

Occurrence of the Indo-Pacific prawn *Macrobrachium equidens* in West Africa (Crustacea, Decapoda, Palaemonidae)

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SUMMARY

Macrobrachium equidens is recorded for the first time from Atlantic waters. The species first appeared in 1981 collections from the Bonny River (eastern Niger Delta, Gulf of Guinea) where it is now abundant. It was not found during similar collecting in 1980, and may be an exotic species introduced recently by shipping traffic.

The known Nigerian distribution of *M. equidens* is mapped. It has been found only in waters of about 15-30 ppt salinity. In east and southern Africa it occurs at lower salinities, which in Nigeria are occupied by indigenous species of *Macrobrachium*. Interspecific competition may be involved.

KEY WORDS : Shrimp — *Macrobrachium* — Introduction — Competition — Distribution — Zoogeography — Salinity — Estuary — Nigeria.

RÉSUMÉ

PRÉSENCE EN AFRIQUE DE L'OUEST DE LA CREVETTE INDO-PACIFIQUE *Macrobrachium equidens* (CRUSTACEA DECAPODA PALAEMONIDES)

La crevette *Macrobrachium equidens*, antérieurement inconnue dans l'Atlantique, est signalée au Nigeria. Elle a fait sa première apparition en 1981, parmi les récoltes faites depuis 1980 dans la rivière Bonny (Delta du Niger, Golfe de Guinée); et elle y est devenue assez abondante. On considère qu'il s'agit d'une espèce exotique, introduite récemment par le trafic maritime.

Dans le delta du Niger, *M. equidens* se trouve uniquement dans des eaux de salinité très élevée (entre 15-30 g/l approximativement). Mais en Afrique orientale et du sud, l'espèce habite des eaux moins salées ou même douces. Au Nigeria ces eaux sont occupées par les espèces indigènes telles que *M. vollenhovenii* et *M. macrobrachion*. On se demande s'il y a exclusion compétitive.

MOTS-CLÉS : Crevette — *Macrobrachium* — Introduction — Compétition — Répartition — Zoogéographie — Salinité — Estuaire — Nigeria.

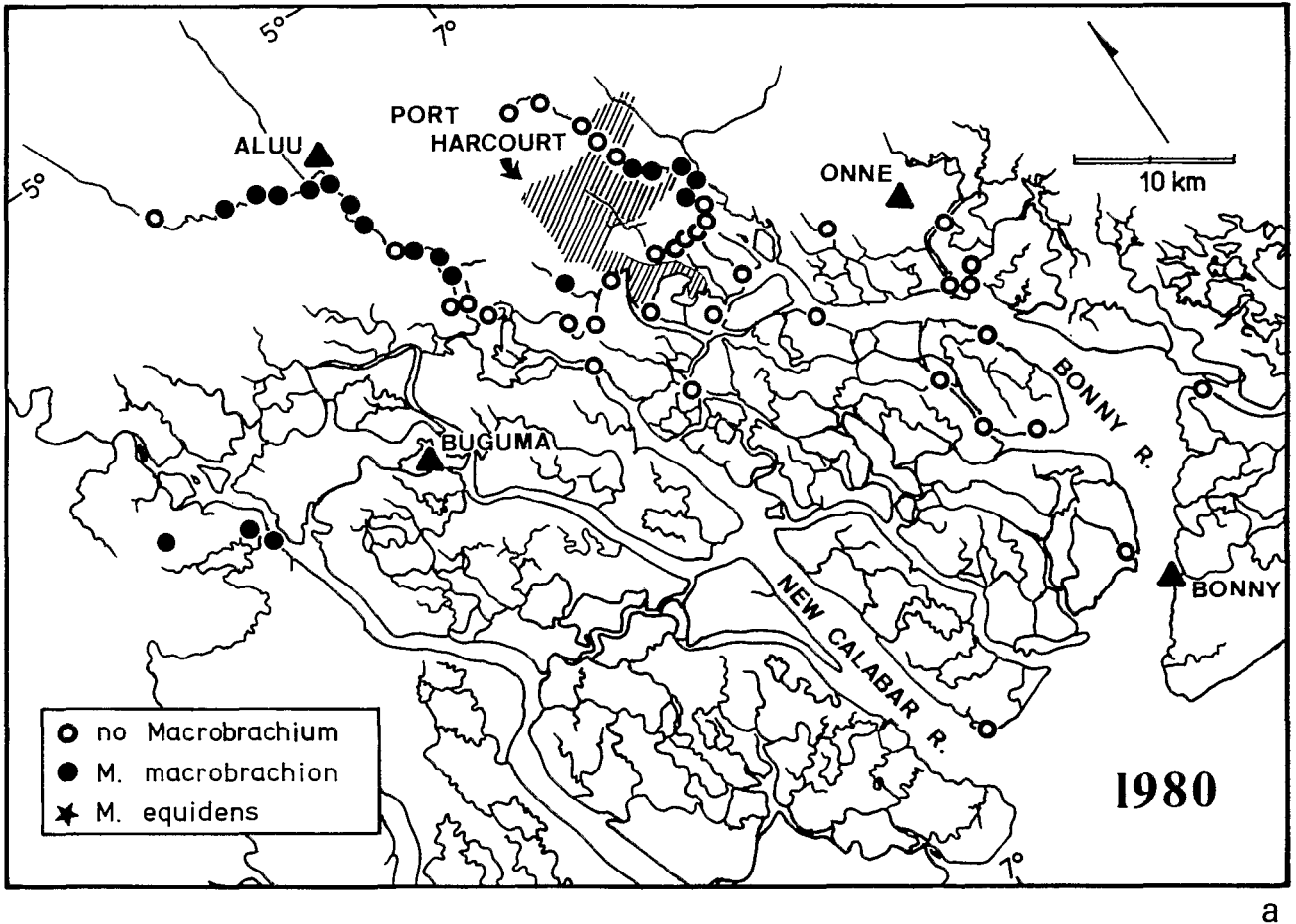
1. INTRODUCTION

In 1982 I reported an apparently undescribed species of *Macrobrachium* from Bonny on the coast of the Niger Delta (POWELL, 1983). On seeing the manuscript of that paper, Prof. L. B. HOLTHUIS (*in litt.*, 17 February 1982) tentatively identified the species as the Indo-Pacific *Macrobrachium equidens* (DANA, 1852). Field work during the rest of 1982

showed the species to be common further inland, at sites from which it was previously unknown. Eventually a fully developed male was obtained, which allowed Prof. HOLTHUIS to confirm his identification (*in litt.*, 20 December 1982).

The information presented below indicates that the species is truly exotic, and colonized the eastern Niger Delta around 1980-81.

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FIG. 1. — Distribution of *Macrobrachium equidens* and *M. macrobrachion* in the Bonny River system in (a) 1980 and (b) 1981-84. Inset shows other 1981-84 records for *M. equidens*, mentioned in the text

Répartition de *Macrobrachium equidens* and *M. macrobrachion* dans le système Bonny, pendant (a) 1980 et (b) 1981-84. La petite carte présente les autres récoltes de 1981-84, citées dans le texte

2. REVIEW OF THE SPECIES' INDO-PACIFIC DISTRIBUTION AND ECOLOGY

2.1. Distribution

M. equidens is a tropical species, occurring naturally from Australasia (New Britain and New Caledonia: HOLTHUIS, 1980) westwards through south-east Asia and southern India to East Africa. In East Africa it is known from Kenya (BAILEY and CRICHTON, 1971) southwards to Natal (KENSLEY, 1981).

It has not been recorded from the relatively well-studied temperate waters of southern and south-western Africa (e.g. DAY, 1981 and KENSLEY, 1981), or the Mediterranean.

2.2. Habitat ecology

The published literature implies geographic variation in the habitat and salinity preferences of *M. equidens*. The species appears to favor higher salinities in the east, and fresh water in the western parts of its range.

JOHNSON (1965, 1973) indicates that in Malaysia it is primarily a species of polyhaline waters including mangrove creeks and prawn ponds. He comments (1965) that it "...occurs in marine habitats, though relatively rare there (HOLTHUIS, 1950; JOHNSON, 1962a)". JOHNSON does not list it under oligohaline fauna (1973) or freshwater fauna (1967).

KURIAN and SEBASTIAN (1982) gives its Indian (Kerala) habitat as "fresh and brackish waters".

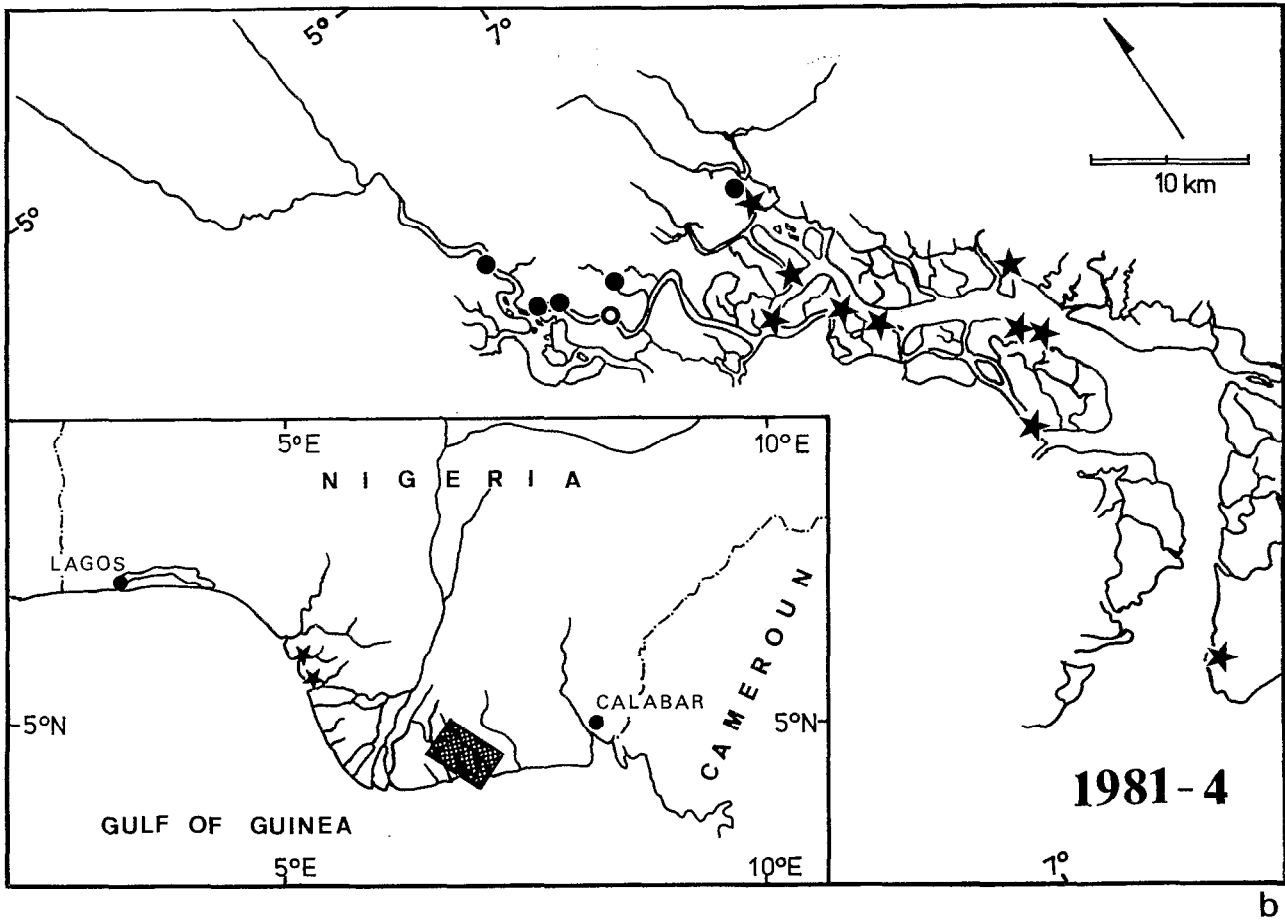


FIG. 1.

In East Africa, BAILEY and CRICHTON (1971) write: "An essentially brackish water species but extending into freshwater."

In southern Africa DAY (1981) and KENSLEY (1981) both list it as a freshwater species. KENSLEY writes further that it "...inhabits the lower reaches and estuaries in Natal and southern Mozambique". DAY (1969) states that it "lives among weeds in brack water and ascends rivers", and later (1981) refers to it occurring at or tolerating low salinities.

3. DISTRIBUTION AND ECOLOGY IN NIGERIA

The salinity of the Bonny River is very stable because of the small freshwater input. Most of the river is tidal; at Aluu the tidal range is 2 meters although the water is fresh. NEDECO (1961) records surface salinities of 18-20 ppt at Port Harcourt regardless of season or tide level. Personal un-

published data for the period 1980-86 suggest a distinct seasonal variation, but confirm that stations downstream of Port Harcourt will have salinities consistently above 15 ppt. The lowest available salinity-range values for Port Harcourt (13-17 ppt with one extreme value of 10 ppt) were obtained during the late wet season (August-September 1982).

The distribution of *Macrobrachium* in the Bonny River in 1980 when its shrimp fauna was surveyed in detail (POWELL, unpublished) is shown in Figure 1 (a). Some of the stations for *M. macrobrachion* also had *M. vollenhovenii* present.

The absence of *M. equidens* can be accepted with a high level of confidence because of the number of stations, the intensity of collecting efforts, and the absence of any other *Macrobrachium* (with which *M. equidens* might have been confused) in stations downstream of Port Harcourt. All the collections were made at low tide, and many stations were sampled on several occasions. Those stations which

later had *M. equidens* present, were sampled during the period 2 May to 12 August 1980, mostly in May (start of rainy season) when seasonally high salinities would occur. The collections included the same range of high-salinity palaemonid species (*Palaemon maculatus*, *Palaemon elegans* and *Leander tenuicornis*) as was found during the 1982-84 collections at the same sites.

Figure 1 (b) shows the distribution of *M. equidens* in 1981-1984 made over the Niger Delta. The records are from three rivers: the Escravos, the Forcados (both records shown on inset maps) and the Bonny.

The first collection of *M. equidens* was made in March 1981 on the east bank of the Bonny River between Bonny Town and the sea. The specimens were taken by hand net from subtidal crevices in the peat bank of the canal cut for the Bonny Liquefied Natural Gas Project at Finima. The salinity of the site would approximate that of sea water at the river mouth.

All subsequent collections of *M. equidens* have been from high salinity waters (15 ppt or more) and associated with steep eroding peat banks. The collections usually also included high-salinity palaemonids such as *Palaemon maculatus*, *Palaemon elegans* and *Leander tenuicornis*, but not low-salinity forms such as *Palaemoneles africanus* and *Palaemon* sp. A (of POWELL, 1983).

4. DISCUSSION

The indigenous species *M. macrobrachion* and *M. vollehovienii* both have salinity ranges from fresh

water to 15 ppt (POWELL, 1983). *M. equidens* is not known from such low salinities in the Bonny River, even though most of the Indo-Pacific literature suggests it should occur there.

Possibly *M. equidens* is excluded from the lower salinity zones by competition from the morphologically similar *M. macrobrachion*. Alternatively, perhaps there is geographic variation in the salinity preference of *M. equidens* in the Indo-Pacific — hence the discrepancy in published accounts of its salinity range — and the Nigerian population is derived from high-salinity stock.

One hopes that workers in other tropical Atlantic areas will watch for the appearance of *M. equidens*, and for evidence of its competitive relations with indigenous species. Its large size, and the striking yellow-to-red and black mottling on its chelipeds, makes it rather conspicuous. So far, no records are available outside the Niger Delta. Occasional samples of *Macrobrachium* submitted to me for identification from the Lagos and Calabar areas over the past 5 years have contained only indigenous species. MARIOGHAE (1982) reports only *M. vollehovienii* and *M. macrobrachion* from Lagos Lagoon.

The mode of introduction cannot be traced, but there has been ample opportunity through shipping traffic to Port Harcourt and more especially through the ballast water of oil tanker traffic to Bonny and other Niger-Delta oil terminals.

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