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CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 142. TWO NEW TAXA OF SUBORDER GAMMARIDEA FROM ASIA, WIH REMARKS TO SOME SRI LANKA'S SPECIES

Abstract

One new genus and one new subgenus of the suborder *Gammaridea* from the brackish waters in Asia are described: *Dodophotis*, n. gen. (type -species: *Photis distinguenda* Ruffo 1955) and *Grandidierella (Bigrandidierella*, n. sbg.) (type-species: *Microdeutopus megnae* Giles 1888). The species *Dodophotis digitata* (K. H. Barnard, 1935) and *Grandidierella (Grandidierella) bonnieroides* Stephensen, 1948, both from Sri Lanka (= Ceylon) are redescribed and figured, and their taxonomic problems are discussed. New diagnosis of the genus *Grandidierella* is presented.

Introduction

The coastal marine and brackishwater fauna of *Amphipoda* from Asia was very intensively studied during recent time and many new taxa have been described by many authors.

During our study of some amphipods from Sri Lanka (= Ceylon) coast, some interesting species have been found and published recently: *Quadrivisio bengalensis* Stebb. 1908, *Victoriopisa chilkensis* (Chilton, 1921)., *Quadrus vagabundus* G. Karaman, 1984 and *Ceradomaera plumosa* Ledoyer, 1979. Two other species are presented in this paper, including the revision of their genera.

A c k n o w l e d g m e n t s: I am indebted to prof. Dr. *Boris SKET* from the University of Ljubljana (Yugoslavia) for the load of material used in this study.

Genus DODOPHOTIS, new genus

Syn.: *Photis* (part.) J. L. Barnard, 1962:26; J. L. Barnard 1969:274; J. L. Barnard 1973:22; Ledoyer 1979:45; Ledoyer 1982:304.

Type-species: *Photis distinguenda* Ruffo 1955.

Diagnosis: Body smooth, urosomites free. Head with short rostrum, lateral cephalic lobes prominent, eyes present. Antennae 1-2 subequal, peduncular segments 1 and 3 of antenna 1 subequal long, segment 2 longer; segment 1 stout; accessory flagellum vestigal or absent. Antenna 2 normal, peduncular segment 3 short, antennal gland cone very short.

Labrum broader than long, entire to emarginate distally; labium with moderate inner lobes, madibular fingers short. Mandible molar triturative, incisor toothed; between molar and incisor a row of setae; palp 3-segmented, segments 2-3 subequal long, segment 3 clavate.

Maxilla 1 inner plate small, smooth, outer plate with 10 spines, palp of left and right maxilla 1 symmetric to each other, 2-segmented, with distal setae and spines. Maxilla 2 outer plate larger than inner one, with distal setae, inner plate with distal setae only, lateral and facial setae absent. Maxilliped inner plate with distal spines, outer plate nearly reaching tip of second palp segment, bearing a row of distoinferior strong spines; palp 4-segmented, segment 3 unlobed, segment 4 short, with slender distal nail and spines.

Coxae 1-4 longer than broad, coxa 1 unproduced, coxa 4 unlobed, coxa 5 as long as 4, coxae 6-7 short. Gnathopods 1-2 subchelate. Gnathopod 1 smaller than 2, with segment 5 shorter than 6, unlobed, segment 6 with oblique palm. Gnathopod 2 segment 5 shorter than 6, with distoposterior lobe, palm oblique.

Pereopods 3-4 normal. Pereopods 5-7 dissimilar, progressively longer, with unlobed segment 2, dactyl with supplementary tooth or nail. Pleopods normal. Uropods 1-2 biramous, well developed; peduncle of uropod 1 without ventrofacial spine. Uropod 3 short, biramous, peduncle large; inner ramus scale-like, short; outer ramus 2-segmented, second segment vestigal. Telson short, triangular. Coxal gills normal, occur on thoracal segments 2-6. Ostegyts narrow, setose, occur on thoracal segments 2-5. Sexual dimorphism present (gnathopods, etc.).

Taxa: *digitata* (K. H. Barnard,1935); *distinguenda* (Ruffo, 1955).

Remarks: Genus *Photis* Kroyer, 1842, differs by presence of lateral and facial setae on inner plate of maxilla 2.

Genus *Nanophotis* G. Karaman & J. L. Barnard (in press, type-species: *Photis nana* Walker, 1904) differs by simple gnathopods 1-2, etc.

Genus *Cedrophotis* J. L. Barnard 1967 (type-species: *Photis (Cedrophotis) malinalco* J. L. Barnard, 1967) differs by longer inner ramus of uropod 1, more incised labrum, etc.

Genus *Geniculophotis* G. Karaman & J. L. Barnard (in press, type-species: *Photis geniculata* K. H. Barnard, 1935) differs by presence of 1-segmented outer ramus of uropod 3, inner ramus of uropod 3 reaching 2/3 of outer ramus, by geniculate nail of pereopods 5-7, dilated coxa 1, etc.

DODOPHOTIS DIGITATA (K. H. Barnard, 1935)

figs.: I — IV

Syn.: *Photis digitata* K. H. Barnard 1935: 302, fig. 15; Nayar 1959:35, pl. 12, fig. 8-24; J. L. Barnard 1962:27 (key); Sivaprakasam 1969:566; Rabindranath 1971:74, fig. 5.

Photis longicaudata (nec Bate & Westwood) Chilton 1921:554, fig. 12.

? Photis longicaudata Chilton 1925:537.

Description: Male 2.3 mm. Body smooth, urosomites free (fig. III, 1). Head with short rostrum, lateral cephalic lobes produced forward, subrounded, ventroanterior sinus present (fig. I, 6); eyes well developed, black with white ring and sitting close to the anterior margin of lobe (fig. I, 6).

Antenna 1 reaching nearly half of body, peduncular segment 1 stout (fig. I, 4), peduncular segments 2-3 slender, segment 3 slightly shorter than 2; main flagellum consisting of 6-7 segments bearing one aesthetasc each (fig. I, 4); ventral margin of peduncular and flagellar segments with long setae; accessory flagellum scale-like, 1-segmented, with 3 distal setae (fig. I, 4).

Antenna 2 almost as long as antenna 1, peduncular segment 3 short, segments 4-5 subequal, flagellum consisting of 5-6 segments (fig. I, 5); peduncle and flagellum with long setae along ventral margin, antennal gland cone very short (fig. I, 5).

Labrum entire, broader than long (fig. III, 7), labium with well developed inner lobes and short mandibular fingers (fig. IV, 7). Mandibular molar triturative, incisor toothed (fig. I, 3), palp 3-segmented, strong: first segment short, smooth; third segment slightly shorter than second one, weakly clavate, bearing distal and lateral setae (fig. I, 3).

Maxilla 1 inner plate very small, smooth (fig. II, 6), outer plate with 10 spines (each spine with 1-3 lateral teeth); palps sy-

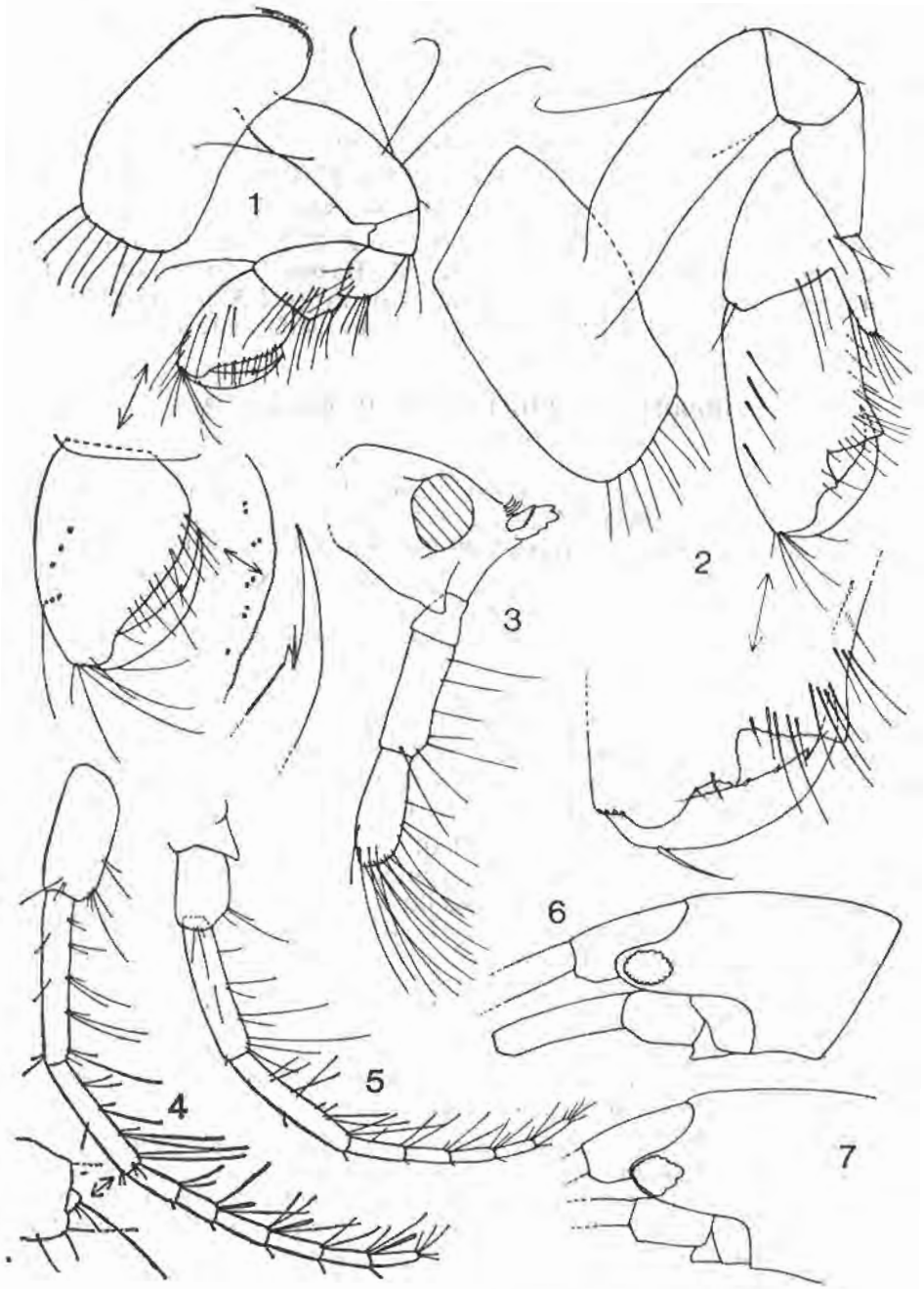

Fig. 1. Dodophotis digitata (K. H. Barnard, 1935), Jaffna, male 2.3 mm: 1 = gnathopod 1; 2 = gnathopod 2; 3 = mandible; 4 = antenna 1; 5 = antenna 2; 6 = head; 7 = head, female 3 mm.

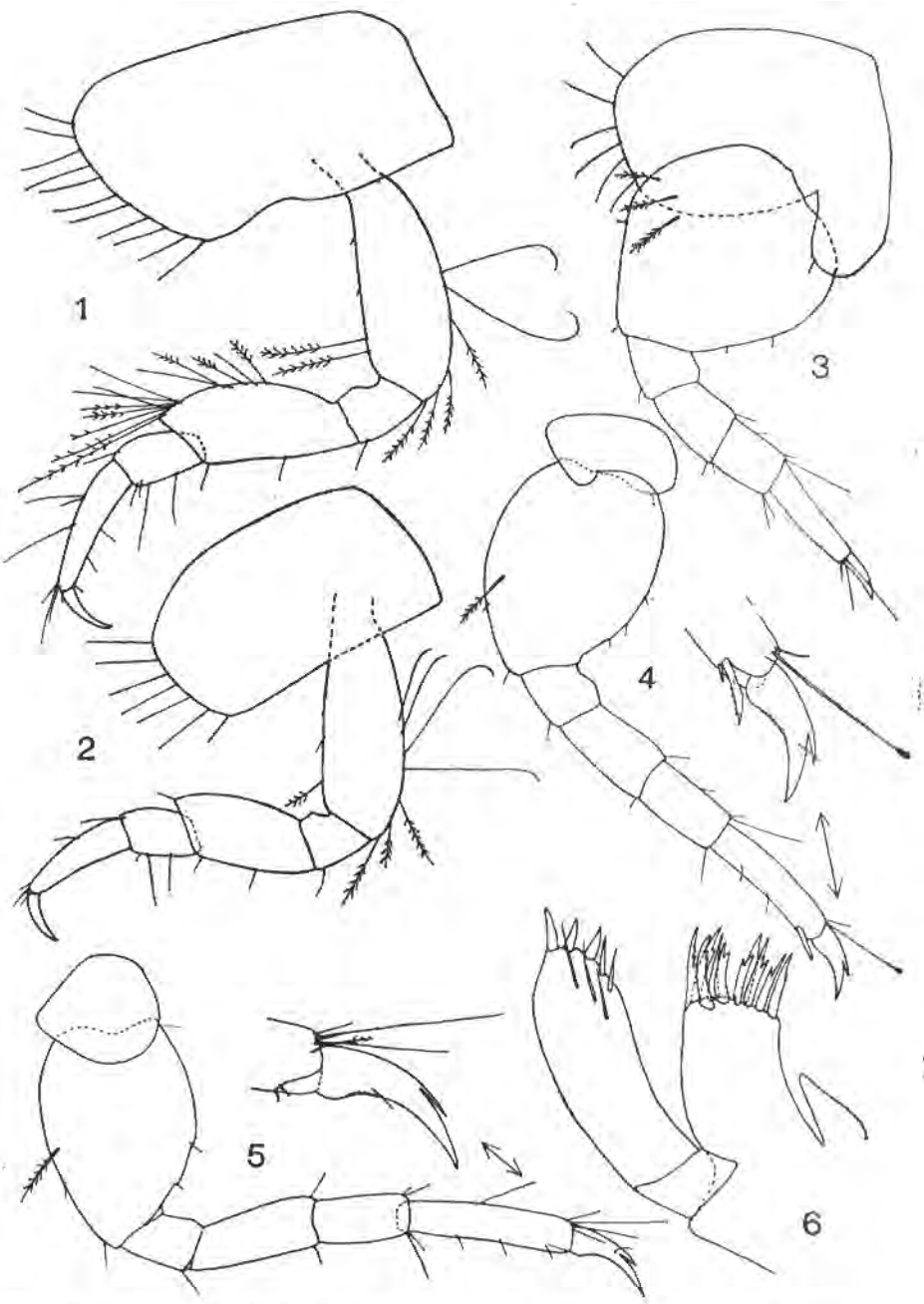

Fig. II. **Dodophotis digitata** (K. H. Barnard, 1935), Jaffna, male 2.3 mm: 1-5 = pereopods 3-7; 6 = maxilla 1.

mmetric to each other, 2-segmented, bearing 3 distinct and 2 weak spines and 3 setae (fig. II, 6).

Maxilla 2 outer plate remarkably larger than inner one, bearing distal setae only (1-2 distoexternal setae are poorly pectinate, other setae are simple); inner plate with many distal setae only, lateral and facial setae absent (fig. III, 6).

Maxilliped inner plate short, with 3-4 distal spines (fig. III, 4), outer plate nearly reaching tip of second palp segment, bearing a row of distoinferior marginal lanceolate spines intermixed with satae (fig. III, 4); palp 4-segmented, palp segment 3 unlobed, segment 4 short, with slender distal spine-like nail nearly as long as segment 4 inself, accompanied by 1 strong subdistal spine (fig. III, 4).

Coxae 1-4 large, longer than broad, with ventral row of marginal long simple setae; coxa 1 undilated (fig. I, 1), coxae 2-3 with ventroposterior weak incision (fig. I, 2; II, 1); coxa 4 slightly shorter than coxa 3, without ventroposterior notch (fig. II, 2). Coxa 5 with anterior lobe as long as coxa 4, posterior lobe short; coxa 6 short, with posterior lobe larger than inner one (fig. II, 3, 4); coxa 7 ovoid, unlobed (fig. II, 5).

Gnathopod 1 smaller than 2, its segment 2 stout, bearing one long anterior and 3 long posterior setae (fig. I, 1); segments 3-4 short; segment 5 almost as long as segment 6 (fig. I, 1), unlobed; segment 6 ovoid, longer than broad (fig. I, 1), palm oblique, undistinctly defined, finely serrate, setose (fig. I, 1); dactyl long, with finely serrate inner margin and bearing one tooth (fig. I, 1), nail long, smooth; outer margin of dactyl with one median seta.

Gnathopod 2: segment 2 linear, poorly setose, without distinct distoanterior lobe (see *distinguenda* Ruffo) (fig. I, 2); segment 4 angular, but not acute (fig. I, 2); segment 5 shorter than 6, with longer ventroposterior lobe not reaching half of posterior margin of segment 6 (fig. I, 2); segment 6 longer than broad, with parallel lateral margins; palm excavated, poorly serrate (fig. I, 2); dactyl stout, at inferior margin with several short spines, at outer margin with one median seta (fig. I, 2).

Pereopods 3-4 stout, alike, but pereopod 3 slightly longer than 4. Anterior margin of segment 4 in pereopod 3 with numerous setae (simple and plumose), that of pereopod 4 poorly setose (fig. II, 1, 2); dactyl strong, recurved, without teeth or spines along margins.

Pereopods 5-7 relatively short, progressively longer toward pereoopd 7, dissimilar to each other. Pereopod 5: segment 2 broad, unlobed, with several plumose facial setae (fig. II, 3), segments 3-5 short. Pereopod 6: segment 2 narrower, unlobed, with one fa-

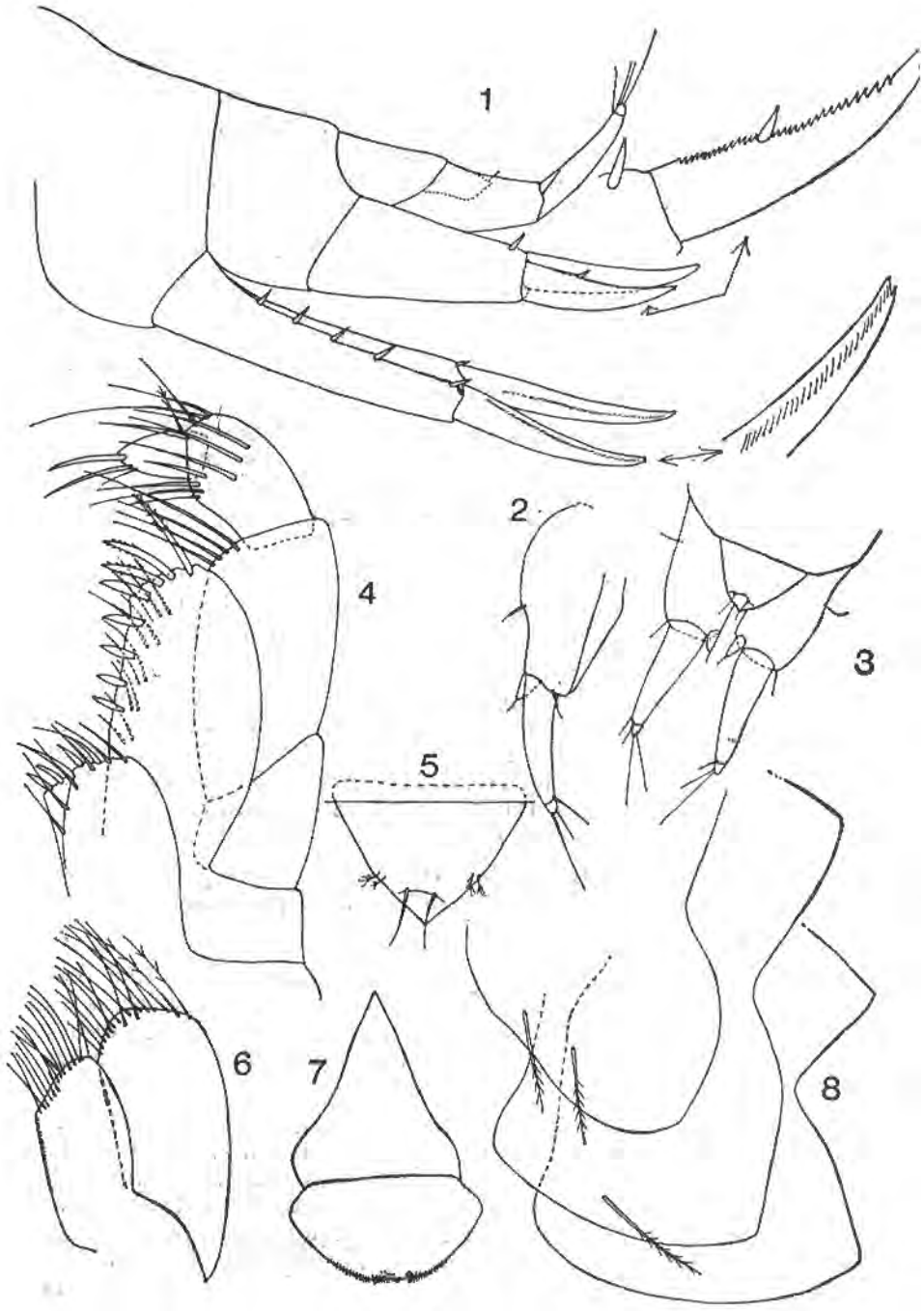

Fig. III. **Dodophotis digitata** (K. H. Barnard, 1935), Jaffna, male 2.3 mm: 1 = urosome with uropods; 2 = uropod 3; 3 = uropod 3 and telson, dorsal projection; 4 = maxilliped; 5 = telson; 6 = maxilla 2; 7 = labrum; 8 = epimeral plates 1-3.

cial plumose seta (fig. II, 4). Segment 2 of pereopod 7 with one facial plumose seta (fig. II, 5). Segment 6 of pereopod 6 with strong spine, that of pereopod 7 with seta. Dactyl of pereopods 5-7 with one tooth along outer margin (fig. II, 3-5).

Pleopods 1-3 short and stout, normal, progressively shorter toward last pleopod; peduncle with several setae and 2 retinacula; rami plurisegmented, unegual, normal.

Epimeral plates 1-3 with angular ventroposterior corner and convex smooth posterior and ventral margins (fig. III, 8), plates 1-2 with single plumose subdistal setae.

Uropod 1: peduncle without ventrofacial spines and without dorsoinferior marginal spines (fig. III, 1), only dorsoexterior row od spines is presented; inner ramus is slightly longer than outer one, both rami without lateral spines, bearing lateral row of minute spines (fig. III, 1), distal spines absent.

Uropod 2: peduncle much larger than that of uropod 1 (fig. III, 1), inner ramus slightly longer than outer one, bearing a row of lateral small minute teeth; outer ramus with a row of dorsal strong teeth (fig. III, 1), distal spines on rami absent.

Uropod 3 not exceeding tip of uropods 1-2 (fig. III, 1), peduncle in dorsal projection of animal, seems to be as long as outer ramus, but dissected uropod 3 showes very large peduncle much longer than outer ramus (fig. III, 1-3); outer ramus 2-segmented, second segment minute (fig. III, 2); inner ramus minute, scale-like, with one short distal seta (fig. III, 2-3).

Telson very short, triangular (fig. III, 5), bearing 2 subdistal setae and on each side with one pair of short plumose setae.

Coxal gills normal.

F e m a l e 3 mm (with 4 eggs in marsupium): Body like that in males, with some differences. Lateral cephalic lobes seems to be slightly stouter (fig. I, 7), but the scarce material in hand didn't permit us to establish the limits of variability of this character among females and males.

Coxae 1-7 like these in males except coxae 2-3 which are without ventroposterior incision (fig. IV, 1, 2, 4). Gnathopod 1 like that in males, with finely serrate palm and inferior margin of dactyl (fig. IV, 1). Gnathopod 2 segment 2 without distinct distoanterior lobe (fig. IV, 2); segment 5 with distoposterior lobe (protrusion) not reaching the half of posterior margin of segment 6 (fig. IV, 2); segment 6 slightly shorter and broader than that in males (fig. IV, 2), with finely serrate palm and distoposterior margin of segment 6; palm deeply excavated medially, defined by setae and one slender short spine; dactyl with serrate inner margin including several teeth (fig. IV, 3).

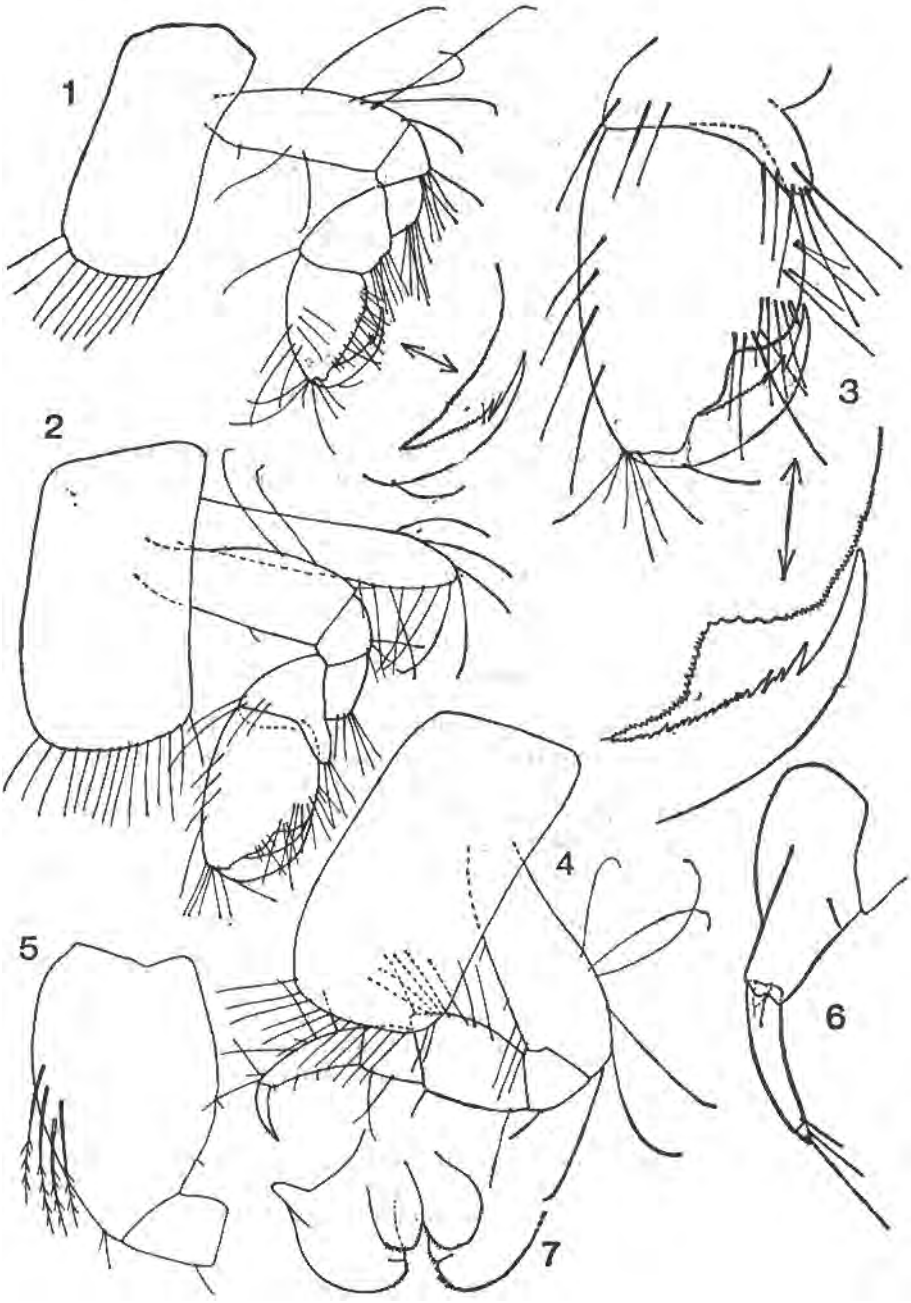

Fig. IV. **Dodophotis digitata** (K. H. Barnard, 1935), Jaffna, female 2.3 mm: 1 = gnathopod 1; 2-3 = gnathopod 2; 4 = pereopod 3; 5 = pereopod 7; 6 = uropod 3; 7 = labium, male 2.3 mm.

Segment 4 of pereopod 3 with numerous setae like these in males; the same segment in pereopod 4 is without these setae, like these in males (fig. IV, 4).

Pereopods 5-7 like these in males, but often anterior margin of segment 2 bearing higher number of plumose setae (fig. IV, 5). As scarce number of males was at disposition in hand, and these males were slightly smaller than females, it was not possible to establish if females have rearly more setose pereopods 5-7 (segment 2) that these in males, or not.

Uropods 1-3 like these in males. Oostegyts broad, setose.

Variability: The number of plumose setae on anterior margin of segment 2 in pereopods 5-7 and in ventral part of epimeral plates 1-2 is rather variable. Segment 2 of gnathopod 2 in our males (2 specimens of 2.3 and 2.35 mm) was without ventroanterior lobe.

Material examined: SRI LANKA (Ceylon): Jaffna, Kecrimalai, spring in the sea, October 1980, 5 spec. accompanied by other amphipods.

Localities cited: INDIA: Chilka Lake (Chilton, 1921); Cochin (between Ernakulam and Edappalli); Travancore (in stake-net Manumbam channel) (K. H. Barnard, 1935); Adyar (San Thome Bridge) (Nayar, 1959); Porto Novo; Kovelong; Madras (Adyar); Ennore estuary; Visakhapatnam harbour (Sivaprakasam, 1969); Kerala (Kayamkulam Lake) (Rabindranath, 1971); THAILAND: Talé Sap: Kaw Yaw; Ban Hua Wang (Koh Yaio) (Chilton, 1925).

Loc. typ.: India: Cochin, between Ernakulam and Edappalli.

Ecology: living in brackish waters, accompanied by other amphipods.

Problem of taxonomic value of Photis digitata: The species *Photis digitata* was described by K. H. Barnard (1935) from regions of Cochin and Travancore in India. Unfortunately, his description was very scarce and uncomplete, showing one very slender narrow gnathopod 2 in male, with segment 5 provided with distoposterior lobe extended along segment 6 reaching 1/3 of segment 6-length, and segment 6 provided with excavated palm with straight serrate posterior part of palm; coxa 2 was slightly excavated ventroposteriorly and provided with ventral setae.

But, he mentioned that to this species belong also Chilton's description and figure of *Photis longicaudata* (1921, fig. 12a, b) known from Chilka Lake in India; in these figures of Chilton regarding *Photis longicaudata*, gnathopod 2 in male is larger and shorter, with the posterior lobe of segment 5 reaching half of seg-

ment 6, palm of segment 6 is excavated and with straight distoposterior part of palm.

Later, this species, with characters and figures similar to these given by K. H. Barnard (1935), was never redescribed nor figured. Other authors later described and figured various populations from India and adjacent regions under the name of *Photis digitata* (Nayar, Rabindranath), and all these species have gnathopod 2 in male like that figured by Chilton in 1921 (fig. 12), i. e. with excavated posterior (distal) half of palm.

So, Nayar (1959) redescribed *Photis digitata* from India (Adyar), and his description and figures agree completely with our specimens from Sri Lanka, except that telson was figured with 2+2 subdistal setae (1+1 in our specimens from Sri Lanka).

Rabindranath (1971) redescribed *Photis digitata* also from India (Kayamkulam Lake in Kerala). His description and figure agree mainly with our specimens from Sri Lanka (excavated coxae 2-3 in males, shape of pereopods, coxae, uropods) except that telson was with 3+3 subdistal setae, segment 6 of gnathopod 2 was shorter and stouter, with palm bisinuate and antennae 1-2 shorter and stouter. Rabindranath mentioned that »in all the 10 males in my collection, the 2nd gnathopod is as illustrated here«, that means that this specific shape of gnathopod 2 is one stable character of this populations, maybe one other species. Taxonomic status of this population must be reexamined.

Ruffo (1955) described a new species *Photis distinguenda* from Madagascar (mouth of Anove) This species is almost identic with our specimens from Sri Lanka except the presence of distinct distoanterior lobe on segment 2 in gnathopod 2 in male, and by slightly shorter distoposterior lobe of segment 5 in gnathopod 2 in males.

The presence of distoanterior lobe can be also the character of final males only; we have not observed this lobe in our males.

On the other hand, we can not exclude the possibility that *P. distinguenda* is identic with Barnard's *P. digitata* as well as with our specimens from Sri Lanka, because the populations described by K. H. Barnard (1935) under the name *P. digitata*, these described by Chilton (1921) from India under the name *P. longicaudata*, by Nayar (1959) from India under the name *P. digitata*, by Rabindranath (1971) under the name *P. digitata*, by Ruffo (1955) from Madagascar under the name *P. distinguenda*, and our specimens from Sri Lanka, all of them are characterized by excavated ventroposterior part of coxae 2-3 in males, by produced distoposterior lobe on segment 5 in gnathopod 2 in males and females, by excavated palm, etc. Maybe all these populations represent various forms or stages of one variable species, *P. digi-*

tata. One new study of this problem with new rich material of this species will show the exact taxonomic status of all these populations and species.

DODOPHOTIS DISTINGUENDA (Ruffo 1955)

Syn.: *Photis distinguenda* Ruffo 1955:195, fig. 1-2; J. L. Barnard 1962:28; Ledoyer 1982:307, fig. 114.

Loc. typ.: Madagascar: mouth of Anove, brackish water.

Distribution: known only from type-locality.

Genus PHOTIS Kroyer 1842

Syn.: *Photis* (part.) J. L. Barnard 1969:274; Ledoyer 1982:304.

Type-species: *Photis reinhardi* Kroyer 1842 (monotypy).

Diagnosis: similar to that mentioned sub *Dodophotis* except maxilla 2: inner plate with lateral and facial row of setae.

Taxa: numerous species.

Genus GRANDIDIERELLA Coutiere
Subgenus GRANDIDIERELLA Coutiere 1904

Syn.: *Grandidierella* (part.) Barnard J. L. 1969:192; J. L. Barnard 1973:18; J. L. Barnard 1977:270; Ledoyer 1982: :242.

Type-species: *Grandidierella mahafalensis* Coutiere 1904 (monotypy).

Diagnosis: Body smooth, urosomites free. Head with short rostrum, lateral cephalic lobes short to produced, ventroanterior sinus of head present, eyes present. Antenna 1 peduncular segment 1 inflated, ped. segment 3 short or elongated, accessory flagellum vestigal to well developed, 1-segmented. Antenna 2 peduncular segment 3 short, flagellum often with spines, antennal gland cone short.

Labrum entire, broader than long, distally subrounded or emarginate. Labium with well developed inner lobes, outer lobes entire, mandibular fingers prominent. Mandibular molar triturative, incisor toothed; between them appears a row of setae; palp strong, 3-segmented: segment 1 shorter than segments 2-3, segments 2-3 nearly subequal long, segment 3 weakly clavate. Maxilla 1 inner plate small, smooth, outer plate with 10 spines; palp of left and right maxilla 1 symmetric to each other, 2-segmented, with spines and setae.

Maxilla 2 with subequal plates, inner plate with lateral and facial oblique row of setae. Maxilliped inner plate with spines, outer plate with distolateral row of strong spines; palp 4-segmented, segment 3 unlobed, segment 4 short, with distal nail.

Coxae short, discontiguous, of various shape, coxa 4 unlobed. Gnathopods 1-2 subchelate, dissimilar, gnathopod 1 larger than gnathopod 2, in males carpochelate, in females normal. Gnathopod 2 normal in both sexes, with elongated unlobed segment 5, segment 6 with transverse palm (usually). Pereopods 3-4 normal. Pereopods 5-7 slightly dissimilar, pereopod 5 shorter than pereopods 6-7, segment 2 of all three pereopods unlobed. Pleopods normal. Uropods 1-2 normal, biramous, rami with lateral and distal spines; peduncle with ventrofacial spine. Uropod 3 short, peduncle with dilated inner side, inner ramus absent, outer ramus 2-segmented, second segment vestigal. Telson short, each dorsolateral crest with spine-like setae. Coxal gills normal, occur on thoracal segments 2-6. Oostegyth broad, setose, occur on thoracal segments 2-5.

Sexual dimorphism present (gnathopod 1, antenna 2, etc.).

T a x a: To this genus belong the most of present *Grandidierella* species.

R e m a r k s: Similar genus *Neomicrodeutopus* Schellenberg 1925 (type-species: *Neomicrodeutopus cabindae* Schellenberg, 1925) differs by short third palp segment of mandible; for the moment only two species of genus *Neomicrodeutopus* are known: *N. cabindae* Schell. 1925 and *N. elongata* (Chevreux, 1926).

GRANDIDIERELLA BONNIEROIDES Stephensen 1948

fig.: V — VIII

S y n.: *Grandidierella bonnieroides* Stephensen 1948:12, fig. 3; Myers 1970:141, fig. 1-2; Myers 1972:790; Asari & Myers 1982:252, fig. 9-10; Ledoyer 1982:245, fig. 89.

Grandidierella Bonnieri Ruffo 1958:58, fig. 8-9.

Grandidierella bonnieri (nec Stebbing) K. H. Barnard 1935:299; Schellenberg 1938:215; Shoemaker 1948:11, fig. 3; K. H. Barnard 1951:708; K. H. Barnard 1952: :279, fig. 1; Nayar 1959:38, pl. 14, fig. 1-5; Nayar 1967:161, fig. 17 f.

? Grandidierella Bonnieri Monod 1951:150, fig. 20-22.

non *Grandidierella bonnieri* Ledoyer 1968:53, fig. 25 b (= *G. spinicoxa).*

Grandidierella megnae (part.) Chilton 1921:548, fig. 10 a-1; Spandl 1924:474; Stephensen 1933:434; Shoemaker 1935:69.

Unciolella lunata (nec Chevreux) Schellenberg 1928: :669, fig. 207.

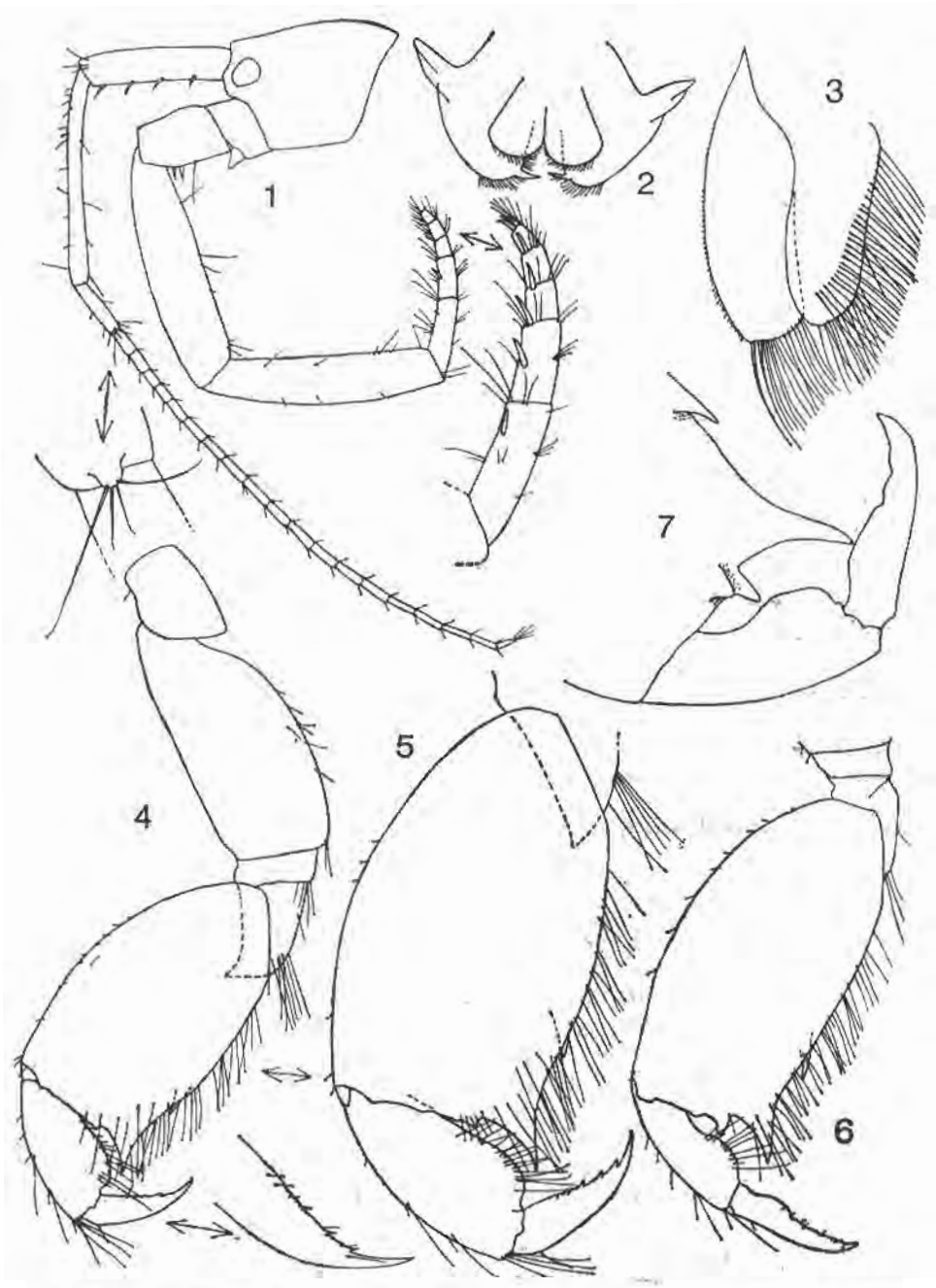

Fig. V. **Grandidierella bonnieroides** Steph. 1948, Ampan, Jaffna, male 4.8 mm: 1 = head with antennae; 2 = labium; 3 = maxilla 2; 4-5 = gnathopod 1; 6 = gnathopod 1, male 4.9 mm; 7 = gnathopod 1, male 5 mm.

Description (based on specimens from Sri Lanka): Male up to 5 mm length. Body smooth, but metasomsegments 1-3 and urosomite 1 with 2 dorsoposterior longer simple setae each (fig. VI, 4, 7), urosomites 2-3 with very short seta or smooth. Urosomites slightly laterally compressed (fig. VI, 7). Head almost reaching two first mesosomal segments in length, with short rostrum (fig. V, 1), lateral cephalic lobes short, quadrate, with long ventroanterior sinus; eyes small, elyptic to ovoid, not exceeding the diameter of first peduncular segment of antenna 1 (fig. V, 1).

Antenna 1 almost reaching body-length, first peduncular segment slender, with several ventral spines (fig. V, 1), ped. segment 2 much longer and more slender than segment 1, segment 3 short; main flagellum consisting of 20-21 segments bearing often one short aesthetasc each (fig. V, 1); accessory flagellum vestigal, scale-like, with 3 distal setae (fig. V, 1).

Antenna 2 strongly inflated, peduncular segment 3 short, with 2 ventral spines (fig. V, 1); peduncular segments 4-5 subequal, poorly setose; flagellum shorter than peduncular segment 5, consisting of 5 segments bearing one ventral spine each (fig. V, 1), last flagellar segment with 2 distal slightly recurved spines. Antennal gland cone very short (fig. V, 1).

Labrum entire, broader than long, emarginate distally (fig. VII, 8). Labium normal, with well developed inner lobes, outer lobes with distoinferior fingers, mandibular lobes strong (fig. V, 2).

Mandible molar triturative, incisor toothed; between both a row of setae (fig. VI, 3); palp strong, 3-segmented: first segment short, with 0-3 setae; second and third segment nearly subequal long or segment 2 slightly longer; third segment poorly clavate, bearing several bunches of A and B-setae, as well as several D and E-setae.

Maxilla 1 inner plate small, smooth, outer plate with 10 toothed spines (fig. VI, 2), palp left and right symmetric to each other, 2-segmented, bearing 6 distal spines and 7-8 setae (fig. VI, 2). Maxilla 2 with subequal plates, inner plate with lateral and facial row of setae. Maxilliped inner plate strong, short, with 2-3 distal spines (fig. VI, 1), outer plate nearly reaching tip of second palp segment, bearing a row of distoinferior strong spines (fig. VI, 1), palp segment 3 unlobed, segment 4 short, with nail shorter than segment 4, accompanied by 2-3 setae.

Coxae very short, discontiguous, coxa 1 with subrounded ventral corners (fig. V, 4), coxae 2-4 unlobed (fig. VII, 1, 3, 4). First mesosomal segment with medioventral soft process of various length (fig. VI, 8, 9).

Gnathopod 1 much larger than gnathopod 2, with segment 2 elongated, poorly setose (fig. V, 4); segment 5 elongated, infla-

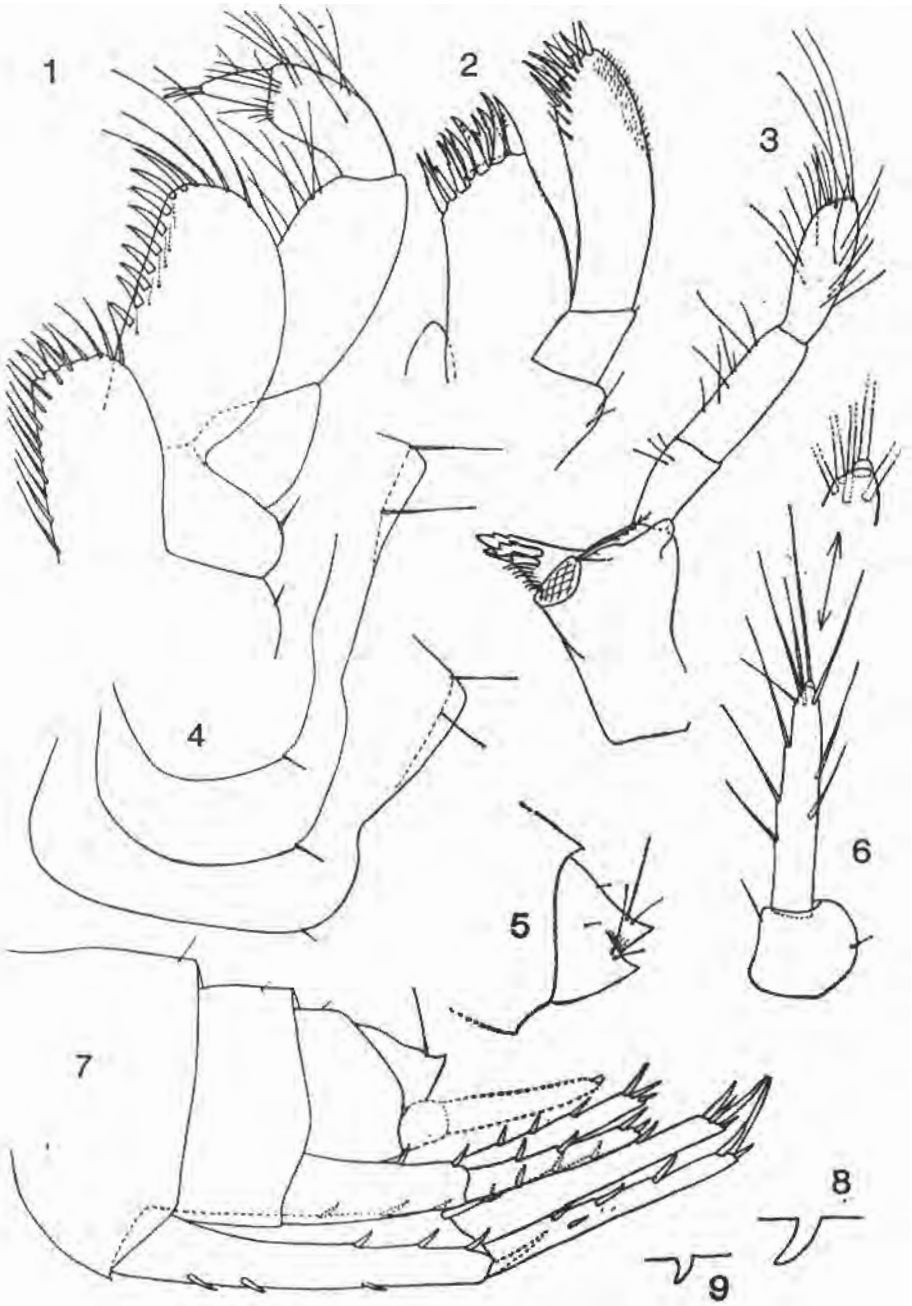

Fig. VI. **Grandidierella bonnieroides** Steph. 1948, Ampan, Jaffna, male 4.8 mm: 1 = maxilliped; 2 = maxilla 1; 3 = mandible; 4 = epimeral plates 1-3; 5 = telson; 6 = uropod 3; 7 = urosome with uropods 1-2; 8 = sternal process on mesosomite 1; 9 = ibid, male 4.9 mm.

ted, with many setae along posterior margin (fig. V, 4-6) and poorly setose at anterior margin; palm of segment 5 transverse, with one median tubercle and strongly produced corner tooth (fig. V, 5-6), posterior margin of segment 5 at posteroinferior part with strong tooth; segment 6 much smaller than 5, with convex entire and setose posterior margin; segment 7 strong, with serrate inferior (posterior) margin and with one seta at outer margin (fig. V, 5-6, 7); sometimes on palm of segment 5 occur 2 parallel tubercles in the middle (fig. V, 7).

Gnathopod 2: segment 2 long, poorly setose at both margins (fig. VII, 1); segment 3-4 short, segment 4 with bunches of distoposterior setae not exceeding tip of segment 5; segment 5 elongated, unlobed, with many rows of setae along posterior margin (fig. VII, 2), anterior margin poorly setose; segment 6 much shorter than 5, nearly twice longer than broad, moderately setose along both margins and bearing a row of marginal spines posteriorly (fig. VII, 2); palm of segment 6 convex, transverse, finely serrate, defined by one short corner spine on outer face and one subcorner spine on inner face of segment 6 (fig. VII, 2); dactyl with toothed and spinose inferior margin and with one seta at outer margin (fig. VII, 2).

Pereopods 3-4 similar to each other, poorly setose (fig. VII, 3-4); segment 7 (dactyl) long, recurved, slightly shorter than segment 6; pereopod 4 is slightly shorter than pereopod 3.

Pereopods 5-7 slender; pereopod 5 much storter than pereopods 6-7, with segment 2 unlobed, almost smooth (fig VII, 5); segment 2 of pereopod 6 with several plumose posterior setae (fig. VII, 6); segment 2 of pereopod 7 with many setae along posterior margin (fig. VII, 7); dactyl of pereopods 5-7 smooth, without any marginal tooth.

Pleopods normal, with short peduncle bearing 2 retinacula each; near retinacula occurs one plumose seta; rami plurisegmented, unequal. Epimeral plates 1-3 subrounded, smooth, with one strong ventroposterior seta (fig. VI, 4).

Uropods 1-2 normal, biramous; uropod 1 peduncle with 2-3 ventrofacial spines (fig. VI, 7), 2-3 dorsoexternal and 2-3 dorsointernal marginal spines as well as one short interramal spine (fig. VI, 7); rami subequal, with lateral and distal spines. Uropod 2 with inner ramus slightly longer than outer one, both rami with lateral and distal spines (fig. VI, 7). Uropod 3 short, not exceeding tip of uropods 1-2 (fig. VI, 7); peduncle dilated along inner margin (fig. VI, 6), inner ramus absent; outer ramus much longer than peduncle, 2-segmented; second segment vestigal, with one distal long seta (fig. VI, 6); along both margins of first segment of outer ramus appear several longer strong setae, spines absent.

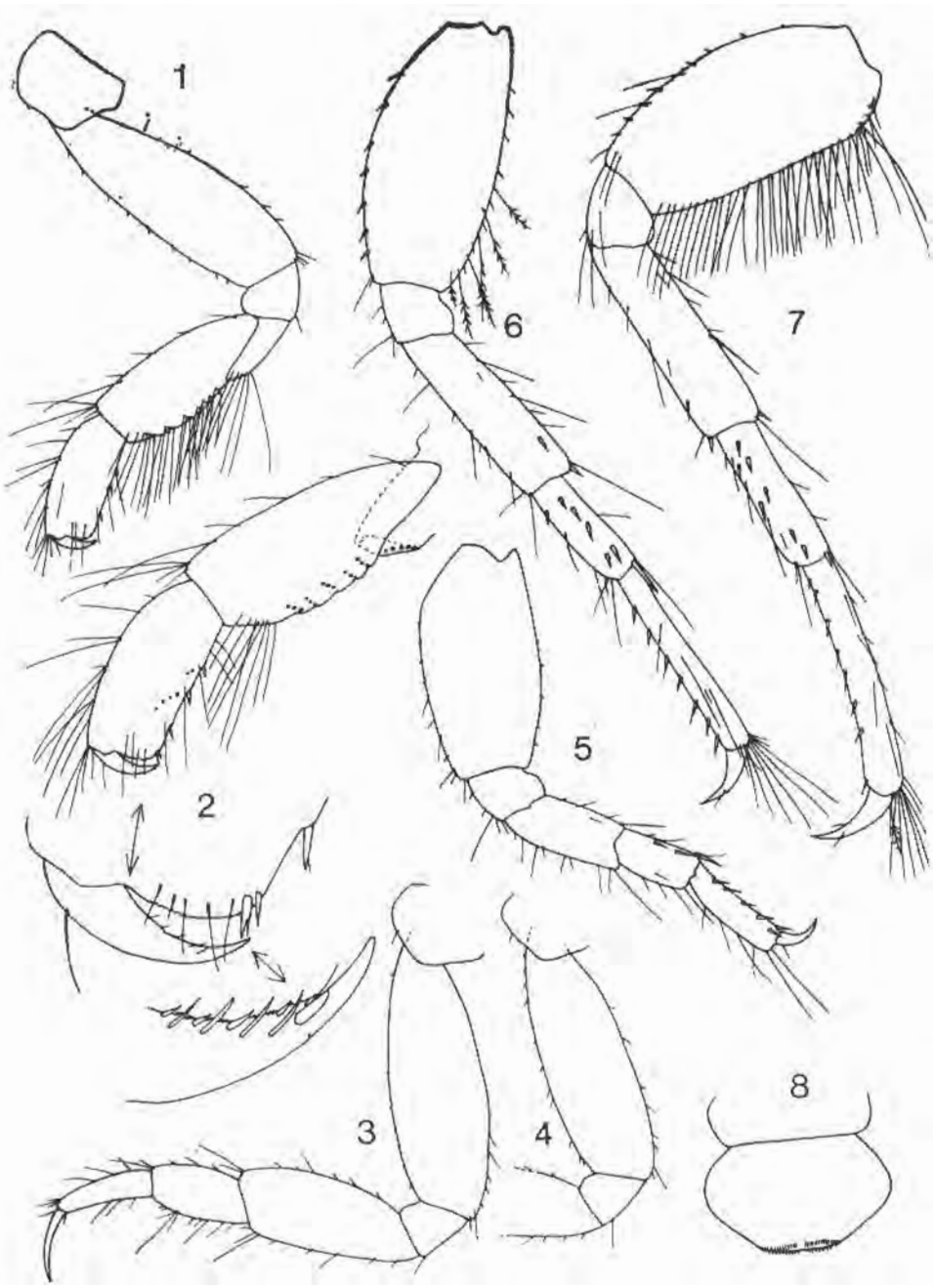

Fig. VII. **Grandidierella bonnieroides** Steph. 1948, Ampan, Jaffna, male 4.8 mm: 1-2 = gnathopod 2; 3-7 = pereopods 3-7; 8 = labrum.

Telson short, excavated distally (fig. VI, 5), each lobe acute, bearing 2-3 subdistal setae.

Coxal gills normal, ovoid. Body with brown small spots over whole surface.

Female: up to 5 mm long, with eggs: Similar to males with some differences. Antenna 1 is shorter, peduncle with many ventral spines (fig. VIII, 1), second peduncular segment relatively shorter than that in males (fig. VIII, 1), accessory flagellum scale--like. Antenna 2 much less inflated than that in males (fig. VIII, 1), peduncular segment 3 with spines at ventral margin; peduncular segment 5 with spines along both margins (fig. VIII, 1), flagellum like that in males, with spines. First mesosomal segment without sternal process.

Gnathopod 1 segment 2 almost smooth (fig. VIII, 2), segments 3-4 short, with short posterior setae; segment 5 longer than 6, unlobed (fig. VIII, 2), poorly setose along anterior margin and bearing many bunches of long setae at posterior margin; segment 6 ovoid, longer than broad, with several spines along posterior margin (fig. VIII, 2); palm convex, oblique, finely serrate; dactyl longer than diameter of segment 6, serrate at inner margin and with 1 seta at outer margin.

Gnathopod 2 smaller than gnathopod 1, their segment 4 with long distoposterior setae exceeding the length of segment 5 (fig. VIII, 3); segment 5 longer than segment 6, poorly setose along anterior margin and with many long setae along posterior margin (these setae nearly reaching the tip of segment 6); segment 6 nearly twice longer than broad, with a row of spines along posterior margin (fig. VIII, 3); palm transverse, like that in males; dactyl like that in males.

Pereopods 3-7 like these in males, but dactyl of pereopods 3-4 with longer dactyl almost reaching the length of segment 6 (fig. VIII, 4). Uropods like these in males. Oostegyts broad, setose, occur on thoracal segments 2-5.

Variability: The size of sternal process on first mesosomal segment in males is very variable between the specimens from the same locality. Segment 5 of gnathopod 1 in males with 1-2 median palmar protrusions (laterally to each other, fig. V, 6, 7); segment 6 is narrow to slightly dilated (fig. V, 5, 6); each lobe of telson with 2-3 subdistal setae. All our males in hand were with very inflated antenna 2.

Material examined: SRI LANKA (= Ceylon): Ampan, laguna, Jaffna, October, 1980, many specimens; Jaffna, Kecrimalai, October 1980, many specimens.

Localities cited: Bonaire Island (Carribean Sea) Stephensen, 1933, 1948); Cuba: Siguanea Bay, depth 12-26 feet (Shoemaker, 1948); Brasil: Recive, Viveiro Afogados; Viveiro Miramari; Viveiro Remedio; Viveiro Giquia; Lagoa do Norte (Schellenberg, 1938);

Venezuela: Marguerita Island; Los Roques Islands (Grand Roque) (Myers, 1970); Tortola Island (British West Indies); Caroni swamp, Trinidad Island; Marta Island, Colombia;

USA: Florida (Port St. Joe; Salt Spring; Marion Co.); Louisiana (Lake Pontchartrain); Texas: (Riviera Beach, Baffin Bay) (Myers, 1970);

Africa: Suez Canal (Schellenberg, 1928); Ivory Coast (Bay of Cocody, W. Africa); Cameroon (Bay of Douala near Souelaba) (Monod, 1951); Tanzania: Msasani Bay (Myers, 1970); South Africa (Durban Bay; Richards Bay; St. Lucia Bay) (K. H. Barnard, 1951, 1952);

Madagascar: Soalara (Ruffo, 1958); Microatols of Songoritelo (Ledoyer, 1982);

India: Chilka Lake (Chilton, 1921); Cochin (West Narakkal; on road to Tiruppunithura); Travancore (Kayankulam Kayal; Kayankulam Bar; Manakudi); Vizagapatam (K. H. Barnard, 1935); Cooum River; Adyar (Nayar, 1959); Tuticorin; Mandapam (Nayar, 1967); Vellar-Coleroon estuarine complex, Porto Novo, brackish water (Asari & Myers, 1982).

Sri Lanka (present paper).

Loc. typ.: Salinja Paloe Lechi, Bonaire Island, Carribean Sea.

Ecology: in brackish waters along the coast and the mouth of rivers, swamps, lagoons, etc.

Remarks: Chilton (1921) figured very well the fingers on inner margin of outer lobe in labium, like these in our specimens.

Stephensen (1948) described this species from Bonaire, and his original description agree with our specimens from Sri Lanka much more than these described by Asari and Myers from Vellar (India) or Florida (USA). Stephensen (1948) well figured extended ventral part of head. But he mentioned that accessory flagellum is absent (probably overlooked vestigal scale-like accessory flagellum).

Myers (1970) revised the species *G. bonnieroides*, showing the large variability of male antenna 2 (slender to inflated) and variability of sternal process on first mesosomal segment. But, he figured infraposterior process on coxa 2 on specimens from Tan-

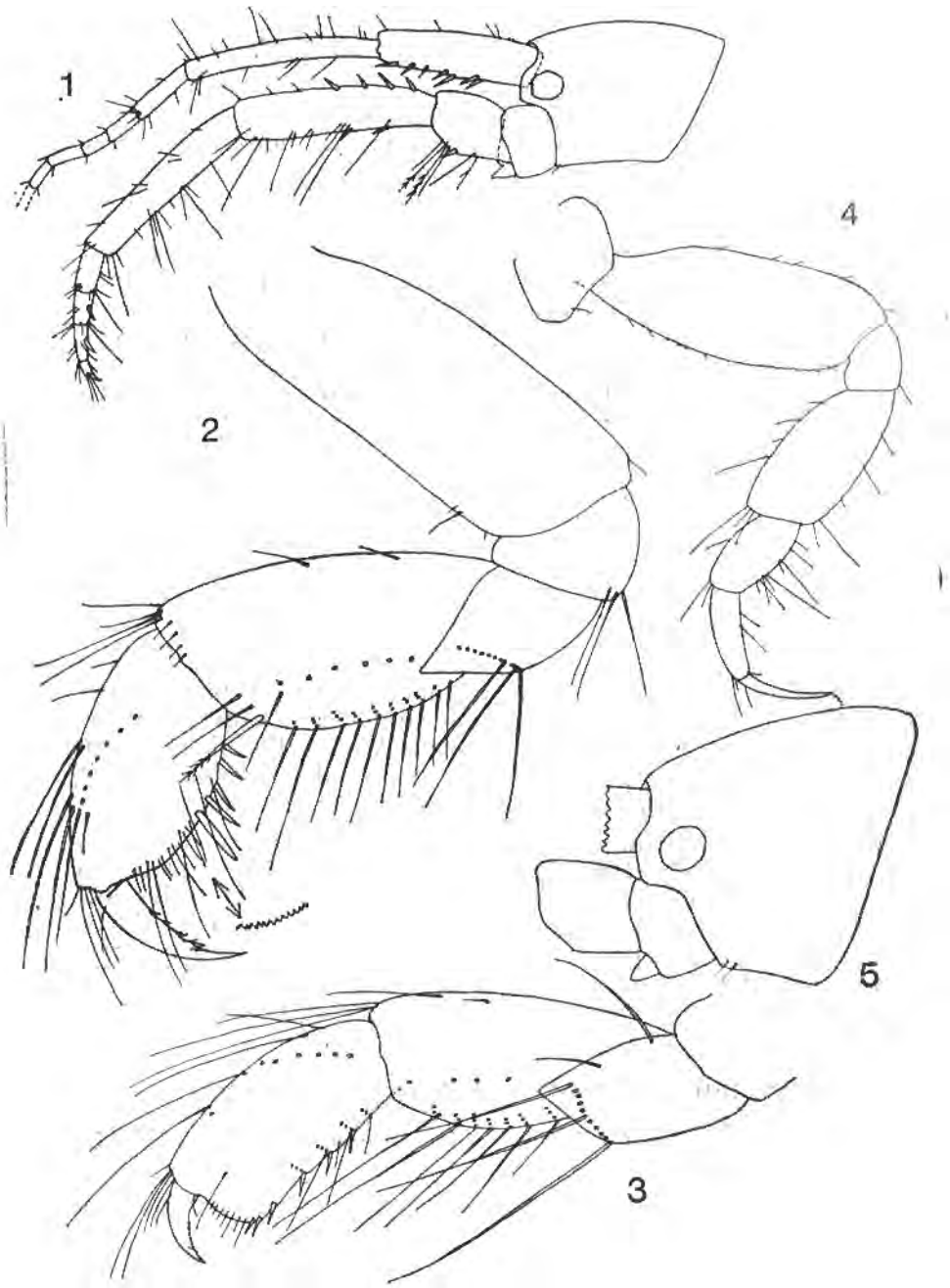

Fig. VIII. **Grandidierella bonnieroides** Steph. 1948, Ampan, Jaffna, female 4.9 mm: 1 = head with antennae; 2 = gnathopod 1; 3 = gnathopod 2; 4 = pereopod 3; 5 = head, female 4.8 mm.

zania, Carribean specimens and these from Gulf of Mexico, as well as short lateral cephalic lobes.

The specimens figured and described by Asari & Myers, 1982) agree with our specimens from Sri Lanka, but male lateral cephalic lobe in their specimens is figured more subroundedly, with slightly larger eyes exceeding diameter of first peduncular segment of antenna 1; peduncular segment 2 of antenna 1 in males is shorter; antenna 2 in males is remarkably less inflated and more setiferous. Labium is without distoinferior fingers on inner lobes. Palp of maxilla 1 is with only 5 distal spines (6 in our specimens from Sri Lanka); mandibular palp is not clavate, palp segment 3 »narrowing terminally« (clavate, inflated terminaly in our specimens); coxae 3-4 with posterior distal margin produced into a slender acute tooth (subrounded in our specimens); telson is more setiferous. In the same paper (1982), one of the authors (Myers) mentioned the identity of *G. bonnieri* Stebbing, 1908 with *G. megnae* (Giles, 1888).

Ledoyer (1982) figured maxilliped of *G. bonnieroides* from Madagascar with palp segment 4 provided with nail as long as palp segment 4 itself (much shorter in our specimens); outer lobe of labium without distoinferior fingers.

We suspect that present *Grandidierella bonnieroides* represents not only one, but several very similar, but well distinct species, but it needs further comparative study of variability of various populations of this species over the World. For this reason, we redescribed *G. bonnieroides* from Sri Lanka, hoping that it can be usefull for further study of variability of this complex.

On the other hand, *Grandidierella mahafalensis* Coutiere, 1904, known only from Lake Tsimanampetsotsa in Madagascar, as a type-species of the genus *Grandidierella*, is not sadisfactorily described in detail, and descriptions of this species, given by Coutiere (1904), Ruffo (1958) and Myers (1972) are rather different to each other (various shape of accessory flagellum, etc.). For this reason, the differences between *G. mahafalensis* and *G. bonnieroides* are still not clear and needs further study.

GRANDIDIERLLA ROBUSTA Ledoyer, 1982 (new rank)

Syn.: *Grandidierella bonnieroides robusta* Ledoyer 1982:248, fig. 90.

Loc. typ.: Madagascar: region of Tulear, detritic zone of sea.

Distribution: known only from type-locality.

Remarks: Ledoyer (1982) described this taxon as a subspecies of *Grandidierella bonnieroides*, but it differs from *G. bonni-*

eroides by strongly spinose uropod 3 and by female gnathopod 2 remarkably more robust than that in males, what suggested the specific rank of this taxon.

GRANDIDIERELLA (BIGRANDIDIERELLA), new subgenus

Type-species: *Microdeutopus megnae* Giles, 1888.

Taxa: *megnae* (Giles, 1888); *macronyx* (K. H. Barnard, 1935).

Diagnosis: Diagnosis like that mentioned sub subgenus *Grandidierella* except the maxilla 2: inner plate of maxilla 2 with lateral row of setae only, facial oblique row of setae absent. Accessory flagellum short.

Remarks: As the shape and pilosity of many *Grandidierella* species was never described, we don't know if some of other known *Grandidierella* species belong to this new subgenus.

Ledoyer (1982) mentioned that *Grandidierella gilesi* Chilton, 1921, has inner plate of maxilla 2 provided with facial oblique row of setae, but hardly visible and consisting of only 5-6 setae. For this reason we left *G. gilesi* to the subgenus *Grandidierella* and *Bigrandidierella* established as a subgenus of *Grandidierella* genus.

Genus *Neomicrodeutopus* Schell. 1925 differs from sbg. *Bigrandidierella* by short third palp segment of mandible, (inner plate of maxilla 2 with lateral setae, presence of facial setae unknown).

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Rezime

142. PRILOG POZNAVANJU AMPHIPODA. DVA NOVA TAKSONA PODREDA GAMMARIDEA IZ AZIJE SA OSVRTOM NA NEKE VRSTE IZ SRI LANKE

U radu su iznijeti rezultati istraživanja nekih vrsta *Amphipoda (Crustacea, Malacostraca)* iz brakičnih voda Sri Lanke (= Cejlona); postavljen je novi rod, *Dodophotis* n. rod. sa tipom roda *Photis distinguenda* Ruffo 1955, kao i novi podrod *Grandidierella (Bigrandidierella,* n. podrod) sa tipom podroda *Microdeutopus megnae* Giles 1888.

Vrste *Grandidierella (Grandidierella) bonnieroides* Stephensen, 1948 i *Dodophotis digitata* (K. H. Barnard, 1935) su po prvi put utvrđene za teritoriju Sri Lanke (= Cejlona) i dat je detaljni opis, sinonimika i rasprostranjenje ovih vrsta, kao i crteži pojedinih dijelova tijela. Sastavljena je nova dijagnoza roda *Grandidierella* i analizirani su problemi taksonomske pripadnosti raznih populacija ovih vrsta iz raznih dijelova svijeta.

»POLJOPRIVREDA I SUMARSTVO«, XXXI, 1, 41-49, 1985, TITOGRAD

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SMEĐE ALPSKO GOVEČE I NJEGOV SADAŠNJI TIP

Domovina je smeđeg alpskog govečeta istočna Švajcarska, zapadna Austrija i Južna Njemačka. To je jedinstvoeno alpsko planinsko područje gdje se nekad gajilo mnogo stoke od koje se znatan broj s jeseni prodavao, a mlijeko prerađivalo u sir i maslo.

Brz privredni napredak u Evropi u drugoj polovini 19. vijeka prouzrokovao je i potrebu za većom proizvodnjom ljudske hrane, posebno stočarskih proizvoda. Zbog toga su državne vlasti počele preduzimati mjere radi podsticanja razvoja govedarstva i formiranja organizacija odgajivača. Definisani su ciljevi o kvalitetu stoke pa je počelo plansko odabiranje priplodnih grla i vođenje knjiga o porijeklu, što je dovelo do stvaranja produktivnijih rasa. Tako je već 1887. god. u Švajcarskoj osnovana prva zadruga odgajivača smeđeg govečeta, a deset godina kasnije, 1897, udružilo se 88 odgajivačkih zadruga u »Švajcarski savez odgajivača smeđe rase«. Krajem prošlog i početkom ovog vijeka formirane su odgajivačke organizacije i u susjednim zemljama.

U našoj zemlji donekle se u tome kasni. Tako je u zapadnoj Sloveniji i Dolenjskoj uvoženo smeđe goveče još krajem prošlog stoljeća, ali je prva organizacija odgajivača ovog govečeta formirana 1904. u okolini Maribora i to od odgajivača većinom njemačke narodnosti pa su se vezali sa Savezom odgajivača ove rase u austrijskoj Štajerskoj.

Prva organizacija slovenačkih odgajivača ustanovljena je tek 1909. god. u Sodražici, nakon čega je narednih godina broj organizacija stalno rastao. Poslije rata obnovljene su stare i osnivane nove organizacije od kojih je 1932. ustanovljen Savez stočarskih organizacija za smeđe goveče, sa sjedištem u Ljubljani.

Ime rase

Još u drugoj polovini prošlog vijeka za sadašnje smeđe govеče postojao je veći broj naziva, što znači da se u ovoj skupini podrazumijevalo više rasa koje su imale naziv zavisno od područja gajenja.

U Švajcarskoj su, na primjer, već od formiranja prvih odgajivačkih organizacija uveli jedinstveno ime s m e đ e g o v e č e (Braunvieh). Iz doline zvane Montafon (pokrajina Foralberg) prodavali su goveda smeđe rase koja su bila poznata nekada po dobroj mliječnosti pod imenom m o n t a f o n s k a rasa, ali su taj naziv stručnjaci odbacili još prije drugog svjetskog rata. Zanimljivo je da znatan broj stručnjaka u Crnoj Gori taj naziv i sada upotrebljava (štaviše, i za smeđe govеče, koje nema nikakve veze sa područjem Montafona u Foralbergu u Austriji). Amerikanci koji prva priplodna grla smeđe rase uvoze 1880. nazvali su tu rasu š v a j c a r s k o s m e đ e govеče ili B r o w n — S w i s s. U Sloveniji negdje do šezdesetih godina korišćen je naziv s i v o s m e đ e govеče ali je i ovdje taj naziv napušten i usvojen samo naziv »smeđe« po ugledu na ostale zemlje članice Evropskog udruženja odgajivača smeđeg govečeta (Braunvieh, Razza bruna, Race brune). Američki naziv i sada se upotrebljava i neki ovo govеče smatraju za posebnu rasu, mada ono to ustvari nije. Dugogodišnjim selekcijskim radom znatno su izmijenjeni tjelesni okvir i tjelesna građa uopšte, a mliječnost znatno povećana, pa se značajnije razlikuje od prvobitnog kombinovanog tipa smeđeg govečeta. Moglo bi se u ovom slučaju govoriti samo o mliječnom tipu smeđeg govečeta.

Značaj i rasprostranjenost smeđeg govečeta

Smeđe govеče danas se može smatrati kosmopolitskom rasom u pravom smislu, jer se ne gaji samo u zemljama postanka nego i u 40 zemalja svijeta i to na svim kontinentima. Posebno ga nalazimo u brdovitim predjelima: u Alpima, Centralnom masivu u Francuskoj, u području Pirineja (u Francuskoj i Španiji), u planinskim predjelima Turske, Irana i do Indije, u području Atlasa (u sjevernoj Africi), na visokim planinama južne Afrike, u državama Južne Afrike i u SAD, gdje preovlađuje kontinentalna klima (s toplim i dugim ljetima i takođe dugim, hladnim zimama.

Praktično se smeđe govеče u svim zemljama smatra za kombinovanu rasu, naročito kada je riječ o prvobitnom tipu ovoga govečeta. Ono je i sada u većini zemalja kombinovana rasa sa izrazitom usmjerenošću na visoku mliječnost. Posebno je pogodna kao alternativna mliječna rasa na travnim površinama i u različitim klimatskim uslovima od suptropske do subalpske klime. Alternativna mliječna rasa je zbog toga što se prema potrebi može gajenje

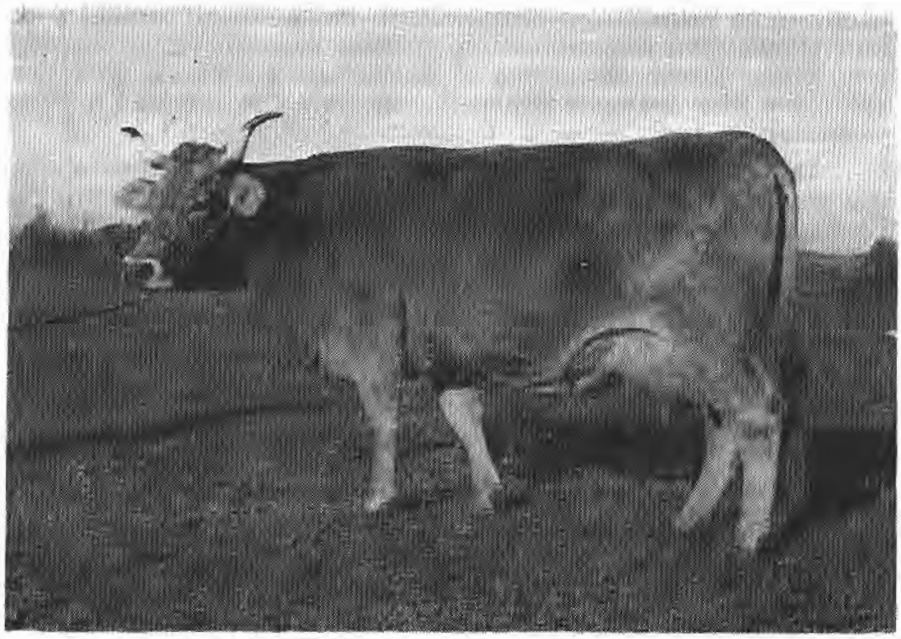
usmjeriti za proizvodnju ili mlijeka ili mesa, što nije slučaj s nekim jednostrano selekcionisanim rasama, kao što je, prije svega, crno-bijelo goveče. Zbog toga se smeđa rasa naziva još u n i v e r z a l n o m ili svestranom rasom (la race versatile, odnosno la razza versatile).

Dr H. Hercog, sekretar Evropskog udruženja odgajivača smeđeg govečeta, čija je 11. konferencija održana u našoj zemlji (na Bledu, aprila 1984.) ističe neke prednosti smeđeg govečeta u odnosu na crno-bijelo prema iskustvima u Italiji. On navodi da su prije nekoliko godina u nekim pokrajinama napuštali smeđe goveče zamjenjujući ga crno-bijelim. Međutim, sada se sve više širi smeđa rasa i to u pokrajinama s najpovoljnijim uslovima za poljoprivredu (kao što je Padska nizija). To svakako govori u prilog kvaliteta ove rase. Broj gazdinstava sa smeđom rasom opet je u nekim predjelima porastao čime su ponovo potvrđene dobre osobine ove rase za moderna gazdinstva i to u uslovima kakvi su u Padskoj niziji, s najintenzivnijom poljoprivrednom proizvodnjom na svijetu.

Postavlja se pitanje zbog čega se smeđa rasa još brže ne širi. Dr Hercog smatra da je glavni konkurent ovoj rasi crno-bijelo goveče, odnosno američki i kanadski soj ove rase, tj. holštajn-frizijsko goveče iz tih država. Iako je američki i kanadski holštajn nešto mlječniji od smeđeg govečeta, kvalitet mlijeka ove rase lošiji je nego u smeđe rase jer sadrži manje masti i bjelančevina, a u ukupnim bjelančevinama manje je kazeina, posebno važnog pri proizvodnji sira. Prema tome, kada bi se mlijeko plaćalo prema kvalitetu, a ne prema količini, skoro bi se izgubila prednost crno-bijelog holštajna i pored veće količine mlijeka. Drugi važan razlog koji je išao u prilog jednostranih mliječnih rasa jeste povoljnija cijena mlijeku nego mesu. Tako je u Njemačkoj odnos cijena mlijeku i mesu bio 1970. god. 1:6,3, da bi se 1981. izmijenio na štetu mesa (1:5,7). U istim periodima u Švajcarskoj odnos između pomenutih cijena bio je 1:7,2 (1970), odnosno 1:6,5 (1981. god.).

Valja naglasiti da jedna studijska komisija Evropske zootehničke federacije (FEZ) u svojoj dokumentovanoj studiji ponovo preporučuje da se veća pažnja posvećuje osobinama za proizvodnju mesa kod goveda. U vezi s tim prof. dr B i a n c a na I svjetskoj konferenciji o smeđem govečetu u Insbruku navodi neke značajne prednosti smeđe rase:

— višestrana upotrebljivost, tj. i za mlijeko i meso,
— prilagodljivost promjeni proizvodnog pravca,
— duža eksploatacija krava u proizvodnji,
— posebna prilagodljivost ekstremnim klimatima, i
— dobre osobine muznosti (dobar protok mlijeka).



Sl. 1. — Krava modernog tipa smeđe rase iz Švajcarske s prosječnom proizvodnjom od 7 002 kg mlijeka sa 3,9% masti (iz zbirke Schweiz. Braunviehzuchtverband, Zug)

Ovo su veoma značajne prednosti sa gledišta ekonomičnosti proizvodnje zbog kojih je u određenim uslovima smeđe goveče ozbiljan konkurent crno-bijelom.

Oplemenjivanje evropskog smeđeg govečeta i promjena prvobitnog tipa

U govedarstvu Jugoslavije, sve negdje tamo do pedesetih godina, selekcija je išla u pravcu forsiranja dubljih i širih životinja koje su bile niže i nešto lakše, bar kada je riječ o glavnim rasama — simentalskoj i smeđoj. Krave tog tipa nijesu se isticale mliječnošću jer je ova osobina bila srednje razvijena.

Krajem pedesetih i početkom šezdesetih godina došlo je u Evropi do bržeg povećavanja produktivnosti u poljoprivredi pod uticajem novih naučnih saznanja, primjene savremene tehnike i opšteg tehničkog napretka, što nije mimoišlo ni govedarstvo. Zbog veće potražnje bilo je nužno povećati proizvodnju mlijeka i mesa mlađih kategorija goveda, pa su u praksu uvedeni vještačko osjemenjavanje krava i nove metode selekcije. Brojne, ali, prema ukupnom broju, manje raširene i neproduktivnije rase proizvođači su

Sl. 2. — Krave na paši u kantonu Appenzell, Švajcarska (iz zbirke Schweiz. Braunviehzuchtverband, Zug)

napustili (u Sloveniji pomursko plavo, zatim pincgavsko u Sloveniji, Hrvatskoj i drugim krajevima, goveče u tipu stepskog, tipična buša u nekim krajevima itd.).

U glavnim odgajivačkim zemljama smeđeg govečeta (Švajcarskoj, Njemačkoj i Austriji) nije do sredine ovog vijeka postignut vidniji uspjeh u povećanju mliječnosti krava. Stoga su se, počev od 1965, odgajivači u pokrajini Virtembergu odlučili za ukrštanje evropskog tipa smeđeg govečeta s američkim, koje su Amerikanci nakon uvoza iz Švajcarske u prošlom vijeku formirali u krupno goveče s velikim mogućnostima za proizvodnju mlijeka. S američkim smeđim govečetom počele su svoju smeđu rasu oplemenjivati i druge evropske zemlje, uključujući i Jugoslaviju, tj. Slovenija s najbrojnijom populacijom ove rase. Cilj oplemenjivanja sa smeđim govečetom bio je da se poveća mliječnost, ali da se, koliko je god moguće, sačuvaju veoma dobre osobine prvobitnog tipa ovog govečeta za proizvodnju mesa. To je postignuto na taj način što su uvoženi bikovi, odnosno sperma američkog smeđeg govečeta (BS), i sačinjeni precizni sopstveni programi selekcije.

Rezultati tog dvadesetogodišnjeg smišljenog odgajivačkog rada vidljivi su u svim značajnim evropskim populacijama, pa i u Sloveniji. Oni se ispoljavaju u sljedećem:

Sl. 3. — Muža krava na alpskom pašnjaku u Švajcarskoj na 1 800 m n. v. (z zbirke Schweiz. Braunviehzuchtverband, Zug)

Krave su postale veće. Sa visinom grebena između 130 i 140 cm, više su od ranijeg tipa 3-4 cm.

Vime je krava prostrano i dobro pripijeno sa znacima dobre mliječnosti i podesno za mašinsku mužu. U vezi s ovim znatno se povećala i mliječnost krava. Već u prvoj laktaciji, ako je ishrana dobra, krave daju dosta mlijeka, a u daljim laktacijama znatno više. Tako prosječna mliječnost prvoteoki — kćeri bikova u progenom tekstu iznosi u Bavarskoj 4 000 pa sve do 5 000 kg mlijeka. U Njemačkoj i Francuskoj za 10 godina (1970—1980) prosječna mliječnost smeđih krava porasla je za 800; Švajcarskoj za 700; Austriji za 500; Italiji za 432 i Sloveniji za 356 kg. Prema tome ,smeđa rasa postala je konkurentna jednostranim mliječnim rasama, kao što su crno-bijelo goveče i rotbunt. Već smo rekli da je mlijeko smeđe rase bogatije bjelančevinama od mlijeka ostalih rasa goveda.

U pogledu prirasta žive mjere bikova podaci su različiti. Prema podacima iz Bavarske i Italije, brzina je prirasta malo poboljšana, dok istraživanja u Austriji ukazuju na malo smanjenje prirasta čiste težine i za 1,1% slabiji klanični kvalitet. Međutim, jednogodišnji bičići znatno su viši i duži te pogodniji za tov na veću masu nego bikovi starijeg rasnog tipa. Pošto su krave krupnije i teže, junice brže rastu nego ranije a i zbog toga što se bikovi u

Sl. 4. — Pogled na dio Alpa i pašnjake u Švajcarskoj (iz zbirke Schweiz. Braunviehzuchtverband, Zug)

novom tipu mogu toviti na veću masu, proizvodnja mesa smeđe rase sadašnjeg tipa može biti veća nego što je bila ranije.

Zbog svojih dobrih osobina broj smeđih krava u kontroli proizvodnje znatno se povećao u svim evropskim zemljama, za značajnijim brojem grla ove rase. To su zemlje članice Evropskog udruženja odgajivača smeđe rase (Austrija, Francuska, Italija, Njemačka, Švajcarska, Španija i Jugoslavija). Pored ovih stalnih članica, za članstvo se prijavljuju i druge zemlje, među njima i Sovjetski Savez.

Smeđe rase u starom tipu ima još oko 30% u Švajcarskoj, dok sve evropske zemlje koriste većinom bikove sa više od 50% krvi američkog smeđeg govečeta (BS), ali je težište na bikovima sa 75% krvi BS.

Proizvodnja mlijeka u evropskim zemljama, SAD i u Jugoslaviji

Oplemenjivanjem BS govečetom postignuta je visoka mliječnost smeđe rase u mnogim evropskim zemljama, pa i u našoj. Prema podacima iz zvaničnih publikacija, daćemo nekoliko uporednih podataka za nekoliko zemalja.

Tab. 1. Mliječnost smeđih krava u evropskim zemljama i Sloveniji

Zemlja	Godina	Broj kontr. krava	Prosječna proizvodnja mlijeka kg	masti %	masti kg
	1970.	62 087	4 023	4,00	161
Austrija	1980.	61 770	4 520	4,02	182
	1982.	62 124	4 799	4,02	193
	1970.	11 706	3 427	3,56	122
Francuska	1980.	12 158	4 257	3,62	154
	1970.	79 711	3 508	3,76	132
Italija	1980.	63 451	3 940	3,81	150
Njemačka	1970.	133 350	4 112	3,92	161
	1980.	176 084	4 912	3,95	195
Švajcarska	1970.	172 636	3 890	8,87	151
	1980.	186 697	4 568	3,91	179
Slovenija	1970.	7 000	3 386	3,79	128
	1980.	9 980	3 742	3,80	142

Zanimljiva su poređenja mliječnosti između tri rase (smeđe, crno-bijele i simentalske u pokrajinama Baden-Würtemberg i Allgäu).

Tab. 2. — Mliječnost pojedinih rasa u pokrajinama Allgäu, Baden-Würtemberg-u i SAD

Rasa	God.	Pokrajina - država	Broj krava	Mlijeko kg	Mast %	Mast kg	Bjel. %	Bjel. kg
Smeđa	1982.	Allgäu	7 980	5 236	3,95	207	3,40	178
Simental.	„	„	270	4 387	3,91	171	3,34	146
Crno-bijela	„	„	3 795	5 232	3,90	204	3,27	171
Smeđa	1984.	Bad.-Würt.	39 709	5 076	4,05	205	3,45	175
Crno-bijela	„	„	69 497	5 125	3,96	203	3,23	165
Crveno-bijela	„	„	14 795	4 876	3,92	191	3,26	159
Simentalac	„	„	117 897	4 529	3,99	181	3,37	153
Smeđe (BS)	1982.	SAD	—	5 874	4,11	241	3,58	210
Am. holštajn	„	„	—	7 084	3,65	258	3,21	227

Umjesto zaključka

Smeđe goveče u starom evropskom tipu poznato je u Crnoj Gori prije drugog svjetskog rata, a nešto više od posljednjeg rata pa do sredine šezdesetih godina kada se masovnije gajilo na poljoprivrednim dobrima. Nakon toga društveni sektor pretežno se orijentisao na crno-bijelo goveče, a smeđe se, donekle u novijem tipu,

ponovo masovnije uvozi počev od 1975. iz Slovenije i Njemačke, a manjim dijelom i iz Austrije. Ono treba da bude vodeća rasa kako za gajenje u čistoj krvi, tako i za oplemenjivanje autohtone neujednačene populacije. Ova zamisao povremeno nailazi na otpor od nedovoljno upućenih stručnjaka, pa se često ide u krajnosti: jedni su za jednostrano mliječno, tj. crno-bijelo goveče, a drugi predlažu simentalca kao najtipičnijeg predstavnika kombinovanih rasa čije su osobine mliječnosti slabije razvijene nego u smeđeg govečeta, iako je i simentalac kosmopolitska rasa odličnih kvaliteta.

Smatramo ipak da sve ono što je rečeno u ovom članku i dokumentovano vjerodostojnim podacima ide u prilog smeđoj masi, čak za čitavo područje Crne Gore, izuzimajući, eventualno, neke veće društvene mliječne farme. Sa smeđom rasom može se i bez koncentrata postići preko 4 000 kg mlijeka u standardnoj laktaciji, a, sa malim dodatkom koncentrata (500-600) kg po grlu godišnje) i iznad 5 000 kg. Zatim, sa ovom rasom normalni su štalski prosjeci od 6 000 ili 6 500 kg mlijeka, (a poznati su i sa 8 000 kg), a nije mali broj ni krava koje prelaze 10 000 kg mlijeka, sa preko 4% masti. O vrijednosti rase ne može se suditi prema pojedinačnim slučajevima niske proizvodnje, jer je to u biologiji sasvim normalno. Inače, ulaganje velikih sredstava u selekcijski rad ne bi imalo nikakve svrhe.

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