU, 1980 : 153, pl. 9, fig. 1. — SERÈNE, 1984 : 272 (part). — GALIL & CLARK, 1990 : 378 (New Caledonia, part). — JENG, 1994 : 315, fig. 5 (color photograph). — JONES & MORGAN, 1994 : 178 (color photograph). non *T. cymodoce* (Herbst).

TYPE MATERIAL. — **New Caledonia.** St. 127, Maître I., 22°19.80'S, 166°25.10'E, 5 m, on *Pocillopora* sp., 24.4.1995, coll. P. CASTRO : 1 ♂ holotype, cw 8.4 mm, cl 6.8 mm (MNHN-B 25222).

Chesterfield Is. CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : ♂ cw 9.7 mm, cl 7.9 mm, ♀ cw 9.5 mm, cl 7.6 mm paratypes (MNHN-B 25223) ; ♂ cw 8.4 mm, cl 6.9 mm, ♀ cw 7.6 mm, cl 6.0 mm paratypes (USNM 277633). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : ♂ cw 9.0 mm, cl 7.5 mm paratype (AM P45527), ♀ cw 7.4 mm, cl 6.0 mm paratype (AM P45528).

ADDITIONAL MATERIAL EXAMINED. — **New Caledonia.** Barrier reef, Dumbéa Pass, 30 m, on *Seriatopora* sp. & *Stylophora* sp., coll. J. L. MENOU : 1 juvenile ♂, 1 ♀ (MNHN-B 25192). Récif M'bere, pente externe, 10 m, 5.5.1993 : 1 ♂, 1 ♀ (MNHN-B 25365). — Material identified by GALIL & CLARK (1990) as *Trapezia cymodoce* : LAGON : st. 79, Prony Bay, Ouen I., 22°29'S, 166°29'E, 16 m, 21.8.1984 : 1 ♀ (MNHN-B 25230). — North lagoon : st. 480, 18°56'S, 163°29'E, 31 m, 2.3.1985 : 1 ♂ (MNHN-B 25231).

Loyalty Is. Ouvéa lagoon, 1992 : 1 ♂, 1 ♀ (MNHN-B 25224).

Chesterfield Is. CORAIL 2 : st. DW 46, 19°18.54'S, 158°20.0'E, 21 m, 23.7.1988 : 1 ♂ (MNHN-B 25225). — St. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25226). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 3 ♂, 4 ♀ (MNHN-B 25227) ; 1 ♂ (AM P45371). — St. DW 165, 19°41.41'S, 158°21.85'E, 45 m, 2.9.1988 : 1 ♂, 1 ♀ (MNHN-B 25228).

French Polynesia. Moorea, 1982, coll. O. ODINETZ : 1 ♂ cw 4.4 mm, cl 3.5 mm, 1 ♀ cw 6.5, cl 5.2 mm (MNHN-B 25332).

Philippine Islands. Material identified by O. ODINETZ as *T. cymodoce* : MUSORSTOM 2 : 12.1981, 1 ♂, 1 ♀ (MNHN-B 9679). — 12.1981, 1 ♂, 1 ♀ (MNHN-B 9680).

Viet Nam. Nhatrang, 14.5.1930, coll. de LAMESSAN : 1 ♂, 1 ♀ (MNHN-B 23074).

Western Australia. Kendrew I., Dampier Archipelago, 20.5.1974, Crown-of-Thorns Survey : 1 ♂, 1 ♀ (WAM 504-86).

Cocos (Keeling) Is., Eastern Indian Ocean. Flying Fish Cove, st. 1, 10-15 m, 11.2.1987, coll. G. MORGAN : 1 ♀ (WAM 600-87). — Landing Place, North Keeling I., st. 13, 17.2.1989, coll. G. MORGAN : 1 ♂, 1 ♀ (WAM 701-89). — Home I., st. 27, coll. L. MARSH : 1 ♂, 1 ♀ (WAM 836-89 ; photographs on pp. 178-179, JONES & MORGAN, 1994).

Maldive Is. Addu Wiack, 15 m, 1.1958 : 2 ♂, 1 ♀ (MNHN-B 23044).

Western Indian Ocean. Mombasa, Kenya, coll. A. J. BRUCE, 1972 : 1 ♀ (MNHN-B 13337). — Aldabra I., 1954 : 2 ♂, 1 ♀ (MNHN-B 23060). — Mauritius, coll. P. CARIÉ, 1913 : 21 ♂, 20 ♀ (MNHN-B 25360). — Port Dauphin, Madagascar : 2 ♂, 1 ♀ (MNHN-B 13331). — Iles Glorieuses, coll. A. CROSNIER, 1.1973 : 1 ♂, 3 ♀ (MNHN-B 23046).

Material identified by R. SERÈNE as *T. cymodoce* : Port Victoria, Seychelles 15.2.1972, coll. A. J . BRUCE : 1 ♂, 1 ♀ (MNHN-B 25232). — Praslin, Ste Anne Bay, 19.2.1972, coll. A. J. BRUCE : 1 ♀ (MNHN-B 25233). Réunion. La Saline, 30 m, 18.12.1976, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 8939). — La Saline, 5 m, coll. S. RIBES : 1 ♀ (MNHN-B 8941). — La Saline, 10 m, coll. S. RIBES : 1 ♀ (MNHN-B 8943). — La Saline, coll. S. RIBES : 1 ♂, 1 ♀ (MNHN-B 25247).

DESCRIPTION OF HOLOTYPE. — Carapace smooth, shiny, and slightly convex dorsally. Anterolateral borders of carapace slightly curved. Epibranchial teeth acute and directed upwards. Postorbital angles obtuse. Inner suborbital teeth subacute.

Frontal border wide, arched, and clearly cut into two rounded supraorbital angles and four rounded lobes. Median lobes with several small to microscopic teeth.

Incomplete suture between second and third thoracic sternites (sternal suture 2/3), conspicuous only distally. Third maxillipeds subrectangular. Ischium of endognath with scattered punctae but no granules ; dorsal border with microscopic teeth.

Chelipeds massive and slightly unequal. Right merus armed with seven teeth ; left with six. Distal and proximal angles on anterior margin of carpus with blunt teeth. Well developed tomentum, consisting of numerous long plumose setae, along upper and outer margin of merus, carpus, propodus, and proximal portion of dactylus. Tomentum is more developed on propodus, where setae are more numerous and longer. Upper margin of

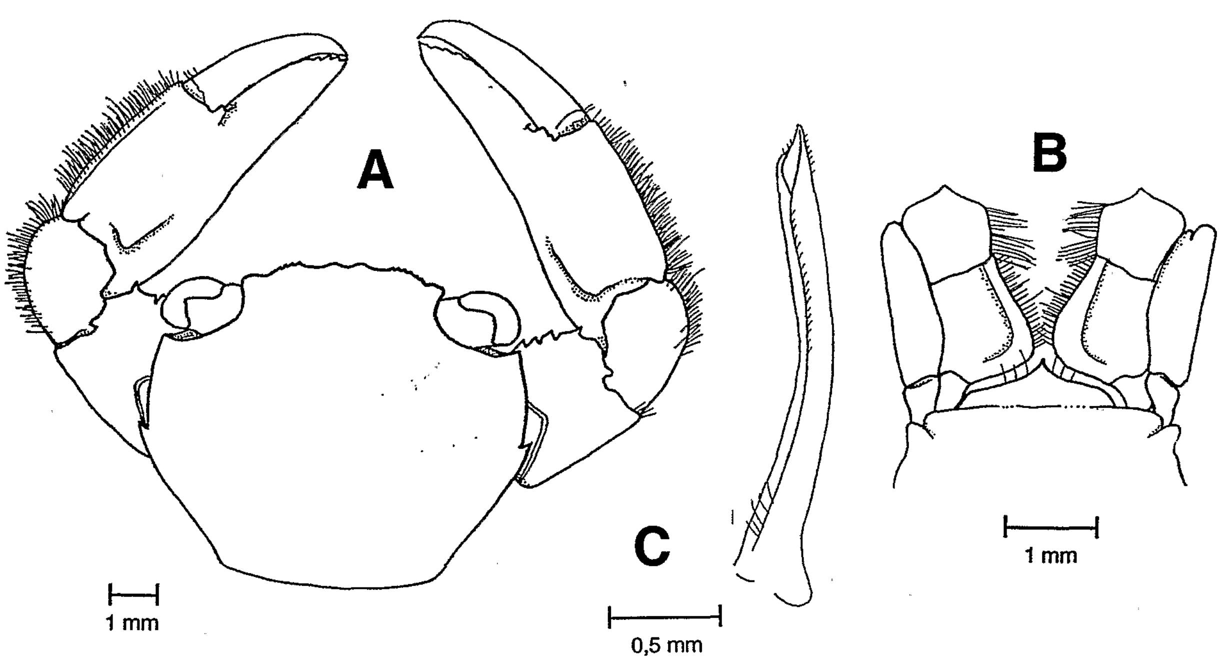

Fig. 3. — *Trapezia lutea* sp. nov., ♂ holotype, New Caledonia (MNHN-B 25222) : **A.** dorsal aspect of the carapace, **B.** anterior sternal region, **C.** first pleopod.

propodus slightly keeled ; lower margin cristate and armed with microscopic teeth. Fingers slender and slightly curved. Dactylus of both chelipeds armed with few small teeth ; immovable fingers with cutting edge.

Merus of walking legs laterally flattened with cristate dorsal margin. Dorsal margin of carpus, propodus, and dactylus with many slender, long setae. Few setae plumose. Distal end of dactylus curved with horny ridges at tip ; inner (posterior) margin of last walking leg (fifth pereiopod) with six thick, horny setae and, proximally, four transversal rows of setae.

Live color of carapace and chelipeds bright orange without any spots or dots (pl. 2 C). Anterior and lateral borders of carapace and anterior border of merus and carpus of chelipeds darker orange. Walking legs and ventral surface of carapace light orange ; upper surface of dactylus of legs darker orange. Tomentum of chelipeds colorless ; fingers brown. Eyes dark gray, almost black.

First pleopod long and slender. Apex slender and symmetrical.

ETYMOLOGY. — From the Latin *luteus* for yellow or yellow-orange. R. SERÈNE used this name for the first time to identify this species as a "variety" of *T. cymodoce* : *T. cymodoce* var. *lutea* (unpublished manuscript of a revision of the Trapeziidae, Raoul SERÈNE, ORSTOM, Paris ; pl. 5 A). The species is thus dedicated to the memory of Dr. SERÈNE.

COLOR. — Live specimens have orange carapace, chelipeds, and walking legs. There are no distinctive spots, dots, or markings other than the darker orange dactylus of the walking legs.

In preserved specimens color varies between orange and yellow-orange. Fingers appear light to dark brown. Two transversal rows of very pale yellow, almost white dots may be observed on the dorsal surface of the carapace in the largest specimens, very much as in *T. cymodoce*. The dots, however, are never a conspicuous orange-red color as in *T. cymodoce*. Similar very light dots have been observed in preserved specimens of all other species of *Trapezia* thus far examined. Patches of dark-brown granules were observed along the anterior and lateral borders of the carapace, eyestalks, and chelipeds of a very small preserved male from French Polynesia (MNHN-B 25332).

Color photographs of *T. lutea* referred to as *T. cymodoce* were given by JENG (1994), JONES & MORGAN (1994), and what is most probably *T. lutea* (specimens not examined) by NAGAI & NOMURA (1988) and TAKEDA (1994).

REMARKS. — *T. lutea* has been undoubtedly confused with *T. cymodoce* on account of the conspicuous tomentum on the chelipeds of both species. References to an orange or yellow "variety" of *T. cymodoce* exist in the literature (MIYAKE, 1983 ; SERÈNE, 1984). BOONE (1934) described specimens of *T. cymodoce* from Queensland, Australia as "vivid orange red". The presence of a tomentum, which is given in the description, plus the convex shape of the anterolateral borders of the carapace and the absence of a sternal suture reveals that at least the specimen shown in a photograph was *T. lutea* (pl. 87).

Further confusion was added by the similarities between *T. lutea* and *T. ferruginea*. Specimens described by LAURIE (1906) as combining the chelipeds of *T. cymodoce* with the carapace of *T. ferruginea* were most probably *T. lutea*. It has been found in material previously identified as *T. ferruginea* and, most frequently, as *T. cymodoce*.

T. lutea can be separated from *T. cymodoce* by : **1)** uniformly orange to yellow color (pls 2 C & 5 A) (purplish blue carapace with a transversal row of orange-red dots across the carapace in *T. cymodoce* (Fig. 2 A, pls 2 A & 3 A), **2)** dark portion of the dactylus of the chelipeds extends almost to the base of the dactylus (fig. 2 C) (it only extends to about two-thirds of the length of the dactylus in *T. cymodoce* ; (fig. 2 A), **3)** rounded anterolateral borders (figs 2 C & 3 A, pl. 5 A) (straight, almost parallel to each other in all except the largest specimens of *T. cymodoce* (fig. 2 A, pls 2 A & 3 A), **4)** blunt epibranchial teeth in many individuals (fig. 2 C), particularly large ones (almost always acute in *T. cymodoce* ; fig. 2 A), **5)** blunt tooth (fig. 2 C) on distal margin of carpus of merus of chelipeds (it is typically acute, except in the largest individuals, in *T. cymodoce* ; fig. 2 A), **6)** presence of a suture between second and third thoracic sternite only in smaller individuals (fig. 3 B) (always present in *T. cymodoce* ; fig. 2 B), **7)** relatively short and subacute inner suborbital teeth (longer and acute, particularly in the smaller individuals, in *T. cymodoce*), **8)** four to five transversal rows of setae on the inner margin of the last walking leg (six to eight in *T. cymodoce*), and **9**) slightly shorter merus of the fourth pair of walking legs is slightly shorter, with a total length to maximum width ratio of 2.1 to 2.2 (longer in *T. cymodoce*, with a length to width ratio of 2.4 to 2.5).

T. lutea is overall smaller in size than *T. cymodoce*. Of the 50 specimens from all locations that were measured, the largest size recorded was for an exceptionally large pair from Western Australia (WA 504-86 : female cw 13.3 mm, cl 10.1 mm ; male cw 11.0 mm, cl 9.3 mm). It is very common for individuals of *T. cymodoce* to reach a carapace width of 15 mm or more. *T. lutea* is also much less common than *T. cymodoce* in the locations sampled in the Coral Sea region. Of 180 specimens from New Caledonia identified as *T. cymodoce* by GALIL & CLARK (1990) (MNHN-B 18195), only two proved to be *T. lutea*. This seems to be the case in other locations judging from their relative frequency in museum collections.

T. lutea is similar to *T. ferruginea* in color, the general shape of the carapace (rounded anterolateral borders and blunt epibranchial teeth, particularly in the larger individuals), absence of a sternal suture on the larger individuals, blunt teeth of the cheliped carpus, and in the shorter and subacute shape of the inner suborbital teeth. Large specimens of *T. lutea* may look very much like *T. ferruginea* but with tomentum on the chelipeds, that is, "intermediates" between *T. cymodoce* and *T. ferruginea*. The species can be separated from *T. ferruginea* by **1**) well developed tomentum (figs 2 C & 3 A) that consists of plumose setae and that is present along the entire upper and outer margin of chelipeds (only microscopic or, if evident, restricted to the carpus of chelipeds in *T. ferruginea*), **2**) sternal suture, complete or incomplete, present in most small individuals (fig. 3 B) (present only in juveniles in *T. ferruginea*), **3**) superior border of propodus of cheliped keeled or subacute (rounded in *T. ferruginea*), and **4**) four to five rows of transversal setae on the inner margin of the last walking leg (five to six in *T. ferruginea*). *T. lutea* is also smaller in size than *T. ferruginea*, which reaches a size comparable to that of *T. cymodoce*.

Differences between *T. lutea*, *T. cymodoce*, and *T. ferruginea* are summarized in table 1.

Some of the morphological features diagnostic for *T. lutea* vary according to size. The acute epibranchial teeth become obtuse in the larger individuals. Twelve individuals out of 48 sampled had obtuse teeth ; two had one of each on each side. Similarly, the presence of a thoracic suture is related to size. Of 48 individuals, sixteen had no suture while it was present but incomplete in twelve. Practically all individuals lacking a suture were among the largest sampled.

The tomentum is thicker and therefore more evident in the largest individuals. Numerous filaments of cyanobacteria often make the tomentum more conspicuous. The thickest tomentum was observed in the two smallest specimens examined, a male and a female from French Polynesia (MNHN-B 25332). Setae, often plumose, are abundant on the walking legs of some specimens. This, however, is a variable character. Setae of the legs are sometimes more abundant on one side of the animal than on the other. As in *T. cymodoce*, clumps of short, plumose setae are found on the surface of the chelipeds.

In addition to New Caledonia, its type location, *T. lutea* is known from the Loyalty and Chesterfield islands, French Polynesia, Taiwan, the Philippine Islands, Viet Nam, Western Australia, Cocos (Keeling) Islands, Maldive Islands, East Africa, the Seychelles, Réunion, Mauritius, and Madagascar. Color photographs demonstrate its presence in Japan (NAGAI & NOMURA, 1994 ; TAKEDA, 1994), Guam (unpublished photographs, P. W. GLYNN). It will undoubtedly be found in other Indo-west Pacific locations.

Trapezia punctipes sp. nov.

Figs 4 A-C, pl. 2 D

TYPE MATERIAL. — **Queensland, Australia.** Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3m, on *Pocillopora damicornis*, 9.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♂ holotype, cw 14.3 mm, cl 12.1 mm (AM P45341) ; 1 ♂ paratype, cw 10.0 mm, cl 9.0 mm (MNHN-B 25283) ; 1 ♂ 13.2 mm, cl 11.5 mm. paratype (USNM 277632) ; 1 ♀ ovigerous cw 10.9 mm, cl 8.9 mm paratype, (AM P44627, photographed). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Pocillopora damicornis*, 8.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♀ cw 16.0 mm, cl 12.9 mm paratype (AM P44629).

DESCRIPTION OF HOLOTYPE. — Carapace smooth, shiny, and slightly convex dorsally. Anterolateral borders of carapace slightly curved. Epibranchial teeth as slight notch. Postorbital angles obtuse. Inner suborbital teeth acute.

Frontal border wide, arched, and clearly cut into two rounded supraorbital angles and four rounded lobes. Median lobes with several irregular, microscopic teeth.

A faint scar but no suture between second and third thoracic sternites. Anterior border of sternum with numerous microscopic punctae and granules. Third maxilliped subrectangular. Ischium of endognath with

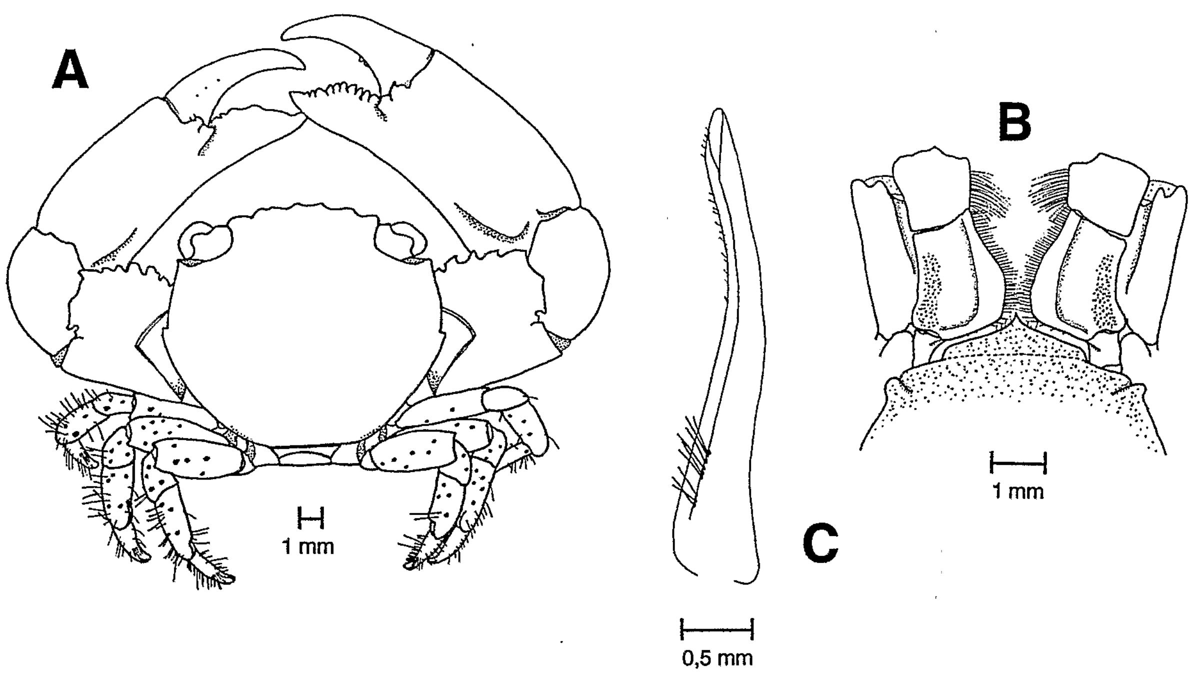

Fig. 4. — *Trapezia punctipes* sp. nov., ♂ holotype, Queensland, Australia (AM P 45341) : **A.** dorsal aspect of the carapace ; **B.** anterior sternal region ; **C.** first pleopod.

scattered punctae and irregular microscopic granules along proximal inner margin.

Chelipeds massive and slightly unequal. Right merus armed with four teeth ; left with five. Distal and proximal angles on anterior margin of carpus with blunt teeth. Few microscopic setae along outer margin of carpus and propodus. Upper margin of propodus rounded ; lower margin cristate and armed with microscopic teeth. Fingers slender and curved. Dactylus and immovable finger armed with large teeth in largest (right) cheliped ; dactylus of smallest cheliped with large teeth, immovable finger with cutting edge.

Merus of walking legs laterally flattened with cristate dorsal margin. Dorsal margin of carpus, propodus, and dactylus with many slender, long setae. Few setae plumose. Distal end of dactylus curved with horny ridges at tip ; inner (posterior) margin of last walking leg (fifth pereiopod) with five thick, horny setae and, proximally, four transversal rows of long setae serrated on two sides.

First pleopod long and slender. Apex slender and symmetrical.

Live color of carapace, chelipeds, and legs light orange. Walking legs with orange-red dots. Fingers of chelipeds brown. Eyes blue-gray.

ETYMOLOGY. — From the Latin *punctum* for dot and *pes* for foot in reference to the characteristic small spots, or dots, on the walking legs.

COLOR. — Live color of carapace is light orange (pl. 2 D). Walking legs are light orange with orange-red dots on both their anterior and posterior sides. Eyes are blue-gray. Chelipeds are orange, with edges of segments darker orange ; fingers vary from light to dark brown-orange. The abdomen, with the exception of the largest male collected, are ornamented with orange-red dots. Dots are more common on the proximal abdominal segments. Similar orange-red dots are present on the ventral sternites. The outer edges of ventral sternites are darker orange. The antennae, antennules, flagellum of third maxilliped, and the second and first maxillipeds are white with minute black dots.

REMARKS. — The species can be easily distinguished by its characteristic color pattern : carapace and chelipeds uniformly orange but walking legs are spotted. Spots that are present on the walking legs but absent on the dorsal surface of the carapace is also characteristic of *T. guttata*. In *T. guttata*, however, the carapace is distinctively white except for a thin red-brown band along the anterior margin (pls 2 B & 4). *T. punctimanus* ODINETZ has small dots that are restricted to the chelipeds. Its carapace and walking legs are orange to light brown. The striking blue-grey color of the eyes of *T. punctipes* is also characteristic. A somewhat similar green-grey eye color is characteristic of *T. formosa* from the eastern Pacific (CASTRO, 1982 ; 1996). Eye color is unfortunately lost in preserved specimens.

Live specimens of *T. ferruginea* (Latreille), a close species, have a uniformly colored ("yellowish bluish-grey") carapace and a red-dot on the propod of the walking legs (GALIL, 1988b). This color pattern was given for specimens from the Red Sea, the type locality. A similar orange-red dot is clearly visible in preserved specimens from the western Pacific (see discussion of *T. ferruginea*). Live color in eastern Pacific populations of *T. ferruginea* is orange to brown-orange carapace with similarly colored walking legs that lack spots or a distal red dot (CASTRO, 1982 ; 1996). *T. serenei*, another morphologically similar species, has no spots on its walking legs and the carapace is orange-pink to light purple with edges darker in color.

Morphological features described for the type agree for the most part with the other four specimens in the collection. Carapace width of the available material varies from 10.9 mm to 16.0 mm in the two females and 10.0 mm to 14.3 mm in the three males ; carapace length from 9.0 mm to 13.0 mm in females and 9.0 mm to 12.1 mm in males. One significant source of variation is the shape of the epibranchial teeth. They are acute and pointed upwards (very much as in *T. cymodoce*) in the three smallest individuals, reduced to notches in two individuals (including the holotype), and almost invisible in the largest female. Similarly, the upper margin of the cheliped propodus has an acute tooth in the two smallest individuals but it is reduced and rounded in the remaining three, also as in *T. cymodoce*. The anterolateral borders of the carapace are only slightly curved (almost parallel to each other on the lower portion immediately above the epibranchial teeth) in the two smallest individuals but it is more noticeably curved in the largest three. This shape is very similar to that of *T. ferruginea* but different from that of *T. cymodoce*, where the anterolateral borders are almost parallel to each other (see table 1). There is a suture between the second and third thoracic sternites in the smallest male but it is reduced in three other individuals (including the holotype) and absent in the largest female. A marked reduction in the size of the epibranchial teeth with an increase in the size of the carapace as well as the disappearance of the sternal suture with increased size is also a characteristic of *T. serenei*. The suture is always present in *T. cymodoce* but absent in *T. ferruginea*.

T. punctipes shares with *T. ferruginea* an absence of tomentum along the chelipeds and, in the larger individuals, blunt epibranchial teeth, rounded anterolateral borders of the carapace, and the absence of a sternal suture. Smaller individuals of *T. punctipes* share with *T. cymodoce* acute epibranchial teeth and a sternal suture. Another similarity with *T. cymodoce* is the acute shape of the inner suborbital tooth. It is subacute in *T. ferruginea*. Most morphological characteristics of *T. punctipes* are shared with *T. serenei*. All of these species can nevertheless be easily distinguished from one another by their color, which unfortunately is gradually lost in preserved specimens.

Specimens collected by PATTON (1966) at Restoration Rock, northern Queensland, Australia possibly represent *T. punctipes*. Specimens were described as "orange colored with blue eyes". Although assigned to *T. ferruginea*, it was added that the specimens "may well represent a different species". Other Queensland specimens collected and identified by W. K. PATTON as *T. ferruginea* most probably were *T. serenei* (see discussion of *T. serenei*).

T. punctipes is known only from Queensland, Australia but it may prove to show a much wider distribution.

Trapezia rufopunctata (Herbst, 1799)
Pl. 5 B

Cancer rufopunctatus Herbst, 1799 : 54, pl. 47, fig. 6.

Trapezia rufopunctata – LATREILLE, 1828 : 695. — A. MILNE EDWARDS, 1873 : 258 (New Caledonia). — PATTON, 1966 : 285 (Queensland, Australia). — SAKAI, 1976 : 509, pl. 182, fig. 1 (color). — SERÈNE, 1984 : 276, fig. 184, pl. 39, fig. A. — GALIL & LEWINSOHN, 1985a : 209, figs 1-6 (full synonymy). — ALLEN & STEENE, 1994 : 159 (color photograph). — JENG, 1994 : 317, fig. 7 (color photograph). — JONES & MORGAN, 1994 : 179 (color photograph). — COLIN & ARNESON, 1995 : 214, fig. 1008 (color photograph).

MATERIAL EXAMINED. — **New Caledonia.** 1 ♂, 1 ♀ (MNHN-B 4345).

Chesterfield Is. CORAIL 2 : st. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 1 ♂ (MNHN-B 25077).

Queensland, Australia. Yonge Reef, off Lizard Island, 14°40'S, 145°28'E, 5 m, on *Pocillopora eydouxi*, 26.11.1975, coll. N. COLMAN : 1 ♀ (AM P21843). — Lady Elliott I., 5 m, on *Acropora* sp., 8.8.85, P. DAVIE & D. POTTER : 2 ♂, 1 ♀ (QM W12099).

COLOR. — The carapace, chelipeds, and legs are ornamented with red dots on a cream-colored background (pl. 5 B). This color pattern remains visible in preserved specimens for many decades. The size and distribution of spots vary widely (GALIL & LEWINSOHN, 1985a).

Color photographs were given by TAKEDA (1986), NAGAI & NOMURA (1988), JONES & MORGAN (1994), TAKEDA (1994), and COLIN & ARNESON (1995).

REMARKS. — *T. rufopunctata* can be confused with *T. flavopunctata* since both species reach a large size, have a somewhat similar color pattern, and the inner margin of the cheliped propodus shows two rows of thick tubercles that give the appearance of a serrated border. The carapace of *T. flavopunctata*, however, has large yellow spots on a red background and the frontal teeth are rounded, not acute (triangular), as in *T. rufopunctata* (GALIL & LEWINSOHN, 1985a). Both species are widely distributed throughout the Indo-west Pacific region.

T. rufopunctata has also been confused with *T. tigrina* EYDOUX & SOULEYET, which is also characterized by red dots on a cream or pink background. *T. tigrina* has never been reported from the Coral Sea region (GALIL & LEWINSOHN, 1984). *T. rufopunctata* can be easily distinguished, however, because of the conspicuously larger size of fully grown individuals, its prominent, acute frontal teeth, and by the presence of prominent, teeth-like granules along the lower margin of the cheliped propodus (GALIL & LEWINSOHN, 1985a). The granules along the lower margin of the cheliped propodus are small, almost microscopic, in *T. tigrina* (fig. 6.1 *in* CASTRO & HUBER, 1997).

T. rufopunctata has a wide distribution across the Indo-west Pacific region (GALIL & LEWINSOHN, 1985a). It appears to be absent from the Red Sea and Easter Island.

Trapezia septata Dana, 1852
Pls 2 E & 6

Trapezia septata (var. ?) Dana, 1852b : 260. — GALIL & LEWINSOHN, 1985b : 288, figs 2, 5, 6 (Queensland, Australia, and New Caledonia ; full synonymy). — GALIL & CLARK, 1990 : 382 (New Caledonia). — JONES & MORGAN, 1994 : 180 (color photograph).

Trapezia areolata – HELLER, 1868 : 25. — MCNEILL, 1968 : 68 (Queensland, Australia). — AUSTIN *et al.*, 1980 : 167 (Queensland, Australia). — HEALY & YALDWYN, 1970 : pl. 45 (color photograph). — SAKAI, 1976 : 508, pl. 181, fig. 2 (color). — MIYAKE, 1983 : 139, pl. 47, fig. 3 (color photograph). — ABELE, 1984 : 128, 131 (Queensland, Australia). — TAKEDA, 1994 : 212, fig. 1 (color photograph).

Trapezia reticulata Stimpson, 1858 : 37. — ODINETZ, 1984 : 444, figs 3 D, 3d, 4 D.

Trapezia areolata var. *inermis* A. Milne Edwards, 1873 : 259, pl. 10, fig. 6 (New Caledonia).

Trapezia ferruginea var. *areolata* – CALMAN, 1900 : 19 (Queensland, Australia). — WARD, 1933 : 254 (Queensland, Australia).

Trapezia ferruginea forma *areolata* – PATTON, 1966 : 285 (Queensland, Australia) ; 1974 : 224, fig. 1 (Queensland, Australia).

Trapezia cymodoce forma *areolata* – LASSIG, 1977 : 86 (Queensland, Australia).

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. 161, Prony Bay, Ouen I., 22°34'S, 166°38'E, 20 m, 24.8.1984 : 1 ♂ (MNHN-B 25081). — St. 249, Prony Bay, Ouen I., 22°25'S, 166°42'E, 11 m, 23.10.1984 : 1 ♂, 1 ♀ (MNHN-B 25082). — Renaurd I., 26.7.1986 : 1 ♂, 1 ♀ (MNHN-B 25078). — Tenia reef, 22°02'S, 165°55'E, 2 m, 29.4.1993 : 1 ♂, 2 ♀ (MNHN-B 25079). — Southwest lagoon : coll. P. TIRARD : 1 ♂ (MNHN-B 25083). — Barrier reef, Dumbéa Pass, 30 m, on *Seriatopora* sp. & *Stylophora* sp., coll. J. L. MENOU : 2 ♂, 1 ♀ (MNHN-B 25084). — Récif M'bere, pente externe, 10 m, 5.5.1993 : 2 ♂, 3 ♀ (MNHN-B 25366).

New Caledonia. St. 127, Maître I., 22°19.80'S, 166°25.10'E, 5 m, on *Pocillopora* spp., 24.4.1995, coll. P. CASTRO : 1 ♂, 1 ♀ (MNHN-B 25085), 1 ♀ (USNM 277635). — St. 140, Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Pocillopora* sp., 26.4.1995, coll. P. CASTRO : 1 ♀ (MNHN-B 25086). — St. 140, Sêche Croissant reef, 22°19.90'S, 166°22.30'E, 13 m, on *Acropora* sp., 26.4.1995, coll. P. CASTRO : 1 ♂ (MNHN-B 25088, photographed). — St. 107, Boulari Pass, 22°29.90'S, 166°26.55'E, 10-20 m, 28.4.1995, on *Pocillopora* spp., 28.4.1995, coll. P. HAMEL : 3 ♂, 1 ♀ (MNHN-B 25087). — Material identified by A.MILNE EDWARDS (1873) as *Trapezia areolata* var. *inermis* (type material) : coll. M. BALANSA : 3 ♂, 4 ♀ (MNHN-B 2915). — Coll. M. BALANSA : 2 ♂, 3 ♀ (MNHN-B 2916).

Loyalty Is. PLOUVEAL : st. 1226, Ouvéa lagoon, 20°32.0'S, 166°24.0'E, 21 m, 9.9.1992, coll. R. LEBORGNE : 2 ♂, 3 ♀ (MNHN-B 25089).

Matthew I. VOLSMAR : st. P 21, 20°59.20'S, 170°01.90'E, 10 m, 3.6.1989 : 1 ♂ (MNHN-B 25090). — St. P 27, 20°59.20'S, 170°01.90'E, 45 m, 4.6.1989 : 1 ♂, 2 ♀ (MNHN-B 25091).

Solomon Islands. Santa Cruz Is., coll. E. TROUGHTON & A. R. LIVINGSTON : 1 ♀ (AM P9164).

Vanuatu. Malekula I., coll. Lt. CROST : 3 ♂, 2 ♀ (AM P1302).

Chesterfield Is. CORAIL 2 : st. DW 84, 19°12.0'S, 158°56.80'E, 16-26 m, 25.8.1988 : 5 ♂, 5 ♀ (MNHN-B 25092). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 12 ♂, 15 ♀ (MNHN-B 25093). — St. DW 101, 19°08.99'S, 158°26.24'E, 37 m, 27.8.1988 : 1 ♂ (MNHN-B 25094). — st. DW 136, 19°31.20'S, 158°16.0'E, 37 m, 30.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25095). — St. DW 163, 19°41.46'S , 158°15.62'E, 23 m, 2.9.1988 : 2 ♂, 3 ♀ (MNHN-B 25096).

Bellona Reefs. CORAIL 1 : 10.8.1988 : 1 ♀ (MNHN-B 25097).

Diamond Islets. West Cay, 13°11'S, 143°43'E, 23.10.1964, coll. D. F. McMICHAEL & J. C. YALDWYN : 3 ♂, 1 ♀ (AM P16977). — WestCay, 13°11'S, 143°43'E, 27.10.1964, coll. D. F. McMICHAEL & J. C. YALDWYN : 1 ♂, 2 ♀ (AM P 16978).

Kenn Reef. 21°15'S, 155°45'E, 2.10.1960, coll. D. F. McMICHAEL : 1 ♀ (AM P16947).

Flinder Reefs. 26°59'S, 153°29'E, 10.3.1989, coll. P. DAVIE, J. SHORT & P. LAWLESS : 12 ♂, 16 ♀ (QM W16225).

Queensland, Australia. Murray I., Torres Strait, 09°56'S, 144°04'E, 9.1907, coll. C. HEADLEY & A. R. McCULLOCH : 1 ♂, 1 ♀ (AM P 7532). — Outer Barrier Reef, H.M.A.S. *Geranium*, 1924 : 1 ♀ (AM P8015). — Batt Reef, on *Pocillopora* sp., Great Barrier Reef Expedition, 1929 : 2 ♂, 1 ♀ (BMNH 1937.9.21.180-182). — Low Is., on *Pocillopora* sp., Great Barrier Reef Expedition, 1929 : 1 ♂, 2 ♀ (BMNH 1937.9.21.180-182). — One Tree I., Capricorn Group, 23°30'S, 152°05'E, on *Pocillopora damicornis*, 3.10.1972, coll. D. F. HOESE : 1 ♂, 1 ♀ (AM P18875). — One Tree I., Capricorn Group, 23°30'S, 152°05'E, on *Pocillopora damicornis*, 4.10.1972, coll. D. F. HOESE : 1 ♂, 1 ♀ (AM P18874). — One Tree I., Capricorn Group, 23°30'S, 152°05'E, on *Seriatopora* sp., 3.10.1972, coll. D. F. HOESE : 1 ♂ (AM P18876). — Lagoon, Lizard Island, 14°40'S, 145°28'E, on *Seriatopora* sp., 2.11.1975, coll. N. COLEMAN : 1 ♂, 1 ♀ (AM P25169). — Heron I., 23°27'S, 151°55'E, on *Pocillopora* sp., 11.1976, coll. P. SALE & A. AUSTIN : 1 ♀ (AM P42562). — Seaforth I., 24.3.1987, coll. P. DAVIE & J. SHORT : 1 ♂ (QM W14396). — Reef 1 km south west of Research Point, Lizard Island, 14°40'S, 145°28'E, 3 m, on *Pocillopora* sp., 8.6.1995, coll. P. CASTRO & R. SPRINGTHORPE : 1 ♂, 1 ♀ (AM P44628, photographed).

Middleton Reef. Site 2 C, reef flat, *Runic*, 29°28.5'E, 159°03.7'S, 4.12.1987, coll. R. SPRINGTHORPE : 1 ♂, 1 ♀ (AM P38230).

Elizabeth Reef. Site 39 A, reef flat, 13.12.1987, coll. R. SPRINGTHORPE : 4 ♂, 3 ♀ (AM P38231). — Site 43, reef flat near *Yoshida Maru Iwaki* wreck, 29°55.8'S, 159°01.3'E, on *Acropora valida*, *Pocillopora damicornis* & *Stylophora pistillata*, 14.12.1987, coll. J. LOWRY : 5 ♂, 10 ♀ (AM P38229).

Lord Howe I. 4.1932, coll. A. A. LIVINGTONE : 3 ♂, 1 ♀ (AM P10307). — 31°33'S, 159°05'E, on *Pocillopora* sp., 2.1973, Australian Museum Party : 1 ♂, 1 ♀ (AM P20112). — Erscott's Hole, 31°33'S, 159°05'E, 13.12.1979, coll. N. COLEMAN : 1 ♂, 1 ♀ (AM P 38883).

Norfolk I. Emily Bay, 29°05'S, 167°57'E, on *Pocillopora*, 20.3.1969, coll. D. GRIFFIN : 1 ♀ (AM P17308). — Off Kingston Wharf, 29°04'S, 167°57'E, 0.5 m, 1981, coll. T. CHURCH : 1 ♀ (AM P32234).

COLOR. — Carapace and chelipeds covered with a network of interconnected red-brown lines, mostly in the form of pentagons and hexagons, on a cream to pink background (pls 2 E & 6). Legs are bright orange, darker at the tips. Lower portion of the cheliped propodus is orange ; fingers brown. Eyes are dark gray. The honeycomb pattern on the carapace and chelipeds remains preserved for decades.

Color photographs of *T. septata* were given by HEALY & YALDWYN (1970), MIYAKE (1983), NAGAI & NOMURA (1988), JONES & MORGAN (1994), and TAKEDA (1994).

REMARKS. — GALIL & LEWINSOHN (1985b) established the identity of *T. septata* as a species different from *T. areolata* Dana. Both species were redescribed and differences confirmed.

T. septata and *T. guttata* are the most common small-size species of *Trapezia* in the Coral Sea region. Preserved specimens of both species are easily separated as long as their diagnostic color pattern remains. *T. septata* can nevertheless be distinguished morphologically from *T. guttata* by having thicker chelipeds that lack the long and slender fingers of *T. guttata*, rounder anterolateral portion of the carapace, mostly obtuse epibranchial teeth, and acute postorbital angles that do not project outward as in *T. guttata.*

T. septata has been recorded throughout most of the Indo-west Pacific region (GALIL, 1988b and GALIL & CLARK, 1990). It is absent from the Hawaiian Islands. Records from Easter Island (GARTH, 1973) and French Polynesia are most probably misidentied *T. areolata* Dana, which also features a honeycomb pattern on the carapace and chelipeds (CASTRO, 1997).

Trapezia serenei Odinetz, 1984
Pl. 2 F

Trapezia serenei Odinetz, 1983 : 34, photograph 6 (color) ; 1984 : 440, figs 3 B, 3b, 4 B. — ALLEN & STEENE, 1994 : 159 (color photograph).
Trapezia ferruginea – JONES & MORGAN, 1994 : 178 (color photograph).

MATERIAL EXAMINED. — **Guam.** 1-3 m, on *Pocillopora damicornis*, 1981 : 1 ♂ holotype (MNHP-B 9681).

New Caledonia. Renaurd I., 26.7.1986 : 1 ♀ (MNHN-B 25098). — LAGON, north lagoon : st. DW 1189, 19°32.10'S, 163°34.20'E, 20 m, 1.11.1989 : 1 ♀ (MNHN-B 25099).

Chesterfield Is. CORAIL 2 : st. DW 85, 19°12.85'S, 158°56.26'E, 32 m, 26.8.1988 : 1 ♂, 1 ♀ (MNHN-B 25102). — St. DW 92, 19°03.0'S, 158°53.93'E, 8 m, 26.8.1988 : 3 ♂, 3 ♀ (MNHN-B 25103).

Flinder Reefs. 26°59'S, 159°29'E, 6-20 m, 10.3.1989, coll. P. DAVIE, J. SHORT, & P. LAWLESS : 1 ♀ (QM W16228).

Middleton Reef. Reef outside lagoon, 7.5.1987, coll. J. SHORT : 1 ♀ (QM W1980).

Elizabeth Reef. Lagoon, 4.5.1987, coll. J. SHORT : 1 ♂, 1 ♀ (QM W12984)

Western Australia. Kendrew I., Dampier Archipelago, 20.5.1974, Crown-of-Thorns Survey : 2 ♂, 2 ♀ (WAM 504-86).

Philippine Islands. MUSORSTOM 2 : Cebu, 12.1981 : 1 ♂, 1 ♀ (MNHN-B 9686).

French Polynesia. Material collected and identified by O. ODINETZ : Moorea, barrier reef, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9688). — Moorea, barrier reef, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9753). — Moorea, on *Pocillopora damicornis*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9689). — Tahiti, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9690). — Takapoto, on *Pocillopora* sp., 1982 : 1 ♂, 1 ♀ (MNHN-B 9693). — Takapoto, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9694). — Takapoto, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9695). — Takapoto, on *Pocillopora elegans*, 1982 : 1 ♂, 1 ♀ (MNHN-B 9752).

French Polynesia. Iaorana, Tahiti, on *Pocillopora damicornis*, 10.1994, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 25193, photographed).

COLOR. — No live specimens of *T. serenei* were obtained during the course of this investigation. Color photographs of live material (ALLEN & STEENE, 1994 and, as *T. ferruginea*, NAGAI & NOMURA, 1988 and JONES & MORGAN, 1994), however, clearly show the diagnostic color of the species. The carapace is orange-pink with pink or purplish edges, chelipeds are pinkish orange with the edges of the segments pink. The walking legs are pink. A photograph referred to as *T. ferruginea* by TAKEDA (1994) is probably *T. serenei* (pl. 2 F).

Preserved specimens will keep a pink or light purplish color along the anterior edges of the carapace and the merus and carpus of the chelipeds. A pink color can also be detected on the lower surface of the walking legs and on the abdomen, particularly in females.

REMARKS. — This species was originally caracterized in a doctoral dissertation of limited distribution (ODINETZ, 1983) and therefore the description should not be considered valid. A subsequent publication (ODINETZ, 1984) formally described the species. ODINETZ (1984) suggested from color descriptions that earlier records of *T. cymodoce* from New Caledonia (A. MILNE EDWARDS, 1873) and *T. ferruginea* from Australia (PATTON, 1966) and French Polynesia (KROPP & BIRKELAND, 1982) were actually *T. serenei*.

The most reliable method of identifying preserved specimens of *T. serenei* is by observing the characteristic pink or purplish color that can be detected along the edges of the carapace and segments of the chelipeds. Preserved specimens may be confused with *T. cymodoce* and *T. lutea*. Morphological features that characterize *T. cymodoce* (acute epibranchial teeth, a complete suture between the second and third thoracic somites, and an often acute tooth on the anterior distal margin of carpus of chelipeds) can also be found in small specimens of *T. serenei*. Nevertheless, in contrast to *T. cymodoce*, *T. serenei* lacks a tomentum, the anterior portion of the carapace is rounded, and in adults the inner suborbital teeth are relatively short and subacute. There are four to five transversal rows of setae on the inner margin of the last walking leg, in contrast to six to eight in *T. cymodoce*.

Of the 25 specimens of *T. serenei* examined, 14 had acute epibranchial teeth and 11 had blunt teeth (including three small specimens) ; 17 had a thoracic suture while it was absent in eight. In *T. serenei*, however, there is no tomentum on the chelipeds and there are no rows of reddish dots on the dorsal surface of the carapace. In many preserved specimens the carapace and chelipeds are noticeably paler than in *T. cymodoce*. *T. serenei* shares with *T. ferruginea* the absence of a conspicuous tomentum and, in large specimens, blunt epibranchial teeth, no thoracic suture, relatively short inner suborbital teeth, and a similar number of transversal rows of setae on the last pair of walking legs (four to five in contrast to five to six in *T. ferruginea*).

In addition to the French Polynesia, Philippine Islands, and Guam records of ODINETZ (1984), *T. serenei* is recorded here for the first time from several Coral Sea locations and from Western Australia. Photographs of specimens from Okinawa (NAGAI & NOMURA, 1988) and an unknown location (ALLEN & STEENE, 1994) confirms a much wider distribution.

CONCLUSIONS

The examination of extensive live and preserved trapeziids from the Coral Sea underscores the critical importance of color in their taxonomy. This is especially evident in the case of species of *Trapezia* and *Tetralia*. Color rather than morphology best characterizes these mostly sympatric species. Very small morphological differences have remained unrecognized by specialists who have worked with preserved material. This investigation stresses the need of recognizing differences in the color pattern of live specimens of *Trapezia* and *Tetralia* before attempting the identification of preserved specimens. Nevertheless, morphology still must be used in preserved specimens where color patterns are no longer apparent. Assemblages of morphologically close species such as some of these trapeziids are known as sibling species (KNOWLTON, 1986, 1993 ; CASTRO, 1996).

A better understanding of the systematics of trapeziids will permit investigating their geographical distribution. Species such as *Trapezia cymodoce*, *T. digitalis*, and *T. ferruginea* have a very wide distribution, where as others such as *T. areolata*, *T. bella*, *T. corallina*, and *T. punctipes* seemingly have a limited distribution (CASTRO, 1997). Host specificity, the geographical distribution of hosts, and larval development should present some clues.

Other species of trapeziids undoubtedly remain to be reported from the Coral Sea region. Such is the case of species of *Jonesius* Sankarankutty and *Palmyria* Galil & Takeda, which have been included in the family Trapeziidae (SERÈNE, 1984 ; GALIL & TAKEDA, 1986). A total of two species are included in the genera. Both are associated with scleractinian corals. *Domecia* Eydoux & Souleyet, which is sometimes included in the

Trapeziidae (SERÈNE, 1984 ; GALIL & VANNINI, 1990), has been previously recorded from the Coral Sea (PATTON, 1966, 1974, 1994). The genus consists of two species associated with scleractinian corals. Its systematic position, however, needs to be clarified.

KEY TO THE CORAL SEA TRAPEZIIDS

1. Carapace with distinctly octagonal or hexagonal outline, its posterior margin wider or as wide as anterior margin. On gorgonians, antipatharians, alcyonaceans, or ahermatypic corals 2

— Carapace trapezoidal or oval, its posterior margin shorter than anterior margin. On hermatypic corals 3

2. Carapace octagonal and clearly wider than long ; anterior margin devoid of conspicuous teeth. Deep water (usually more than 300 m) .... ***Calocarcinus africanus***

— Carapace hexagonal and only slightly wider than long ; anterior margin with conspicuous triangular, teeth-like lobes. In water usually shallower than 150 m .... ***Quadrella maculosa***

3. Anterior margin of carapace with small teeth and no distinctive lobes. Chelipeds very dissimilar in size. Male abdomen with seven segments. On acroporid corals (*Acropora*).. 4

— Anterior margin of carapace with four rounded lobes.Chelipeds massive and only slightly dissimilar in size. Male abdomen with five segments. Almost exclusively on pocilloporid corals (*Pocillopora, Seriatopora, Stylophora*) .... ***Trapezia*** 9

4. Largest cheliped with setae-filled depression on dorsal, proximal surface. Thoracic sternum with median vertical suture .... ***Tetralia*** 5

— Largest cheliped without setae-filled depression on dorsal surface. Thoracic sternum without median suture .... ***Tetraloides*** 8

5. Chelipeds with many heavy granules. Endopod of first maxilliped with slightly concave distal edge. Walking legs light tan with proximal portions of segments banded brown .... ***Tetralia cinctipes***

— Chelipeds smooth or with microscopic granules. Endopod of first maxilliped with straight or slightly convex edge. Walking legs not distinctively banded 6

6. Cheliped merus with very prominent dentate crest. Endopod of first maxilliped with rectangular anterior edges, having both external and internal anterior edges at nearly right angles. Distal portion of cheliped dactylus distinctively orange red ; distal border of cheliped merus and carpus dark brown .... ***Tetralia rubridactyla***

— Cheliped merus with shallow crest or no crest at all. Endopod of first maxilliped with one or both anterior edges rounded. Cheliped dactylus not conspicuously colored ; no dark-brown bands on merus or carpus 7

7. Endopod of first maxilliped with rectangular inner anterior edge and rounded outer edge. Posterolateral sides of carapace usually straight. Thin orange to orange-red line along anterior border of carapace, faint gray band along anterolateral borders .... ***Tetralia fulva***

— Endopod of first maxilliped with inner and outer anterior edges rounded. Posterolateral sides of carapace rounded. Conspicuous dark band along anterior and anterolateral borders of carapace .... ***Tetralia nigrolineata***

8. Small cheliped with triangular, teeth-like tubercles along lower margin. Carapace light brown ; walking legs light brown with dark-brown spots .... ***Tetraloides heterodactyla***

— Small cheliped with rounded tubercles along lower margin. Carapace dark brown anteriorly, cream posteriorly ; walking legs dark brown with cream spots ....
.... ***Tetraloides nigrifrons***

9. Upper and outer border of chelipeds with conspicuous tomentum that consists of many long setae ; cheliped propodus with keel-like (subacute) upper edge 10

— Upper border of chelipeds without tomentum along entire length, though microscopic or visible setae may be present along proximal segments ; cheliped propodus with rounded upper edge 11

10. Conspicuous suture between second and third thoracic sternites always present. Carapace with almost straight anterolateral borders ; epibranchial teeth acute except in largest individuals. Carapace purplish to brownish blue, with row of orange-red spots across dorsal surface .... ***Trapezia cymodoce***

— Suture between second and third thoracic sternite present only in smaller individuals, partially or completely fused in larger ones. Carapace with rounded anterolateral borders ; epibranchial teeth acute in smaller individuals, obtuse in larger ones. Carapace orange .....
.... ***Trapezia lutea* new species**

11. Dorsal surface of carapace of live individuals or recently preserved specimens without colored spots, dots, bands or lines, other than a very thin line along anterior border of carapace or distinctive band in postlarvae and juveniles 12

— Dorsal surface of carapace ornamented with distinctive colored spots, dots, bands, or lines that very often remain in preserved specimens (if anterior border of carapace is colored differently from rest of carapace, it is as a broad band, not a very thin line) 16

12. Carapace and chelipeds dark brown in color, which remains in preserved specimens (broad cream band may be present across carapace in postlarvae and juveniles). Frontal border of carapace with slight emarginations and minute teeth .... ***Trapezia digitalis***

— Carapace orange or orange-pink. Frontal border of carapace with well demarcated emarginations and no visible teeth (microscopic in some individuals) 13

13. Carapace with anterolateral borders strongly curved (inclination up to 45°, giving carapace rounded or globose appearance) .... ***Trapezia formosa***

— Carapace with anterolateral borders only slightly rounded 14

14. Walking legs bright orange with numerous orange-red dots on anterior and posterior sides. Orange-red dots also on ventral somites and usually on abdomen ....
.... ***Trapezia punctipes* new species**

— Walking legs, ventral somites, and abdomen without colored dots (an orange-red spot may be present on each walking leg) 15

15. Carapace orange or brown orange with very thin, lighter orange edges. Orange-red spot on distal end of propodus of walking legs. Suture between second and third thoracic somites present only in very small specimens .... ***Trapezia ferruginea***

— Carapace orange-pink with conspicuous pink or purplish edges. No spots on walking legs. Suture between second and third somatic somite present except in larger specimens ....
.... ***Trapezia serenei***

16. Inner margin of cheliped propodus armed with thick, teeth-like tubercles. Dorsal surface of carapace with colored spots 17

— Inner margin of cheliped propodus smooth or with microscopic tubercles. Dorsal surface of carapace without spots **18**

17. Frontal teeth rounded. Dorsal surface of carapace red with large yellow spots .... ***Trapezia flavopunctata***

— Frontal teeth triangular. Dorsal surface of carapace cream with red spots .... ***Trapezia rufopunctata***

18. Dorsal surface of carapace white to cream, with a brown band across frontal border between eyes. Walking legs with brown-red spots. Chelipeds slender, with long and slender fingers that extend well over tips when closed .... ***Trapezia guttata***

— Dorsal surface of carapace with honeycomb-like network of red-brown lines interconnected as pentagons or hexagons on cream to pink background. Walking legs without spots. Chelipeds thick .... ***Trapezia septata***

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REFERENCES

ABELE, L. G., 1984. — Biogeography, colonization, and experimental community structure of coral-associated crustaceans. *In* : STRONG, D. R., SIMBERLOFF, D., ABELE, L. G. & THISTLE, A. B. (eds), *Ecological communities : Conceptual Issues and the Evidence*. Princeton University Press, Princeton, N. J. : 123-137.

ALCOCK, A., 1898. — The Brachyura Cyclometopa. Part 1. The Family Xanthidae. No. 3. Materials for a carcinological fauna of India, No. 3. *J. Asiat. Soc. Beng.* **67** (2, no.1) : 67-233.

ALLEN, J. R. & STEENE, R., 1994. — *Indo-Pacific Coral Reef Guide*. Singapore, Tropical Reef Research ; 378 p., unnumbered figs.

AUSTIN, A. D., AUSTIN, S. A. & SALE, P., 1980. — Community structure of the fauna associated with the coral *Pocillopora damicornis* (L.) on the Great Barrier Reef. *Aust. J. Mar. Freshwat. Res.*, **31** : 163-174, fig. 1, tabls 1-4.

BOONE, L., 1934. — Scientific results of the world cruise of the yacht "Alva", William K. Vanderbilt, commanding. *Bull. Vanderbilt Mar. Mus.*, **5** : 1-210, pls 1-109.

CALMAN, W. T., 1900. — On a collection of Brachyura from Torres Straits. *Trans. Linn. Soc., London*, Zoology, **8** : 1-50, pls 1-3.

CALMAN, W.T., 1909. — On a new crab taken from a deep-sea telegraph-cable in the Indian Ocean. *Ann. Mag. Nat. Hist.*, ser. 3, **3** (13) : 30-33, 1 unnumbered fig.

CASTRO, P., 1976. — Brachyuran crabs symbiotic with scleractinian corals : a review of their biology. *Micronesica* **12** (1) : 99-110.

CASTRO, P., 1982. — Notes on symbiotic decapod crustaceans from Gorgona Island, Colombia, with a revision of the eastern

Pacific species of *Trapezia* (Brachyura, Xanthidae), symbionts of scleractinian corals. *An. Inst. Invest. Mar. Punta de Betín* **12** : 9-17, tabl. 1.

CASTRO, P., 1988. — Animal symbioses in coral reef communities : a review. *Symbiosis* **5** : 161-184, tabl. 1.

CASTRO, P., 1996. — The eastern Pacific species of *Trapezia* (Crustacea, Brachyura : Trapeziidae), sibling species symbiotic with reef corals. *Bull. Mar. Sci.*, **58** (2) : 531-554, figs 1-4, tabls 1 & 2.

CASTRO, P., 1997. — Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of French Polynesia. *In* : RICHER DE FORGES, B. (ed.). — *Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). Études & Thèses*, volume **3**, Paris, ORSTOM : 109-139 ; Figs 1, 2, pl. 1.

CASTRO, P. & HUBER, M., 1997. — *Marine Biology*. Dubuque, Iowa, W. C. Brown ; 464 pp., 548 figs.

CHANG, K.-H., CHEN, Y.-S. & CHEN, C.-P., 1987. — Xanthid crabs in the corals, *Pocillopora damicornis* and *P. verrucosa* of southern Taiwan. *Bull. Mar. Sci.*, **41** (2) : 214-220, fig. 1, tabls 1-4.

COLIN, P. L. & ARNESON, C., 1995. — *Tropical Pacific Invertebrates*. Beverly Hills, California, Coral Reef Press : viii + 296 pp., figs 1-1354.

DAI, A. & YANG, S., 1991. — *Crabs of the China Seas*. Beijing, China Ocean Press : 21 + 608 pp., figs 1-295, pls 1-74.

DAI, A., SONG, Y., CHEN, G. & YANG, S., 1983. — On the crabs of the Xisha Islands – Xanthidae. *Studia Mar. Sinica* **20** : 231-261, figs 1-14, pls 1-4. [In Chinese with English summary].

DAI, A., YANG, S., SONG, Y. & CHEN, G., 1986. — *Crabs of Chinese Seas*. Beijing, China Ocean Press : 17 + 642 pp., figs 1-295, pls1-74. [In Chinese].

DANA, J. D., 1851a. — On the genera *Trapezia* and *Tetralia*. *Am. J. Sci. Arts*, ser. 2, **11** : 222-224.

DANA, J. D., 1851b. — On the classification of the Cancroidea. *Am. J. Sci. Arts*, ser. 2, **12** : 121-131.

DANA, J. D., 1852a. — Conspectus crustaceorum, etc. Conspectus of the Crustacea of the Exploring Expedition under Capt. Wilkes, U.S.N., including the Crustacea Cancroidea Corystoidea. *Proc. Acad. Nat. Sci. Philad.*, **6** : 73-86.

DANA, J. D., 1852b. — Crustacea, Part I. *In* : *United States Exploring Expedition, during the Years 1838, 1839, 1840, 1841, 1842, under the Command of Charles Wilkes, U.S.N.* Philadelphia, C. Sherman, **13** : viii + 685 pp. ; **14** (atlas) : 1-27, pls 1-96.

DAVIE, P. J. F., 1993. — Order Decapoda (Class Malacostraca, Eucarida). *In* : MATHER, P., & BENNETT, I. (eds), *A Coral Reef Handbook. A Guide to the Geology, Flora and Fauna of the Great Barrier Reef.* Chippin Norton, Australia, Surrey Beatty & Sons : 1-264, figs 1-77, pls 1-8.

ELDREDGE, L. G. & KROPP, R. K., 1982. — Decapod crustacean-induced skeletal modifications of *Acropora*. *Proc. Fourth Int. Coral Reef Symp., Manila, Philippines*, **2** : 115-119, figs 1-10.

EYDOUX, F. & SOULEYET, F. A., 1842. — Crustacés. *In* : *Voyage Autour du Monde Executé Pendant les Années 1836 et 1837 sur la corvette La Bonite, Commandée par M. Vaillant.* Zoologie **1** (2) : 107-328 ; Atlas, pls 1-150. [see DAVIES SHERBORN, C. & WOODWARD, B. B., 1906, *Ann. Mag.Nat. Hist.*, ser. 7, **17** : 577-582 for dates of publication of different sections].

FOREST, J. & GUINOT, D., 1961. — Crustacés Décapodes Brachyoures de Tahiti et des Tuamotu. *In* : *Expédition Française sur les Récifs Coralliens de la Nouvelle-Calédonie*. Volume préliminaire. Paris, Fondation Singer-Polignac : xi + 195, figs 1-178, pls 1-18, tabls 1-3.

GALIL, B., 1983. — Two new species of *Trapezia* (Decapoda :Brachyura), coral-inhabiting crabs from Taiwan. *Micronesica*, **19** (1/2) : 123-119, figs 1-9.

GALIL, B., 1986a. — *Tetraloides* — a new genus of coral-inhabiting crabs. *Crustaceana*, **50** (1985) : 68-77, figs 1-3.

GALIL, B., 1986b. — On the identity of *Tetralia cinctipes* Paulson, 1875 (Decapoda, Brachyura). *Crustaceana*, **51** (1) : 97-102, figs 1-3.

GALIL, B., 1986c. — *Quadrella* (Brachyura : Xanthoidea : Trapeziidae) – review and revision. *J. Crust. Biol.*, **6** (2) : 275-293, figs 1-8.

GALIL, B., 1987. — The adaptive functional structure of mucus-gathering setae in trapezid crabs symbiotic with corals. *Symbiosis*, **4** : 75-86, figs 1-5.

GALIL, B., 1988a. — Further notes on species of *Tetralia* (Decapoda, Trapeziidae). *Crustaceana*, **54** (1) : 57-68, figs 1 & 2.

GALIL, B., 1988b. — Trapeziidae (Decapoda : Brachyura : Xanthoidea) of the Red Sea. *Israel J. Zool.*, **34** (3/4) [1986/87] : 159-182, figs 1-11.

GALIL, B. & CLARK, P. F. 1988. — On a collection of *Acropora*-inhabiting trapeziids (Crustacea Brachyura Xanthoidea) from East Africa. *Trop. Zool.*, **1** : 137-151, figs 1-6, tabl. 1.

GALIL, B. & CLARK, P. F., 1990. — Crustacea Decapoda : Notes on trapeziid crabs from New Caledonia including descriptions of two new species. *In* : CROSNIER, A. (ed.), Résultats des Campagnes MUSORSTOM, volume 6. *Mém. Mus. Natl Hist. Nat.*, Paris, ser. A, **145** : 369-388, figs 1-6.

GALIL, B. & LEWINSOHN, C., 1984. — On the taxonomic status of *Trapezia tigrina* Eydoux & Souleyet, 1842 (Decapoda, Brachyura). *Crustaceana*, **46** (2) : 166-175, fig. 1.

GALIL, B. & LEWINSOHN, C., 1985a. — On the taxonomic status of *Trapezia rufopunctata* (Herbst) and *Trapezia flavopunctata* Eydoux& Souleyet (Decapoda, Brachyura). *Crustaceana*, **48** (2) : 209-217, figs 1-7.

GALIL, B. & LEWINSOHN, C., 1985b. — On the taxonomic status of *Trapezia areolata* Dana and *Trapezia septata* Dana (Decapoda, Brachyura). *Crustaceana*, **48** (3) : 286-293, figs 1-4.

GALIL, B. & TAKEDA, M., 1985. — Crabs of the genus *Quadrella* (Crustacea, Decapoda, Trapeziidae) from Japanese waters. *Bull. Natl Sci. Mus., Tokyo*, ser. A (Zoology), **11** (4) : 197-207, figs 1-3.

GALIL, B. & TAKEDA, M., 1986. — Resurrection of the genus *Jonesius* and the establishment of a new genus : commensal crabs associated with corals from the Indo-Pacific Ocean. *Bull. Natl Sci. Mus., Tokyo*, ser. A (Zoology), **12** (4) : 163-171, figs 1-8.

GALIL, B. & VANNINI, M., 1990. — Research on the coast of Somalia. Xanthidae, Trapeziidae, Carpilidae, Menippidae (Crustacea Brachyura). *Trop. Zool.*, **3** : 21-56, figs 1-8.

GARTH, J. S., 1971. — Borradaile's Maldivian collection revisited. *J. Mar. Biol. Ass. India*, **11** [1969] : 182-190.

GARTH, J. S., 1973. — The brachyuran crabs of Easter Island. *Proc. Calif. Acad. Sci.*, **39** (17) : 311-336, figs 1-6.

GRANT, F. E. & MCCULLOUGH, A. R. 1906. — On a collection of Crustacea from the Port Curtis District, Queensland. *Proc. Linn. Soc. N. S. W.*, **31** (1) : 1-53, figs 1-3, pls 1-4.

HASWELL, W. A., 1882. — *Catalogue of the Australian Stalk- and Sessile-Eyed Crustacea.* Sydney, Australian Museum : xxiv + 324 pp., figs 1-8, pls 1-4.

HEALY, A. & YALDWYN, J. 1970. — *Australian Crustaceans in Colour.* Sydney, Reed : 112 pp., pls 1-52.

HELLER, C., 1861. — Synopsis der im rothen Meere vorkommenden Crustaceen. *Verh. Zool. - Bot. Ges. Wien*, **11** : 3-32.

HELLER, C., 1868. — Crustaceen. *In* : *Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorf-Urbair.*Zoologischer Theil, Wien, **2** (3) : 1-280, pls 1-25.

HERBST, J. F. W., 1782-1804. — Versuch einer Naturgeschichte der Krabben und Krebse nebst einer Systematischen Beschreibung ihrer Verschiedenen Arten. Berlin : 3 vols, pls 1-62. [see MONOD, T., 1956, *Mém. Inst. Fr. Af. Noire*, **45** : 638 for dates of publications of different sections].

HUBER, M. E., 1985. — Population genetics of eight species of *Trapezia* (Brachyura : Xanthidae), symbionts of corals. *Mar. Biol.*, **85** : 23-36, fig. 1, tabls 1-5.

HUBER, M. E. & COLES, S. L., 1986. — Resource utilization and competition among the five Hawaiian species of *Trapezia* (Crustacea, Brachyura). *Mar. Ecol. Prog. Ser.*, **30** : 21-31, figs 1-3, tabls 1-5.

HWANG, J. J. & YU, H. P., 1980. — A fauna-list of the Crustacea from Lan-Yu Island. *Ann. Taiwan Mus.*, **23** : 151-180, pls 1-12.

JAMIESON, B. G. M., GUINOT, D. & RICHER DE FORGES, B., 1993. — The spermatozoon of *Calocarcinus africanus* (Heterotremata, Brachyura, Crustacea) : ultrastructural synapomorphies with xanthid sperm. *Invert. Reprod. Dev.*, **24** (3) : 189-196, figs1 & 2.

JENG, M. -J., 1994. — Newly recorded symbiotic crabs (Crustacea: Decapoda: Brachyura) from southern Taiwan coral reefs. *Zool. Stud.*, **33** : 314-318, figs 1-7.

JONES, D. S. & MORGAN, G. J., 1994. — *A Field Guide to Crustaceans of Australian Waters*. Chatswood, Australia, Reed : 216 pp., unnumbered figs.

KNOWLTON, N., 1986. — Cryptic and sibling species among the decapod Crustacea. *J. Crust. Biol.*, **6** (3) : 356-363.

KNOWLTON, N., 1993. — Sibling species in the sea. *A. Rev. Ecol. Syst.*, **24** : 189-216, 1 tabl.

KNUDSEN, J. W., 1967. — *Trapezia* and *Tetralia* (Decapoda, Brachyura, Xanthidae) as obligate ectoparasites of pocilloporid and acroporid corals. *Pac. Sci.*, **21** : 50-57, fig. 1.

KROPP, R. K. & BIRKELAND, C., 1982. — Comparison of crustacean associates of *Pocillopora verrucosa* from high island and an atoll. *Proc. Fourth Int. Coral Reef Symp., Manila, Philippines*, **2** : 627-632, tabls 1-5.

LASSIG, B. R., 1977. — Communication and coexistence in a coral community. *Mar. Biol.*, **42** : 85-92, figs 1-3.

LATREILLE, P. A., 1828. — Trapézie. *In* : *Entomologie, ou Histoire Naturelle des Crustacés, des Arachnides et des Insectes. Encyclopédie Méthodique, Histoire Naturelle*, 10 (2) : 695-696. [see DAVIES SHERBORN, C. & WOODWARD, B. B., 1906, *Ann. Mag. Nat. Hist.*, ser. 7, **17** : 577-582 for dates of publication of different sections]

LAURIE, R. D., 1906. — Report on the Brachyura collected by Professor Herdman, at Ceylon, in 1902. *In* : HERDMAN, W. A. (ed.), *Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar*. Part 5 (Supplementary Reports, no. 40) : 349-432, figs 1-12, pls 1 & 2.

MCNEILL, F. A., 1968. — Crustacea, Decapoda & Stomatopoda. *In* : *Great Barrier Reef Expedition, 1928-29, Scientific Reports*, **7** (1) : 1-98, pls 1 & 2.

MAN, J. G. DE, 1880. — On some podophthalmous Crustacea, presented to the Leyden Museum by Mr. J. A. Kruyt, collected in the Red Sea near the city of Djeddah. *Notes Leyden Mus.*, **2** (21) : 171-185.

MILNE EDWARDS, A., 1867. — Descriptions de quelques espèces nouvelles des Crustacés Brachyoures. *Annls Soc. Ent. Fr.*, ser. 4, **7** (4) : 263-288.

MILNE EDWARDS, A., 1873. — Recherches sur la faune carcinologique de la Nouvelle-Calédonie. Deuxième partie. *Nouv. Arch. Mus. Hist. Nat., Paris*, **8** : 155-332, pls 4-18.

MIYAKE, S., 1983. — Brachyura (Crabs). *In* : *Japanese Crustacean Decapods and Stomatopods in Color*. Osaka, Hoikusha : vol 2, viii+ 277 pp., pls 1-64, unnumbered figures, first edition [In Japanese ; second edition in 1992].

NAGAI, S. & NOMURA, K., 1988. — *Crustacea (Brachyura), [The Guide Book of Marine Organisms of Okinawa]*, (In Japanese) Shinsei Tosho : 250 pp., unnumbered plates.

ODINETZ, O., 1983. — *Ecologie et Structure des Peuplements de Crustacés Décapodes Associés aux Coraux du Genre Pocillopora en Polynesie Française et en Micronesie (Guam)*. Doctoral thesis, Université Pierre et Marie Curie, Paris VI : 221 pp., figs 1-48, photo. 1-17, tabls 1-10, 1-20 [microfilm TDM 12, 1984, ORSTOM, Paris].

ODINETZ, O., 1984. — Révision des *Trapezia* du groupe *cymodoce-ferruginea* (Crustacea, Decapoda, Brachyura), avec des notes complémentaires concernant *T. serenei* Odinetz, 1983, et *T. punctimanus* Odinetz, 1983. *Bull. Mus. Natl Hist. Nat., Paris*, (4) (A), **6** : 431-451, figs 1-4.

ORTMANN, A. E., 1893. — Abtheilung : Brachyura (Brachyura genuina Boas), II. Unterabtheilung : Cancroidea, 2. Section : Cancrinea, 1. Gruppe : Cyclometopa. Die Decapoden-Krebse des Strassburger Museums. VII. Theil. *Zool. Jb., Syst.*, **7** : 411-495, pl.17.

ORTMANN, A. E., 1897. — Die geographische Verbreitung der Decapoden-Familie Trapeziidae. *Zool. Jb., Syst.*, **10** : 201-216.

PATTON, W. K., 1966. — Decapod Crustacea commensal with Queensland branching corals. *Crustaceana*, **10** (3) : 271-295, figs 1-3, tabl. 1.

PATTON, W. K., 1974. — Community structure among the animals inhabiting the coral *Pocillopora damicornis* at Heron Island, Australia. *In* : VERNBERG, W. B. (ed.), *Symbiosis in the Sea*, pp. 219-243. Columbia, S. C., University of South Carolina Press.

PATTON, W. K., 1994. — Distribution and ecology of animals associated with branching corals (*Acropora* spp.) from the Great Barrier Reef, Australia. *Bull. Mar. Sci.*, **55** (1) : 193-211, figs 1-3, tabls 1-5.

PAULSON, O., 1875. — *[Studies on Crustacea of the Red Sea with Notes Regarding other Seas]*. English translation by The Israel Program for Scientific Translation, Jerusalem, S. Monson, 1961 : 164 pp., pls 1-21, 1 tabl.

POUPIN, J., 1996. — Crustacea Decapoda of French Polynesia (Astacidea, Palinuridea, Anomura, Brachyura). *Atoll Res. Bull.*, **442** : 1-114, 2 figs.

RATHBUN, M. J., 1906. — The Brachyura and Macrura of the Hawaiian Islands. *Bull. U. S. Fish Comm.*, **23** (3) : 827-930, figs 1-79, pls 1-24.

RATHBUN, M. J., 1907. — The Brachyura. X. Reports on the scientific results of the expedition to the tropical Pacific, in charge of Alexander Agassiz, by the U.S. Fish Commission steamer "Albatross" from October, 1904, to March, 1905, Lieut.-Commander L. M. Garrett, U.S.N., commanding. *Mem. Mus. Comp. Zool. Harv.*, **35** (2) : 23-74, pls 1-9.

RATHBUN, M. J., 1923. — Report on the Brachyrhyncha, Oxystomata and Dromiacea. Report on the Crabs Obtained by the F.I.S."Endeavour" on the Coasts of Queensland, New South Wales, Victoria, South Australia and Tasmania. *In : Biological Results of the Fishing Experiments Carried On by the F.I.S "Endeavour" 1904-14.* Sydney, **5** (3) : 95-156, figs 1-3, pls 16-42.

RATHBUN, M. J., 1930. — The cancroid crabs of America of the families Euryalidae, Portunidae, Atelecyclidae, Cancridae and Xanthidae. *Bull. U. S. Natl Mus.*, **152** : i-xvi, 1-609, figs 1-85, pls 1-230.

RÜPPELL, E., 1830. — *Beschreibung und Abbildung von 24 Arten kurzschwänzingen Krabben, Beitrag zur Naturgeschichte des rothen Meeres.* Frankfurt a. M., H. L. Brönner : 28 pp., pls 1-6.

SAKAI, T., 1976. — *Crabs of Japan and the Adjacent Seas.* Kodansha, Tokyo : vol. 1, xxix + 773 pp., figs 1-379 ; vol. 2, 461 pp., figs 1 & 2 ; vol. 3, 16 pp., pls 1-251.

SERÈNE, R., 1959. — Note sur les espèces de *Trapezia* du groupe *digitalis* et sur leurs relations avec les espèces de *Tetralia. Treubia*, **25** (1) : 127-157, figs 1-6, pls 1 & 2.

SERÈNE, R., 1971. — Observations on species of the group *Trapezia rufopunctata-maculata*, with a provisional key for all the species of *Trapezia. J. Mar. Biol. Ass. India*, **11** [1969] : 126-148.

SERÈNE, R., 1973a. — Observations sur les espèces des genres *Quadrella* Dana 1851 et *Sphenomerides* Rathbun 1898 (Decapoda-Brachyura). *Bull. Soc. Zool. Fr.*, **98** (1) : 191-209, figs 1-28, pls 1-5.

SERÈNE, R., 1973b. — Notes sur quelques espèces de brachyoures de Nouvelle-Calédonie. *Cah. Pacif.*, **17** : 119-161, figs 1-31, pls 1-8.

SERÈNE, R., 1984. — Crustacés Décapodes Brachyoures de l'Océan Indien Occidental et de la Mer Rouge, Xanthoidea : Xanthidae et Trapeziidae. Avec un addendum par A. CROSNIER : Carpiliidae et Menippidae. *Faune tropicale*, **24** : 1-349, figs A-C + 1-243, pls 1-48.

SERÈNE, R. & DAT, P.T., 1957. — Note sur *Tetralia nigrifrons* Dana 1852. *Annls Fac. Sci., Univ. Saigon*, **1957** : 107-131, figs 1-4, pls 1-3.

SMITH, S. I., 1869. — Notes on new or little known species of American cancroid Crustacea. *Proc. Boston Soc. Nat. Hist.*, **12** : 274-289.

STIMPSON, W., 1858. — Prodromus descriptionis animaliume vertebratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgoldet Johanne Rodgers ducibus, observavit et descripsit W. Stimpson. Pars IV. Crustacea Cancroidea et Corystoidea. *Proc. Acad. Nat. Sci. Philad.*, **10** : 31-40.

TAKEDA, M., 1980. — Two new crabs associated with precious coral from the Central Pacific. *Bull. Natl Sci. Mus., Tokyo*, ser. A (Zoology), **6** (2) : 71-76, figs 1-3.

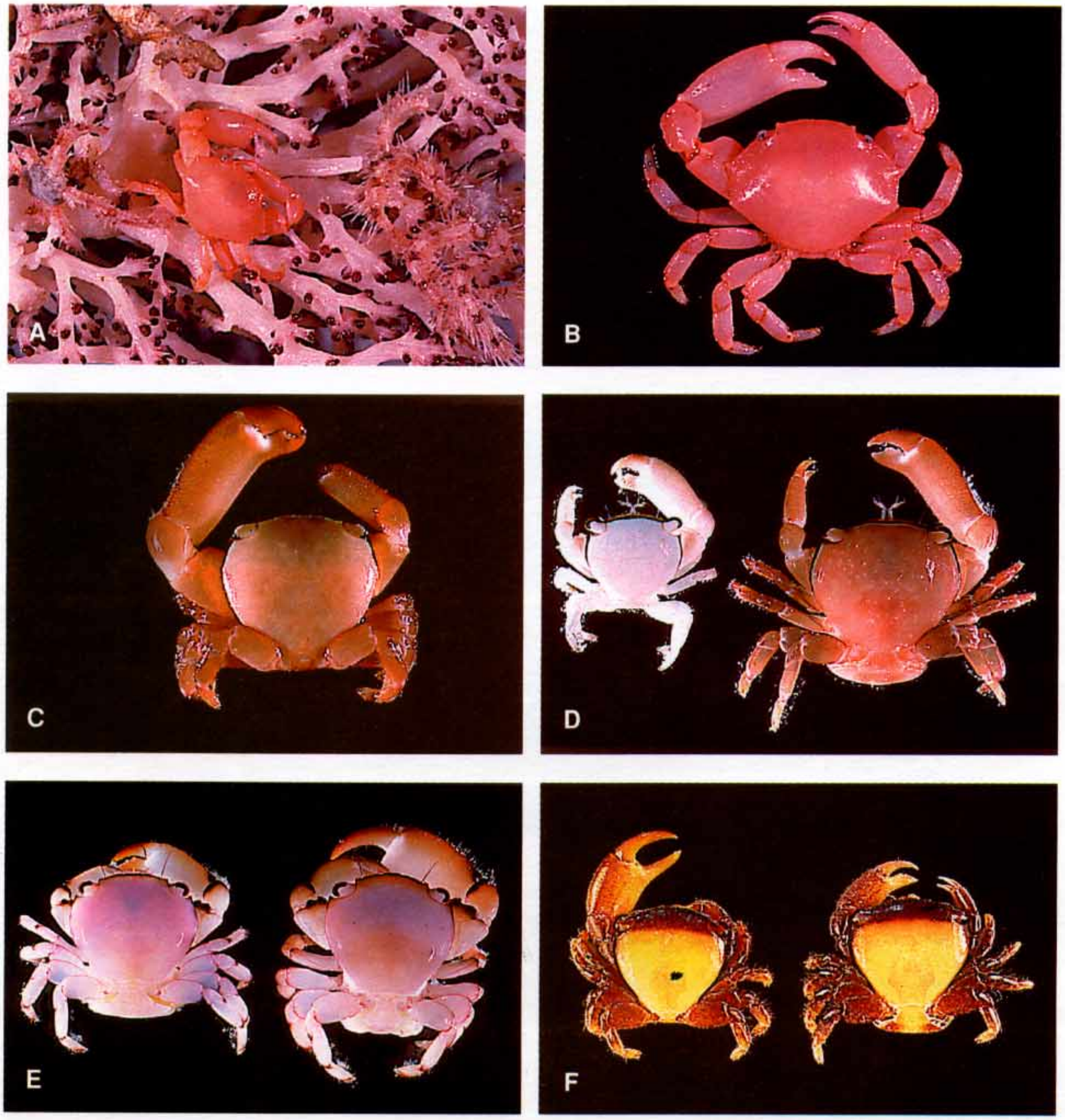
TAKEDA, M., 1986. — Macruran, anomuran and brachyuran crustaceans. *In* : MASUDA, H., HAYASHI, K., NAKAMURA, H.& KOBAYASHI, A, (eds), *Marine Invertebrates*, pp. 99-146.Tokyo, Tokai University Press. [In Japanese ; corrected edition in 1991, second corrected edition in 1993].

TAKEDA, M., 1994. — Pagurids and crabs. *In* : OKUTANI, T. (ed.), *Coral Reef Animal Life*. pp. 221-264. Tokyo, Yamakei. [In Japanese].

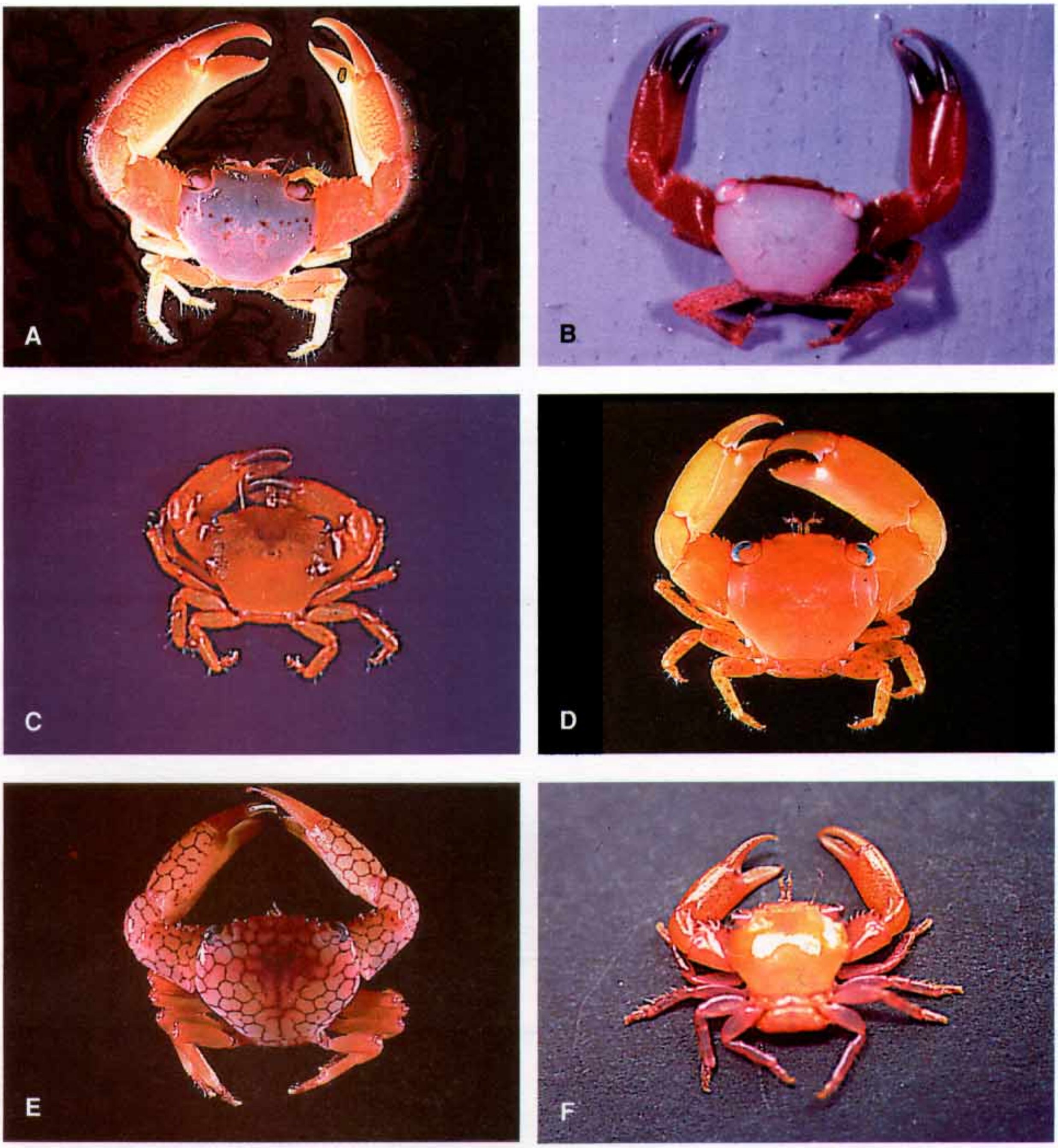
TAKEDA, M. & NUNOMURA, N., 1976. — Crabs collected by Melanesia Expedition of the Osaka Museum of Natural History, 1958. *Bull. Osaka Mus. Nat. Hist.*, **30** : 61-92, figs 1-3.

WARD, M., 1933. — The true crabs of the Capricorn Group, Queensland (Class Crustacea, Order Decapoda Brachyura). Part 1, Xanthidae. *Aust. Zool.*, **7** (5) [1932] : 237-255.

WARD, M., 1941. — New Brachyura from the Gulf of Davao, Mindanao, Philippine Islands. *Am. Mus. Novit.*, **1104** : 1-15, figs 1-30.

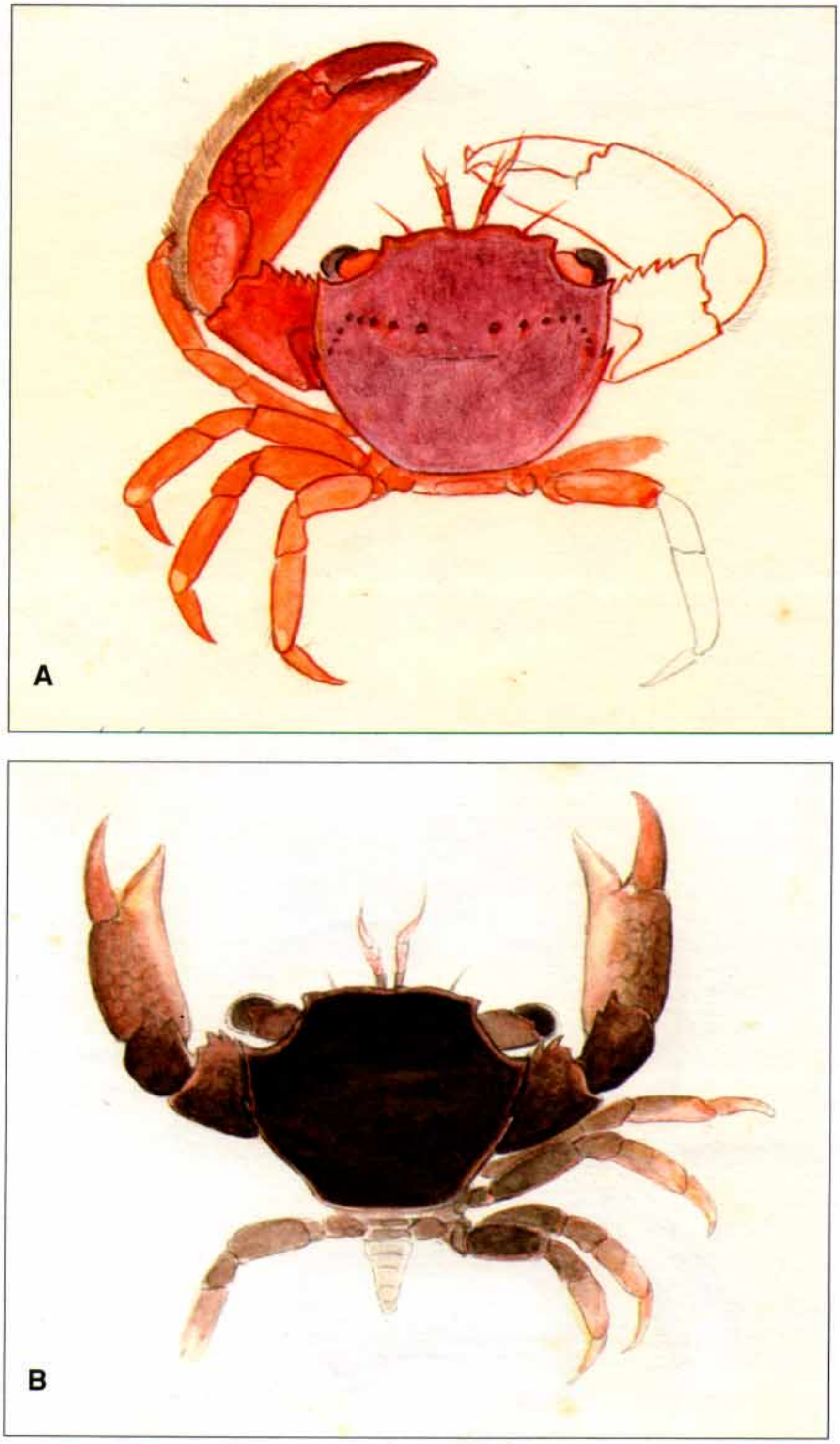


Pl. 1. — **A** : *Calocarcinus africanus* (Calman, 1909). Live male (MNHN-B 25221) dredged on its host, an alcyonacean (*Siphonogorgia* sp.), Loyalty Is., New Caledonia. (Photograph by P. LABOUTE, ORSTOM). **B** : *Calocarcinus africanus* (Calman, 1909). Live male (MNHN-B 25221), Loyalty Is., New Caledonia. (Photograph by P. LABOUTE, ORSTOM). **C** : *Tetralia fulva* Serène, 1984. Live male (AM P44626), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **D** : *Tetralia nigrolineata* Serène & Dat, 1957. Live male & female (AM P44620), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **E** : *Tetralia rubridactyla* Serène, 1984. Live male & female (AM P44617), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **F** : *Tetraloides nigrifrons* (Dana, 1852). Preserved male & female (MNHN-B 25186), Chesterfield Is. (Photograph by J. REBIÈRE, MNHN).

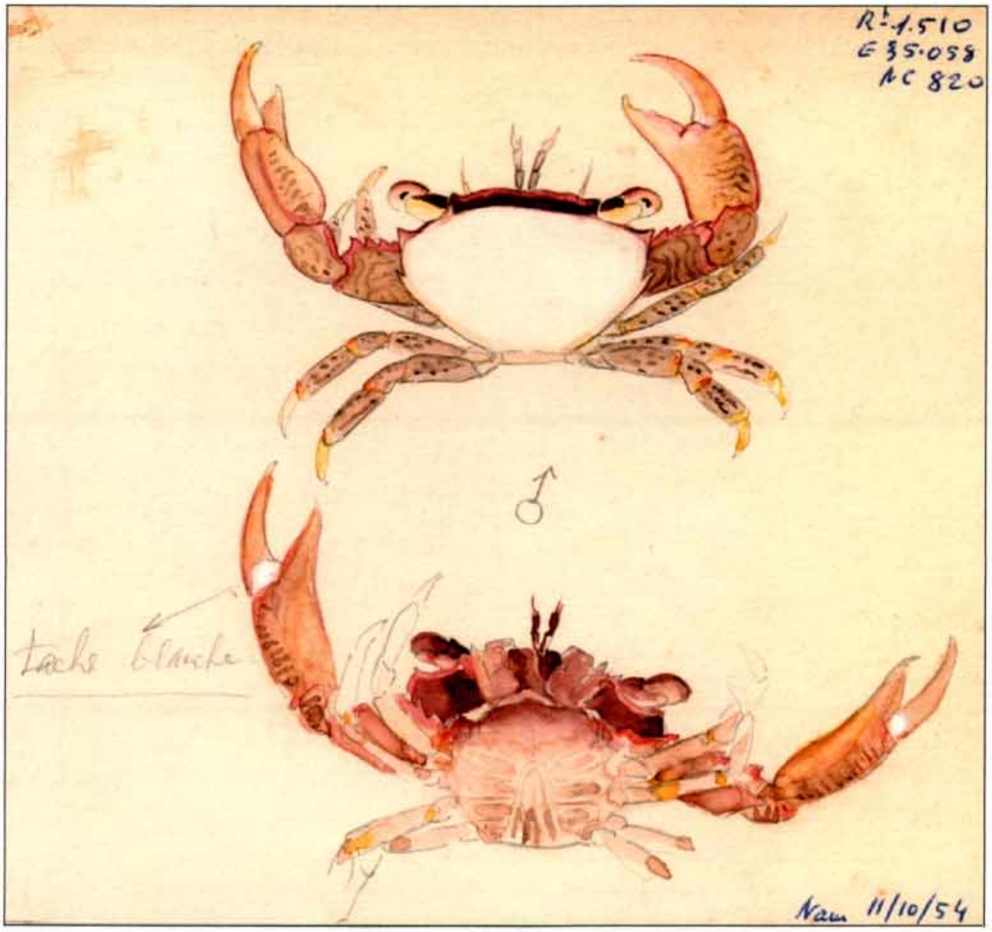


Pl. 2. — **A** : *Trapezia cymodoce* (Herbst, 1801). Live male (AM P 44622), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **B** : *Trapezia guttata* Rüppell, 1830. Live male (MNHN-B 25008), New Caledonia. (Photograph by J. -L. MENOU, ORSTOM). **C** : *Trapezia lutea* sp. nov. Live male holotype (MNHN-B 25222), New Caledonia. (Photograph by P. CASTRO for ORSTOM). **D** : *Trapezia punctipes* sp. nov. Live female paratype (AM P44627), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **E** : *Trapezia septata* Dana, 1852. Live female (AM P44628), Lizard I., Queensland, Australia. (Photograph by R. SPRINGTHORPE, AM). **F** : *Trapezia serenei* Odinetz, 1984. Live female (MNHN-B 25193), Tahiti. (Photograph by J. POUPIN).

Pls 3-6. — Original watercolors made by Trinh VAN NAM for Raoul SERÈNE at the Institut Océanographique, Nhatrang, Viet Nam between 1954 and 1956 (notes and documents on the Trapeziidae, R. SERÈNE, ORSTOM, Paris).

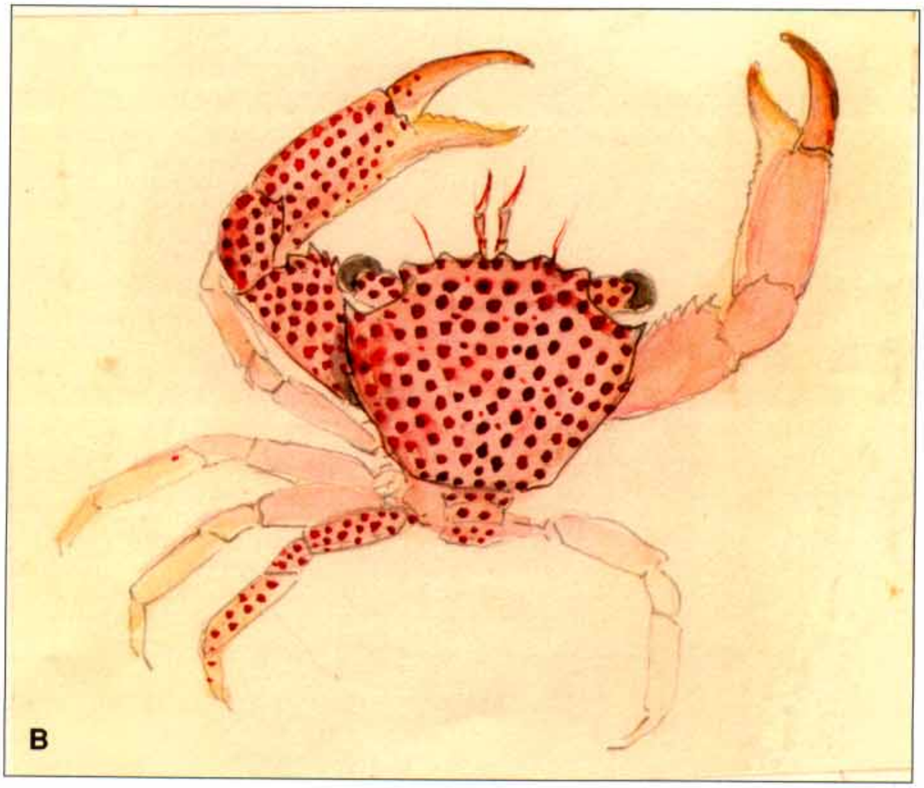


Pl. 3. — **A** : *Trapezia cymodoce* (Herbst, 1801) as *T. cymodoce* var. *rosea*. **B** : *Trapezia digitalis* Latreille, 1828.

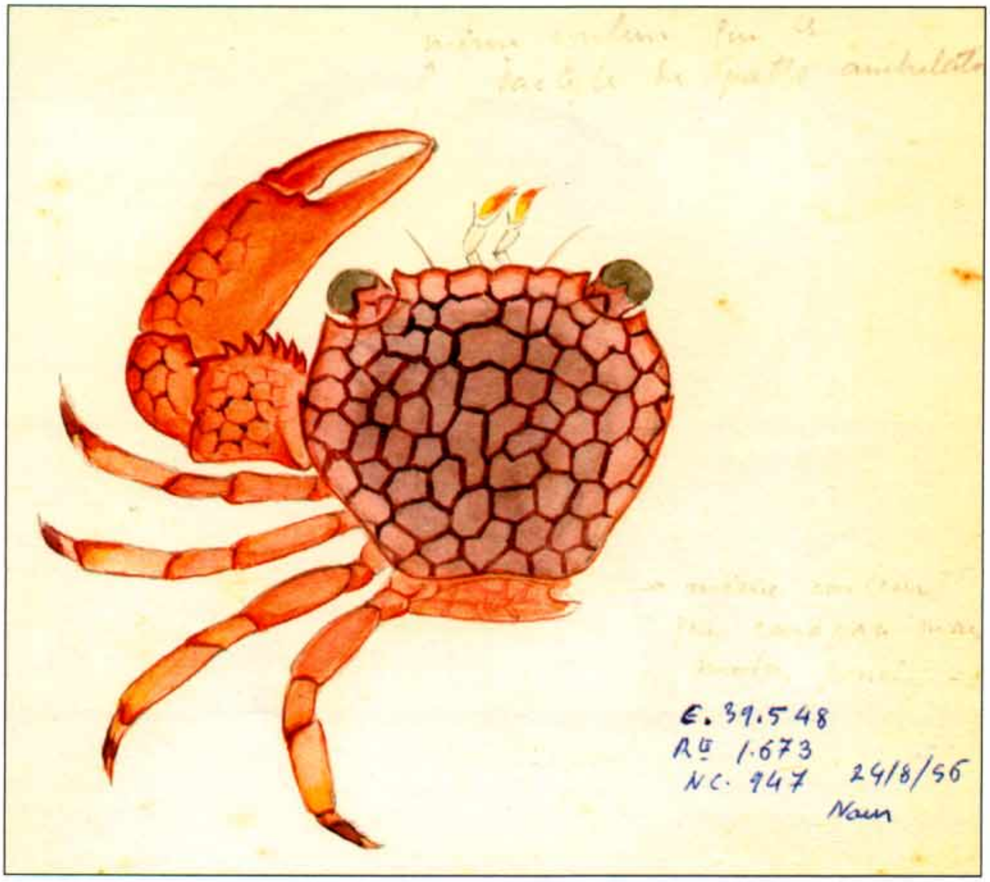


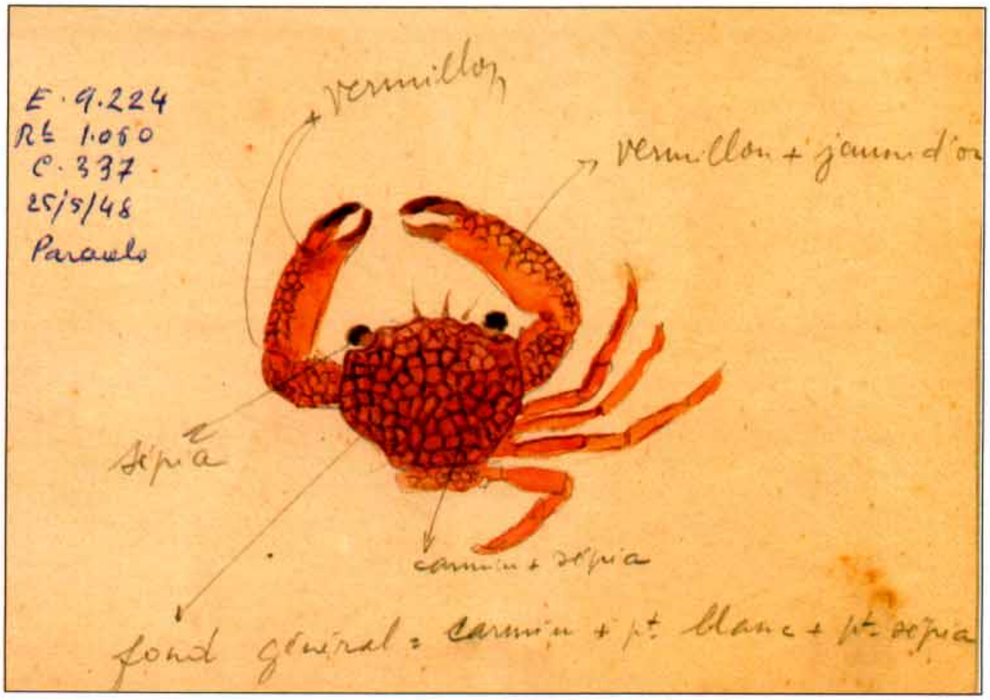
Pl. 4. — *Trapezia guttata* Rüppell, 1830.


A


B

Pl. 5. — **A** : *Trapezia lutea* sp. nov. as *T. cymodoce* var. *lutea*. **B** : *Trapezia rufopunctata* (Herbst, 1799).





Pl. 6. — *Trapezia septata* Dana, 1852.

Pl. 7. — **A** : *Quadrella coronata* Dana, 1852. Live female (MNHN-B 25765). **B** : *Quadrella maculosa* Alcock, 1898. Live female (MNHN-B 25766). (Photographs by J. -L. MENOU).

4

Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of French Polynesia

Peter CASTRO

Biological Sciences Department
California State Polytechnic University
Pomona, California 91768-4032
U.S.A.

ABSTRACT

Identification of material recently collected in French Polynesia and of specimens from museum collections shows that a total of 22 species of crabs belonging to four genera (*Quadrella, Tetralia, Tetraloides,* and *Trapezia*) of the family Trapeziidae inhabit southeastern Polynesia. One species of *Trapezia* is new. A relatively high number of the species of *Trapezia*, a total of fourteen, inhabits the region. Of these, three appear to be endemic.

RÉSUMÉ

L'identification du matériel récolté récemment en Polynésie française et de matériel se trouvant dans des collections des musées permettent de montrer que 22 espèces de crabes appartenant à quatre genres (*Quadrella, Tetralia, Tetraloides,* et *Trapezia*) de la famille des Trapeziidae vivent dans le sud-est de la Polynésie. Une espèce de *Trapezia* est nouvelle. Quatorze espèces de *Trapezia* sont connues de la région, ce qui représente un nombre relativement important. Trois espèces sont endémiques.

INTRODUCTION

This work is the third in a series that aims at a review of the systematics and geographical distribution of trapeziid crabs, symbionts of reef corals and other colonial cnidarians. The first dealt with the eastern Pacific species (CASTRO, 1996), the second those from the Coral Sea region (CASTRO, 1997). These studies have

CASTRO, P., 1997. — Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of French Polynesia. *In* : RICHER DE FORGES, B. (ed.), Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). *Études & Thèses*, volume 3, ORSTOM : Paris : 109-139. ISBN 2-7099-1376-3

stressed the importance of color in the identification of the species of *Trapezia* and *Tetralia*, close sibling species that live as heterosexual pairs on their coral hosts. Species can be best recognized by color differences that are mostly lost with preservation, hence the confusion that has been created when traditional morphological characters are used. Whereas the first two investigations were initiated with the examination of live material in the field, information on the live color of the French Polynesian species has been obtained mostly from photographs of live and frozen individuals and recently preserved material generously provided by J. POUPIN (Service Mixte de Surveillance Radiologique et Biologique, France).

Most of the species in this survey are included in a list of the brachyuran crabs of French Polynesia compiled by POUPIN (1996), who also gives an account of the history of scientific expeditions to the region. Not included here are four species included in POUPIN's list : a new species of *Hexagonalia* Galil being described by B. GALIL, and *Jonesius triunguiculatus* (Borradaile), both of which are usually included in the Trapeziidae (GALIL & TAKEDA, 1986), and *Domecia glabra* Alcock and *D. hispida* Eydoux & Souleyet, which are sometimes placed in the Trapeziidae by some (SERÈNE, 1984).

The synonymy that is given for each of the species is not intended to be a complete list of references. Effort has been made to include the most important synonyms, all records for French Polynesia as listed by POUPIN (1996), and known references with useful illustrations, particularly those in color.

The material examined is deposited in the British Museum (BMNH), London, United Kingdom, The Natural History Museum of Los Angeles County (LACM), Los Angeles, California ; the Muséum national d'Histoire naturelle (MNHN), Paris ; the Nationaal Natuurhistorisch Museum (RMNH), Leiden, The Netherlands, and the United States National Museum of Natural History, Smithsonian Institution (USNM), Washington, D.C. Geographical names follow the spelling given by MOTTELER (1986). Measurements for specimens refer to carapace length (cl) and carapace width (cw).

LIST OF SPECIES

Quadrella lewinsohni Galil, 1986
Quadrella maculosa Alcock, 1898
Tetralia cinctipes Paulson, 1875
Tetralia fulva Serène, 1984
Tetralia rubridactyla Garth, 1971
Tetralia vanninii Galil & Clark, 1988
Tetraloides heterodactyla (Heller, 1861)
Tetraloides nigrifrons (Dana, 1852)
Trapezia areolata Dana, 1852
Trapezia bella Dana, 1852
Trapezia cymodoce (Herbst, 1801)
Trapezia digitalis Latreille, 1828
Trapezia ferruginea Latreille, 1828
Trapezia flavopunctata Eydoux & Souleyet, 1842
Trapezia globosa **new species**
Trapezia guttata Rüppell, 1830
Trapezia lutea Castro, 1997
Trapezia punctimanus Odinetz, 1984
Trapezia rufopunctata (Herbst, 1799)
Trapezia serenei Odinetz, 1984
Trapezia speciosa Dana, 1852
Trapezia tigrina Eydoux & Souleyet, 1842

SYSTEMATIC ACCOUNT

TRAPEZIIDAE Miers, 1886

QUADRELLA Dana, 1851

GALIL (1986c) revised the genus and recognized eight species. All are symbionts of alcyonaceans, antipatharians, and ahermatypic scleractinian corals.

Quadrella lewinsohni Galil, 1986

Quadrella lewinsohni Galil, 1986c : 285, figs 5 A, B, 6. — POUPIN, 1996 : 57 (list).
Quadrella sp. Monod, 1979 : 9, figs 1-8 (Tahuata).
Quadrella cyrenae – SERÈNE, 1975 : 510, figs 3, 4, pl. 1, figs B', E'.

MATERIAL EXAMINED. — **Marquesas Islands.** Tahuata, 10-15 m, on antipatharian, 18.3.1973, coll. M. DENIZOT : 1 ♂, 2 ♀ (MNHN-B 20411).

GEOGRAPHICAL DISTRIBUTION. — It is known only from the Nicobar and Marquesas islands (GALIL, 1986).

COLOR. — The three preserved specimens from the Marquesas Islands are dark red-brown.

Quadrella maculosa Alcock, 1898

Quadrella coronata var. *maculosa* Alcock, 1898 : 226.
Quadrella maculosa – SERÈNE, 1973 : 204, figs 4, 9, 20-22, pl. 3 ; 1984 : 288, fig. 194, pl. 41, fig. E. — GALIL, 1986c : 285, figs 5 C-F (full synonymy). — GALIL & CLARK, 1990 : 372. — ALLEN & STEENE, 1994 : 162 (color photograph). — COLIN & ARNESON, 1995 : 214, fig. 1007 (color photograph). — POUPIN, 1996 : 57 (Fatu Hiva). — CASTRO, 1997 : 63.

MATERIAL EXAMINED. — **Marquesas Islands.** Fatu Hiva, st. D86, 10°29'S, 138°40'W, 49 m, 29.1.1991, coll. J. POUPIN : 3 ♂, 3 ♀ (MNHN-B 23017).

GEOGRAPHICAL DISTRIBUTION. — Distributed across the Indo-west Pacific region from the Red Sea to French Polynesia (CASTRO, 1997).

TETRALIA Dana, 1851

Seven species of *Tetralia* resulted from its revision by GALIL (1986b, 1988a) and GALIL & CLARK (1988). Most of these species were originally treated as one species, *T. glaberrima* Herbst. Unfortunately, it is rarely possible to identify the material recorded in the literature by this name since color pattern is rarely given. All species are symbionts of *Acropora*, hermatypic reef corals.

Tetralia cinctipes Paulson, 1875

Pl. 1 A

Tetralia cinctipes Paulson, 1875 : 60, pl. 7, fig. 8. — GALIL, 1986b : 97, figs 1-3 (Rapa) ; 1987 : fig. 3 ; 1988b : 171, fig. 7. — GALIL & CLARK, 1988 : 138, figs 1 A, 3 A, 4 A, 4 F, 5 A, 6 A (full synonymy). — POUPIN, 1996 : 57 (list). — CASTRO, 1997 : 64.
Tetralia glaberrima forma *pullidactyla* Patton, 1966 : 287. — SERÈNE, 1984 : 282, pl. 40, fig. C.
Tetralia glaberrima – JONES & MORGAN, 1994 : 179 (color photograph).
? *Tetralia glaberrima* – DANA, 1852b : 262 (Carlshoff island = Aratika, Tahiti) ; 1855, fig. 3g (color).

MATERIAL EXAMINED. — **Society Islands.** Raiatea, Taoru I., st. 80, 29.4.1957, Smithsonian-Bredin Expedition : 3 ♂, 1 ♀ (USNM). — Moorea, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 25328).

Tuamotu Archipelago. Moruroa, 10 m, *Acropora*, 2.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 25327) ; 4.1996 : 2 ♂, 2 ♀ (MNHN-B 25326).

GEOGRAPHICAL DISTRIBUTION. — Across the Indo-west Pacific region from the Red Sea to French Polynesia, including Japan but excluding the Hawaiian Islands (GALIL, 1986b ; CASTRO, 1997).

COLOR. — Live color (pl. 1 A) has not been previously recorded. A diagnostic color characteristic that quickly disappears in preserved specimens is a light blue band across the frontal border of the carapace between the eyes and immediately below a red-brown margin. A faint blue band can be seen in a color photograph, identified as *Tetralia glaberrima*, that is given by JONES & MORGAN (1994). The eyes are light blue. The segments of the chelipeds are ornamented with brown reticulations that remain in preserved specimens for decades. Also retained in preserved specimens is the brown color on the ventral portion of the carapace between the eyes. The walking legs are typically banded since the segments are light tan with brown proximal portions.

REMARKS. — Specimens identified as *T. glaberrima* by DANA (1852b) may have included *T. cinctipes*. One color figure (DANA, 1855) shows a blue-green band across the front of the carapace. The characteristic banding of the walking legs, however, was not indicated.

T. cinctipes is also characterized by tuberculate chelipeds and by the slightly concave distal border of the endopod of the first maxillipeds.

Tetralia fulva Serène, 1984

Tetralia glaberrima forma *fulva* Patton, 1966 : 286.
Tetralia glaberrima fulva Serène, 1984 : 282 (part).
Tetralia fulva – GALIL, 1988a : 62, figs 1b, 2c, 2d (Tahiti). — CASTRO, 1997 : 65, pl. 1 C (color photograph).
Tetralia glaberrima – FOREST & GUINOT, 1961 : 139 (Hikueru) ; 1962 : 70 (list). — GUINOT, 1985 : 452 (list). — POUPIN, 1996 : 57 (list, part).
Tetralia sanguineomaculata Galil & Clark, 1990 : 375, figs 4, 5, 6b.
? *Tetralia glaberrima* – DANA, 1852b : 262 (Carlshoff island = Aratika, Tahiti ; part ?) ; 1855, fig. 3 a-f, h. — ORTMANN, 1893 : 486 (Tahiti). — NOBILI, 1907 : 404 (Marutea). — RATHBUN, 1907 : 60 (Fakarava, Makemo, Tahiti). — BOONE, 1934 : 174 (Raiatea, Tahiti ; part). — SEURAT, 1934 : 59 (list). — PEYROT-CLAUSADE, 1989 : 111 (Tikehau).
? *Trapezia serratifrons* Jacquinot, 1846 : pl. 4, fig. 20 (color)-23. — LUCAS, 1853 : 47 (Nuku Hiva).
? *Tetralia cavimana* – HELLER, 1865 : 26 (Tahiti).

MATERIAL EXAMINED. — **Tuamotu Archipelago.** Rangiroa, Mohican reef, 21.9.1899, *Albatross* : 1 ♀ (USNM). — Hikueru, 1952, Mission RANSON : 3 ♂, 2 ♀ (MNHN-B 13910). — Moruroa, *Acropora*, 4.1996, coll. J. POUPIN : 4 ♂, 3 ♀ (MNHN-B 25329) ; 15 m : 1 ♂ (MNHN-B 25330) ; dead corals : 1 ♂ (MNHN-B 25331).

Society Islands. Raiatea, Taoru I., st. 80, 29.4.1957, Smithsonian-Bredin Expedition : 5 ♂, 7 ♀ (USNM). — Tahiti, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 25550).

GEOGRAPHICAL DISTRIBUTION. — *T. fulva* has been reported from Indonesia to French Polynesia (GALIL, 1988a). The status of Indian Ocean populations identified as *T. fulva* (SERÈNE, 1984), awaits the study of color patterns in live individuals (see CASTRO, 1997).

COLOR. — Live individuals have an orange-brown to light pink-brown (peach) carapace (CASTRO, 1997). It is bordered anteriorly by a thin orange to red-orange line followed by a wider light-gray band . A faint gray band may be present on each of the anterolateral borders. The chelipeds are orange brown, with the distal edge of the carpus and the anterior border of the merus dark orange. The walking legs are orange brown, usually with a black spot at the distal end of the merus and another at the propodal joint.

REMARKS. — *T. fulva* can be distinguished by its characteristic color pattern and by the shape of the endopod of the first maxillipeds. Its inner side ends at a right angle but the outer edge is rounded (fig. 2c *in* GALIL, 1988a).

The typical light-gray band along the anterior border of the carapace was conspicuously black in one specimen from Moruroa (MNHN-B 25331). The edges of the postorbital angles were also black. A similar color pattern, which was observed among specimens of *T. fulva* collected in New Caledonia and Australia (CASTRO, 1997), should not be confused with that of a close species, *T. nigrolineata* Serène & Dat. The latter species, which has not yet been reported from southeastern Polynesia, has a different color pattern (broader black bands along the anterior and anterolateral borders followed by a blue-green line) and the endopod of the first maxillipeds is spatulate (fig. 2e *in* GALIL, 1988a).

Many records from French Polynesia attributed to *T. glaberrima* probably represent *T. fulva*, as the examination of the material from the Mission RANSON (FOREST & GUINOT, 1961) has shown.

The authorship of *T. serratifrons*, like others first published in the Atlas of the *Astrolabe* and *Zélée* expedition, is clearly credited to H. JACQUINOT in a footnote in the introduction to a revised edition of the text (JACQUINOT & LUCAS, 1853).

Tetralia rubridactyla Garth, 1971

Tetralia glaberrima forma *rubridactyla* Patton, 1966 : 287.
Tetralia glaberrima rubridactyla Garth, 1971 : 185.
Tetralia glaberrima laevissima - SERÈNE, 1984 : 282, fig. 188, pl. 40, fig. B.
Tetralia rubridactyla - GALIL, 1988a : 65, figs 1d, 2g, 2h (full synonymy). — CASTRO, 1997 : 70 pl. 1 E (color photograph).

MATERIAL EXAMINED. — **Society Islands.** Tahiti, 21-27 m, 7.9.1967, N.G.S. - Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂, 1 ♀ (USNM). - Material identified as *Tetralia glaberrima* by J. S. GARTH : Moorea, pass to Papetoai Bay, 15.5.1957, coll. J. E. RANDALL, Smithsonian-Bredin Expedition : 1 ♀ (USNM 228274).

GEOGRAPHICAL DISTRIBUTION. — *T. rubridactyla* is known from the Indian Ocean to southeastern Polynesia.

COLOR. — A diagnostic feature is the orange-red distal portion of the dorsal surface of the cheliped dactylus (CASTRO, 1997). This color pattern usually remains visible in specimens that have been preserved for some time. The rest of the cheliped is light brown, with dark-brown portions on the distal borders of the merus and carpus and on the proximal portion of the propodus. The anterior portion of the carapace is pink-purple to lavender.

Tetralia vanninii Galil & Clark, 1988
Fig. 1 A-D

Tetralia vanninii Galil & Clark, 1988 : 146, figs 1 C, 2 B, 3 C, 4 C, 4 H, 6 C.
? *Tetralia glaberrima* Rathbun, 1907 : 60 (Fakarava, part).

MATERIAL EXAMINED. — **Kenya.** Wasin Is., 5.10.1971, coll. A. J. BRUCE : 10 ♂, 6 ♀ (BMNH 1986 : 1037) paratypes of *Trapezia vanninii* Galil & Clark.

Tuamotu Archipelago. Anuanuraro, 1-5 m, *Acropora*, 4.1996, coll. J. POUPIN : 1 ♂ (MNHN-B 25334) ; 1 ♀ (MNHN-B 25335) ; 1 ♂ (MNHN-B 25336) ; 1 ♂ (USNM 282634). ? Fakarava, outer reef, *Albatross* : 1 ♂, 1 ♀ (USNM 33342).

Society Islands. Material identified as *Tetralia glaberrima* by J. S. GARTH : Raiatea, Taoru I., st. 80, 29.4.1957, Smithsonian-Bredin Expedition : 6 ♂, 4 ♀, 3 juv. (USNM). — Moorea, Hauru Point, st. 105, 8.5.1957, Smithsonian-Bredin Expedition : 5 ♂, 5 ♀ (USNM). — Moorea, Nuarei Bay, st. 127, 11.5.1957, Smithsonian-Bredin Expedition : 2 ♂, 2 ♀ (USNM 244129).

Seychelles. Mahé, Cap Maçons/Anse de Forbans, sta. 612, 4°65'S, 55°31'E, reef flat and slope, 5 m, *Acropora*, 12.12.1992, NIOP-E, Tyro Seychelles Expedition 1992-93 : 1 ♂, 1 ♀ (RMNH D 47218) ; Aride Island, south coast, sta. 711, 4°13'S, 55°40'E, 18/19.12.1992 : 1 ♀ (RMNH D 47219).

GEOGRAPHICAL DISTRIBUTION. — *T. vanninii* was previously recorded only from Somalia, its type location, and Kenya (GALIL & CLARK, 1988). Its presence in French Polynesia and the Seychelles demonstrates a wider Indo-west Pacific distribution.

COLORS. — The small teeth along the anterior border of the carapace are brownish red. A black band that is followed by a thin, light-blue line extends across the anterior border and the eyestalks. This color pattern is repeated along the ventral surfaces of the carapace and eyestalks. The rest of the dorsal surface of the carapace is light grayish brown to very light tan. The merus, carpus, and proximal region of the propodus are light brown with small black dots. A thin orange line borders the anterior margins of the merus and carpus ; the raised articulation of the propodus with the carpus is orange red in one of the smaller individuals. The rest of the propodus is light tan. The fingers are orange red. The walking legs are tan to light brown with small black dots ; the distal borders of the segments orange brown in the larger individuals. The color pattern along the anterior portion of the carapace does not preserve well, changing into irregular greenish patches.

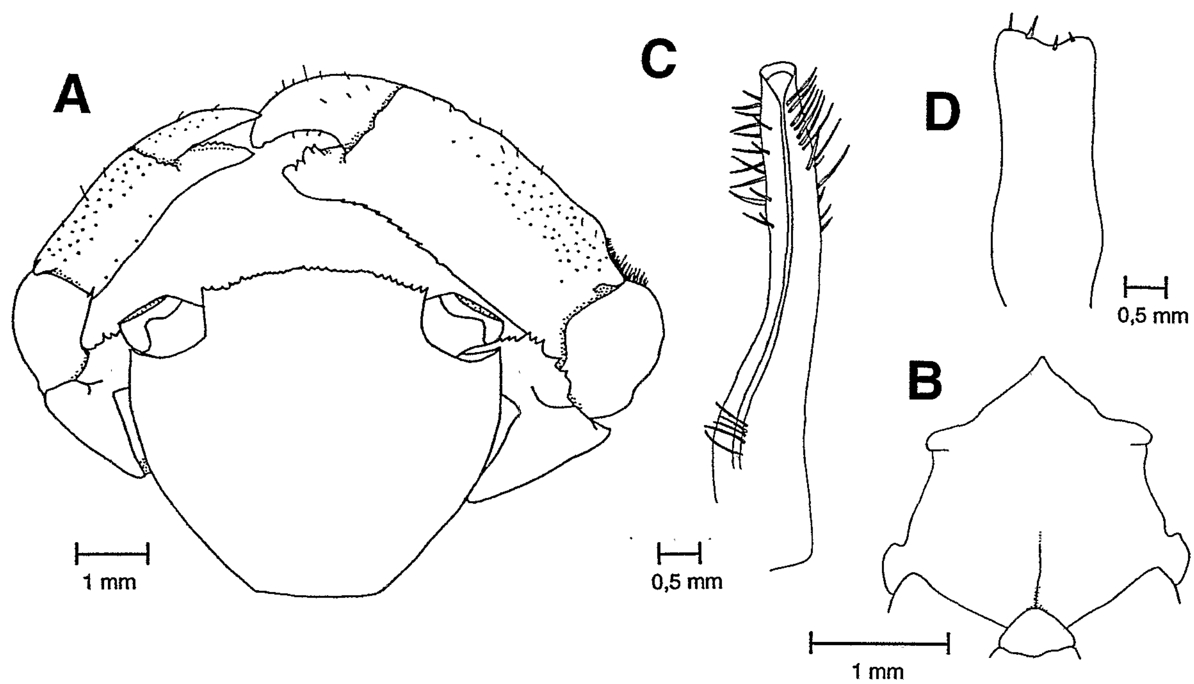


Fig. 1. — *Tetralia vanninii* Galil & Clark, 1988. Male, Tuamotu Archipelago, French Polynesia (MNHN-B 25334) : **A.** dorsal aspect of the carapace, **B.** anterior sternal region, **C.** first pleopod. Female, Tuamotu Archipelago, French Polynesia (MNHN-B 25335) : **D.** endopod of first maxilliped. The eyes were flatenned anteriorly, the result of preservation.

REMARKS. — Specimens from French Polynesia and the Seychelles proved to be morphologically identical to sixteen paratype specimens of *T. vanninii* (BMNH 1986 : 1037). The only difference is in their color pattern since preserved specimens were used in the description of the species (GALIL & CLARK, 1988). The diagnostic red color of the fingers of the chelipeds and the black and blue-green lines across the anterior border of the carapace were missing in the paratypes, which had been preserved for twenty-five years. The preserved specimens used in the description of the species had orange-tipped fingers (of the large cheliped) and a brown band along the anterior border of the carapace.

Similarities in color are more marked between *T. vanninii* and *T. rubridactyla*, where the distal portion of the dactylus of the largest cheliped is orange red (see pl. 1 E *in* CASTRO, 1997). Other details of the color pattern of *T. rubridactyla* are very different from that of *T. vanninii*. The anterior half of the carapace of *T. rubridactyla* is pink-purple and there is no black band along the anterior border. *T. vanninii* is morphogically closer to *T. cinctipes* Paulson. Both have tuberculate chelipeds, the denticulate anterior border of the cheliped merus does not form a prominent crest (pl. 1 A), and the distal border of the endopod of the first maxillipeds is concave (fig. 1 D). They differ in their color pattern.

TETRALOIDES Galil, 1986

Tetraloides heterodactyla (Heller, 1861)

Pl. 1 B

Tetralia heterodactyla Heller, 1861 : 14 (part).
Tetralia heterodactyla fusca Serène, 1959 : 153, fig. 5 C, 6 B (part) ; 1984 : 283, pl. 42, fig. B (part).
Tetraloides heterodactyla – GALIL, 1988b : 174, fig. 8 (part). — GALIL & CLARK, 1988 : 147, figs 1 D, 3 D, 4 D, 4 I, 6 D (full synonymy). — CASTRO, 1997 : 71.
Tetraloides nigrifrons – GALIL, 1986a : 72, figs 1-3 (part) ; 1987 : fig. 4 ?. — POUPIN, 1996 : 58 (list, part). non *Tetraloides nigrifrons* (Dana).

MATERIAL EXAMINED. — **Tuamotu Archipelago.** Marutea, coll. G. SEURAT, 1905 : 1 juv. (MNHN-B 8543). — Moruroa, *Acropora*, 4.1996, coll. J. POUPIN : 1 ♀ (MNHN-B 25323) ; 15 m : 1 ♂ (MNHN-B 25324) ; 10 m : 2 ♂, 2 ♀ (MNHN-B 25325). — Material identified as *Tetralia heterodactyla fusca* by J. S. GARTH : Tikehau, lagoon, st. 10a, 11.4.1956, Smithsonian-Bredin Expedition : 1 ♀ (USNM).

GEOGRAPHICAL DISTRIBUTION. — This is the first record of *T. heterodactyla* from French Polynesia, confirming a wide Indo-west Pacific distribution. Some of the records attributed to *T. nigrifrons* (Dana) by GALIL (1986a) were most probably for *T. heterodactyla* since they were identified before its recognition as a distinct species by GALIL & CLARK (1988).

COLOR. — The color pattern of live individuals (pl. 1 B) has not been previously described. The color of the carapace, however, is not much different from that of preserved specimens : light brown with the anterior border marked by a thin red-brown line followed by a much lighter band (CASTRO, 1997). A very light purplish band was also observed in one individual. The anterolateral borders are brown in some. The light-brown chelipeds are ornamented with red-brown spots, which are arranged as horizontal bands along the dorsal surface. Large black spots as well as smaller brown dots are always observed on the walking legs.

Tetraloides nigrifrons (Dana, 1852)

Tetralia nigrifrons Dana, 1852a : 83 (Honden island = Pukapuka) ; 1852b : 262 ; 1855 : pl. 16, figs 2a (color), b-d.
Tetralia heterodactyla forma *fusca* Patton, 1966 : 290.
Tetralia heterodactyla fusca Serène, 1984 : 283 (part).
Tetralia heterodactyla lissodactyla Serène, 1984 : 283, pl. 42, fig. C
Tetralia heterodactyla – JONES & MORGAN, 1994 : 178 (color photograph).
Tetraloides nigrifrons – GALIL, 1986a : 72 (Raiatea, Makemo, Tikehau ; part). — GALIL & CLARK, 1988 : 149, figs 1 E, 3 E, 4 E, 4 J, 5 B, 6 E (full synonymy). — POUPIN, 1996 : 58 (list, part). — CASTRO, 1997 : 72, pl. 1 F (color photograph).

MATERIAL EXAMINED. — **Society Islands.** Raiatea, 29.4.1957, Smithsonian-Bredin Expedition : 2 ♂, 2 ♀ (USNM).
Tuamotu Archipelago. Takapoto, 8.10.1967, N. G. S. - Smithsonian Bishop Museum Expedition : 1 ♀ (USNM). — Anuanuraro, 1 m, *Acropora*, 4.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 25322). — Material identified as *Tetralia glaberrima* by M. J. RATHBUN : Makemo, 21.10.1899, *Albatross* : 1 ♂, 2 ♀ (USNM 33343). — Material identified as

Tetralia heterodactyla heterodactyla by J. S. GARTH : Tikehau, lagoon, st. 10a, 11.4.1957, Smithsonian-Bredin Expedition : 1 ♀ (USNM).

GEOGRAPHICAL DISTRIBUTION. — Like *T. heterodactyla, T. nigrifrons* is now known across the Indo-west Pacific region from the western Indian Ocean to French Polynesia (CASTRO, 1997). Some of the records for *T. nigrifrons* by GALIL (1986a), however, probably included *T. heterodactyla.*

COLOR. — The carapace of live specimens is white to very light brown (cream) in sharp contrast to the dark-brown anterior and anterolateral borders (CASTRO, 1997). The walking legs are dark brown with large light-brown spots.

REMARKS. — The specimens from Makemo and Tikehau examined by GALIL (1986a) actually belong to *T. nigrifrons*, even when they were identified before the recognition of *T. heterodactyla* as different from *T. nigrifrons* by GALIL & CLARK (1988).

TRAPEZIA Latreille, 1828

Twenty-two species of *Trapezia* have been described so far. As in *Tetralia*, failure to recognize color differences resulted in much ambiguity. The more recent work on the taxonomy of these species has stressed the importance of color in addition to small morphological differences (CASTRO, 1997). All species are symbionts of pocilloporid corals (*Pocillopora, Seriatopora*, and *Stylophora*).

Trapezia areolata Dana, 1852

Pl. 1 C

Trapezia areolata Dana, 1852a : 83 (Tahiti) ; 1852b : 259; 1855 : pl. 15, figs 8 a (color), b. — CANO, 1888 : 173 (Tahiti). — ORTMANN, 1893 : 485 (Tahiti, part). — SERÈNE, 1959 : 149, figs 5 A, 6 C. — FOREST & GUINOT, 1961 : 135, fig. 133 (Hikueru, part). — ODINETZ, 1983 : 31 (French Polynesia) ; 1984a : 443, figs 3 C, 3 c, 4 C (Moorea, Tahiti, Takapoto). — GALIL & LEWINSOHN, 1985b : 286, figs 1, 3, 4 (Tahiti, Pitcairn Island). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — POUPIN, 1996 : 58 (list).
Trapezia cymodoce maculata – RATHBUN, 1907 : 59 (Makemo, part).
Trapezia ferruginea areolata – SENDLER, 1923 : 40 (Tahiti). — SEURAT, 1934 : 59 (list).
Trapezia reticulata – KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — ODINETZ, 1983 : 31, 85, 87, 107, 114, 134, 205, 214, 216, photograph 3 (Moorea, Tahiti, Takapoto). — GUINOT, 1985 : 452 (list). (non *Trapezia reticulata* Stimpson).
Trapezia septata – POUPIN, 1996 : 60 (list). (non *Trapezia septata* Dana).

MATERIAL EXAMINED. — **Society Islands.** Moorea, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9710) ; 1 ♀ (MNHN-B 23037) ; 1 ♂, 1 juv. (MNHN-B 25433-25434). — Tahiti, coll. O. ODINETZ, 1982 : 1 ♂, 1 ♀ (MNHN-B 9708) ; *Pocillopora elegans* : 2 ♂, 1 ♀ (MNHN-B 9709) ; *P. elegans* : 1 ♂, 1 ♀ (MNHN-B 9711) ; 3 ♂, 3 ♀ (MNHN-B 25435-25436).

Tuamotu Archipelago. Takaroa, 12.2.1929, coll. A. W. HERRE : 1 ♂, 1 ♀ (USNM). — Hikueru, 1952, Mission RANSON : 1 ♀ (MNHN-B 16826). — Takapoto, 1982, coll. O. ODINETZ : 2 ♂, 2 ♀ (MNHN-B 9712) ; *Pocillopora verrucosa* : 1 ♂ (MNHN-B 9713) ; 1 ♀, P5-B3 (MNHN-B 22968) ; 20 m : 1 ♂, 1 ♀, E3-B2 (MNHN-B 22969) ; 1 ♂,1 ♀, P5-C1 (MNHN-B 22970) ; 1 ♂, P3-A6 (MNHN-B 22971) ; 1 ♂, 1 ♀, P4-A2 (MNHN-B 22972) ; 10 m : 1 ♂, 1 ♀, E4-A3 (MNHN-B 22973) ; 1 ♂, P5-A2 (MNHN-B 22974) ; 1 ♂, P4-A6 (MNHN-B 22975) ; 1 ♂, 1 ♀, P6-A5 (MNHN-B 22976) ; 11 ♂, 10 ♀, 2 juv. (MNHN-B 25420-25432). — Anuanuraro, 1 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 2 ♀ (MNHN-B 25313). — Material identified as *Trapezia cymodoce maculata* "reticulated variety" by M. J. RATHBUN : Makemo, 21.10.1899, *Albatross* : 1 ♀ (USNM 33351).

Easter Island. Anakena Bay, 9.9.1995, coll. M. RETAMAL : 1 ♂.

GEOGRAPHICAL DISTRIBUTION. — Restricted to southeastern Polynesia, having been recorded only from French Polynesia, Pitcairn Island (GALIL & LEWINSOHN, 1985), and Easter Island.

COLOR. — The carapace, chelipeds, and walking legs in live individuals (pl. 1 C) are light greenish brown (olive green). The dorsal surface of the carapace and chelipeds are ornamented with brown lines that form a honeycomb pattern of large rectangles, squares, and a few circles. The anterior portion of the carapace, both dorsally and ventrally, is brownish. The outer borders of the carapace and segments of the chelipeds are slightly lighter in color. The honeycomb pattern is darker and more defined along the dorsal portion of the cheliped propodus. The fingers are light greenish brown like the rest of the chelipeds. Small brown dots are present on the walking legs. The eyes are dark brown. Small brown dots form the honeycomb pattern on the carapace and chelipeds of small individuals. The honeycomb pattern persists for decades in preserved specimens as orange or orange-brown lines on a light-orange background.

REMARKS. — *T. areolata* has been confused with *T. septata* Dana (and its synonym *T. reticulata* Stimpson), which is known from the Indian Ocean and from Japan as far east as Samoa in the Pacific Ocean (GALIL & LEWINSOHN, 1985b ; CASTRO, 1997). They share a similar honeycomb ornamentation that may be confused in preserved specimens.

T. areolata can be easily distinguished from *T. septata*, however, by the straight anterolateral borders of its carapace in contrast to the rounded edges in *T. septata*. In *T. areolata* the posterior portion of the carapace is much narrower than the anterior border in *T. areolata*, and sparse simple and plumose setae are present along the outer border of the merus, carpus, and propodus of the chelipeds. The acute, spine-like distal edge of the inner angle of the cheliped carpus, which was contrasted with the rounded edge of *T. septata* by GALIL & LEWINSOHN (1985b), actually becomes rounded in the larger specimens of *T. areolata*.The inner suborbital teeth are very acute and curved in small specimens.

Most specimens examined were small, the largest being a male (cw 11.2 mm, cl 9.6 mm ; MNHN-B 9712).

Trapezia bella Dana, 1852

Trapezia bella Dana, 1852a : 83 (Carlshoff island = Aratika) ; 1852b : 254 ; 1855 : pl. 15, fig. 2 (color). — NOBILI, 1907 : 403 (Hao). — SEURAT, 1934 : 59 (list). — FOREST & GUINOT, 1961 : 133, figs 129, 130, 135 a, b (Hikueru) ; 1962 : 70 (list). — KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — ODINETZ, 1983 : 31, 107, 114, 134, 206 (Tahiti, Takapoto). — SERÈNE, 1984 : 278 (full synonymy). — DELESALLE, 1985 : 289 (Mataiva). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — POUPIN, 1996 : 58 (list).
Trapezia digitalis bella – RATHBUN, 1907 : 59 (Tahiti).
non *Trapezia bella* – SERÈNE, 1984 : fig. 187, pl. 38, fig. F. (= *Trapezia formosa* Smith)

MATERIAL EXAMINED. — **Society Islands.** Tahiti, 28.9.1899, *Albatross* : 1 ♂ (USNM 33344). — Tahiti, 1982, coll. O. ODINETZ : 2 ♂, 3 ♀ (MNHN-B 9732). — Takaroa, 12.2.1929 : 2 ♂, 1 ♀ (USNM). — Moorea, Smithsonian-Bredin Expedition : Maharepa Bay, st. 116, 10.5.1957 : 1 ♂ (USNM) ; Nuarei Bay, 12.5.1957 (USNM). — Moorea, *Pocillopora elegans*, 1982, coll. O. ODINETZ : 15 ♂, 16 ♀ , 1 juv. (MNHN-B 9733-9738, 25419).

Marquesas Islands. Atuona Bay, Hiva Oa, 1-5 m, *Pocillopora*, 15.2.1996, coll. J. POUPIN : 4 ♂, 3 ♀ (MNHN-B 22989).

Tuamotu Archipelago. Hao, 1905, coll. G. SEURAT : 1 ♂, 2 ♀ (MNHN-B 16788). — Hikueru, 1952, Mission RANSON : 2 ♂, 2 ♀ (MNHN-B 16787). — Pukapuka, 6.10.1967, N. G. S. - Smithsonian-Bishop Museum Marquesas Expedition : 1 ♀ (USNM). — Takapoto, 1982, coll. O. ODINETZ : 1 ♀ , P5-A5 (MNHN-B 22977) ; 1 ♂, 1 ♀, P3-C1 (MNHN-B 22978) ; 2 ♂, 1 ♀ , P5-A2 (MNHN-B 22979) ; 1 ♂, 1 ♀, A3-C6 (MNHN-B 22980) ; 1 ♂, 1 ♀, P4-A6 (MNHN-B 22981) ; 1 ♀, L1-B10 (MNHN-B 22982) ; 1 ♀, P3-A6 (MNHN-B 22983) ; 1 ♀, P5-C1 (MNHN-B 22984) ; 1 ♂, 1 ♀, P3-A11 (MNHN-B 22985) ; 1 ♂, 1 ♀, P5-B3 (MNHN-B 22986) ; 1 ♂, 1 ♀, P6-A5 (MNHN-B 22987) ; 1 ♂, 1 ♀, P5-A4 (MNHN-B 22988) ; 1 juv. E4-A5 (MNHN-B 23028) ; 1 ♂, 1 ♀, P5-C4 (MNHN-B 23029) ; 1 ♂, 12 ♀ (MNHN-B 25411-25418). — Anuanuraro, *Pocillopora*, 4.1996, coll. J. POUPIN : 3 ♂, 2 ♀ (MNHN-B 25312). — Moruroa, 5 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 25314).

Kiribati. Phoenix Is., Canton (= Kanton), coll. C. P. SCHULTZ : 1 ♂, 1 ♀ (USNM).

GEOGRAPHICAL DISTRIBUTION. — Known only from French Polynesia and the Phoenix Is., Kiribati. Its listing as *T. digitalis bella* from Enewetak atoll, Marshall Is. (GARTH *et al.*, 1987) is most probably a misidentification. Specimens from Réunion, western Indian Ocean identified as *T. formosa* Smith by RIBES (1978) were considered to be identical to *T. bella* by SERÈNE (1984). The Réunion specimens (MHNH-B 8345), however, are light orange and show no trace of dots on the carapace and appendages. Although they are morphologically identical to *T. formosa*, its live color pattern is yet to be described.

COLOR. — The carapace, chelipeds, walking legs, abdomen, and third maxillipeds of live individuals are ornamented with numerous red-brown dots on a light red-brown background. Square, light-brown reticulations are present along the middle portion of the inner surface of the cheliped propodus ; the lower portion is light yellow brown. The fingers are brown ; the eyes dark brown. The red-brown dots remain visible in specimens preserved for decades.

REMARKS. — SERÈNE (1984) concluded that the specimens from French Polynesia identified by NOBILI (1907) as *T. bella* were mistaken with those of *T. speciosa* Dana from the same locality. None of the specimens in question (MNHN-B 16788) conserve any remains of their original color pattern. The two specimens identified by NOBILI as *T. bella*, however, lack the abundant tomentum on the anterior portion of the chelipeds and on the walking legs found in some *T. speciosa* and therefore still present in his *T. speciosa* specimens. Perhaps SERÈNE was confused by NOBILI's statement that in *T. bella* the crabs'color ("dessin" in the original label) harmonizes with that of the coral, which may apply to both species.

The anterolateral borders of the carapace are parallel to each other in juveniles but become rounded in adults. The epibranchial teeth becomes progressively obtuse with size until they disappear in the largest individuals.

This is a small-size species. The largest individual examined was a male (cw 8.6 mm, cl 7.1 mm ; MNHN-B 22989).

Trapezia cymodoce (Herbst, 1801)

Cancer cymodoce Herbst, 1801 : 22, pl. 51, fig. 5.

Trapezia cymodoce – ORTMANN, 1897 : 204 (Tahiti). — SEURAT, 1934 : 59 (list). — PATTON, 1966 : 285. — SAKAI, 1976 : 507, pl. 181, fig. 1 (color), pl. 184, fig. 1 (color photograph). — MIYAKE, 1983 : 139, pl. 47, fig. 1 (color photograph). — ODINETZ, 1984a : 432, figs 1 C, 2 (part). — SERÈNE, 1984 : 272, fig. 179, pl. 38, fig. B (part). — GUINOT, 1985 : 452 (list). — GALIL, 1988b : 161, fig. 1. — GALIL & CLARK, 1990 : 378 (full synonymy, part). — TAKEDA, 1994 : 212, fig. 10 (color photograph). — POUPIN, 1996 : 58 (list). — CASTRO, 1997 : 74, figs 2 A, B, pls 2 A (color photograph), 3 A (color).

Trapezia coerulea Rüppell, 1830 : 27, pl. 5, fig.7. — ODINETZ, 1984a : 438, figs 1 C, 3 A, a, 4 A, a.

Trapezia hirtipes Jacquinot, 1846 : pl. 4, fig. 14 (color)-16. — LUCAS, 1853 : 44 (Nuku Hiva).

Trapezia dentata – DANA, 1852b : 258 (Tahiti) ; 1855 : pl. 15, figs 6 a (color) - d.

? *Trapezia dentata* var *subintegra* Dana, 1852b : 259 (Disappointment Island = Tuamako) ; 1855 : pl. 15, fig. 7 a (color), b.

Trapezia ferruginea – BOONE, 1934 : 171, pl. 88 (French Polynesia ?, part). (non *Trapezia ferruginea* Latreille).

Trapezia guttata – ODINETZ, 1983 : photograph 8.(non *Trapezia guttata* Rüppell).

non *Trapezia cymodoce* – ODINETZ, 1983 : 30, 85, 87, 96, 107, 114, 134, 205, 211, 216, photograph 2 (color). — ODINETZ - COLLART & RICHER DE FORGES, 1985 : 200, 201 (Takapoto, Moorea ?, Tahiti ?). (= *Trapezia ferruginea* Latreille). — JONES & MORGAN, 1994 : 178 (color photograph) (= *Trapezia lutea* Castro)

MATERIAL EXAMINED. — **Tuamotu Archipelago.** 1 ♀ apparent type material of *Trapezia hirtipes* Jacquinot (MNHN-B 2953). — Takapoto, 10-20 m, outer slope, *Pocillopora elegans*, 2.1982, coll. O. ODINETZ : 1 ♀ (MNHN-B 23052).

GEOGRAPHICAL DISTRIBUTION. — Present across the Indo-west Pacific region except the Hawaiian Islands (CASTRO, 1997). It is among the most common species throughout its range. An exception is French Polynesia, where it is apparently very rare.

COLOR. — Dorsal surface of the carapace of live individuals is usually purplish blue but it may vary from brownish blue to light violet (CASTRO, 1977). One row of orange-red dots crosses the upper half of the carapace, curving on each side above the epibranchial tooth (figs 2a, pls 2 A & 3 A *in* CASTRO, 1997). Chelipeds and walking legs are orange. The anterior portion of the carapace tends to be slightly brownish in preserved specimens. Some of the orange-red dots may remain visible after many decades of preservation in alcohol and in dry specimens.

REMARKS. — Many of the earlier records from southeastern Polynesia that were attributed to *T. cymodoce* actually belong to *T. ferruginea* (see synonymy for this species below) or other species. *T. cymodoce* has long been confused with *T. ferruginea* Latreille. Although both species have even been considered synonyms (ODINETZ, 1984a), they can be easily distinguished by color and morphology (CASTRO, 1997). *T. cymodoce* shows a well developed tomentum along the outer border of the propodus of the chelipeds. In addition, there is always a suture between the second and third thoracic sternites, and, except in the largest individuals, the epibranchial teeth are acute.

The French Polynesia specimens identified as *T. cymodoce dentata* by RATHBUN (1907), which is considered a synonym of *T. cymodoce* (GALIL & CLARK, 1990) actually belong to three species : *T. ferruginea, T. guttata*, and *T. serenei.*

Additional material from French Polynesia was also identified as *T. dentata* by DANA (1852b). DANA's specimens are thought to be lost but his color description ("dark ochreous, also brownish, also deep vermilion, also dull purplish blue") and the acute epibranchial teeth shown in his illustration (DANA, 1855) indicate that at least part of the material most probably belonged to *T. cymodoce.* The light - to dark-orange colors used in the illustration, however, are not those given in the description. DANA (1852b) also described from French Polynesia another color variety ("light orange, bordering on flesh-red") as *T. cymodoce* var. *subintegra.* From the illustration, however, it appears close if not identical to *T. cymodoce.*

Photographs given by BOONE (1934) of two specimens attributed to *T. ferruginea* are clearly *T. cymodoce.* The specimens have acute epibranchial teeth, dried tomentum on the chelipeds, and one still shows a row of dots on the dorsal surface of the carapace. BOONE had recorded *T. ferruginea* from French Polynesia and Indonesia but the locality of the specimens was not indicated.

The identities of "*T. cymodoce* sp. 1" and "sp. 2" of ODINETZ (1984b) were never explained. Judging from its color ("jaune orangé"), "*T. cymodoce* sp. 1" is most probably *T. ferruginea* ; "*T. cymodoce* sp. 2" ("rose claire") is *T. serenei* Odinetz. The first species was reported as more common on the outer reef slope, as in the case of *T. ferruginea* (but referred to as *T. cymodoce*) ; the second as more common in the lagoon, as in *T. serenei* (ODINETZ, 1984a).

T. cymodoce was not found in the poorly preserved collection of KROPP & BIRKELAND (1982). These authors also refer to "*T. cymodoce* sp. 1" and "sp. 2." Although they list *T. ferruginea* separately, it is possible this name was used for another species and that the more common "*T. cymodoce* sp. 1" was *T. ferruginea.*

Only two specimens belonging to material supposedly collected from French Polynesia have been identified as *T. cymodoce.* The apparent type specimen of *T. hirtipes* Jacquinot, a species described from French Polynesia (LUCAS, 1853) and long considered a synonym of *T. cymodoce* (SERÈNE, 1984 ; GALIL & CLARK, 1990) is certainly *T. cymodoce.* Remains of the characteristic tomentum can still be seen on the only surviving cheliped of the dry specimen. The tomentum is also shown in the figure given by HOMBRON & JACQUINOT (1842-53).

The second specimen, a large ovigerous female (MNHN-B 23052) collected and identified as "*T. cymodoce* aff. *ferruginea*" by O. ODINETZ is undoubtedly *T. cymodoce. T. coerulea* Rüppell, which is the name used by ODINETZ (1984a) to refer to *T. cymodoce*, however, was never mentioned as occurring in French Polynesia.

Trapezia digitalis Latreille, 1828

Trapezia digitalis Latreille, 1828 : 696. — SENDLER, 1923 : 40 (Makatea). — SERÈNE, 1959 : 129, figs 1, 2 A, pl. 1. — FOREST & GUINOT, 1962 : 70 (list). — PATTON, 1966 : 286. — SAKAI, 1976 : 510, pl. 182, fig. 3 (color). — ODINETZ, 1983 : 31, 197, 199, 206 (Takapoto). — SERÈNE, 1984 : 277 (full synonymy), fig. 185, pl. 38, fig. D. — GUINOT, 1985 : 452 (list). — GALIL, 1988b : 163, fig. 2. — CASTRO, 1996 : 536, fig. 2. — POUPIN, 1996 : 59 (list). — CASTRO, 1997 : 78, pl. 3 B (color).
Trapezia fusca Jacquinot, 1846 : pl. 4, figs 17 (color)-19. — LUCAS, 1853 : 45 (Nuku Hiva).

MATERIAL EXAMINED. — **Marquesas Islands.** Nuku Hiva, *Zélée* : 1 ♂, 1 ♀ (MNHN-B 2951), 1 ♂, 1 ♀ (MNHN-B 2952) type material of *Trapezia fusca* Jacquinot. — Hiva Oa, Puamau Bay, *Pocillopora*, 14.2.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 23030) ; 15.2.1996 : 3 ♂ (MNHN-B 23032). — Fatu Hiva, *Pocillopora*, 16.2.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B23031).

Society Islands. Moorea, 1982, coll. O. ODINETZ : 1 ♀ (MNHN-B 23035).

GEOGRAPHICAL DISTRIBUTION. — Widely distributed throughout the Indo-west Pacific and eastern Pacific regions (SERÈNE, 1984 ; CASTRO, 1996).

COLOR. — The carapace is dark brown. The cheliped propodus is dark brown dorsally (with light-brown reticulations in many individuals) and light brown to dark orange-white (cream) ventrally. The conspicuous tubercle at the base of the dactylus is orange white.

Trapezia ferruginea Latreille, 1828

Trapezia ferruginea Latreille, 1828 : 695. — BOONE, 1934 : 171 (Bora-Bora, Nuku Hiva, Raiatea, Tahiti ; part). — SEURAT, 1934 : 59 (list). — SAKAI, 1976 : 507, pl. 182, fig. 2 (color). — KROPP & BIRKELAND, 1982 : 629 (Moorea). — SERÈNE, 1984 : 273 (full synonymy), fig. 180, pl. 38, fig. C. — GUINOT, 1985 : 452 (list). — GALIL, 1987 : fig. 1 ; 1988b : 164, fig. 3. — PEYROT-CLAUSADE, 1989 : 115 (Moorea). — CASTRO, 1996 : 539, fig. 3. — POUPIN, 1996 : 59 (list). — CASTRO, 1997 : 79, figs 2 E, F.
Trapezia miniata Jacquinot, 1846 : pl. 4, figs 10 (color) - 13. — LUCAS, 1853 : 43 (Nuku Hiva).
Trapezia cymodoce – DANA, 1852b : 257 (Tahiti) ; 1855 : pl. 15, figs 5 a (color)-i. — SENDLER, 1923 : 39 (Tahiti). — ODINETZ, 1983 : 30, 85, 87, 96, 107, 114, 134, 205, 211, 216, photograph 2 (color) (Moorea, Tahiti, Takapoto) ; 1984a : 432, figs 1 A, 1 B, 2 (Moorea, Tahiti, Takapoto ; part). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 200, 201 (Takapoto, Moorea ?, Tahiti ?) non *Trapezia cymodoce* (Herbst)
Trapezia cymodoce dentata – RATHBUN, 1907 : 58 (Bora-Bora, Makemo ; part).
Trapezia cymodoce ferruginea – RATHBUN, 1907 : 58 (Bora-Bora, Fakarava ?, Makemo ; part).
Trapezia ferruginea dentata – SEURAT, 1934 : 59 (list).
? *Trapezia cymodoce* sp. 1 – KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — ODINETZ, 1984b : 124 (Moorea, Tahiti, Takapoto).
non *Trapezia ferruginea* – DANA, 1852b : 260 (Tahiti, part) ; 1855 : pl. 16, figs 1 a (color), b. — FOREST & GUINOT, 1961 : 136, figs 137 a, b (Tahiti). — JONES & MORGAN, 1994 : 178 (= *Trapezia serenei* Odinetz)
non *Trapezia ferruginea* – BOONE, 1934 : pl. 88 (French Polynesia ?) = *Trapezia cymodoce* (Herbst).

MATERIAL EXAMINED. — **Marquesas Islands.** Nuku Hiva : 1 ♂, 1 ♀ (MNHN-B 2956) ; 2 ♂ (MNHN-B 2959) apparent type material of *Trapezia miniata* Jacquinot. — Ua Huka, Hane Bay, *Pocillopora*, 14.2.1996, coll. J. POUPIN : 2 ♂, 1 ♀ (MNHN-B 22990). — Hiva Oa, Puamau Bay, *Pocillopora*, 14.2.1996, coll. J. POUPIN : 3 ♂, 2 ♀ (MNHN-B 22991) ; 15.2.1996 : 8 ♂, 3 ♀ (MNHN-B 22992). — Fatu Hiva, 7 m, 25.9.1967, N. G. S.- Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂, 2 ♀ (USNM). — Fatu Hiva, *Pocillopora*, 16.2.1996, coll. J. POUPIN : 1 ♂, 1 ♀ (MNHN-B 22993).

Society Islands. Coll. G. GARRETT : 2 ♂, 2 ♀ (USNM 84383). — Bora-Bora, fringing reef, 17.11.1899, *Albatross* : 1 ♂ (USNM 33363). — Tahiti, coll. DUBOIS : 1 ♂ (MNHN-B 2929) ; 1 ♀ (MNHN-B 2942). Tahiti, 21-27 m, 7.9.1967, N. G. S.- Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂, 1 ♀ (USNM). — Tahiti, 3.1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9671) ; 2 ♂, 1 ♀ (MNHN-B 9673) ; 6 ♂, 7 ♀ (MNHN-B 25536-25540). — Moorea, *Pocillopora elegans*, 2.6.1980, coll. R. KROPP & C. BIRKELAND : 1 ♂, 1 ♀ (USNM 277763) ; 1.7.1980 : 1 ♂, 1 ♀ (USNM

277764). — Moorea, 1982, coll. O. ODINETZ : 3 ♂, 3 ♀ (MNHN-B 23034) ; *P. elegans*, 4.1982 : 1 ♂, 1 ♀ (MNHN-B 9670) ; 1 ♂, 1 ♀ (MNHN-B 9672) ; 4 ♂, 2 ♀ (MNHN-B 25541-25542). — Raiatea, Uturoa, st. 75, 28.4.1957, Smithsonian-Bredin Expedition : 1 ♂ (USNM). — Bora-Bora, 1957, Smithsonian-Bredin Expedition : 1 ♀ (USNM). — Material identified as *Trapezia cymodoce dentata* by M. J. RATHBUN : Bora-Bora, fringing reef, 17.11.1899, *Albatross* : 1 ♀ (USNM 33357).

Tuamotu Archipelago. Makemo, 21.10.1899, *Albatross* : 1 ♂, 1 ♀ (USNM 33338). — Tikehau, lagoon, st. 10a, 11.4.1957, Smithsonian-Bredin Expedition : 1 ♂, 1 ♀ (USNM). — Pukapuka, 6.10.1967, N.G.S.-Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂, 1 ♀ (USNM). — Takapoto, 20 m, *P. elegans*, 2.1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9674) ; 1 ♂, 1 ♀ (MNHN-B 9675) ; 1982 : 1 ♂, 1 ♀, P5-A3 (MNHN-B 22943) ; 1 ♂, 1 ♀, E4-A3 (MNHN-B 22944) ; 1 ♀, L1-C2, G4 (MNHN-B 22945) ; 20 m : 1 ♂, 1 ♀, E3-A2 (MNHN-B 22946) ; 1 ♂, 1 ♀, P3-C1 (MNHN-B 22947) ; 1 ♂, 1 ♀, A3-C6 (MNHN-B 22948) ; 1 ♂, 1 ♀, L1-B3 (MNHN-B 22949) ; 1 ♂, 1 ♀, P3-A6 (MNHN-B 22950) ; 1 ♂, 1 ♀, P6-A5 (MNHN-B 22951) ; 10 m : 1 ♂, E2-C2 (MNHN-B 22952) ; 1 ♂, P5-C1 (MNHN-B 22953) ; 1 ♂, P4-A2 (MNHN-B22945) ; 22 ♂, 18 ♀, 2 juv. (MNHN-B 25513-25535). — Material identified as *Trapezia cymodoce dentata* by M. J. RATHBUN : Makemo, 21.10.1899, *Albatross* : 1 ♀ (USNM 33354).

GEOGRAPHICAL DISTRIBUTION. — Common across the Indo-west Pacific and eastern Pacific regions (CASTRO, 1996; 1997).

COLOR. — Live individuals have a brownish orange carapace and walking legs. A thin, light-orange band is present along the anterior border of the carapace and the anterior, distal borders of the merus and carpus of the chelipeds. Preserved specimens turn light orange, often with the anterior borders of the carapace and merus of the chelipeds dark orange. A characteristic color feature is the presence of an orange-red spot at the distal end of the propodus of the walking legs, which remains visible for many decades. The color pattern is identical to that described for specimens from the eastern Pacific (CASTRO, 1996) and Coral Sea (CASTRO, 1997) regions.

REMARKS. — Some workers have confused *T. ferruginea* with *T. cymodoce* (Herbst) although there are clear morphological and color differences between them (CASTRO, 1997). *T. ferruginea* lacks a conspicuous tomentum along the complete outer border of the propodus of the chelipeds and, except in juveniles and very small adults, the suture between the second and third thoracic sternites is incomplete or absent and the epibranchial teeth are obtuse, not acute as in *T. cymodoce*. Although BOONE (1934) was aware of these morphological differences, photographs of two specimens identified as *T. ferruginea* are actually *T. cymodoce*. Most if not all specimens from French Polynesia that were identified as *T. cymodoce* by ODINETZ (1983) were also *T. ferruginea*.

Trapezia flavopunctata Eydoux & Souleyet, 1842

Trapezia flavopunctata Eydoux & Souleyet, 1842 : 230, pl. 2, fig. 3. — ORTMANN, 1893 : 485 (Tahiti). — FOREST & GUINOT, 1961 : 136, figs 138 a, b (Hikueru). — SAKAI, 1976 : 510, pl. 182, fig. 4 (color). — ODINETZ, 1983 : 34, 205 (as "*T. flavomaculata*") (Tahiti). — SERÈNE, 1984 : 276 (full synonymy), fig. 183, pl. 42, fig. A. — GALIL & LEWINSOHN, 1985a : 210 (full synonymy ; Moorea, Tahiti). — GUINOT, 1985 : 452 (list). — POUPIN, 1996 : 59 (list).
Trapezia rufopunctata flavopunctata – SEURAT, 1934 : 59 (list).
Trapezia areolata – FOREST & GUINOT, 1961 : 135, fig. 133 (Hikueru, part). (non *Trapezia areolata* Dana).
Trapezia latifrons A. Milne Edwards, 1867 : 281.

MATERIAL EXAMINED. — **Hawaiian Islands.** 1838, coll. F. EYDOUX & F. A. SOULEYET : 1 ♀ type (MNHN-B 2968).

Tuamotu Archipelago. Hikueru, 1952, Mission RANSON : 1 ♀ (MNHN-B 16827).

Society Islands. Moorea, pass to Papetoai Bay, outer barrier reef, 21 m, 15.5.1957, coll. J. E. RANDALL, Smithsonian-Bredin Expedition : 2 ♂ (USNM). — Moorea, 1982, coll. O. ODINETZ : 2 ♂ (MNHN-B 23038). — Tahiti : 4 ♂, 1 ♀ (RMNH D 1337) ; *Pocillopora elegans* & *P. eydouxi*, 1982, coll. O. ODINETZ : 2 ♂, 5 ♀ (MNHN-B 9745).

GEOGRAPHICAL DISTRIBUTION. — Found throughout the Indo-west Pacific region (CASTRO, 1997).

COLOR. — Large yellow spots on a red background. Orange-red markings remain visible for decades at the base of each of the epibranchial teeth and along the anterior border of the carapace and segments of the chelipeds.

REMARKS. — This species is characterized by large individuals. A carapace width of 26.0 mm was measured in a female from Mauritius, western Indian Ocean (MNHN-B 16539). In contrast to *T. rufopunctata* (Herbst), another large-size species with spots, the frontal teeth are not acute but rounded (see GALIL & LEWINSOHN, 1985a).

Trapezia globosa sp. nov.

Fig. 2 A-D ; Pl. 1 D

Trapezia formosa – KROPP & BIRKELAND, 1982 : 629 (Takapoto). — ODINETZ, 1983 : 31, 85, 107, 114, 134, 206, 214, photograph 4 (Moorea, Tahiti, Takapoto). — DELESALLE, 1985 : 289 (Mataiva). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — POUPIN, 1996 : 59 (list). (non *Trapezia formosa* Smith)

MATERIAL EXAMINED AND TYPES. — **Marquesas Islands.** Hiva Oa, Atuona Bay, 9°45'S, 139°00'W, 1-5 m, *Pocillopora*, 15.2.1996, coll. J. POUPIN : 1 ♂ holotype, cw 7.0 mm, cl 5.7 mm (MNHN-B 25293) ; 1 ♀ allotype, cw. 6.6 mm, cl. 5.0 mm (MNHN-B 25294).

Tuamotu Archipelago. Anuanuraro, 20°25'S, 143°30'W, 1 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 1 ♂ paratype, cw 5.0 mm, cl 4.1 mm ; 2 ovigerous ♀ paratypes, cw 5.4, 6.5 mm, cl 3.9, 4.9 mm (MNHN-B 25295) ; 2 ♂ paratypes, cw 3.8, 4.0 mm, cl 3.2, 3.3 mm ; 1 ovigerous ♀ paratype, cw 5.3 mm, cl 4.2 mm (USNM 282636).

Marquesas Islands. Hiva Oa, Atuona Bay, 9°45'S, 139°00'W, 1-5 m, *Pocillopora*, 15.2.1996, coll. J. POUPIN : 3 ♂, cw 5.7-6.2 mm, cl 4.8-4.9 mm, 3 ♀, cw 5.1 mm, cl 3.9-6.4 mm (width distorted by bopyrid parasite in two largest females) (MNHN-B 25321).

Society Islands. Tahiti, 17°32'S, 149°34'W, 1982, coll. O. ODINETZ : 1 ♂, cw 4.3 mm, cl 3.4 mm, 3 ovigerous ♀ , cw 4.5-7.2mm, cl 3.4-5.3 mm (MNHN-B 9744) ; 1 ♀, cw 3.7 mm, cl 3.1 mm (MNHN-B 25543) ; 1 ♀, cw 4.1 mm, cl 3.3 mm (MNHN-B 25544) ; 1 ♀, cw 2.8 mm, cl 2.2 mm (MNHN-B 25545).

Tuamotu Archipelago. Takapoto, 14°35'S, 145°13'W, *P. bulbosa*, 1982, coll. O. ODINETZ : 3 ♂, cw 2.3-6.7 mm, cl 1.9-5.5 mm, 3 ovigerous ♀, cw 3.2-7.4 mm, cl 2.5-5.5 mm (MNHN-B 9739) ; 2 ♂, cw 4.1, 5.5 mm, cl 3.5, 4.4 mm, 1 ovigerous ♀, cw 6.7 mm, cl 4.4 mm (MNHN-B 9740) ; 1 ♂, cw 5.3 mm, cl 4.3 mm, 2 ovigerous ♀, cw 5.3, 5.7 mm, cl 4.2, 4.4 mm (MNHN-B 9741) ; 6 ♂, cw 3.6-5.3 mm, cl 2.9-4.4 mm, 6 ♀ (4 ovigerous), cw 2.0-5.0 mm, cl 1.7-3.7 mm (MNHN-B 9742) ; 5 ♂, cw 4.2-5.0 mm, cl. 3.5-4.1 mm, 6 ♀ (3 ovigerous), cw 3.7-5.3 mm, cl 2.9-4.1 mm (MNHN-B 9743) ; 1 ovigerous ♀, cw 4.0 mm, cl 3.3 mm (MNHN-B 25296) ; 2 ♂, cw 3.4, 4.0 mm, cl 2.8, 3.3 mm (MNHN-B 25297) ; 1 ♂, cw 3.6 mm, cl. 3.0 mm, 1 ovigerous ♀, cw. 4.0 mm, cl. 3.2 mm (MNHN-B 25298) ; 1 ♂, cw 2.5 mm, cl 2.0 mm, 1 ovigerous ♀, cw 2.4 mm, cl 2.0 mm, 1 juv., cw 1.5 mm, cl 1.8 mm (MNHN-B 25299). 1 ovigerous ♀, cw 5.2 mm, cl 4.2 mm (MNHN-B 25546) ; 1 ♂, cw 3.5 mm, cl 3.0 mm (MNHN-B 25547) ; 3 ♂, cw 2.3-4.1 mm, cl 1.8-3.2 mm, 2 ovigerous ♀, cw 2.0, 4.1 mm, cl 2.1, 3.3 mm (MNHN-B 25548). — Anuanuraro, 1 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 2 ♂, cw 5.0, 5.6 mm, cl 4.2, 4.8 mm, 1 ovigerous ♀, cw 4.1 mm, cl 3.3 mm (MNHN-B 25315).

ETYMOLOGY. — From the Latin *globus* meaning ball or sphere, in reference to the conspicuously spherical carapace.

DESCRIPTION OF HOLOTYPE. — Carapace (fig. 2a) smooth, shiny, and slightly convex dorsally. Anterolateral borders of carapace markedly curved and smooth, without epibranchial tooth or notch. Postorbital angles and inner suborbital teeth obtuse. Frontal border wide, very slightly arched, and cut into two barely demarcated supraorbital angles and two nearly straight lobes separated from each other by shallow central depression. Supraorbital angles with few microscopic teeth; median lobes with small teeth.

No suture or scar between second and third thoracic sternites (fig. 2b). Third maxillipeds subrectangular. Ischium of endopod with scattered punctae but no granules. Abdomen with five complete segments.

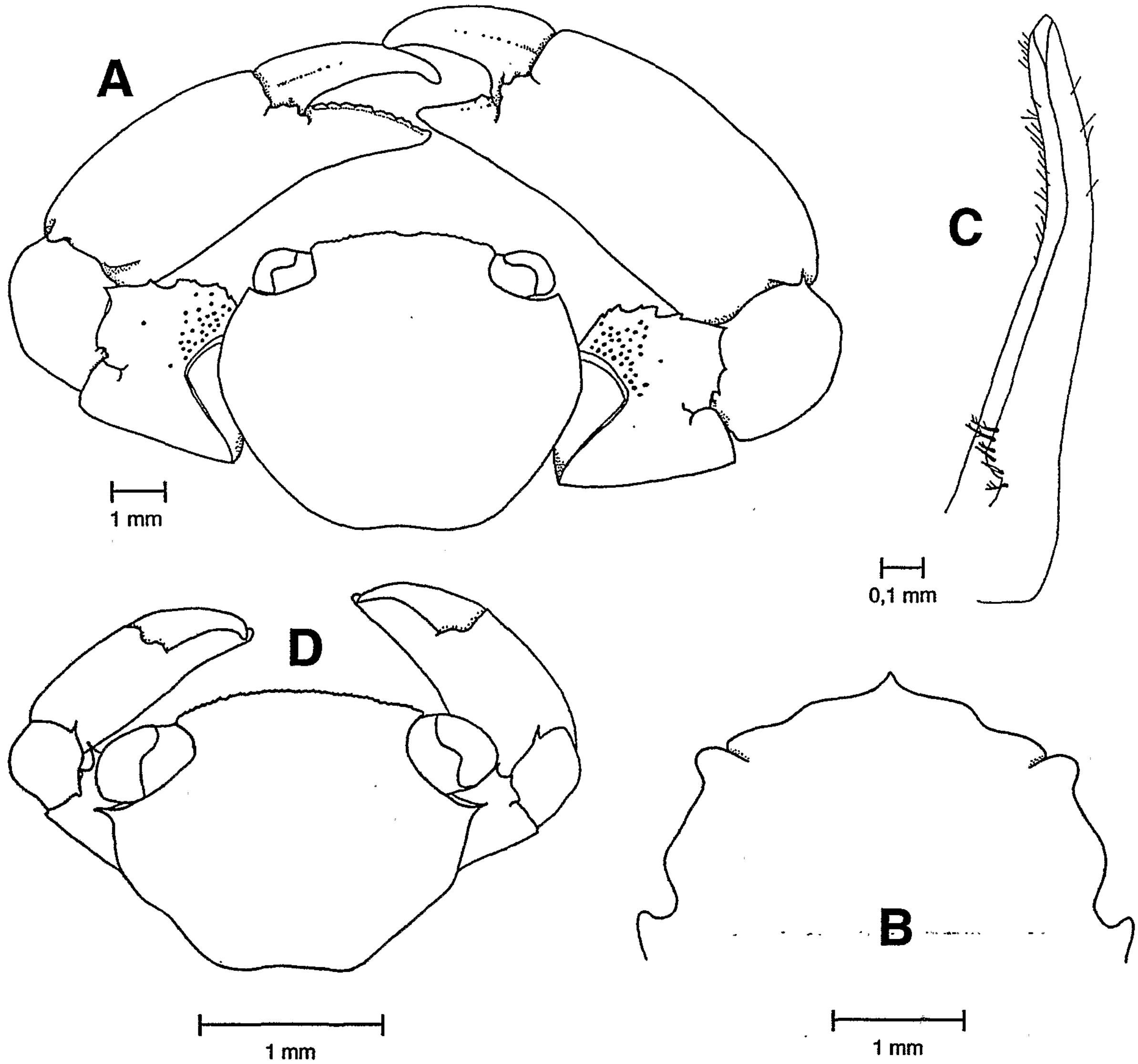


Fig. 2. — *Trapezia globosa* sp. nov., ♂ holotype, Marquesas Islands, French Polynesia (MNHN-B 25293) : **A.** dorsal aspect of the carapace, **B.** anterior sternal region, **C.** first pleopod. Juvenile, Takapoto, French Polynesia (MNHN-B 25299) : **D.** dorsal aspect of the carapace.

Chelipeds unequal and conspicuously thick. Both meri armed with six to seven unequal teeth. Dorsal surface of merus with numerous round, shallow granules along anterior, proximal region. Proximal angle on anterior border of carpus smooth, without tooth. No setae along outer border of chelipeds. Upper border of propodus rounded ; lower border cristate and smooth. Fingers thick and slightly curved. Dactylus and immovable finger of largest (right) cheliped each armed with rounded tooth ; dactylus of smallest cheliped with several small teeth and cutting edge, immovable finger with cutting edge.

Merus of walking legs laterally flattened with cristate dorsal border. Lower border of propodus with few short setae distally. Upper border of dactylus with numerous short setae. Distal end of dactylus curved with horny ridges at tip ; inner (posterior) border of fourth walking leg with several thick, horny setae and, proximally, four horizontal rows of simple setae.

First pleopod (fig. 2 C) short, tapered distally, and with rounded, slightly asymmetrical apex. Short, thin setae distally ; thicker, plumose setae with few setules proximally.

GEOGRAPHICAL DISTRIBUTION. — Known only from French Polynesia.

COLOR. — Live individuals (pl. 1 D) have a red-brown carapace. A thin, slightly lighter red-brown line borders the margin of the carapace. The line is particularly obvious along the anterior and posterior borders. The anterior portion of the carapace may be slightly darker ; the central (metagastric) region lighter, almost tan, in some of the smaller individuals. There are otherwise no distinctive dots or spots. The ventral portion of the carapace is red brown, the thoracic sternites yellowish tan, and the abdomen red brown. The inner surface of the cheliped propodus is dark red-brown dorsally, gradually turning light yellowish-brown along the ventral border. Dark red-brown irregular reticulations may be present on the outer and inner surface of the propodus. The fingers are dark red brown ; the inner portion of the fixed finger is usually light tan. The walking legs are red brown. Preserved specimens gradually become light orange-brown but some turn grayish brown.

MORPHOLOGICAL VARIATION. — Juveniles (fig. 2 D) and very small adults have an acute postorbital angle and an acute tooth on the distal angle of the anterior border of the cheliped carpus. The postorbital angle becomes obtuse with increasing size. The acute tooth on the carpus disappears but an obtuse, often conspicuous tooth develops at the proximal angle. The teeth on the cheliped merus are much more acute in juveniles as in other species of *Trapezia*.

Maximum size among the 74 specimens that were measured was recorded in a female (cl. 6.4 mm ; MNHN-B 25321). The width of its carapace, however, was distorted by a bopyrid parasite (pl. 1 D). Largest male examined was the holotype (cw 7.0 mm, cl 5.7 mm ; MNHN-B 25293). As in other species of *Trapezia*, most females were ovigerous. Exceptional in *T. globosa* is that females become ovigerous at a very small size. The smallest ovigerous female among the specimens examined had a carapace width of only 2.0 mm (MNHN-B 25548).

REMARKS. — *T. globosa* is unique in the genus *Trapezia* for having a carapace that lacks epibranchial teeth or notches in adults as well as in juveniles (figs 1 A & 1 C). There was no evidence of even a notch in the smallest specimen examined, a juvenile with a carapace width of only 1.5 mm (MNHN-B 25299).

T. globosa is close to six other species characterized by a small size, carapace with rounded edges, reduced or absent epibranchial teeth, and thick, bulky chelipeds. All of these species can be best differentiated by their color pattern.

T. formosa Smith, 1869, from the eastern Pacific (CASTRO, 1982, 1996) and the Coral Sea (CASTRO, 1997), is bright reddish orange, with the inner surface of the propodus of the chelipeds reddish orange dorsally and orange-yellow ventrally. Dark-orange reticulations are also present on the inner surface of the chelipeds in many individuals. *T. formosa* also differs from *T. globosa* in the presence of epibranchial teeth in juveniles and small adults, and notches that are visible in all but the largest individuals. The frontal border of the carapace is divided into two clearly demarcated supraorbital angles and four rounded median lobes in *T. formosa* (figs 4 A & 4 B in CASTRO, 1996), whereas it almost straight in *T. globosa*. The anterolateral edges of the carapace are less rounded in large adults of *T. formosa* than those of *T. globosa*. Fully-grown individuals of *T. formosa* are slightly larger than *T. globosa*, the largest recorded specimen had a carapace width of 12.4 mm (CASTRO, 1996). *T. formosa* is also found in the western Indian Ocean (RIBES, 1978 ; SERÈNE, 1984 as *T. bella*). Its color has only been described as bright orange (RIBES, 1978).

Three other small-size species, *T. areolata*, *T. bella*, and *T. speciosa*, are also present in French Polynesia. The carapace, chelipeds, and walking legs of *T. bella* are light red-brown with numerous, small red-brown dots. Juveniles show an epibranchial tooth on each side of the carapace, becoming obtuse within creasing size. A notch remains in most of the largest specimens. The notch is barely noticeable in some, however, so that the carapace may resemble that of *T. globosa*. One morphological difference is that the anterior border of the carapace of *T. bella* is divided into four shallow but identifiable lobes.

The carapace and chelipeds of *T. speciosa* are ornamented with a characteristic pattern of irregular dark-red lines. Also diagnostic is the tomentum on the walking legs and the proximal portion of the chelipeds that is present in many individuals.

Also present in southeastern Polynesia are *T. areolata* and *T. digitalis*. Members of these species are of a relatively small size but, in contrast to *T. globosa*, both have anterolateral sides that are straight, almost parallel to each other. In *T. areolata* the epibranchial tooth is always present (always acute except in the largest individuals), whereas it is present as an acute tooth in the juveniles and small adults (obtuse tooth or notch in most large adults) in *T. digitalis* (see figs 2 & 5 *in* SERÈNE, 1959 and fig. 2 *in* CASTRO, 1996). The carapace of *T. digitalis* is uniformly dark brown and in *T. areolata* light greenish brown ornamented with a honeycomb-like network of dark-brown lines.

Two other small-size species are not known from southeastern Polynesia. *T. cheni* Galil, described from Taiwan, is orange yellow with the anterior and lateral portions of the carapace brownish red (GALIL, 1983). The chelipeds are deep red, with a white tubercle on the upper proximal portion of the dactylus. As in *T. globosa*, there is no tooth or notch on each side of the carapace and the anterior border of the carapace is nearly straight. It is not known if there are epibranchial teeth in juveniles. The anterolateral sides of the carapace, however, are markedly less rounded in *T. cheni* than in *T. globosa*.

The carapace of *T. garthi* Galil, also from Taiwan, has "irregular rounded areolae enclosed in thick net of magenta" on the dorsal surface of the carapace (GALIL, 1983). The sides of the carapace, which is less rounded than in *T. globosa*, are marked by a notch.

T. globosa is known only from French Polynesia. It may occur in other locations, however, but overlooked because of its small size and the possibility that, like *T. formosa* in the eastern Pacific (CASTRO, 1996), an inhabitant of areas deep in coral colonies, very small colonies, and live coral fragments that are rarely sampled. *T. globosa* has been found in *Pocillopora verrucosa* colonies taken from the lagoon at Takapoto atoll (KROPP & BIRKELAND, 1982) and from *P. verrucosa* and *P. elegans* colonies exposed to heavy wave action at the barrier reef outer slope and reef flat of Takapoto atoll and the islands of Moorea and Tahiti (ODINETZ, 1983 ; ODINETZ - COLLART & RICHER DE FORGES, 1985).

Trapezia guttata Rüppell, 1830

Trapezia guttata Rüppell, 1830 : 27. — HELLER, 1865 : 25 (Tahiti). — FOREST & GUINOT, 1961 : 136, figs 134, 139 a, b (Hikueru, Tahiti) ; 1962 : 70 (list). — SAKAI, 1976 : 508, fig. 270, pl. 183, fig. 3 (color). — MIYAKE, 1983 : 139, pl. 47, fig.2 (color photograph). — ODINETZ, 1983 : 30, 65, 85, 87, 96, 134, 197, 199, 205, 211 (Moorea, Tahiti, Takapoto) ; 1984a : 442 (Moorea, Tahiti). — SERÈNE, 1984 : 271 (full synonymy), fig. 178, pl. 38, fig. A. — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 200, 201 (Moorea ?, Tahiti ?). — GALIL, 1988b : 166, fig. 4. — PEYROT-CLAUSADE, 1989 : 111, 113 (Tikehau). — GALIL & CLARK, 1990 : 381 (full synonymy). — JENG, 1994 : 317, fig. 6 B (color photograph). — TAKEDA, 1994 : 212, fig. 4 (color photograph). — POUPIN, 1996 : 59 (list). — CASTRO, 1997 :82, pls. 2 B (color photograph) & 4 (color).

Trapezia davaoensis Ward, 1941 : 14, fig. 27. — KROPP & BIRKELAND, 1982 : 629 (Moorea). — GUINOT, 1985 : 452 (list).

Trapezia ferruginea – DANA, 1852b : 260 (part) ; 1855 : pl. 16, fig. 1b (color). (non *Trapezia ferruginea* Latreille).

Trapezia cymodoce dentata – RATHBUN, 1907 : 58 (Fakarava, Rangiroa ; part).

Trapezia cymodoce ferruginea – RATHBUN, 1907 : 58 (Bora-Bora, Rangiroa ; part).

Trapezia ferruginea forma *guttata* – SEURAT, 1934 : 59 (list). — PATTON, 1966 : 285.

Trapezia sp. – COLIN & ARNESON, 1995 : 214, fig.1009 (color photograph).

non *Trapezia guttata* – ODINETZ, 1983 : photograph 8 (color) = *Trapezia cymodoce* (Herbst).

MATERIAL EXAMINED. — **Philippine Islands.** Mindanao : 1 ♂, 1 ♀ paratypes of *Trapezia davaoensis* Ward (MNHN-B 16783).

Society Islands. Tahiti, 1952. Mission RANSON : 1 ♀ (MNHN-B16912). — Tahiti, *Pocillopora damicornis*, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9707) ; 1 ♂, 1 ♀ , 8-BB5 (0604) (MNHN-B 23001) ; 1 ♂, 1 ♀, 8-A3 (0604) (MNHN-B 23002) ; 1 ♂, 1 ♀, 2-D4 (0804) (MNHN-B 23003) ; 1 ♀, beach B5 (9.4) (MNHN-B 23004) ; 1 ♀, L1-C2 (G4) (MNHN-B 23005) ; 19 ♂, 17 ♀, 2 juv. (MNHN-B 25437-25450). — Arue, Tahiti, 1993, coll. C. HILY : 1 ♂ (MNHN-B 25320). Moorea, Hauru Point, st. 105, 8.5.1957, Smithsonian-Bredin Expedition : 1 ♂, 1 ♀ (USNM). — Moorea, 30.6.1980, coll. R. KROPP & C. BIRKELAND : 1 ♂, 1 ♀ (USNM 277765) ; *P. elegans*, 3.7.1980 : 1 ♂, 1 ♀ (USNM 277761) ; *P. damicornis* 3.7.1980 : 1 ♂, 1 ♀ (USNM 277771) ; 4.7.1980 : 1 ♂, 1 ♀ (USNM 277768). — Moorea, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀, MV-A1 (MNHN-B 22995) ; 1 ♂, 1 ♀, OPU-E5(1) (MNHN-B 22996) ; 4 ♂, 1 ♀, OPU-D3-5 (MNHN-B 22997) ; 1 ♂, 1 ♀, MV-A8 (MNHN-B 22998) ; 1 ♀, OPU-E1 (1) (MNHN-B 22999) ; 2 ♀, OPU-F1 (1)

(MNHN-B 23000) ; 6 ♂, 9 ♀ (MNHN-B 25451-25455, 25549). — Smithsonian-Bredin Expedition : Bora-Bora, Motu Tapu I., st. 62, 25.4.1957 : 1 ♂ (USNM) ; Raiatea, Uturoa, st. 75, 28.4.1957 : 10 ♂, 12 ♀ (USNM) ; Huahine, Bourayne Bay, st. 88, 1.5.1957 : 1 ♂, 1 ♀ (USNM). — Bora-Bora, 28.8.1978, coll. E. TARVYD : 1 ♂ (LACM).

Tuamotu Archipelago. Hikueru, 1952, Mission RANSON : 1 ♂, 2 ♀, 1 juv. (MNHN-B 16913). — Tikehau, Maiai I., st. 26 c, Smithsonian-Bredin Expedition : 1 ♂ (USNM). — Material identified as *Trapezia cymodoce dentata* by M. J. RATHBUN : Rangiroa, beach, 23.9.1899, *Albatross* : 1 ♂ (USNM 33356) ; Fakarava, outer reef, 12.10.1899, *Albatross* : 1 ♂ (USNM 33355). — Material identified as *Trapezia cymodoce ferruginea* by M. J. RATHBUN : Rangiroa, Mohican reef, 23.9.1899, *Albatross* : 1 ♂, 1 ♀ (USNM 33361).

French Polynesia (unspecified location). *P. damicornis*, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9706).

GEOGRAPHICAL DISTRIBUTION. — Known from numerous locations across the Indo-west Pacific region except the Hawaiian Islands.

COLOR. — The carapace is white to orange white (cream) with a thin red-brown line across the anterior border. The tips of the postorbital angles and epibranchial teeth are red brown to brown.The walking legs are light brown with red-brown spots. Some of the color features remain for some time in preserved specimens (see CASTRO, 1997).

Trapezia lutea Castro, 1997

Trapezia lutea Castro, 1997 : 84,figs 2 C, 2 D, 3, pls 2 C (color photograph) & 5 A (color).
Trapezia cymodoce – BOONE, 1934 : 168, pl. 87. — JENG, 1994 : 315, fig. 5 (color photograph). — JONES & MORGAN, 1994 : 178 (color photograph). Non *Trapezia cymodoce* (Herbst)

MATERIAL EXAMINED. — **Society Islands.** Moorea, 1982, coll. O. ODINETZ : 1 ♂ (cw 4.4 mm, cl 3.5 mm), 1 ♀ (cw 6.5 mm, cl 5.2 mm) (MNHN-B 25332).

GEOGRAPHICAL DISTRIBUTION. — It has so far been reported from locations across the Indian Ocean and from Japan to the Coral Sea (CASTRO, 1997).

COLOR. — The carapace, chelipeds, and walking legs are orange in live individuals, orange to yellow-orange in preserved specimens (CASTRO, 1997).

REMARKS. — *T. lutea* can be best described as intermediate between *T. cymodoce* and *T. ferruginea.* It has a conspicuous tomentum along the entire outer surface of the propodus of the chelipeds as in *T. cymodoce*, while fully-grown individuals share the rounded anterolateral borders of the carapace, obtuse epibranchial teeth, and incomplete or absent thoracic suture of *T. ferruginea* (CASTRO, 1997).

Only two small specimens, a male and an ovigerous female, were supposedly collected in southeastern Polynesia. Thick setae, many of which are plumose, cover not only the outer surface of the chelipeds but the inner border of the propodus and the walking legs as well. Both specimens are orange but dark-brown granules are present along the anterior and lateral borders of the carapace, eyestalks, and chelipeds of the male. The distal edge of the propodus of the walking legs is darker orange.

Trapezia punctimanus Odinetz, 1984
Pl. 1 E

Trapezia punctimanus Odinetz, 1983 : 35, 107, 114, 134, 206, 214, photograph 7 (Tahiti, Takapoto) ; 1984a : 445, figs 3 E, 3 e, 4 E (Tahiti, Takapoto). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — POUPIN, 1996 : 60 (list).
Trapezia cymodoce ferruginea – RATHBUN, 1907 : 58 (Rangiroa, Easter Island ; part).
Trapezia cymodoce – GARTH, 1973 : 321 (Easter Island). non *Trapezia cymodoce* (Herbst).

Trapezia ferruginea – GARTH, 1973 : 322 (Easter Island). (non *Trapezia ferruginea* Latreille).

MATERIAL EXAMINED. — **Tuamotu Archipelago.** Takapoto, 30 m, *Pocillopora elegans*, 1982, coll. O. ODINETZ : 1 ♂ holotype (MNHN-B 9717). — Takapoto, 1982, coll. O. ODINETZ : 8 ♂, 8 ♀ (MNHN-B 9718-9724) ; 1 ♂, 1 ♀, E2-C2 (MNHN-B 22966) ; 1 ♂, 1 ♀, E3-A6 (MNHN-B 22967) ; 2 ♂, 2 ♀ (MNHN-B 25456-25457). — Fangataufa, 10 m, *Acropora* ?, 2.1996, coll. SMSRB divers : 2 ♂, 2 ♀ (MNHN-B 22994). — Moruroa, *Pocillopora*, 4.1996, coll. J. POUPIN : 1 ♂, 2 ♀ (MNHN-B 25317). — Material identified as *Trapezia cymodoce ferruginea* by M. J. RATHBUN : Rangiroa, Mohican reef, 23.9.1899, *Albatross* : 1 ♂ (USNM 33358). — Material identified as *Trapezia ferruginea* by J. S. GARTH : Raraoia, coll. J. P. E. MORRISON : 1 ♂, 1 ♀ (USNM).

Society Islands. Material identified as *Trapezia ferruginea* by J. S. GARTH : Tahiti, Papeete Harbor, Motu-Uta I., st. 42, 20.4.1957, Smithsonian-Bredin Expedition : 2 ♀ (USNM).

Gambier Islands. Aukena, 12.10.1967, coll. D. M. DEVANEY & B. R. WILSON, N. G. S. - Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂, 1 ♀ (USNM).

"Micronésie, Polynésie" (no specified location). Coll. O. ODINETZ : 4 ♂, 4 ♀ (MNHN-B 9828-9829).

Easter Island. Anakena Bay, 9.9.1995, coll. M. RETAMAL : 2 ♂, 3 ♀. — Material identified as *Trapezia cymodoce ferruginea* by M. J. RATHBUN : shore station, 20.12.1904, *Albatross* : 1 ♂, 1 ♀ (USNM 33359). — Material identified as *Trapezia ferruginea* by J. S. GARTH : from stomach of starfish (*Leiaster leachii*), coll. I. A. EFFORD & J. A. MATHIAS : 3 ♂, 1 ♀ (LACM). — Material identified as *Trapezia cymodoce* by J. S. GARTH : Hanga-piko, METEI, 2.2.1965 : 1 ♀ (LACM).

GEOGRAPHICAL DISTRIBUTION. — *T. punctimanus* appears to be endemic to southeastern Polynesia, having been recorded only from French Polynesia and Easter Island. Some of the specimens collected by O. ODINETZ, however, are listed as "Micronésie, Polynésie" without giving a specific location.

COLOR. — Live individuals (pl. 1 E) have an orange to purplish-orange carapace and chelipeds. The outer edges of the carapace and the segments of the chelipeds are orange. The chelipeds are ornamented with small red-brown dots, particularly on the dorsal surface. Dots are also found on the third maxillipeds as well as on the abdomen of some females. The fingers are light brown. The walking legs are purplish orange but the edges of the segments are orange, giving them a distinctive banded appearance. The eyes are light orange-brown. Preserved specimens are uniformly orange except the red-brown dots on the chelipeds, which remain for years.

REMARKS. — One diagnostic morphological feature is the relatively narrow and long chelipeds, a characteristic that is unfortunately not shown in the figure given by ODINETZ (1994). The fingers are particularly slender, the dactylus crossing and extending well over the immovable finger. The anterior border of the merus is armed with distinctively slender teeth that in many specimens are absent along the distal end of the border.

The characterization of the species by ODINETZ (1983) is invalid since it was published in a thesis of limited distribution. It was formally described and the type material designated in a later publication (ODINETZ, 1984a).

Trapezia rufopunctata (Herbst, 1799)

Cancer rufopunctatus Herbst, 1799 : 54, pl. 47, fig. 6 (color).

Trapezia rufopunctata – LATREILLE, 1828 : 695. — DANA, 1852b : 255 (Tahiti) ; 1855 : pl. 15, figs 3 a (color), b. — JACQUINOT, 1846 : pl. 8 (color), 9. — LUCAS, 1853 : 41 (Nuku Hiva, part). — RATHBUN, 1907 : 57 (Makemo). — BOONE, 1934 : 166, pl. 86 (Raiatea). — SEURAT, 1934 : 59 (list). — PATTON, 1966 : 285. — SAKAI, 1976 : 509, pl. 182, fig. 1 (color). — ODINETZ, 1983 : 34, 205 (Tahiti). — SERÈNE, 1984 : 276 (full synonymy), fig. 184, pl. 39, fig. A. — GALIL & LEWINSOHN, 1985a : 209 (full synonymy), figs 1-6. — GUINOT, 1985 : 452 (list). — PEYROT-CLAUSADE, 1989 : 112, 113 (Tikehau). — ALLEN & STEENE, 1994 : 159 (color photograph). — JENG, 1994 : 317, fig. 7 (color photograph). — JONES & MORGAN, 1994 : 179 (color photograph). — COLIN & ARNESON, 1995 : 214, fig. 1008 (color photograph). — POUPIN, 1996 : 60 (list). CASTRO, 1997 : 89, pl. 5 B (color).

Trapezia ferruginea maculata – SEURAT, 1934 : 59 (list).

MATERIAL EXAMINED. — **Marquesas Islands.** Nuku Hiva : 1 ♀ (RMNH D 543). — Hiva Oa, Atuona Bay, 1-5 m, *Pocillopora*, 15.2.1996, coll. J. POUPIN : 1 ♂, 2 ♀ (MNHN-B 23033).

Tuamotu Archipelago. Tikehau, lagoon, st. 10, 11.4.1957, Smithsonian-Bredin Expedition : 2 ♂ (USNM).

Society Islands. Tahiti : 1 ♂ (RMNH D 2797).

GEOGRAPHICAL DISTRIBUTION. — Throughout the Indo-west Pacific region but apparently never recorded from the Red Sea or Easter Island. Specimens from the Red Sea at the Muséum national d'Histoire naturelle, Paris that were previously identified as *T. rufopunctata* belong to *T. tigrina* Eydoux & Souleyet.

COLOR. — Carapace, chelipeds, and walking legs show distinctive red spots on a cream or very light orange background. GALIL and LEWINSOHN (1985a) report on the variation in the size and distribution of spots.

REMARKS. — *T. rufopunctata* can be confused with *T. tigrina*, which shows a similar color pattern. Diagnostic to *T. rufopunctata* are the triangular teeth along the anterior border of the carapace (rounded in *T. tigrina*) and the two rows of thick, teeth-like tubercles along the inner border of the cheliped propodus (very small tubercles in *T. tigrina*).

Trapezia serenei Odinetz, 1984

Trapezia serenei Odinetz, 1983 : 34, 65, 85, 87, 96, 107, 114, 134, 197, 199, 206, 211, 214, 216, photograph 6 (color) (Moorea, Tahiti, Takapoto) ; 1984a : 440, figs 3 B, 4 B (Mataiva, Moorea, Tahiti, Takapoto). — SALVAT & RICHARD, 1985 : 344 (Takapoto). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 200, 201 (Takapoto, Moorea ?, Tahiti ?). — ALLEN & STEENE, 1994 : 159 (color photograph). — POUPIN, 1996 : 60 (list). — CASTRO, 1997 : 92 , pl. 2 F (color photograph ; Tahiti).

Trapezia ferruginea – DANA, 1852b : 260 (Tahiti, part) ; 1855 : pl. 16, fig. 1a (color). — FOREST & GUINOT, 1961 : 136, figs 137 a, b (Tahiti). — JONES & MORGAN, 1994 : 178 (color photograph). (non *Trapezia ferruginea* Latreille).

Trapezia cymodoce dentata – RATHBUN, 1907 : 58 (Makemo, part).

Trapezia cymodoce ferruginea – RATHBUN, 1907 : 58 (Makemo, part).

Trapezia cymodoce sp. 2 – KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — ODINETZ, 1984b : 124 (Moorea, Tahiti, Takapoto).

MATERIAL EXAMINED. — **Guam.** *Pocillopora damicornis*, 4.1981, coll. O. ODINETZ : 1 ♂ holotype (MNHN-B 9681).

Society Islands. Tahiti, 1952, Mission RANSON : 1 ♂, 1 ♀ (MNHN-B 16543). — Tahiti, *P. elegans*, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9690) ; 10 ♂, 8 ♀, 1 juv. (MNHN-B 25494-25504). — Moorea, 1.7.1980, coll. R. KROPP & C. BIRKELAND : 1 ♂, 1 ♀ (USNM 277762) ; *P. elegans*, 3.7.1980 : 1 ♂, 1 ♀ (USNM 277769). — Moorea, *P. damicornis*, 1982, coll. O. ODINETZ : 2 ♂, 2 ♀ (MNHN-B 9688-9689) ; *P. elegans* : 1 ♂, 1 ♀ (MNHN-B 9753) ; 1 ♂, 1 ♀, P4-A2 (MNHN-B 22955) ; 1 ♂, 1 ♀, P5-C1 (MNHN-B 22956) ; 1 ♂, P5-A4 (MNHN-B 22957) ; 1 ♂, 1 ♀, P5-C4 (MNHN-B 22958) ; 1 ♂,1 ♀, L1-B11 (MNHN-B 22959) ; 1 ♂, 1 ♀, P5-A5 (MNHN-B 22960) ; 1 ♀, P5-B3 (MNHN-B 22961) ; 1 ♂, 1 ♀, L1-C3 (MNHN-B 22962) ; 3 ♂, 3 ♀, 1 juv. (MNHN-B 25505-25507, 25511). — Material identified as *Trapezia ferruginea* by J. S. GARTH : Tahiti, Taapuna Pass, st. 46, 21.4.1957, Smithsonian-Bredin Expedition : 1 ♀ (USNM) ; Bora-Bora, st. 72, 27.4.1957, Smithsonian-Bredin Expedition : 1 ♂, 2 ♀ (USNM) ; Raiatea, Uturoa, st. 75, 28.4.1957, Smithsonian-Bredin Expedition : 6 ♂, 4 ♀ (USNM) ; Huahine, Bourayne Bay, st. 88, 1.5.1957, Smithsonian-Bredin Expedition : 2 ♂, 5 ♀ (USNM) ; Moorea, Nuarei Bay, st. 126, 12.5.1957, Smithsonian-Bredin Expedition : 1 ♀ (USNM). — Material identified as *Trapezia dentata* by J. S. GARTH : Bora-Bora, 28.8.1978, coll. E. TARVYD : 1 ♂, 1 ♀ (LACM).

Tuamotu Archipelago. Takapoto, *P. elegans*, 1982, coll. O. ODINETZ : 3 ♂, 3 ♀ (MNHN-B 9694, 9695, 9752) ; 1 ♂, 1 ♀ (MNHN-B9693) ; 1 ♂, 1 ♀, OPU-F1 (1) (MNHN-B 22963) ; 1 ♂, OPU-E1 (1) (MNHN-B22964) ; 1 ♂, 1 ♀, OPU-E5 (1) (MNHN-B 22965) ; 4 ♂, 4 ♀ (MNHN-B 25508-25510, 25512). — Material identified by M. J. RATHBUN as *Trapezia cymodoce dentata* : Makemo, 21.10.1899, *Albatross* : 2 ♂, 2 ♀ (USNM 33354). Material identified by M. J. RATHBUN as *Trapezia cymodoce ferruginea* : Makemo, 21.10.1899, *Albatross* : 1 ♂ (USNM 33358). — Material identified as *Trapezia ferruginea* by J. S. GARTH : Tikehau, lagoon, st. 10a, 11.4.1957, Smithsonian-Bredin Expedition : 4 ♂, 2 ♀

(USNM) ; Rangiroa, 8. 10. 1975, coll. A. FIELDING : 2 ♂, 1 ♀ (LACM).

GEOGRAPHICAL DISTRIBUTION. — Known from Okinawa, southern Japan to French Polynesia and Western Australia (CASTRO, 1997). Its distribution is probably wider as it has been confused with *T. ferruginea*.

COLOR. — Carapace and chelipeds are orange pink with pink to purplish borders. The walking legs are pink. Preserved specimens are light orange with the borders of the carapace and the merus and carpus of the chelipeds pink to light purple (CASTRO, 1997).

REMARKS. — The specimens of *T. ferruginea* Latreille described by DANA (1852b) as having borders of the carapace carmine in color and therefore belonging to *T. serenei* were collected in Tahiti, not in Samoa as stated by ODINETZ (1984a, 1984b). This diagnostic coloration is depicted in the original color illustration of DANA (1855).

T. serenei is almost morphologically identical to *T. ferruginea* (CASTRO, 1997). The only reliable way to distinguish between them is their color pattern : pink to purplish borders in *T. serenei* and an orange-red spot on the distal end of the propodus of the walking legs of *T. ferruginea*.

The original characterization of *T. serenei* by ODINETZ (1983), like that of *T. punctimanus*, was published in a thesis of limited distribution. The more detailed characterization (ODINETZ, 1984a) is the valid description.

Trapezia speciosa Dana, 1852
Pl. 1 F

Trapezia speciosa Dana, 1852a : 83 (Carlshoff island = Aratika) ; 1852b : 253 ; 1855 : pl. 15, fig. 1 (color). — NOBILI, 1907 : 403 (Marutea). — SEURAT, 1934 : 59 (list). — SERÈNE, 1959 : 140, figs 3, 4, 5 B, 6 A, pl. 2. — FOREST & GUINOT, 1961 : 133, figs 131, 132, 136 a, b (Hikueru) ; 1962 : 70 (list). — KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — GALIL, 1983 : fig. 9 C. — ODINETZ, 1983 : 31, 107, 114, 134, 205, 214 (Moorea, Tahiti, Takapoto). — SERÈNE, 1984 : 278 (full synonymy), fig. 186, pl. 38, fig. E. — DELESALLE, 1985 : 289 (Mataiva). — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — POUPIN, 1996 : 60 (list).
Trapezia digitalis speciosa – RATHBUN, 1907 : 59 (Fakarava, Makemo, Tahiti).

MATERIAL EXAMINED. — **Society Islands.** Tahiti, Papeete, 28.10.1899, *Albatross* : 1 ♂, 1 ♀ (USNM 33347). — Bora-Bora, Motu Tapu I., st. 62, 25.4.1957, Smithsonian-Bredin Expedition : 1 ♂ (USNM). — Moorea, Nuarei Bay, st. 129, 12.5.1957, Smithsonian-Bredin Expedition : 1 ♂ (USNM). — Moorea, *Pocillopora damicornis*, 1982, coll. O. ODINETZ : 2 ♂, 2 ♀ (MNHN-B 9749) ; 1 ♂, 5 ♀, TIA-M4 (MNHN-B 16823). — Tahiti, 1982, coll. O. ODINETZ : 4 ♂, 5 ♀ (MNHN-B 25464-25467).

Tuamotu Archipelago. Fakarava, outer reef, 12.10.1899, *Albatross* : 5 ♂, 5 ♀ (USNM 33345). — Fakarava, *Albatross* ? : 2 ♂, 1 ♀ (USNM). — Makemo, 21.10.1899, *Albatross* : 1 ♂, 1 ♀ (USNM 33346). — Marutea, 1905, coll. G. SEURAT : 1 ♂ (MNHN-B 16922). — Hikueru, 1952, Mission RANSON : 1 ♀ (MNHN-B16921). — Tikehau, lagoon, st. 10, 11.4.1957, Smithsonian-Bredin Expedition : 1 ♂ (USNM). — Pukapuka, 6.10.1967, N. G. S. - Smithsonian-Bishop Museum Marquesas Expedition : 2 ♂, 1 ♀ (USNM). — Raroia, coll. J. P. E. MORRISON : 1 ♂, 1 ♀ (USNM). — Takapoto, *P. damicornis*, 1982, coll. O. ODINETZ : 6 ♂, 8 ♀ (MNHN-B 9750-51) ; 1 ♂, 1 ♀, P3-A11 (MNHN-B 23006) ; 2 ♂, 2 ♀, L1-B10 (MNHN-B 23007) ; 1 ♀, P5-B3 (MNHN-B 23008) ; 1 ♂, 1 ♀, P5-B2 (MNHN-B 23009) ; 1 ♂, 2 ♀, P5-A2 (MNHN-B 23010) ; 1 ♂, 1 ♀, P6-A5 (MNHN-B 23011) ; 4 ♂, 3 ♀, P5-C4 (MNHN-B 23012) ; 1 ♂, L1-B11 (MNHN-B 23013) ; 1 ♂, 1 ♀, P5-A4 (MNHN-B 23014) ; 1 ♂, 1 ♀, P3-C1 (MNHN-B 23015) ; 2 ♀, P4-A2 (MNHN-B 23016) ; 12 ♂, 15 ♀, 2 juv. (MNHN-B 25458-25463). — Anuanuraro, 3 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 5 ♂, 4 ♀ (MNHN-B 25318). — Moruroa, 5-10 m, *Pocillopora*, 4.1996, coll. J. POUPIN : 4 ♂, 4 ♀ (MNHN-B 25319).

Réunion, Indian Ocean. *Pocillopora* & *Stylophora*, 1976-77, coll. S. RIBES : 14 ♂, 12 ♀ (MNHN-B 8326-8328, B 16093, B 25302-25311) ; coll. M. PEYROT-CLAUSADE : 1 ♀ (MNHN-B 25301).

Seychelles Is., Indian Ocean. 17.2.1972, coll. A. J. BRUCE : 2 ♂, 1 ♀ (MNHN-B 23048).

GEOGRAPHICAL DISTRIBUTION. — *T. speciosa* is known from southeastern Polynesia, Wake and Johnston islands (EDMONDSON, 1925), the Marshall Islands (GARTH, 1964, 1989 ; GARTH *et al.*, 1987), Ifalik atoll (GARTH, 1989), Tuvalu and Fiji (BORRADAILE, 1900), the Paracel Islands (DAI & LAN, 1981), Viet Nam (SERÈNE, 1959), and the western Indian Ocean (SERÈNE, 1984).

COLOR. — The dorsal surfaces of the carapace and chelipeds of live individuals (pl. 1 F) are ornamented with sinuous, interconnected red lines over a light-orange or pinkish (in largest individuals) background. In some the pattern is more regular and form rectangles along the anterior edge of the carapace. The pattern is similarly more regular and honeycomb-like on the dorsal surface of the cheliped propodus. The sinuous pattern is repeated on the ventral surface of the anterior portion of the carapace, third maxillipeds, and abdomen. The ventral portion of the cheliped propodus is orange. A flat tubercle at the base of the dactylus is red. The dactylus is light brown and the immovable finger orange ventrally, light brown dorsally. The walking legs are light orange with very small red dots. The eyes are dark brown. The ornamentation on the carapace and chelipeds of preserved specimens remains as dark-orange lines on a light-orange background.

REMARKS. — *T. speciosa* is best characterized by its very distinctive color pattern. As in *T. bella*, the straight anterolateral borders of the carapace and acute epibranchial spines of juveniles develop into fully grown adults with rounded anterolateral borders and notches instead of epibranchial teeth. A characteristic tomentum that consists of very thin and long setae is present on the walking legs and along the posterior border of the merus, carpus, and proximal portion of the cheliped propodus. The development of a tomentum is a variable character, however. It is more common in the larger specimens from southeastern Polynesia, very rare in those from the western Indian Ocean.

T. speciosa, like *T. areolata*, *T. bella*, and *T. globosa*, is distinguished by small individuals. The largest specimen examined was a female from Réunion, western Indian Ocean (cw 12.8 mm, cl 9.5 mm ; MNHN-B 8328).

Trapezia tigrina Eydoux & Souleyet, 1842

Trapezia tigrina Eydoux & Souleyet, 1842 : 232, pl. 2, fig. 4. — WARD, 1939 : 13, figs 15, 16. — ODINETZ, 1983 : 34, 85, 87, 96, 107, 114, 134, 197, 199, 205, 211, 214, 216, photograph 5 (Moorea, Tahiti, Takapoto). — GALIL & LEWINSOHN, 1984 : 166 (full synonymy), fig. 1 (Society Is, Anaa, Tikehau, Pitcairn Island). — SERÈNE, 1984 : 275 (full synonymy), fig. 182, pl. 39, fig. C, D. — GALIL & LEWINSOHN, 1985a : fig. 7. — GUINOT, 1985 : 452 (list). — ODINETZ-COLLART & RICHER DE FORGES, 1985 : 201 (Takapoto, Moorea ?, Tahiti ?). — CASTRO & HUBER, 1997 : fig. 6.1 (color photograph). — POUPIN, 1996 : 60 (list).

Trapezia maculata – DANA, 1852b : 256 (Tahiti) ; 1855, pl. 15, figs 4 a (color)- d.

Trapezia danae Ward, 1939 : 13, figs 17, 18.

Trapezia wardi Serène, 1971 : 140. — KROPP & BIRKELAND, 1982 : 629 (Moorea, Takapoto). — GUINOT, 1985 : 452 (list).

Trapezia rufopunctata – LUCAS, 1853 : 41 (Nuku Hiva, part) not *Trapezia rufopunctata* (Herbst)

? *Trapezia rufopunctata* var. *maculata* – ORTMANN, 1893 : 484 (Tahiti).

Trapezia cymodoce maculata – RATHBUN,1907 : 59 (Makemo, part).

MATERIAL EXAMINED. — **Hawaiian Islands.** 1838, coll. F. EYDOUX & F. A. SOULEYET : 1 ♀ type (MNHN-B 2950).

Society Islands. Coll. A. GARRETT : 1 ♂, 1 ♀ (USNM 15893). — Tahiti : 1 ♂, 1 ♀ (RMNH D 540). — Tahiti, 7.9.1967, coll. B. R. WILSON, N. G. S. - Smithsonian-Bishop Museum Marquesas Expedition : 1 ♀ (USNM). — Tahiti, *Pocillopora elegans*, 1982, coll. O. ODINETZ : 3 ♂, 3 ♀ (MNHN-B 9729-9731) ; 2 ♂, 1 ♀ (MNHN-B 25492-25493). — Moorea, pass to Papetoai Bay, outer barrier reef, 15.5.1957, coll. J. E. RANDALL, Smithsonian-Bredin Expedition : 1 ♀ (USNM). — Moorea, 1982, coll. O. ODINETZ : 1 ♀ (MNHN-B 23036) ; *P. elegans* : 4 ♂, 4 ♀ (MNHN-B 9726-9728) ; 1 ♂, 1 ♀, OPU-D7 (MNHN-B 23020) ; 5 ♂, 3 ♀ (MNHN-B 25488-25491).

Tuamotu Archipelago. Makemo, 21.10.1899, *Albatross* : 1 ♀ (USNM 33350). — Takaroa, 12.2.1929, coll. A. W. HERRE : 2 ♂, 1 ♀ (USNM). — Tikehau, lagoon, st. 10a, 11.4.1957, Smithsonian-Bredin Expedition : 1 ♂, 1 ♀ (USNM).

— Anaa, 18-19 m, 27.10.1967, N. G. S. - Smithsonian-Bishop Museum Marquesas Expedition : 1 ♂ (USNM). — Takapoto, *P. elegans*, 1982, coll. O. ODINETZ : 1 ♂, 1 ♀ (MNHN-B 9725) ; 10 m : 1 ♂, 1 ♀, E2-C3 (MNHN-B 23021) ; 30 m : 2 ♂, 2 ♀, E4-A5 (MNHN-B 23022) ; 10 m : 2 ♂, 2 ♀, E4-C4 (MNHN-B 23023) ; 10 m : 1 ♂, 1 ♀, E4-C5 (MNHN-B 23024) ; 1 ♀, P5-C4 (MNHN-B 23025) ; 30 m : 1 juv., E4-A3 (MNHN-B 23026) ; 20 m : 1 ♂, 1 ♀, 1 juv., E3-B2 (MNHN-B 23027) ; 16 ♂, 18 ♀, 9 juv. (MNHN-B 25468-25487). — Fangataufa, 10 m, *Acropora* ?, 2.1996, coll. SMSRB divers : 1 ♂ (MNHN-B23018). — Moruroa, *Pocillopora*, 10.1995, coll. J. POUPIN : 2 ♂, 2 ♀ (MNHN-B 23019) ; 5 m, 4.1996 : 2 ♂, 1 ♀ (MNHN-B 25316).

Pitcairn Island. Off south coast, 40-45 m, 20.10.1967, N. G. S. - Smithsonian-Bishop Museum Expedition : 2 ♂, 1 ♀ (USNM).

GEOGRAPHICAL DISTRIBUTION. — Present across the Indo-west Pacific region, including the Hawaiian Islands. It seems to be absent, however, from the Coral Sea.

COLOR. — Live specimens are light orange or cream with red spots distributed throughout the carapace and appendages. The size and distribution of spots varies widely (GALIL & LEWINSOHN, 1984). The fingers show the same cream color of the rest of the body. The eyes are light gray.

REMARKS. — GALIL & LEWINSOHN (1984) clarified the status of *T. tigrina* and explained the confusion that resulted from the exchange of its type material with that of *T. flavopunctata*. This exchange, which had previously been recorded in a handwritten note by R. SERÈNE in 1976, is now confirmed. Both species were described and illustrated by EYDOUX & SOULEYET (1842).

Differences between *T. tigrina* and a similar species, *T. richtersi* Galil & Lewinsohn, however, have never been outlined. Both species occur together in the western Indian Ocean. *T. ritchersi* is not recorded from elsewhere, whereas *T. tigrina* is found throughout the Indo-west Pacific. Both species feature red dots on the carapace. The dots, however, are typically larger and less numerous in *T. tigrina* (see photographs in GALIL & LEWINSOHN, 1984). The chelipeds also have red dots in *T. tigrina* but typically red reticulations, not distinct dots, in the propodus of *T. ritchersi* (see photographs *in* GALIL & LEWINSOHN, 1983 and SERÈNE, 1984). The epibranchial teeth are conspicuous and acute in *T. tigrina* and the anterolateral borders of the carapace almost parallel to each other, although slightly rounded in the largest specimens. In *T. richtersi* the epibranchial teeth become obtuse and the anterolateral borders distinctively rounded with increasing size. *T. richtersi* is smaller (maximum cw 10-12 mm, 13-14 mm in exceptional cases) than *T. tigrina* (largest specimen examined was a female from the Maldive Islands, cw 19.7 mm ; MNHN-B 16535) so that differences in the morphology of the carapace are clear when adults of similar size are compared.

Juveniles and very small adults of *T. tigrina* can be differentiated from those of *T. bella*, which is also ornamented with red dots, by the larger dots and the more pronounced and projecting epibranchial teeth and postorbital angles.

ZOOGEOGRAPHICAL CONSIDERATIONS

The number of species of *Trapezia* is unexpectedly high in southeastern Polynesia, the region that extends from French Polynesia to Easter Island. Fourteen species are reported here, including the rare presence of *T. cymodoce* and *T. lutea*. Of these fourteen species, three seem to be endemic to the region : *T. areolata*, *T. globosa*, and *T. punctimanus*. The first two are small-size species. Three species that so far seem relatively rare in other Indo-west Pacific locations, *T. bella*, *T. serenei* and *T. speciosa*, are common in French Polynesia. *T. cymodoce*, very common in the southwestern Pacific, is rare.

The decrease in species diversity that is expected as one moves eastward from areas of high diversity in the western Pacific is not observed in trapeziids. Eleven species of *Trapezia* are found in the Coral Sea region (CASTRO, 1997) against fourteen in southeastern Polynesia. Eight species are found in both regions.

This study confirms earlier work on the eastern Pacific (CASTRO, 1996) and the Coral Sea (CASTRO, 1997) species that suggests that while some species of *Trapezia* are widely distributed, others appear to have evolved in relatively isolated areas such as the eastern Pacific. Only six species of *Trapezia* inhabit the Hawaiian Islands, which at the extreme northeastern edge of the Indo-west Pacific region are more isolated than the islands of southeastern Polynesia. Only four species occur in the more isolated eastern Pacific. None of the Hawaiian species appears to be endemic ; one (*T. corallina* Gerstaecker) is endemic to the eastern Pacific. Five of the six Hawaiian species and two of the eastern Pacific species are also found in eastern Polynesia. All of them are widely distributed, or eurytopic, species.

Some less isolated regions like the Coral Sea and Taiwan (GALIL, 1983), however, also have species of *Trapezia* not known elsewhere. The careful collection and identification of material from other regions may reveal a wider distribution of what appear to be endemic species of limited distribution. It might probably reveal, however, new endemic species.

Six species of *Tetralia* and *Tetraloides*, are known from French Polynesia. This figure is similar to the six present in the Coral Sea. Both genera are absent in the Hawaiian Islands, Easter Island, and the eastern Pacific, areas where *Acropora*, their coral host, is absent or has a very limited distribution.

Although it is too early to speculate, differences in the geographical distribution among the species of *Trapezia*, *Tetralia* and *Tetraloides* may be explained, at least in part, by differences in the dispersal abilities of their larvae. Unfortunately, nothing is known about the life history of the larvae. Host specificity and the species diversity of the coral hosts may also influence geographical distribution although there is yet no evidence to support this. Species with a more limited distribution have evolved mostly but not exclusively in the more isolated regions such as southeastern Polynesia. Some of these species, like two of the three southeastern Polynesian species and the two Taiwanese species, are characterized by their small size.

The rare occurrence in isolated regions of widely distributed species may be the result of infrequent long-distance dispersal of larvae. This may explain, if the locality of the few specimens in question is actually correct, the unusually rare frequency of *T. cymodoce* and *T. lutea* in French Polynesia and of *T. tigrina* (not *T. rufopunctata* as reported by CASTRO, 1996) in the Revillagigedo Islands off the west coast of Mexico. Infrequent long-distance dispersal can be explained by post-larvae that conceivably survive on small *Pocillopora* colonies living on floating pumice (JOKIEL, 1984) or carried by unusually-warm El Niño currents.

Species diversity among obligate symbionts of corals, many of which are trapeziids, were found not to vary between high and low islands in French Polynesia (KROPP & BIRKELAND, 1982 ; ODINETZ-COLLART & RICHER DE FORGES, 1985). Additional collections reported here confirm this observation.

KEY TO THE SOUTHEASTERN POLYNESIA TRAPEZIIDS

1. Anterior border of carapace with conspicuous, triangular, teeth-like lobes ; carapace with distinctly hexagonal outline, its posterior border slightly wider or as wide as anterior border. On gorgonians, antipatharians, or alcyonaceans .... ***Quadrella* 2**

— Anterior border of carapace with relatively small lobes or no lobes at all (if triangular, tip is obtuse, not acute). Carapace trapezoidal or oval, its posterior border shorter than anterior border. On hermatypic corals **3**

2. Anterior border of carpus of cheliped with two well-developed spines or tubercles .... ***Quadrella maculosa***

— Anterior border of carpus of chelipeds without spines .... ***Quadrella lewinsohni***

3. Chelipeds very dissimilar in size. Male abdomen with seven segments. In acroporid corals.. **4**

— Both chelipeds massive and only slightly dissimilar in size. Male abdomen with five segments. In pocilloporid corals .... ***Trapezia* 9**

4. Largest cheliped with setae-filled depression on dorsal, proximal surface. Thoracic sternum with median suture .... ***Tetralia* 5**

— Largest cheliped without setae-filled depression on dorsal surface. Thoracic sternum without median suture .... ***Tetraloides* 8**

5. Anterior border of cheliped merus with prominent, salient crest provided with teeth. Dorsal surface of finger of cheliped with large orange-red spot .... *Tetralia rubridactyla*

— Anterior border of cheliped merus dentate but without prominent, salient crest. Entire finger of cheliped brown or orange red 6

6. Chelipeds smooth or with microscopic granules and no dark spots or markings. Endopod of first maxillipeds straight or with slightly convex border .... *Tetralia fulva*

— Chelipeds with tubercles and brown spots or irregular markings. Endopod of first maxillipeds with slightly concave border 7

7. Fingers of chelipeds light brown. Walking legs banded with dark brown ... *Tetralia cinctipes*

— Fingers of chelipeds orange red. Walking legs not banded .... *Tetralia vanninii*

8. Small cheliped with triangular, teeth-like tubercles along lower border. Carapace light brown ; walking legs light brown with dark-brown to black spots .... *Tetraloides heterodactyla*

— Small cheliped with rounded tubercles along lower border. Carapace white or cream with dark-brown anterior border ; walking legs dark brown with cream spots ....
.... *Tetraloides nigrifrons*

9. Honeycomb-like pattern of lines on carapace and chelipeds 10

— Carapace uniformly colored, with spots, or with color band along anterior border. 11

10. Anterolateral borders of carapace parallel to each other. Honeycomb pattern of brown lines on greenish-brown background .... *Trapezia areolata*

— Anterolateral borders of carapace rounded except in very small individuals and juveniles. Honeycomb pattern of red lines on light-orange or pinkish background ... *Trapezia speciosa*

11. Chelipeds and dorsal surface of carapace with distinctive spots or dots throughout surface that very often remain inpreserved specimens 12

— Dorsal surface of carapace not covered with spots or dots, although small dots may be present on chelipeds or as a row across carapace 15

12. Inner border of carpus of chelipeds with thick, teeth-like tubercles 13

— Inner border of carpus of chelipeds smooth or with very small tubercles 14

13. Teeth along anterior border of carapace rounded. Carapace and chelipeds with large yellow spots .... *Trapezia flavopunctata*

— Teeth along anterior border of carapace triangular. Carapace and chelipeds with large red spots .... *Trapezia rufopunctata*

14. Anterolateral borders of carapace rounded and epibranchial teeth obtuse or absent except in juveniles. Carapace and chelipeds with small red-brown dots on a light red-brown background .... *Trapezia bella*

— Anterolateral borders of carapace almost parallel to each other except in large adults. Epibranchial teeth acute. Carapace and chelipeds with red spots on a light-orange or cream background .... *Trapezia tigrina*

15. Upper border of carpus and propodus of chelipeds with conspicuous tomentum that consists of numerous setae 16

— Upper border of propodus of cheliped without a tomentum 17

16. Conspicuous suture between second and third thoracic sternites always present. Carapace with almost straight anterolateral borders ; epibranchial teeth acute except in largest individuals. Carapace purplish to brownish blue, with arow of small orange-red spots across dorsal surface .... *Trapezia cymodoce*

— Suture between second and third thoracic sternites only in smaller individuals, partially or completely fused in fully-grown ones. Carapace with rounded anterolateral borders ; epibranchial teeth obtuse except in smallest individuals. Carapace orange to yellow-orange without a row of orange-red spots on dorsal surface .... *Trapezia lutea*

17. Anterior border of carapace with minute teeth ; almost straight or only with slight emarginations. Carapace uniformly dark brown or red brown **18**

— Anterior border of carapace emarginated into distinct lobes that may only have microscopic teeth. Carapace not uniformly brown or red brown **19**

18. Anterolateral borders of carapace parallel to each other .... *Trapezia digitalis*

— Anterolateral borders of carapace rounded .... *Trapezia globosa*

19. Dorsal surface of carapace white to cream with a red-brown band across frontal border. Walking legs with red-brown spots .... *Trapezia guttata*

— Dorsal surface of carapace not white and without a dark-color band across anterior border. Walking legs not spotted **20**

20. Chelipeds with red dots throughout inner dorsal surface .... *Trapezia punctimanus*

— Chelipeds without color dots **21**

21. Carapace brown orange with thin, lighter orange edges. Orange-red spot on distal end of propodus of walking legs .... *Trapezia ferruginea*

— Carapace orange pink with pink to purplish edges. No color spots on walking legs .... *Trapezia serenei*

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REFERENCES

ALCOCK, A., 1898. — The Brachyura Cyclometopa. Part 1. The Family Xanthidae. No. 3. Materials for a carcinological fauna of India, No. 3. *J. Asiat. Soc. Beng.*, **67** (2, no. 1) : 67-233.

ALLEN, J.R. & STEENE, R.,1994. — *Indo-Pacific Coral Reef Guide.* Singapore, Tropical Reef Research : 378 pp., unnumbered figs.

BOONE, L., 1934. — Scientific results of the world cruise of the yacht "Alva," William K. Vanderbilt, commanding. *Bull. Vanderbilt Mar. Mus.*, **5** : 1-210, pls 1-109.

BORRADAILE, L. A., 1900. — On some crustaceans from the South Pacific. *Proc. Zool. Soc. London*, **1900** : 568-596, pls 40-42.

CANO, G., 1888. — Crostacei raccolti dalla R. Corvetta Caracciolo nel viaggio intorno al globo durante gli anni 1881-82-83-

84. *Boll. Soc. Nat. Napoli*, ser. 1, **2** : 160-184, figs 1-3.

CASTRO, P., 1982. — Notes on symbiotic decapod crustaceans from Gorgona Island, Colombia, with a revision of the eastern Pacific species of *Trapezia* (Brachyura, Xanthidae), symbionts of scleractinian corals. *An. Inst. Invest. Mar. Punta de Betín*, **12** : 9-17, tabl. 1.

CASTRO, P., 1996. — The eastern Pacific species of *Trapezia* (Crustacea, Brachyura : Trapeziidae), sibling species symbiotic with reef corals. *Bull. Mar. Sci.*, **58** : 531-554, figs 1-4, tabls 1 & 2.

CASTRO, P., 1997. — Trapeziid crabs (Brachyura : Xanthoidea : Trapeziidae) of New Caledonia, eastern Australia, and the Coral Sea. *In* : RICHER DE FORGES, B., (ed.). — *Les fonds meubles des lagons de Nouvelle-Calédonie (Sédimentologie, Benthos). Etudes et Thèses*, **3** Paris, ORSTOM : 59-107,figs 1-4, pls 1-6, tabl. 1.

CASTRO, P. & HUBER, M., 1997. — *Marine Biology*. Dubuque, Iowa,W. C. Brown : 464 pp., 548 figs.

COLIN, P. L. & ARNESON, C., 1995. — *Tropical Pacific Invertebrates*. Beverly Hills, California, Coral Reef Press : viii+ 296 pp., figs 1-1354.

DAI, A. & LAN, J., 1981. — Studies on the crabs of Xisha Islands-Xanthidae. *Studia Mar. Sinica*, **2** : 123-132, figs 1-3, figs 1-12 (pls). (In Chinese with English summary).

DANA, J. D., 1852a. — Conspectus crustaceorum, etc. Conspectus of the Crustacea of the Exploring Expedition under Capt. Wilkes,U.S.N., including the Crustacea Cancroidea Corystoidea. *Proc. Acad. Nat. Sci. Philad.*, **6** : 73-86.

DANA, J. D., 1852b. — Crustacea. Part I. *In* : *United States Exploring Expedition, during the Years 1838, 1839, 1840, 1841, 1842, under the Command of Charles Wilkes, U.S.N.* Philadelphia, C. Sherman, **13** : viii + 685 pp.

DANA, J. D., 1855. — Atlas. Crustacea. *In : United States Exploring Expedition,during the Years 1838, 1839, 1840, 1841, 1842, under the Command of Charles Wilkes, U.S.N.* Philadelphia, C. Sherman : 1-27, pls 1-96.

DELESALLE, B., 1985. — Mataiva Atoll, Tuamotu Archipelago. *In* : DELESALLE, B., GALZIN, R. & SALVAT, B., (eds). — French Polynesian coral reefs. *Fifth Int. Coral Reef Cong., Tahiti*, **1** : 269-307, figs 1-44.

EDMONDSON, C. H., 1925. — Crustacea. Marine zoology of tropical Central Pacific. *Bull. Bernice P. Bishop* , **27** : 3-62, pls 1-4.

EYDOUX, F. & SOULEYET, F. A., 1842. — Crustacés. *In : Voyage Autour du Monde Executé Pendant les Années 1836 et 1837 sur la corvette La Bonite,Commandée par M. Vaillant.* Zoologie **1** (2) : 107-328 ; *Atlas*, pls 1-150. [see DAVIES SHERBORN, C., & WOODWARD, B.B., 1906, *Ann. Mag. Nat. Hist.*, ser. 7, **17** : 577-582 for dates of publication].

FOREST, J. & GUINOT, D., 1961. — Crustacés Décapodes Brachyoures de Tahiti et des Tuamotu. *In : Expédition Française sur les Récifs Coralliens de la Nouvelle-Calédonie.* Volume préliminaire. Paris, Fondation Singer-Polignac : xi + 195, figs 1-178, pls 1-18.

FOREST, J., & GUINOT, D., 1962. — Remarques biogéographiques sur les crabes des archipels de la Société et des Tuamotu. *Cah. Pacif.*, **4** : 41-75, fig. 1, tabls 1 & 2.

GALIL, B., 1983. — Two new species of *Trapezia* (Decapoda : Brachyura), coral-inhabiting crabs from Taiwan. *Micronesica*, **19** (1/2) : 123-119, figs 1-9.

GALIL, B., 1986a. — *Tetraloides* – a new genus of coral-inhabiting crabs. *Crustaceana*, **50** (1985) : 68-77, figs 1-3.

GALIL, B., 1986b. — On the identity of *Tetralia cinctipes* Paulson, 1875 (Decapoda, Brachyura). *Crustaceana*, **51** (1) : 97-102, figs 1-3.

GALIL, B., 1986c. — *Quadrella* (Brachyura : Xanthoidea : Trapeziidae) – review and revision. *J. Crust. Biol.*, **6** (2) : 275-293, figs1-8.

GALIL, B., 1987. — The adaptive functional structure of mucus-gathering setae in trapezid crabs symbiotic with corals. *Symbiosis*, **4** : 75-86, figs 1-5.

GALIL, B., 1988a. — Further notes on species of *Tetralia* (Decapoda, Trapeziidae). *Crustaceana*, **54** (1) : 57-68, figs 1 & 2.

GALIL, B., 1988b. — Trapeziidae (Decapoda : Brachyura : Xanthoidea) of the Red Sea. *Israel J. Zool.*, **34** (3/4) [1986/87] : 159-182, figs 1-11.

GALIL, B. & CLARK, P. F., 1988. — On a collection of *Acropora*-inhabiting trapeziids (Crustacea Brachyura Xanthoidea) from East Africa. *Trop. Zool.*, **1** : 137-151, figs 1-6, tabl. 1.

GALIL, B. & CLARK, P.F., 1990. — Crustacea Decapoda : Notes on trapeziid crabs from New Caledonia including descriptions of two new species. *In* : CROSNIER, A. (ed.), Résultats des Campagnes MUSORSTOM, volume 6. *Mém. Mus. Natl Hist. Nat., Paris*, ser. A, **145** : 369-388, figs 1-6.

GALIL, B. & LEWINSOHN, C., 1983. — Researches on the coast of Somalia. *Trapezia richtersi* n. sp., a new trapeziid crab(Decapoda, Brachyura). *Monit. Zool. Ital.*, n.s., suppl. **18** : 159-166, figs 1-4.

GALIL, B. & LEWINSOHN, C., 1984. — On the taxonomic status of *Trapezia tigrina* Eydoux &Souleyet, 1842 (Decapoda, Brachyura). *Crustaceana*, **46** (2) : 166-175, fig. 1.

GALIL, B. & LEWINSOHN, C., 1985a. — On the taxonomic status of *Trapezia rufopunctata* (Herbst) and *Trapezia flavopunctata* Eydoux & Souleyet (Decapoda, Brachyura). *Crustaceana*, **48** (2) : 209-217, figs 1-7.

GALIL, B. & LEWINSOHN, C., 1985b. — On the taxonomic status of *Trapezia areolata* Dana and *Trapezia septata* Dana (Decapoda, Brachyura). *Crustaceana*, **48** (3) : 286-293, figs 1-4.

GALIL, B. & TAKEDA, M., 1986. — Resurrection of the genus *Jonesius* and the establishment of a new genus : commensal crabs associated with corals from the Indo-Pacific Ocean. *Bull. Natl Sci. Mus., Tokyo*, ser. A (Zoology), **12** (4) : 163-171, figs 1-8.

GARTH, J. S., 1964. — The crustacea decapoda (Brachyura and Anomura) of Eniwetok Atoll, Marshall Islands, with special reference to the obligate commensals of branching corals. *Miconesica*, **1** : 137-144, figs 1, 2.

GARTH, J. S., 1971. — Borradaille's Maldivian collection revisited. *J. Mar. Biol. Ass. India*, **11** (1969) : 182-190.

GARTH, J. S., 1973. — The brachyuran crabs of Easter Island. *Proc. Calif. Acad. Sci.*, ser. 4, **39** : 311-336, figs 1-6.

GARTH, J. S., 1989. — Xanthidae of Ifaluk atoll, Caroline Islands, collected in 1953 by D. P. Abbott and F. M. Bayer with special reference to coral commensals. *Bull. Mar. Sci.*, **45** : 478-486, tabls 1-3.

GARTH, J. S., HAIG, J. & KNUDSEN, J. W., 1987. — Crustacea Decapoda (Brachyura and Anomura) of Enewetak Atoll. *In* : DEVANEY, D. M., REESE, E. S., BURCH, B. L. & HELFRICH, P. (eds), *The Natural History of Enewetak Atoll*, vol. 2, *Biogeography and Systematics* : 235-261, fig. 1, tabls 1, 2. Oak Ridge, Tenn., U. S. Department of Energy.

GUINOT, D., 1985. — Crustacea (chapter restricted to brachyuran decapod Crustacea). *In* : RICHARD, G. (ed.), Fauna and flora. A first compendium of French Polynesian sea-dwellers, *In* : DELESALLE, B., GALZIN, R. & SALVAT, B. (eds), French Polynesian Coral Reefs. *Fifth Int.Coral Reef Congr, Tahiti*, **1** : 446-455.

HELLER, C., 1861. — Synopsis der im rothen Meere vorkommenden Crustaceen. *Verh. Zool. Bot. Ges. Wien*, **11** : 3-32.

HELLER, C., 1865. — Crustaceen. *In : Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unterden Befehlen des Commodore B. von Wüllerstorf-Urbair.* Zoologischer Theil, **2** (3) : 1-280, pls 1-25.

HERBST, J. F. W., 1782-1804. — Versuch einer Naturgeschichte der Krabben und Krebse nebst einer Systematischen Beschreibung ihrerVerschiedenen Arten. Berlin : 3 vols, pls 1-62. [see MONOD, T., 1956, *Mém. Inst. Fr. Afr. Noire*, **45** : 638 for dates of publication].

HOMBRON, J. B. & JACQUINOT, H., 1842-53. — Atlas. Crustacés. *In : Zoologie. Voyage au Pôle Sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée ; exécuté par ordre du Roi pendent les années 1837-1838-1839-1840, sous le commandement de M. J. Dumont-D'Urville, Capitaine de vaisseau.* Paris, Gide et J. Baudry, pls 1-9. [see CROSNIER, A. & CLARK, P. F., *in press*, for dates of publication].

JENG, M.-J., 1994. — Newly recorded symbiotic crabs (Crustacea: Decapoda: Brachyura) from southern Taiwan coral reefs. *Zool. Stud.*, **33** : 314-318, figs 1-7.

JOKIEL, P. L., 1984. — Long distance dispersal of reef corals by rafting. *Coral Reefs*, **3** : 113-116.

JONES, D. S. & MORGAN, G.J., 1994. — *A Field Guide to Crustaceans of Australian Waters.* Chatswood, Australia, Reed : 216 pp. unnumbered figures.

KROPP, R. K. & BIRKELAND., C., 1982. — Comparison of crustacean associates of *Pocillopora verrucosa* from high island and an atoll. *Proc. Fourth Int. Coral Reef Symp., Manila, Philippines* **2** : 627-632, tabls 1-5.

LATREILLE, P. A., 1828. — Trapézie. *In: Entomologie, ou Histoire Naturelle des Crustacés, des Arachnides et des Insectes.*

Encyclopédie Méthodique, Histoire Naturelle, **10** (2) : 695-696. [see DAVIES SHERBORN, C. & WOODWARD, B. B., 1906. *Ann. Mag. Nat. Hist.*, ser. 7, **17** : 577-582 for dates of publication]

LUCAS, H. 1853. — Crustacés. *In : Zoologie* (par MM. Hombron et Jacquinot). *Voyage au Pôle Sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée ; exécuté par ordre du Roi pendent les années 1837-1838-1839-1840, sous le commandement de M. J. Dumont-D'Urville, Capitaine de vaisseau.* Paris, Gide et J. Baudry, **3** : 1-107.

MILNE EDWARDS, A., 1867. — Descriptions de quelques espèces nouvelles des Crustacés Brachyoures. *Annls Soc. Ent. Fr.*, sér. 4, **7** (4) : 263-288.

MIYAKE, S., 1983. — Brachyura (Crabs). *In : Japanese Crustacean Decapods and Stomatopods in Color.* Osaka, Hoikusha : vol 2, viii+ 277 pp., pls 1-64, unnumbered figures, first edition [In Japanese ; second edition in 1992].

MONOD, T., 1979. — Crustacés associés à un antipathaire des Îles Marquises. *Cah. Indo Pacif.*, **1** : 1-23, figs 1-85.

MOTTELER, L. S. 1986. — Pacific island names. A map and name guide to the new Pacific. *Misc. Publs Bernice P. Bishop Mus.*, **34** : 1-91.

NOBILI, G., 1907. — Ricerche sui crostacei della Polinesia. Decapodi, stomatopodi, anisopodi e isopodi. *Mem. Accad. Sci. Torino*, ser 2, **57** : 351-430, pls 1-3.

ODINETZ, O., 1983. — *Ecologie et Structure des Peuplements de Crustacés Décapodes Associés aux Coraux du Genre Pocillopora en Polynesie Française et en Micronesie (Guam).* Doctoral thesis, Université Pierre et Marie Curie, Paris 6 : 221 pp., figs 1-48,photo. 1-17, tabls 1-10, 1-2. [microfilm TDM 12, 1984, ORSTOM,Paris].

ODINETZ, O., 1984a. — Révision des *Trapezia* du groupe *cymodoce-ferruginea* (Crustacea, Decapoda, Brachyura), avec des notes complémentaires concernant *T. serenei* Odinetz, 1983, et *T. punctimanus* Odinetz, 1983. *Bull. Mus. Natl Hist. Nat., Paris*, (4) (A), **6** : 431-451, figs 1-4.

ODINETZ, O., 1984b. — L'éthologie au service de la systématique : l'example des *Trapezia* (Crustacés Décapodes, Brachyoures). *Oceanis*, **10** (1) : 123-130, figs 1-4.

ODINETZ-COLLART, O. & RICHER DE FORGES, B., 1985. — Ecology of decapod crustaceans associated with *Pocillopora* corals from Polynesia and Guam. *Proc. Fifth Int. Coral Reef Cong. , Tahiti*, **5** : 197-203, figs 1-4, tabl. 1.

ORTMANN, A. E., 1893. — Abtheilung : Brachyura (Brachyura genuina Boas), II. Unterabtheilung : Cancroidea, 2. Section : Cancrinea, 1. Gruppe : Cyclometopa. Die Decapoden-Krebse des Strassburger Museums. VII. Theil. *Zool. Jb. Syst.* **7** : 411-495, pl.17.

ORTMANN, A. E., 1897. — Die geographische Verbreitung der Decapoden-Familie Trapeziidae. *Zool. Jb. Syst.*, **10** : 201-216.

PATTON, W. K., 1966. — Decapod Crustacea commensal with Queensland branching corals. *Crustaceana*, **10** (3) : 271-295, figs1-3, tabl. 1.

PAULSON, O., 1875. — *[Studies on Crustacea of the Red Sea with Notes Regarding other Seas].* English translation by The Israel Program for Scientific Translation, Jerusalem, S. Monson, 1961 : 164 pp., pls 1-21, tabl. 1.

PEYROT-CLAUSADE, M., 1989. — Crab cryptofauna (Brachyura and Anomura) of Tikehau, Tuamotu Archipelago, French Polynesia. *Coral Reefs*, **8** : 109-117, figs 1-5, tabls 1 & 2.

POUPIN, J., 1996. — Crustacea Decapoda of French Polynesia (Astacidea, Palinuridea, Anomura, Brachyura). *Atoll Res. Bull.*, **442** : 1-114, 2 figs.

RATHBUN, M. J., 1907. — Reports on the scientific results of the expedition to the tropical Pacific, in charge of Alexander Agassiz, by the U. S. Fish Commission Steamer "Albatross", from August, 1899, to March, 1900, Commander Jefferson F. Mosher, U. S. N., commanding. IX. Reports on the scientific results of the expedition to the eastern tropical Pacific...from October, 1904, to March, 1905...X. The Brachyura. *Mem. Mus. Comp. Zool. Harv.*, **35** (2) : 23-74, pls 1-9.

RIBES, S. 1978. — *La macrofaune vagile associée à la partie vivante des scléractiniaires sur un récif frangeant de l'île de la Réunion (Océan Indien).* Doctoral thesis, Université Aix-Marseille 2 : 167 pp, figs 1-28, tabls 1-27, 1-4.

RÜPPELL, E., 1830. — *Beschreibung und Abbildung von 24 Arten kurzschwänzingen Krabben, Beitrag zur Naturgeschichte des rothen Meeres.* Frankfurt a. M., H. L. Brönner : 28 pp., pls 1- 6.

SAKAI, T., 1976. — *Crabs of Japan and the Adjacent Seas.* Kodansha, Tokyo : vol. 1, xxix + 773 pp., figs 1-379 ; vol. 2, 461pp., figs 1 & 2 ; vol. 3, 16 pp., pls 1-251.

SALVAT, B. & RICHARD, G., 1985. — Takapoto Atoll, Tuamotu Archipelago. *In* : DELESALLE, B., GALZIN, R. & SALVAT, B., (eds), French Polynesian coral reefs. *Proc. Fifth Int. Coral Reef Congress, Tahiti*, **1** : 323-362, figs 1-34.

SENDLER, A., 1923. — Die Decapoden und Stomatopoden der Hanseatischen Südsee-Expedition. *Abh. Senckenb. Naturforsch. Ges.* , **38** : 21-47, figs 1-3, pls 5, 6.

SERÈNE, R., 1959. — Note sur les espèces de *Trapezia* du groupe *digitalis* et sur leurs relations avec les espèces de *Tetralia. Treubia*, **25** (1) : 127-157, figs1-6, pls 1 & 2.

SERÈNE, R., 1971. — Observations on species of the group *Trapezia rufopunctata-maculata*, with a provisional key for all the species of *Trapezia. J. Mar. Biol. Ass. India*, **11** [1969] : 126-148.

SERÈNE, R., 1973. — Observations sur les espèces des genres *Quadrella* Dana 1851 et *Sphenomerides* Rathbun 1898 (Decapoda-Brachyura). *Bull. Soc. Zool. Fr.*, **98** (1) : 191-209, figs 1-28, pls 1-5.

SERÈNE, R., 1975. — Note additionnelle sur les espèces indo-pacifiques de *Quadrella* Dana 1851 (Crustacea, Decapoda, Brachyura). *Bull. Soc. Zool. Fr.*, **100** (4) : 509-521, figs 1-13, pls 1 & 2.

SERÈNE, R., 1984. — Crustacés Décapodes Brachyoures de l'Océan Indien Occidental et de la Mer Rouge, Xanthoidea : Xanthidae et Trapeziidae. Avec un addendum par A. CROSNIER : Carpiliidae et Menippidae. *Faune tropicale*, **24** : 1-349, figs A-C + 1-243, pls 1-48.

SEURAT, L. G., 1934. — La faune et le peuplement de la Polynésie française. *In* : Contribution à l'étude du peuplement zoologique et botanique des îles du Pacifique. *Mém. Soc. Biogéogr.*, **4** : 41-74.

TAKEDA, M., 1994. — [Pagurids and crabs.]. *In* : OKUTANI, T. (ed.) [*Coral Reef Animal Life.*] Pp. 221-264. Tokyo, Yamakei.[In Japanese].

WARD, M., 1939. — The Brachyura of the second Templeton Crocker - American Museum Expedition to the Pacific Ocean. *Am. Mus. Novit.*, **1049** : 1-15, figs 1-17.

WARD, M., 1941. — New Brachyura from the Gulf of Davao, Mindanao, Philippine Islands. *Am. Mus. Novit.*, **1104** : 1-15, figs 1-30.

Pl. 1. — **A**. *Tetralia cinctipes* Paulson, 1875. Live ♂, Tuamotu Archipelago, French Polynesia (MNHN-B 25326). **B**. *Tetraloides heterodactyla* (Heller, 1861). Live ♂, Tuamotu Archipelago, French Polynesia (MNHN-B 25325). **C**. *Trapezia areolata* Dana, 1852. Live ♀, Tuamotu Archipelago, French Polynesia (MNHN-B 25313). **D**. *Trapezia globosa* sp. nov. Live ♀ infected with bopyrid parasite, Marquesas Islands, French Polynesia (MHNN-B 25321). **E**. *Trapezia punctimanus* Odinetz, 1984. Live, Tuamotu Archipelago, French Polynesia (MNHN-B 22994). **F**. *Trapezia speciosa* Dana, 1852. Live ♀, Tuamotu Archipelago, French Polynesia (MNHN-B 25319). Photographs by J. POUPIN.

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CARTE DE RÉPARTITION DES LUTITES

Christophe CHEVILLON

CENTRE ORSTOM DE NOUMÉA

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SÉDIMENTOLOGIE DESCRIPTIVE
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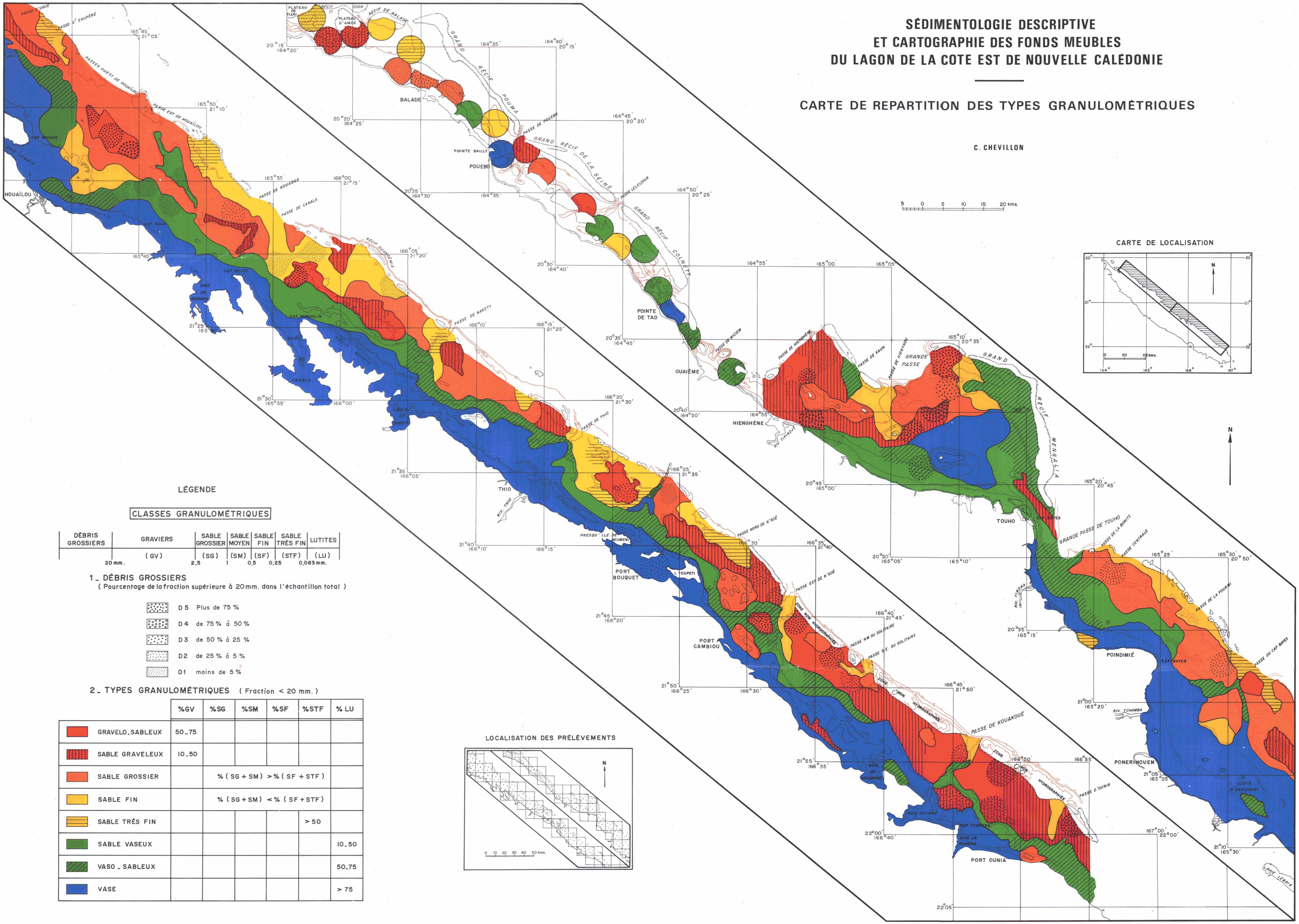
CARTE DE REPARTITION DES TYPES GRANULOMÉTRIQUES

C. CHEVILLON



LÉGENDE

CLASSES GRANULOMÉTRIQUES

DÉBRIS GROSSIERS	GRAVIERS (GV)	SABLE GROSSIER (SG)	SABLE MOYEN (SM)	SABLE FIN (SF)	SABLE TRÈS FIN (STF)	LUTITES (LU)

20 mm. — 2,5 — 1 — 0,5 — 0,25 — 0,063 mm.

1_ DÉBRIS GROSSIERS

(Pourcentage de la fraction supérieure à 20 mm. dans l'échantillon total)

- D 5 Plus de 75 %
- D 4 de 75 % à 50 %
- D 3 de 50 % à 25 %
- D 2 de 25 % à 5 %
- D 1 moins de 5 %

2_ TYPES GRANULOMÉTRIQUES (Fraction < 20 mm.)

	%GV	%SG	%SM	%SF	%STF	% LU
GRAVELO_SABLEUX	50_75					
SABLE GRAVELEUX	10_50					
SABLE GROSSIER		% (SG + SM) > % (SF + STF)				
SABLE FIN		% (SG + SM) < % (SF + STF)				
SABLE TRÈS FIN					> 50	
SABLE VASEUX						10_50
VASO _ SABLEUX						50_75
VASE						> 75