Cteniobathynella essameuri *n. sp.*, *the first representative of the* Bathynellacea (Crustacea) *in the central Sahara* (1)

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ABSTRACT

Description of a new species of the almost exclusively African genus Cteniobathynella *from a spring in the central Sahara in Algeria.* SCHMINCKE's *idea on the history of distribution of the family is discussed; the hypothesis that the sole South-American representative of the genus is apomorphic is criticized.*

KEY WORDS: Africa. Sahara. *Crustacea.* Biogeography. Origin.

RÉSUMÉ

CTENIOBATHYNELLA ESSAMEURI N. SP., PREMIER REPRÉSENTANT DES *BATHYNELLACEA* (CRUSTACÉS) AU CENTRE DU SAHARA

Description d'une nouvelle espèce du genre Cteniobathynella *d'Ain Essameur, une source à faible débit dans le Jebel Idjerane, Sahara Central, Algérie. La situation du biotope-type amène à une révision des idées de* SCHMINKE *sur la voie migratrice (en utilisant la vallée du Rift) des ancêtres de la famille des* Parabathynellidae *d'Asie vers le Centre africain et l'Amérique du Sud. Comme l'espèce nouvelle est plus proche de l'unique espèce brésilienne que des cinq espèces africaines, l'hypothèse que l'espèce sud-américaine soit la plus évoluée est mise en doute.*

MOTS-CLÉS : Afrique. Sahara. Crustacés. Biogeographie. Origine.

The relictual fauna and flora of the Sahara desert shows very different origins. As a crude approximation, the northern half of the desert is characterized by predominantly holarctic biota, and the Southern half by Africotropical biota (MONOD, 1957; QUEZEL, 1965). However, a finer analysis shows that, in almost all animal groups, Africotropical elements have reached northern Africa, the Iberian Peninsula and even Corsardinia and Southern Italy, while, on the other hand, elements of holarctic origin have settled as far south as the Sahel.

Another basic feature of the Saharian fauna is the scarcity of endemic species, due to the pulsating nature of the climatic conditions in Africa since the early Tertiary, and, especially, during the Pleistocene. Under given climatic conditions, there was either not enough time for speciation to occur, or newly evolved species went extinct because of climatic change, or both.

This reasoning applies, of course, in particular to aquatic faunas which are reputedly the first victims in the event of an aridisation. Exceptions

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do, however, occur, and are instructive because they give insight into the very process of speciation. The present paper deals with such an exception, occurring in a type of biotope that, even in case of drying-out of the surface waters, can maintain its identity: the groundwater. Sufficient time is therefore available to allow evolution to proceed, and it is precisely the presence of a high endemicity in the phreatic space that strenghtens the views given above about the absence of such an endemicity in surface waters.

A systematic study of the groundwater fauna of the Sahara will therefore certainly yield interesting results, especially in such a group as the *Bathynellacea*.

DESCRIPTION OF *CTENIOBATHYNELLA ESSAMEURI* N. SP.

Material

2 ♂, 1 ♀ (Holotype). Holotype and allotype dissected and mounted on slides, deposited in the Musée royal de l'Afrique centrale, Tervuren, Belgium.

Holotype

Length 1.3 mm. Body segments gradually widening towards the pleotelson. Body smooth, except the head area, which has a somewhat granular surface.

Uropods (fig. 8), first antenna (fig. 1), first maxilla (fig. 3), second maxilla (fig. 4) and seven thoracopods (*e.g.* thoracopod VII, fig. 5) all typical for the genus. Second antenna five-segmented, set with three hairs on top of the apical segment. Uropod (fig. 9): sympodite set with 12 homonomous spines on one side, 10 on the other side. Endopodite ending in a strong spur, surrounded by a narrow membrane, set with three setae. Apical seta longest, basal seta shortest, shorter than spur and less than half as long as median seta. Exopodite bearing two apical setae, as usual.

Mandibula (fig. 11, 12): the pars incisiva has four teeth at its tip. There is no stiff seta at the base of the proximal tooth, the tip of which is sharply produced; "Borstenlobus" trifid. Mandibular palp single-segmented, rather strongly developed. Thoracopod VIII reduced to a tubercle, longer than wide, not swollen apically (fig. 6).

Male

Smaller than female, total length 1.10 and 1.16 mm. Sexual dimorphism limited to the presence of a supplementary seta on the endopodite of the uropod (fig. 10), and the presence of a more developed thoracopod VIII (fig. 7), which shows little differenciation and bears two small apical hairs of very unequal length. There is, again, asymmetry in the number of internal teeth on the sympodite of the uropod, which is 11:10 in both specimens available.

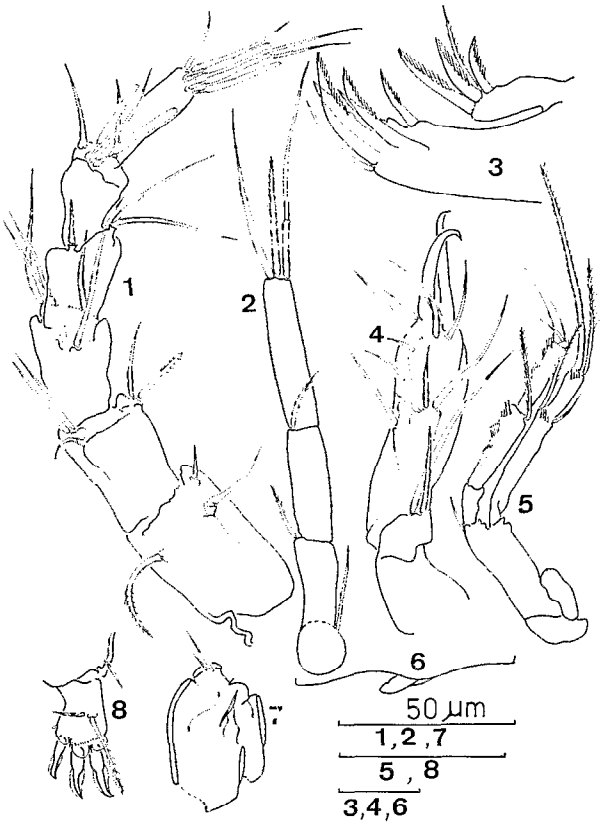

FIG. 1 à 8. — *Cteniobathynella essameuri* n. sp. ♀. 1. first antenna, 2. second antenna, 3. first maxilla, 4. second maxilla, 5. thoracopod VII, 6. thoracopod VIII, 7. ♂, thoracopod VIII, 8. ♀, furcal ramus.

Type locality

Ain Essameur is one of the relatively numerous freshwater springs that are found on the flanks of Djebel Idjerane, a rocky massif which is part of the Adrar Ahnet, some 150 km SE of In Salah, Central Algeria and Central Sahara. Among 14 springs sampled here by the members of a biological expedition party on 13 September 1979, Ain Essameur was the only one yielding a significant fauna. At the time of sampling, the spring was hardly producing any flow, and rather looked like

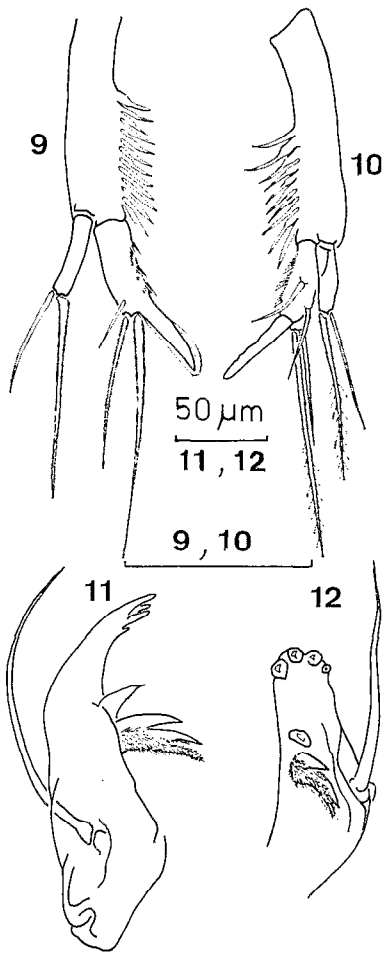

FIG. 9 à 12. — *Cteniobathynella essameuri* n. sp., 9. ♀, uropod, 10. ♂, uropod, 11-12. ♀, mandibula viewed from aside (11) and from above (12).

a series of smallest, shallow puddles, the bottom of which was covered by an algal mat.

Origin of the name

The species is named after the type locality.

Accompanying fauna

Apart from a few unidentified mites, specimens were found of the cyclopoid *Microcyclops rubellus* (Lillj.), a facultative phreatobiont, an a single damaged female of a harpacticoid, *Nitocrella* sp., non *N. ioneli* DUMONT & DECRAMER. The latter is the only representative of this exclusively subterranean genus known from the Sahara so far. The complete absence of Nematodes in the sample is remarkable.

RELATIONSHIP OF THE NEW SPECIES AND CHOROLOGICAL AFFINITIES

As stressed by SCHMINKE (1972), the species of *Cteniobathynella* form a cluster of very closely related species. The discovery of another species in the central Sahara considerably widens the range of the genus as previously known to the North-West. Geographically closest is *C. calmani* (Por) from the Dead Sea depression, from which it differs in a number of morphological respects (number of teeth on the sympodite of the uropod, Borstenlobus of mandible quadrifid, five apical teeth on pars incisiva, two hairs on top of apical segment of second antenna).

Remarkably, the only non-African representative of the genus, *C. noodti* Schminke, described from Brasil, appears to be the closest described relative of *C. essameuri*, with which it shares the absence of a seta at the base of the proximal tooth of the pars incisiva of the mandible. Significant differences are, however, seen in the structure of the uropods and of the furcal rami. If the genus *Cteniobathynella* was thus already extant at the time of segregation of Africa and South-America, there was evidently ample time and occasion for it to get distributed all over Africa, and get firmly established in the Sahara before or in between major arid phases. Since Syncarids distribute slowly and difficultly, it is unlikely that the isolation of *C. essameuri* has, at any time, been ruptured since the early Pleistocene. This also throws some doubt on SCHMINKE's idea (1972) that *C. noodti* is the most apomorphic species of the genus. Instead, it might, together with *C. essameuri* and on chorological grounds, well be the most plesiomorphic one.

Finally, SCHMINKE's (1971, 1974) scheme on the genesis of the chorology of the *Parabathynellidae* should also be somewhat revised. Indeed, the hypothetical pathway followed by ancestral forms from SE Asia through Africa was believed to have followed the East African rift valley very closely in the northern half of the continent. *Acanthobathynella*, the West African genus was believed to have originated from this ancestral stock as the result of an East-West migratory movement at about the latitude of the equator. The discovery of another species considerably West of the former range of the genus *Cteniobathynella*, which Schminke believes to lie at the basis of both African and South American distribution patterns, now allows one to predict possibly far more complicated historical backgrounds to present genus and species ranges.

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REFERENCES

DUMONT (H. J.), 1979. — Limnologie van Sahara en Sahel. State University of Gent, 557 pp.

MONOD (T.), 1957. — Les grandes divisions chorologiques de l'Afrique. *Cons. Sci. Afr. Sud Sahara*, 24 : 147 pp.

POR (F. D.), 1968. — *Parabathynella calmani* n. sp. (Syncarida, Bathynellacea) from Israel. *Crustaceana*, 14: 151-154.

SCHMINKE (H. K.), 1972. — Evolution, System und Verbreitungsgeschichte der Familie Parabathynellidae (Bathynellacea, Malacostraca). Akad. Wiss. Lit. Mainz, math.-nat. Kl., *Mikrofauna Meeresboden*, 24 : 1-192.

SCHMINKE (H. K.), 1974. Mesozoic intercontinental relationships as evidenced by bathynellid Crustacea (Syncarida: Malacostraca). *Syst. Zool.*, 23 : 157-164.

QUÉZEL (P.), 1965. — La végétation du Sahara. Du Tchad à la Mauritanie. *Geobotanica Selecta*, 2 : 333 pp. Fischer, Stuttgart.