CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 140. ON SOME GAMMARIDEAN AMPHIPODS FROM SRI LANKA AND ADJACENT REGIONS

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ABSTRACT

Genera *Ceradomaera* Ledoyer 1973 and *Quadrivisio* Stebbing 1907 are discovered for the first time in Sri Lanka (=Ceylon). The species *C. plumosa* Led. 1973 and *Q. bengalensis* Stebb. 1907 are redescribed and figured, and bibliography and synonymy of all *Quadrivisio* species are presented. Genus *Ceradocus* Costa 1853 is revised and new genus *Animoceradocus* n. gen. (type-species: *Gammarus semiserratus* Bate 1862) is established. New diagnosis of genera *Ceradomaera, Ceradocus* and *Quadrivisio* are given.

IZVOD

140. PRILOG POZNAVANJU AMPHIPODA. O NEKIM GAMMARIDNIM AMPHIPODAMA IZ SRI LANKE I SUSJEDNIH OBLASTI

Rodovi *Ceradomaera* Ledoyer 1973 i *Quadrivisio* Stebbing 1907 su nađeni po prvi put u Sri Lanki (=Cejlonu). Vrste *C. plumosa* Led. 1973 i *Q. bengalensis* Stebb. 1907 su ponovo opisani i nacrtani, i data je bibliografija i sinonimika svih vrsta roda *Quadrivisio*. Izvršena je revizija roda *Ceradocus* Costa 1853 i postavljen je novi rod, *Animoceradocus*, novi rod (tip roda: *Gammarus semiserratus* Bate 1862). Iznijete su nove dijagnoze rodova *Ceradomaera, Ceradocus* i *Quadrivisio*.

INTRODUCTION

Although certain number of species of *Amphipoda* from Sri Lanka (=Ceylon) has been described and mentioned by several scientists, the fauna of this island is still poorly known. Recently Dr. B. Sket from the University of Ljubljana (Yugoslavia) gave me some material of amphipods at disposition from Sri Lanka. The results of study of one part of that material are presented in this paper; it show the close similarity of fauna of amphipods from Sri Lanka with that of corresponding areas of India and Madagascar.

Acknowledgments: I am indebted to Prof. Dr. Boris Sket from the University of Ljubljana (Yugoslavia) for the loan of material used in this study.

TAXONOMIC PART

Genus CERADOMAERA Ledoyer 1973

Syn.: *Ceradomaera* Ledoyer 1973: 61; Ledoyer 1982: 447; Barnard & Barnard 1983: 616.

Type - species: *Ceradomaera plumosa* Ledoyer 1973 (original design.).

Diagnosis: Body laterally compressed, dorsoposterior margin of some metasomsegments and urosomal segments serrate, dorsum partially setose, urosomites free.

Rostrum short, lateral cephalic lobes subrounded, with ventroanterior incision; eyes present. Antennae normal, accessory flagellum plurisegmented. Labrum entire, subrounded, labium with inner lobes. Mandible incisor toothed, molar triturative, palp slender, 3-segmented, linear, last segment the longest. Maxilla 1 inner plate with few distolateral setae, outer plate with 9 spines, palps of left and right maxilla 1 symmetric to each other, 2-segmented, with distal setae. Maxilla 2 inner plate with lateral setae and only 1 dorsofacial seta. Maxilliped inner plate long, with distoinferior tooth and 3 spines, outer plate with a row of distolateral slender spines, palp 4-segmented, segment 2 elongated, segment 4 with long nail.

Coxae short, coxa 1 produced anteriorly, coxa 4 unlobed, coxae 5-6 with posterior lobe larger than anterior one.

Gnathopod 1 remarkably smaller than 2, with elongate segment 5, segment 6 subchelate. Gnathopods 2 dissimilar to each other in shape and size, with short segment 5. Pereopods 5-7 normal, with toothed ventroposterior corner of segment 2. Pleopods normal. Epimeral plates serrate. Uropods 1-2 biramous, normal, peduncle of uropod 1 with ventrofacial spine. Uropod 3 long, biramous, rami subequal, nearly foliaceous, 1-segmented. Telson gaping, partially incised. Coxal gills normal, ovoid, occur on thoracal segments 2-6. Oostegyts?

Taxa: *plumosa* Ledoyer 1973.

CERADOMAERA PLUMOSA Ledoyer 1973

fig.: I-III

Syn.: *Ceradomaera plumosa* Ledoyer 1973: 65, fig. 11-13; Ledoyer 1982: 448, fig. 168, 169; Barnard & Barnard 1983: 617.

?*Maera othonides* Chilton 1921: 535, fig. 5; K. H. Barnard 1935: 285, fig. 5; Nayar 1959: 24, fig. 1-18.

Description: male 7.5 mm from Jaffna: Last metasomsegment and all three urosomal segments dorsally covered by numerous very fine setae (fig. I, 6; III, 4); dorsoposterior margin of first metasomsegment smooth, that of second and third metasomsegment and first and second urosomal segment crenellated (fig. I, 6; III, 4).

Head with short rostrum and subrounded lateral cephalic lobes notched anteroventrally (fig. I, 1); eyes large, ovoid. Antenna 1 shorter than body, peduncular segments slender, ped. segment 2 longer than 1, both with short ventral spines (fig. II, 6), ped. segment 3 very short; main flagellum 17-segmented, shorter than peduncle, segments each with one short aesthetasc (fig. II, 6).

Antenna 2 peduncular segment 3 elongated, with ventrolateral tooth (fig. II, 7), ped. segment 5 shorter than 4, flagellum 9--segmented; whole antenna 2 with many bunches of long setae, antennal gland cone nearly reaching tip of third ped. segment (fig. II, 7).

Labrum entire, broader than long, subrounded distally (fig. II, 4). Labium with developed inner lobes (fig. II, 5). Mandible molar strong, triturative, incisor toothed; palp slender, palp segment 1 and 3 short, first segment with distal process (fig. III, 6), second palp segment with 2 longitudinal rows of setae, third segment with 5 long setae (D-E setae).

Maxilla 1 inner plate ovoid, with 5 distolateral plumose setae (fig. II, 8), outer plate with 9 spines bearing several lateral teeth each; palp of both maxilla 1 symmetric to each other, 2-segmented, obtuse distally, with 12-14 distal setae (fig. II, 8).

Maxilla 2 both plates with distal setae, inner plate with a few lateral setae and one dorsofacial seta (fig. II, 3). Maxilliped inner plate long, much exceeding tip of first palp segment, truncate distally, with distoinferior tooth and 3 spines (fig. II, 9), outer plate nearly reaching tip of second palp segment, bearing a row of distolateral slender spines; palp 4-segmented, segment 4 with long nail.

Coxae 1-2 nearly as long as broad (fig. III, 1, 2), coxae 3-4 broader than long (fig. II, 1, 2), coxa 5 as long as coxa 4 (fig. I, 2). Coxa 1 with concave anterior margin and produced ventroanterior corner (fig. III, 1).

Gnathopod 1 much smaller than 2, segment 2 at posterior margin with 2 slender spines (fig. III, 1); segment 4 with distal tooth, segment 5 longer than 6, unlobed, densely setose; segment 6

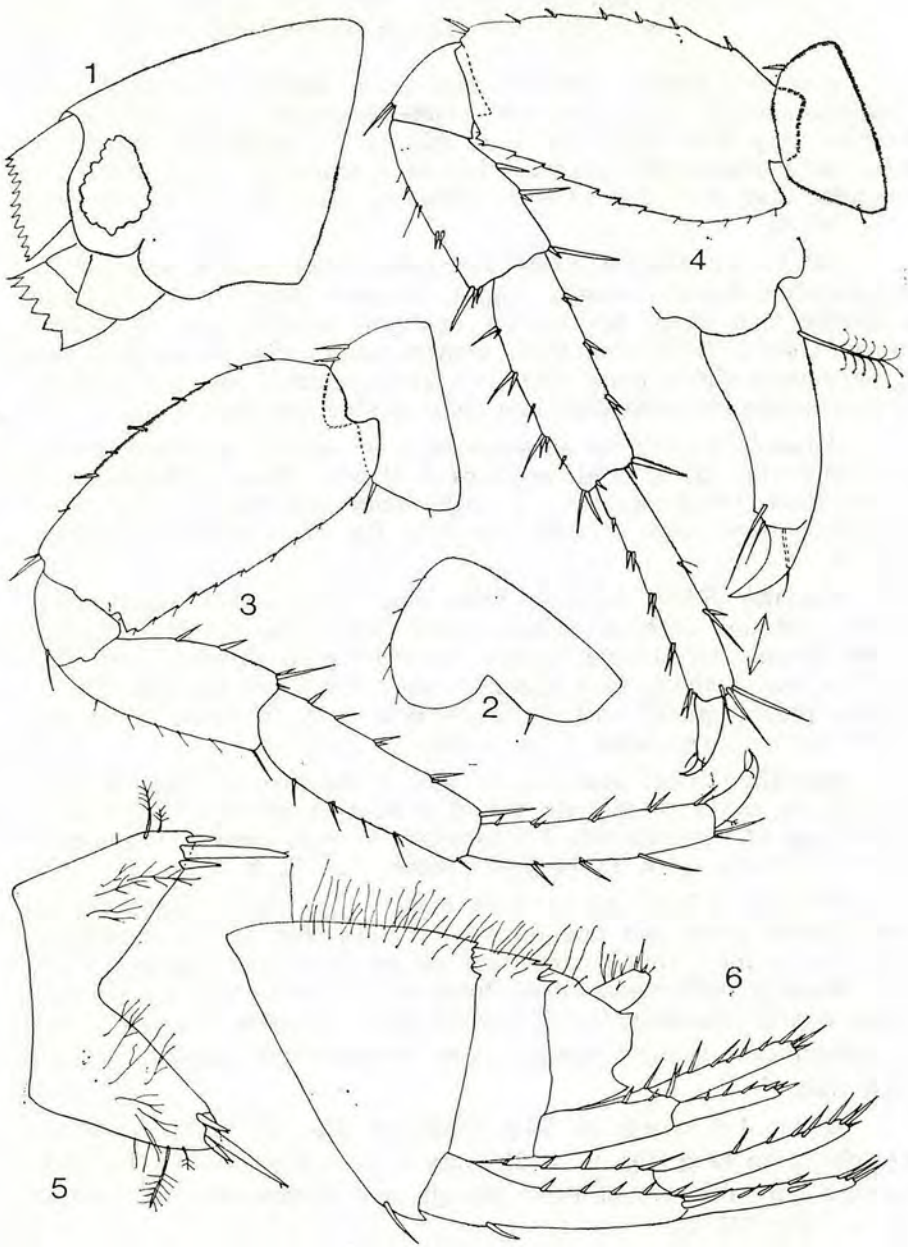

Fig. 1. *Ceradomaera plumosa* Led. 1973, Jaffna, male 7.5 mm: 1 = head; 2 = $coxa_5$; 3 = pereopod 6; 4 = pereopod 7; 5 = telson; 6 = urosome with uropods 1-2.

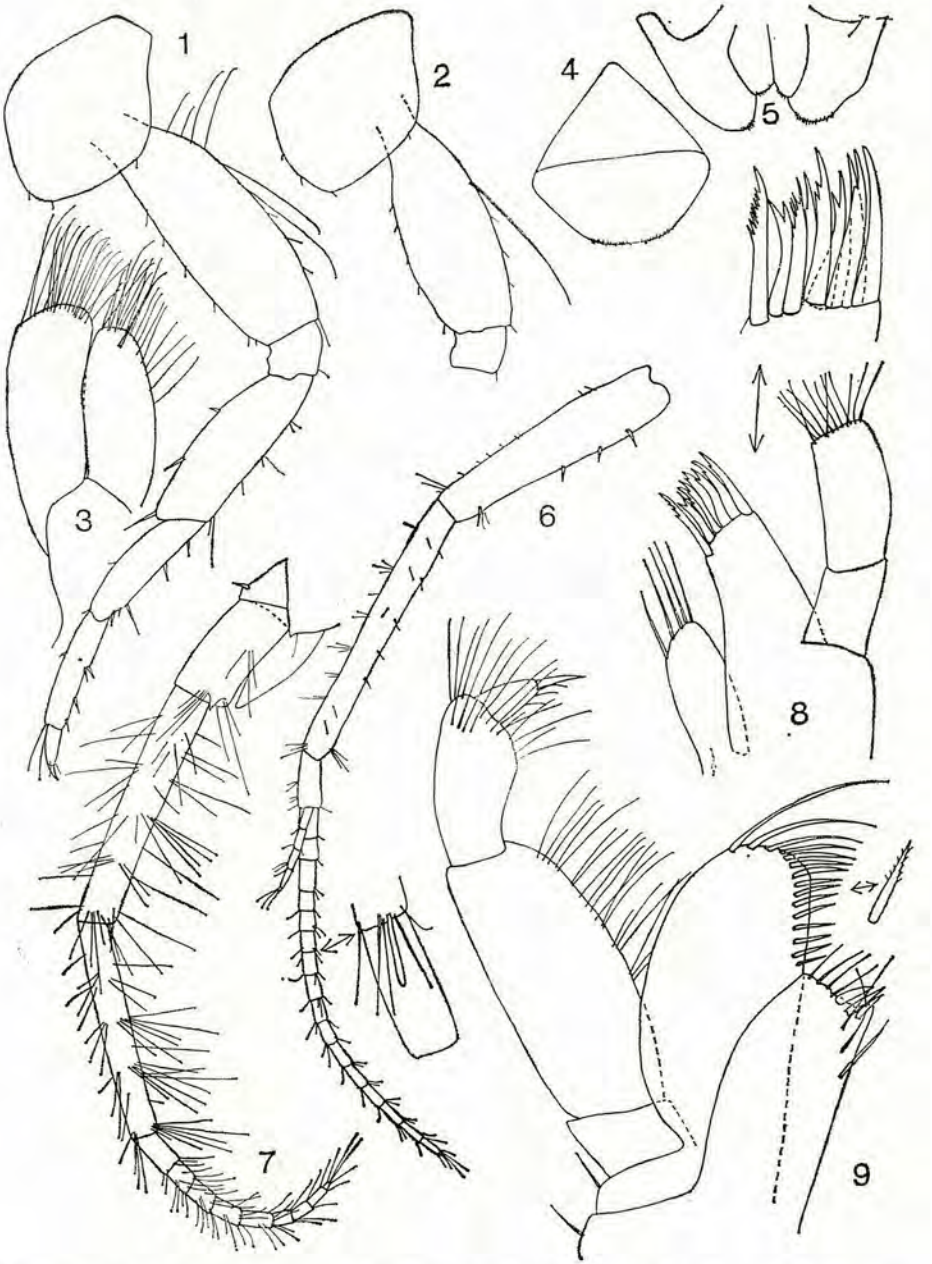

Fig. II. *Ceradomaera plumosa* Led. 1973, Jaffna, male 7.5 mm: 1-2 = pereopods 3-4; 3 = maxilla 2; 4 = labrum; 5 = labium; 6-7 = antennae 1-2; 8 = maxilla 1; 9 = maxiliped.

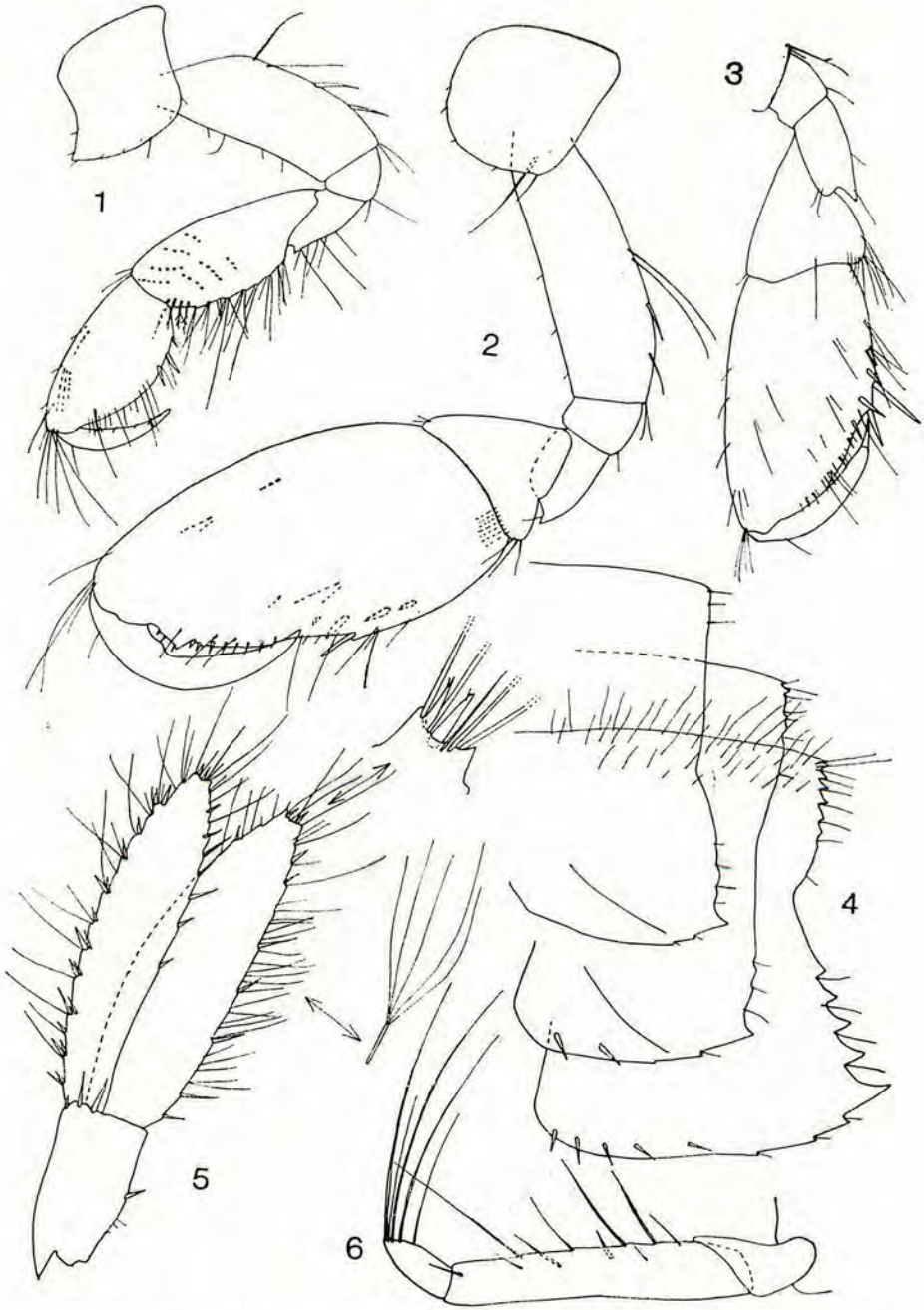

Fig. III. *Ceradomaera plumosa* Led. 1973, Jaffna, male 7.5 mm: 1 = gnathopod 1; 2 = right gnathopod 2; 3 = left gnathopod 2; 4 = epimeral plates 1-3; 5 = uropod 3; 6 = mandibular palp.

ovoid, with oblique convex palm undefined, bearing 3 median palmar spines (fig. III, 1), posterior margin of segment 6 with 3 spines, dactyl slender, with 1 outer marginal seta.

Gnathopod 2 left and right are dissymmetric to each other. Right gnathopod 2 is larger, with segment 4 toothed, segment 5 short, segment 6 large, palm with proximal angular dilatation (fig. III, 2), and defined by 1 long marginal and 3 submarginal spines at posterior margin; dactyl short, with small proximal dilatation at inner margin.

Left gnathopod 2 with segment 5 slightly longer; segment 6 with convex smooth palm; dactyl longer, with 1 seta at outer margin (fig. III, 3).

Pereopod 3 slightly longer than 4, its segment 2 with a row of long setae at posterior margin (fig. II, 1), posterior margin of segments 3-6 with short setae or slender spines (fig. II, 1). Segment 2 of pereopod 4 with one long seta at posterior margin (fig. II, 2).

Pereopod 5 missing. Pereopods 6-7 similar to each other, with toothed unlobed segment 2 with serrate posterior margin (fig. I, 3, 4); segments 4-5 slightly dilated, spinose, dactyl short (fig. I, 3, 4).

Pleopods 1-3 normal, slender, with peduncles provided with 2 retinacula each. Epimeral plates 1-3 sharply pointed, and with serrate posterior margin and ventral margin (fig. III, 4); several spines appear at ventral margin of plates 2-3 (fig. III, 4).

Urosomite 1 near basis of peduncle of uropod 1 with spine (fig. I, 6). Uropods 1-2 normal, biramous, rami with lateral and distal spines. Peduncle of uropod 1 with one ventrofacial spine (fig. I, 6), rami subequal. Inner ramus of uropod 2 distinctly longer than outer one.

Uropod 3 much exceeding tip of uropods 1-2, rami almost foliaceous, bearing many lateral spines and fine setae (fig. III, 5), both rami 1-segmented, subequal.

Telson short, gaping, incised slightly over half of telson-length (fig. I, 5), each lobe with 3 distal spines and with several very fine dorsal setae or hairs. Coxal gills normal.

Material examined: Sri Lanka (=Ceylon): Jaffna, Kecrimalai, spring in the sea, October 1980, one male, accompanied by specimens of *Quadrivisio bengalensis* and *Victoriopisa chilkensis*.

Localities cited: Madagascar: Ifaty, N. of Tulear, on sandy bottom, intertidal zone (Ledoyer, 1973) Sohoit, Russes (Ledoyer, 1982).

— India: of Samal Island, 8-15 feets; Chirriya Island; Breakfast Island; Barkuda Island; Maludaikuda Island; Ennur brackwater near Madras (Chilton, 1921); Travancore (Manumbam Channel; Quilon); Cochin Harbour (K. H. Barnard, 1935); Adyar (Nayar, 1959);

Sri Lanka (=Ceylon): Jaffna (present paper).

Loc. typ.: Madagascar, Ifaty.

Remarks and affinities: The single specimen in hand from Sri Lanka is very similar to the species *C. plumosa* described by Ledoyer from Madagascar, except some details:

Antenna 2 in male densely setose (poorly setose on Ledoyer's figure from Madagascar); eyes large, ovoid (small rounded in description of Ledoyer); segment 5 of pereopod 3 in males with short posterior spines (long spines in Madagascar); outer ramus of uropod 2 remarkably shorter than inner ramus (hardly shorter in Madagascar, but female); accessory flagellum shorter (longer in Madagascar).

Unfortunately, first Ledoyer's description was based on female, and male in his hand was juvenile specimen. On the other hand, Nayar's descriptions and figures of *Maera othonides* from India (1959) and probably these of Chilton (1921) and K. H. Barnard (1935) from India reffer to *Ceradomaera plumosa*.

On figure of Nayar (1959) rami of uropod 2 are subequal long and these of uropod 1 are slightly unequal; palm of gnathopod 2 in adult male is concave, like that in Chilton's and K. H Barnard's specimens from India. It is necessary to establish a variability of that species based on richer material.

Despite all these small differences between different descriptions and figures of material from India, Madagascar and Sri Lanka, we didn'te like to create a new taxon for Sri Lanka specimen untill better knowledge of the variability of this species.

Maera othonides Walker 1904 from Sri Lanka (Ceylon, Cheval Paar) differs from *C. plumosa* by notched lobes of telson, narrow telson; other differences is not possible to establish because of poor description of this species. *Maera othonides* of Pirlot (1936) figured from Paternoster islands and other localities from suthern Hemisphere, maybe is identic with *M. othonides* of Walker, 1904.

Genus CERADOCUS Costa 1853

Syn.: *Ceradocus* Costa 1853: 170; Costa 1857: 224.
Ceradocus (part.) Stebbing 1906: 430; Sheard 1939: 277; J. L. Barnard 1969: 239; J. L. Barnard 1972: 215; G. Karaman 1982: 261; Barnard & Barnard 1983: 614.

Ceradocus (Denticeradocus) Sheard 1939: 277 (type--species: *Gammarus rubromaculatus* Stimpson 1856, selected by Barnard & Barnard 1983).

Type - species: *Ceradocus orchestiipes* Costa 1853 (monotypy).

Diagnosis: Metasomsegments and urosomsegments partially or completely serrate or toothed at posterior margin, occasionally smooth. Head with short rostrum, lateral cephalic lobes subrounded, with ventroanterior incision, eyes present.

Labrum entire, subrounded. Labium with well developed inner lobes. Mandible molar triturative, incisor toothed; palp 3-segmented: first segment toothed distally, short, second segment long, inflated proximally, setose, third segment not shorter than first segment, linear, with distal setae. Maxilla 1 inner plate triangular with row of distolateral setae, outer plate with 9 spines; palp of left and right maxilla 1 symmetric to each other, 2-segmented, setose. Maxilla 2 inner plate with lateral and dorsal oblique row of setae. Maxilliped inner plate with distal spines, outer plate with distolateral row of spines, palp 4-segmented, segment 4 with nail.

Antenna 1 stronger and longer than 2, ped. segment 2 longer than 1, segment 3 short; accessory flagellum plurisegmented. Antenna 2 peduncular segment 3 elongated, ped. segment 5 shorter than 4, antennal gland cone long.

Coxae moderate, coxa 1 with produced ventroanterior corner coxa 4 unlobed. Gnathopods 1-2 dissimilar, gnathopod 1 smaller than 2, with elongated segment 5; segment 5 of gnathopod 2 short in males, segment 6 large. Pereopods 3-4 normal. Segment 2 of pereopods 5-7 with distoposterior tooth or lobe. Pleopods normal. Uropods 1-2 biramous, normal, peduncle of uropod 1 with ventrofacial spine. Uropod 3 biramous, rami subequal, 1-segmented, lanceolate. Telson more or less deeply incised, lobes notched distally. Coxal gills normal, ovoid, occur on thoracal segments 2-6. Oostegyts narrow, occur on thoracal segments 2-5. Sexual dimorphism present.

Taxa: *breweri* (Kunkel, 1910); *capensis* Sheard, 1939; *chevreuxi* Sheard, 1939; *chiltoni* Sheard, 1939; *colei* Kunkel 1910; *crenatipalma* Ledoyer, 1979; *diversimanus* (Miers, 1884); *dooliba* J. L. Barnard, 1972; *haumuri* J. L. Barnard, 1972; *hawaiensis* J. L. Barnard, 1955; *incisa* Ledoyer, 1978; *laevis* Oleröd, 1970; *mahafalensis* Ledoyer, 1979; *natalensis* Griffiths, 1974; *orchestiipes* Costa, 1853; *oxyodus* Berents, 1983; *parkeri* Kunkel, 1910; *paucidentatus* J. L. Barnard, 1952; *ramsayi* (Haswell, 1879); *rubromaculatus* (Stimpson, 1856); *sellickensis* Sheard, 1939; *serratus* (Bate, 1862) (=*spinosa*, Haswell, 1879); *sheardi* Shoemaker, 1948; *shoemakeri* Fox, 1973;

spinicauda (Holmes, 1908); *spinifera* Ledoyer, 1973; *tattersalli* Ledoyer, 1982; *woorree* Berents, 1983; *yandala* Berents, 1983.

Remarks: *C. woorree* and *C. laevis* are with smooth body. *Ceradocus torelli* (Goes, 1866) don't belong to the genus *Ceradocus* because of shape and pilosity of maxilla 2 provided with long distal setae on outer plate (see fig. 28 of Goess, 1866), like that in genus *Pseudoniphargus*.

The number of spines on outer plate of maxilla 1 must be reexamined in all species because Berents (1983) mentioned that *C. woorree* is with only 7 spines and *C. yandala* with 8 spines on outer plate of maxilla 1. The species *colei* and *parkeri* are poorly described and their taxonomic position must be reexamined.

As already mentioned several authors, the subgenus *Denticeradocus* Sheard, 1939, based on denticulation of body-segments, must be considered a synonym of the genus *Ceradocus*.

Genus ANIMOCERADOCUS n. gen.

Syn.: *Ceradocus* (part.) J. L. Barnard 1969: 239; G. Karaman 1982: 261; Barnard & Barnard 1983: 614.

Ceradocus Lincoln 1979: 280.

Type - species: *Megamoera semiserrata* Bate 1862.

Diagnosis: Body similar to that of genus *Ceradocus*, but smooth dorsally; lateral cephalic lobes subrounded, with ventroanterior sinus (not notch), eyes present. Antenna 1 longer than 2, peduncular segment 2 slightly longer than 1, ped. segment 3 nearly four times longer than broad; accessory flagellum plurisegmented. Antenna 2 more slender than antenna 1, ped. segment 5 shorter than 4, ped. segment 3 elongated; antennal gland cone not exceeding third ped. segment.

Mouthparts like these in genus *Ceradocus* except mandible: mandible palp 3-segmented, linear all segments: segment 1 short, without distal tooth, segment 2 is the longest one; segment 3 longer than 1 but exceeding 2/3 of segment 2, non falciform. Coxae moderate, coxa 1 produced ventroanteriorly, coxae 2-4 progressively smaller, coxa 5 as long as 4, coxae 1-2 with ventral notch. Gnathopods 1-2 subchelate, dissimilar, segment 5 of gnathopod 1 elongated, longer than 6. Gnathopod 2 segment 5 shorter than 6. Pereopods 3-4 slender. Segment 2 of pereopods 5-7 with ventroposterior tooth. Epimeral plates serrate posteriorly. Uropods 1-2 biramous, normal, peduncle of uropod 1 with ventrofacial spine. Uropod 3 much exceeding tip of uropods 1-2, rami subequal, lanceolate, 1-segmented. Telson short, cleft over half of its length, lobes notched distally.

Coxal gills occur on thoracal segments 2-6, ovoid. Oostegyts narrow, occur on thoracal segments 2-5. Sexual dimorphism present.

Taxa: *semiserratus* (Bate, 1862); ? *baffini* Stephensen, 1933).

Remarks and affinities: Genus *Ceradocus* differs from *Animoceradocus* by incised, not excavated, ventroanterior part of cephalic lobe, mandibular palp segment 1 toothed, palp segment 2 dilated proximally, palp segment 3 as long as segment 1; peduncular segment 3 of antenna 1 short, etc.

Genus *Ceradocoides* Nicholls, 1938, differs from new genus by presence of 11 spines on outer plate of maxilla 1, inner plate of maxilla 2 without dorsal oblique row of setae, urosomites 1-2 with »sharp pointed triangular carina«, etc.

Genus *Maera* differs by absence of dorsal oblique row of setae on inner plate of maxilla 2.

Genus *Paraceradocus* Stebbing, 1899, differs by linear segment 2 of pereopods 5-7 (unlobed), third palp segment of mandible is subfalciform, peduncle of antenna 2 is stronger than that of antenna 1, etc.

Genus *Ceradomaera* Led. 1973 differs by different pilosity of inner plate of maxilla 2.

Genus *Quadrivisio* Stebbing 1907 differs by shape of mandibular palp (segment 3 longer than 2), coxae 1-4 progressively increasing toward coxa 4, coxa 4 with ventroposterior lobe, etc.

We removed to this genus also *C. baffini* Stephensen 1933, based on smooth first palp segment of mandible, palp segment 3 longer than 1 and only slightly shorter than palp segment 2. But, the pilosity of inner plate of maxilla 2 and armature of outer plate of maxilliped are not completely clear; position of this species needs reexamination.

Genus QUADRIVISIO Stebbing 1907

Syn.: *Quadrivisio* Stebbing 1907: 159; Stephensen 1933: 420; Gordon & Monod 1968: 508; J. L. Barnard 1969: 247; Barnard & Barnard 1983: 619.

Pseudoceradocus Shoemaker 1933: 11 (type-species: *P. lutzi* Shoemaker, 1933, by monotypy).

Type-species: *Quadrivisio bengalensis* Stebbing 1907 (monotypy).

Diagnosis: Body smooth or with small dorsal denticles, head with subrounded lateral cephalic lobes incised at ventroanterior margin; eyes 2 on each side of the head, shape and size

of these eyes are very variable. Antennae 1-2 normal, accessory flagellum plurisegmented.

Labrum subrounded, labium with inner lobes. Maxilla 1 with row of lateral setae only, outer plate with 9 spines, palp 2-segmented, left and right palp slightly asymmetric to each other. Maxilla 2 inner plate with dorsal oblique row of setae. Maxilliped inner plate with distal spines, outer plate with distolateral spines, palp 4-segmented, with distal nail. Mandible molar triturative, incisor toothed, palp 3-segmented, slender, linear, palp segments progressively longer, poorly setose.

Coxae long, coxa 1 linear, coxa 4 with ventroposterior lobe, coxa 5 shorter than 4. Gnathopods 1-2 subchelate, dissimilar, segment 5 of gnathopod 1 elongated. Segment 5 of gnathopod 2 shorter than 6.

Pereopods and pleopods normal. Uropods 1-2 biramous, peduncle of uropod 1 with ventrofacial spine. Uropod 3 long, biramous, rami foliaceous, subequal, 1-segmented. Telson short, cleft nearly to the basis, each lobe notched distally. Coxal gills occur on thoracal segments 2-6; oostegyts narrow, occur on thoracal segments 2-5.

Sexual dimorphism present.

Taxa: *aviceps* (K. H. Barnard, 1940); *bengalensis* Stebbing, 1907; *bousfieldi* G. Karaman & J. L. Barnard, 1979; *chevreuxi* Gordon & Monod, 1968; *lutzi* (Shoemaker, 1933).

KEY TO THE SPECIES

1. Body strongly pitted. Gnathopod 2 in males with dactyl short and strongly hooked AVICEPS

— Body not pitted. Gnathopod 2 in males normal 2

2. Lateral cephalic lobes with excavated ventroanterior margin BOUSFIELDI

— Lateral cephalic lobes of head with incised ventroanterior margin 3

3. Telson without inner lateral spines on each lobe LUTZI

— Telson with inner lateral spines on each lobe 4

4. Palm of gnathopod 2 in males with proximal dilatation BENGALENSIS

— Palm of gnathopod 2 in males without proximal dilatation CHEVREUXI

QUADRIVISIO BENGALENSIS Stebbing 1907

fig. IV-V

Syn.: *Quadrivisio bengalensis* Stebbing 1907: 159, pl. 7; Chilton 1921: 537, fig. 6; Spandl 1924: 440; Chilton 1925: 534; K. H. Barnard 1935: 287; Schellenberg 1938b: 63; Nayar 1959: 26, pl. 9, fig. 1-19; Rabindranath 1972: 162, fig. 6, 7.

Quadrivisio bengalensis (part.) Chevreux 1913: 15, fig. 1A.

nec Quadrivisio bengalensis Bousfield 1971: 260, fig. 3, 4.

Description: All our specimens in hand from Sri Lanka were non adult specimens, the largest one was female with short, non setose oostegyts, 4.2 mm long. As several authors described this species, I mentioned only several interesting and important details: Body smooth, but metasomsegments 1 and 2 often with one dorsolateral posterior short tooth (fig. IV, 7); urosomite 1 with strong posterolateral tooth on each side, urosomite 2 sometimes with posterolateral small tooth and always with spine (fig. V, 8).

Head with short rostrum and obtuse lateral cephalic lobes provided with narrow ventroanterior notch (fig. IV, 6), eyes 2 on each side of head, of variable shape and size (fig. IV, 6, 11). Antenna 1 peduncular segment 1 swollen, with distoventral spine (fig. IV, 1), segment 3 short, segments of main flagellum with 1 aesthetasc each; accessory flagellum 3-4 segmented (fig. IV, 1).

Antenna 2 with peduncular segments 3-4 bearing single dorsal spines, peduncular segments 4-5 subequal long, flagellum longer than last peduncular segment, poorly setose (fig. IV, 2), antennal gland cone reaching tip of third peduncular segment.

Labrum entire, subrounded, broader than long. Labium with small inner lobes (fig. V, 5). Mandible incisor with 5-6 teeth, molar triturative, lacinia mobilis of left and right mandible asymmetric, with 5-10 teeth (fig. IV, 8, 9); mandibular palp slender, linear, second segment with 1 lateral seta, third segment longer than second one, with 2 distal setae (fig. IV, 8).

Maxilla 1 inner plate triangular, with lateral row of setae only (fig. V, 6), outer plate with 9 toothed spines (8 spines with 1-3 lateral teeth, 1 spine with 6-9 teeth), palp of left and right maxilla 1 slightly asymmetric, 2-segmented (left with 4-5 distal spine-like setae, right with 3-4 distal teeth). Inner plate of maxilla 2 with lateral setae and with dorsal oblique row of setae. Maxil-

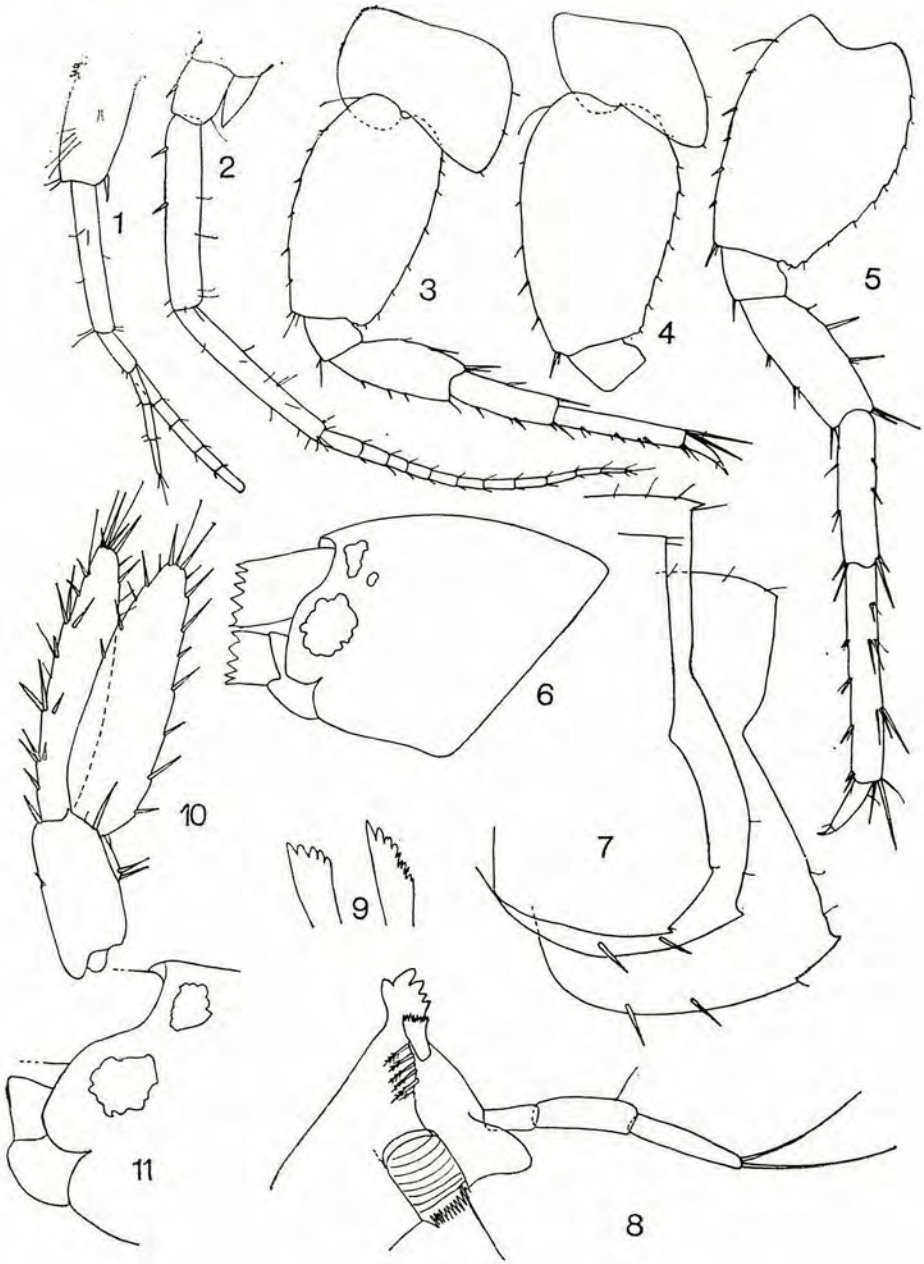

Fig. IV. *Quadrivisio bengalensis* Stebbing 1907, Jaffna, female 4.2 mm: 1-2 = antennae 1-2; 3-5 = pereopods 5-7; 6 = head; 7 = epimeral plates 1-3; 8 = mandible; 9 = left and right lacinia mobilis; 10 = uropod 3; 11 = head, other specimen.

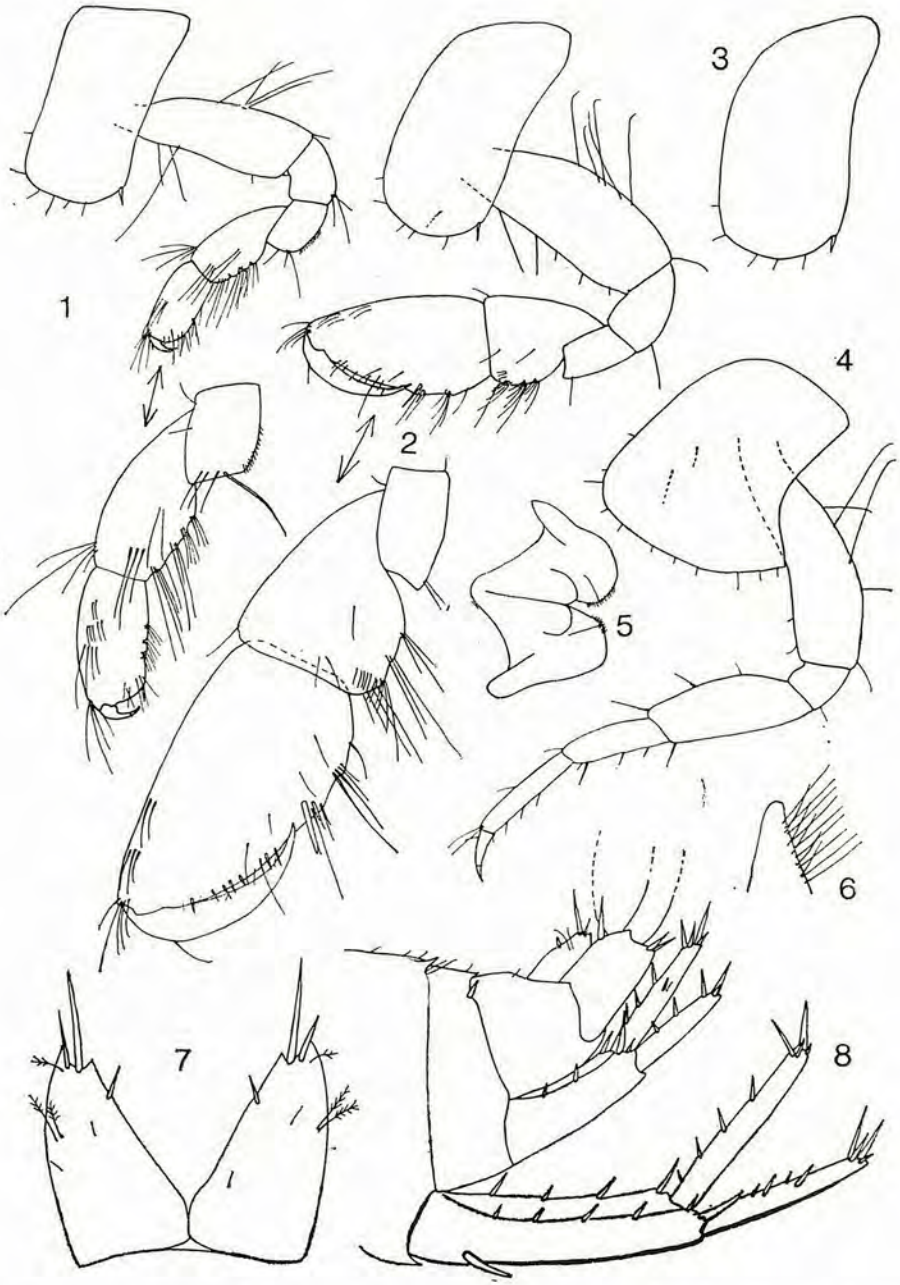

Fig. V. *Quadrivisio bengalensis* Stebbing 1907, Jaffna, female 4.2 mm: 1 = gnathopod 1; 2 = gnathopod 2; 3 = coxa 3; 4 = pereopod 4; 5 = labium; 6 = inner plate of maxilla 1; 7 = telson; 8 = urosome with uropods 1-2.

liped inner plate with 3-4 distal spines; outer plate with row of distoposteral spines, palp 4-segmented, segment 4 with distinct nail.

Coxa 1 not tapering distally, (fig. V, 1), coxae 1-3 with distoposterior spine (fig. V, 1-3), coxa 4 with excavated posterior margin (fig. V, 4).

Gnathopod 1 segment 5 larger and longer than 6, unlobed (fig. V, 1), palm of segment 6 oblique, dactyl with 1 seta at outer margin. Gnathopod 2 segment 5 shorter than 6 (fig. V, 2), segment 6 with convex oblique palm (female), defined by corner spines, dactyl slender, with one seta at outer margin (fig. V, 2).

Pereopods 3-4 normal, with short dactyl (fig. V, 4). Pereopods 5-7 with segment 2 provided with ventroposterior corner (fig. IV, 3-5), dactyl with 1 seta at inner margin, nail short.

Epimeral plates 1-3 with short ventroposterior tooth and convex ventral and posterior margin (fig. IV, 7), plates 2-3 with ventral spines. Uropod 1 peduncle with ventrofacial spine, rami subequal (fig. V, 8).

Uropod 2 inner ramus longer than outer one (fig. V, 8). Uropod 3 much exceeding tip of uropods 1-2, rami subequal, 1-segmented (fig. IV, 10). Telson short, cleft nearly to the basis, each lobe notched distally, with 2 distal spines (fig. V, 7).

Variability: Very variable shape and size of eyes, armature os metasom- and urosomsegments.

Material examined: Sri Lanka (=Ceylon): N. W. Jaffna, Kecrimalai, October, 1980, 10 specimens juv., spring in the sea; accompanied by *Victoriopisa chilkensis* and *Ceradomaera plumosa*.

Loc. typ.: India: Port Canning (Lower Bengal), brackish pool.

Localities cited: INDIA: loc. typ. (Stebbing, 1907); Chilka Lake region (off Samal Island, 8-15 fathoms depth; off Barkul, 3-4 fathoms; off Satpara, 4-5 fathoms; Ghiakhala headland and neighbouring island; main channel, W. of Satpara island (Chilton, 1921); Salt Lakes (Bengal), isolated pond, S. side of Church Hill, Vizagapatam; Mundattalkari, Vaikom, Travancore; Kurumbil Kayal, Travancore; Shertallai, Travancore; Veli Lake, Trivandrum, Travancore (K. H. Barnard, 1935); coast of Madras (Adyar, San Thome) (Nayar, 1959); Kerala: Lake Kayamkulam (Rabindranath, 1972);

THAILAND (=Siam): Thale Luang (=Thale Sap) (Chilton, 1921); Thale Luang Lake and its region: Mouth of Patalung river; Koh-si-Hah; shore of Kaw-Deng; Kaw-Yaw; mainland opposite Kay-Yaw (Chilton, 1925);

SRI LANKA: Jaffna (present work);

FIJI island, Pacific ocean: Viti Levu (Schellenberg, 1938);

AFRICA: coast of Kenya: cave Shimoni, 80 km S. of Mombasa Chevreux, 1913).

QUADRIVISIO AVICEPS K. H. Barnard 1940

Syn.: *Ceradocus aviceps* K. H. Barnard 1940: 456, fig. 25.
Quadrivisio aviceps Griffiths 1975: 35; G. Karaman & J. L. Barnard 1979: 154; Barnard & Barnard 1983: 619.

Loc. typ.: South Africa: Palmiet river lagoon, near Kleinmond, under stones at junction of river and tidal areas.

Localities cited: S. Africa: loc. typ. (K. H. Barnard, 1940); Cape province: Klein River estuary, Hermanus (Griffiths, 1975).

Ecology: in brackish water, under stones.

QUADRIVISIO BOUSFIELDI
G. Karaman & J. L. Barnard 1979

Syn.: *Quadrivisio bengalensis* Bousfield 1973: 260, fig. 3, 4.
Quadrivisio bousfieldi G. Karaman & J. L. Barnard 1979: 154; Barnard & Barnard 1983: 620.

Loc. typ.: Bismarck Archipelago: Manus Island, Liei River, outlet.

Localities cited: known only from type-locality (Bousfield, 1973).

QUADRIVISIO CHEVREUXI Gordon & Monod 1968

Syn.: *Quadrivisio chevreuxi* Gordon & Monod 1968: 509, fig. 28 B-D; G. Karaman & J. L. Barnard 1979: 154; Barnard & Barnard 1983: 620.
Quadrivisio bengalensis (part.) Chevreux 1913: 15, fig. 1 B.

Loc. typ.: Zanzibar island (Tanzania): Machumvi Ndogoro, lake.

Localities cited: Zanzibar, Tanzania: loc. typ. (Chevreux, 1913; Gordon & Monod, 1968); Lake Machumvi Kubwa (Chevreux, 1913).

Ecology: brackish water species.

QUADRIVISIO LUTZI (Shoemaker 1933)

Syn.: *Pseudoceradocus lutzi* Shoemaker 1933: 12, fig. 6, 7; Stephensen 1947: 2, 4.

Quadrivisio Lutzi Monod 1951: 150, fig. 17, 18.

Quadrivisio lutzi Schellenberg 1938: 208; G. Karaman & J. L. Barnard 1979: 154; Barnard & Barnard 1983: 620.

Quadrivisio occidentalis Stephensen 1933: 421, fig. 3-5.

Loc. typ.: Southern America, Guiana: Georgetown (coast of Atlantic ocean).

Localities cited: Southern America: loc. typ. (Shoemaker, 1933); Brasil: Lagoa de Iiquia (Sao Miguel, Alagoas, freshwater) (Schellenberg, 1938);

Lesser Antilles: Bonaire island (Pos Boven Bolivia, brackwater cistern); Aruba island (Fontein, brackwater well) (Stephensen, 1933; Stephensen, 1947);

Western Africa: Ivory Coast: Baie de Cocody; Hora island; Abidjan (Monod, 1951).

Ecology: in fresh or slightly brackish waters.

Remarks: The specimens from western Africa coast (Ivory coast) must be reexamined to prove the identity of this taxon.

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140. PRILOG POZNAVANJU AMPHIPODA. O NEKIM GAMMARIDNIM AMPHIPODIMA IZ SRI LANKE I SUSJEDNIH OBLASTI

Gordan S. KARAMAN

Rezime

U radu su dati rezultati istraživanja nekih vrsta *Amphipoda* iz Sri Lanke (Cejlona). Rodovi *Ceradomaera* Ledoyer, 1973. i *Quadrivisio* Stebbing, 1907, su po prvi put otkriveni u Sri Lanki. Rod *Ceradomaera* je do sada bio poznat samo sa Madagaskara. Dat je detaljni opis vrste *Ceradomaera plumosa* Ledoyer, 1973, na osnovu naših primjeraka iz obalne zone (izvori u moru) kod Jaffna. Utvrđene su samo male razlike od primjeraka iz Madagaskara.

Izvršena je revizija roda *Ceradocus* Costa 1853. i data je nova dijagnoza ovog roda i spisak svih vrsta koji mu pripadaju. Vrste *C. semiserrata* (Bate, 1862) i *C. baffini* Stephensen, 1933, su izdvojeni iz ovog roda i za njih je postavljen novi rod *Animoceradocus*, n. rod. Tip ovog roda je *Megamoera semiserrata* Bate, 1862, vrsta koja naseljava obale Sredozemnog mora, uključujući i Jadran.

Rod *Animoceradocus* se razlikuje od roda *Ceradocus* po usječenom bočnom glavenom pločom, po glatkom prvom segmentu palpusa mandibule, po dužim trećim segmentom palpusa mandibule, po dužim trećim segmentom drške prve antene, itd.

Vrsta *Ceradocus torelli* (Goess, 1866) je izbačena iz roda *Ceradocus* na osnovu drugačije građe vanjskog lobusa druge maksile koja liči na istu kod roda *Pseudoniphargus*.

Data je dijagnoza roda *Quadrivisio* Stebbing 1907. i ponovo je opisan tip ovog roda, *Q. bengalensis* Stebbing 1907, na osnovu primjeraka iz Sri Lanke (Jaffna); to je prvi nalaz ovog roda i vrste u Sri Lanki. *Q. bengalensis* je nađen u izvoru pod morem, dakle u zoni plime i osjeke, zajedno sa vrstama *Victoriopisa chilkensis* (Chilton) i *Ceradomaera plumosa* Led. 1973. Dat je ključ za određivanje svih vrsta roda *Quadrivisio*, i data je sinonimika, bibliografija i rasprostranjenje svih vrsta ovog roda.