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STATUS OF *DICRANOCENTRUGA* WRAY, 1953 WITH THE DESCRIPTION OF A NEW SPECIES (COLLEMBOLA : ENTOMOBRYIDAE)

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INTRODUCTION

The genus *Paronella* Schött, 1893 was a long heterogenous one with species belonging to widely different genera.

While fixing the concept of *Paronella*, Mitra (1992) observed that the species now known under *Paronella* from the Ethiopian and Neotropical Regions are widely different from *Paronella fusca* Schött, 1893 (type species of *Paronella*) and proposed for their inclusion under *Dicranocentruga* Wray, 1953, a genus very insufficiently described from Puerto Rico.

Subsequently, the author had an opportunity to examine a series of collections of the species from Puerto Rico through the courtesy of Dr. Mari Mutt and it is noted that the species possesses the vestigial G and H ocelli and extra ocular structure as in other *Paronella*—like species of these regions. Thus *Dicranocentruga** is a valid genus and the name should be used for accommodating the *Paronella*—like species of the Ethiopian and Neotropical Regions.

The genus *Dicranocentruga* includes most of the species described under *Paronella* from the Ethiopian and Neotropical Regions. Though close to the genus *Paronella,* it is distinct from the latter in the following important characters : (i) general body facies and relatively smaller size, (ii) nature of ungues which is distinctly different from *Paronella* and is uniform in the species, under the genus, (iii) nature of tenent hair which is always clavate in all the known species under the genus, (iv) absence of manubrial spines and dentes being armed with single inner row of spines, often transiting distally, outer row of spines not well developed, (v) nature of mucrones, (vi) in the nature of extra ocular structure and (vii) in the number of macrochaetae anteriorly on the anterior face of ventral tube (4 + 4 vs. 7 + 7 in *Paronella*) [Mitra , 1992].

Denis (1933) though indicated that *Paronella fusca* as a form with larger body facies, with both manubrial and dental spines and possessing tenent hair which is not dilated apically, he did not separate out the group of species lacking such characters. Further, cephalic chaetotaxy of the two genera differs significantly from each other, at least in the orientation of dorsal setae (specially in the orientation of $D_1 + D_1$and $D_2 + D_2$) [Mitra, 1993].

*Mitra (1972) proposed *Metaparonella* to accommodate the *Paronella*—like species from Ethiopian and Neotropical Regions (unpublished, hence, a cheironym).

Dicranocentruga is distinct from *Campylothorax* in all fundamental morphological characters although both of them possess extra ocular structure. In structural details, extra ocular structures of these two genera are different. The genus is distinct from *Microparonella* Carpenter (1916) in its relatively large size, presence of extra ocular structure and nature of ungues and its teeth. Moreover, the nature of scales clothing body, number of ocelli and structure of mucrones in the two genera are also different. It is distinct from *Bromacanthus* and *Lepidonella* in many striking characters like the structure of ungues and unguiculi, presence of extra ocular structure, arrangement of ocelli (in two longitudinal parallel rows *vs.* circular arrangement in *Bromacanthus* and *Lepidonella*). Moreover, the chaetotaxy of head in the species of *Dicranocentruga* is also distinct from those of *Bromacanthus* and *Lepidonella* (Mitra, 1993).

Dicranocentruga Wray, 1953

Dicranocentruga Wray, 1953. *Jour. Agric. Univ. Puerto Rico*, **37**(2) : 140-150.

Material : *Paronella nigromaculata* Schött : 19 original slide-preparations of Schött (Nos. 1255, 1257 to 1274); 30 exs. (syntypes) in 5 vials; *Paronella nigromaculata* det. Wahlgren : c. 115 exs. in spirit in single vial; *Paronella penicillata* Schött : 6 syntypes mounted on 6 slides (Nos. 1276 to 1281). All from the Swedish Museum Natural History, Stockholm, Sweden.

Paronella hirtipes Handschin : 3 syntypes mounted on 3 slides from the Natural History Museum, Basel, Switzerland.

Dicranocentruga jataca Wray : Several topotypes on slides and in alcohol received from Dr. Mari Mutt, Puerto Rico.

Redefinition : Body facies not fusiform like *Paronella fusca*, antennae of variable lengths, normally shorter than half the length of body; apex of Ant. IV with indistinct sense-knob and smooth setae; prelabral setae 4, ciliated, labral setae 5, 5, 4, smooth; ocelli 8 + 8, G and H vestigial, appear nonfunctional; extra ocular structure, 2–3 lobed, outer lobe not drawn into a slender process; ungues with paired inner basal teeth enlarged, distal inner unpaired tooth always present and conspicuous; external basolateral teeth well developed; unguiculi mostly lanceolate, nondentate, in some species fore unguiculi sometime sublanceolate; tenent hair well developed, clavate; tibiotarsal spines absent; ventral tube well developed, anterior face anteriorly with 4 + 4 ciliated macrochaetae; manubrium without spines, dentes with only one inner row of simple, sometifme serrated or ciliated spines (in *D. penicillata* n. comb.), which usually transit into stiff setae distally, outer margin with delicate or strong spiny setae but not distinct spines; mucro usually elongate and narrow with 4 teeth, sometimes short and broad, apical tooth rounded or pointed.

Type-species : *Dicranocentruga jataca* Wray, 1953.

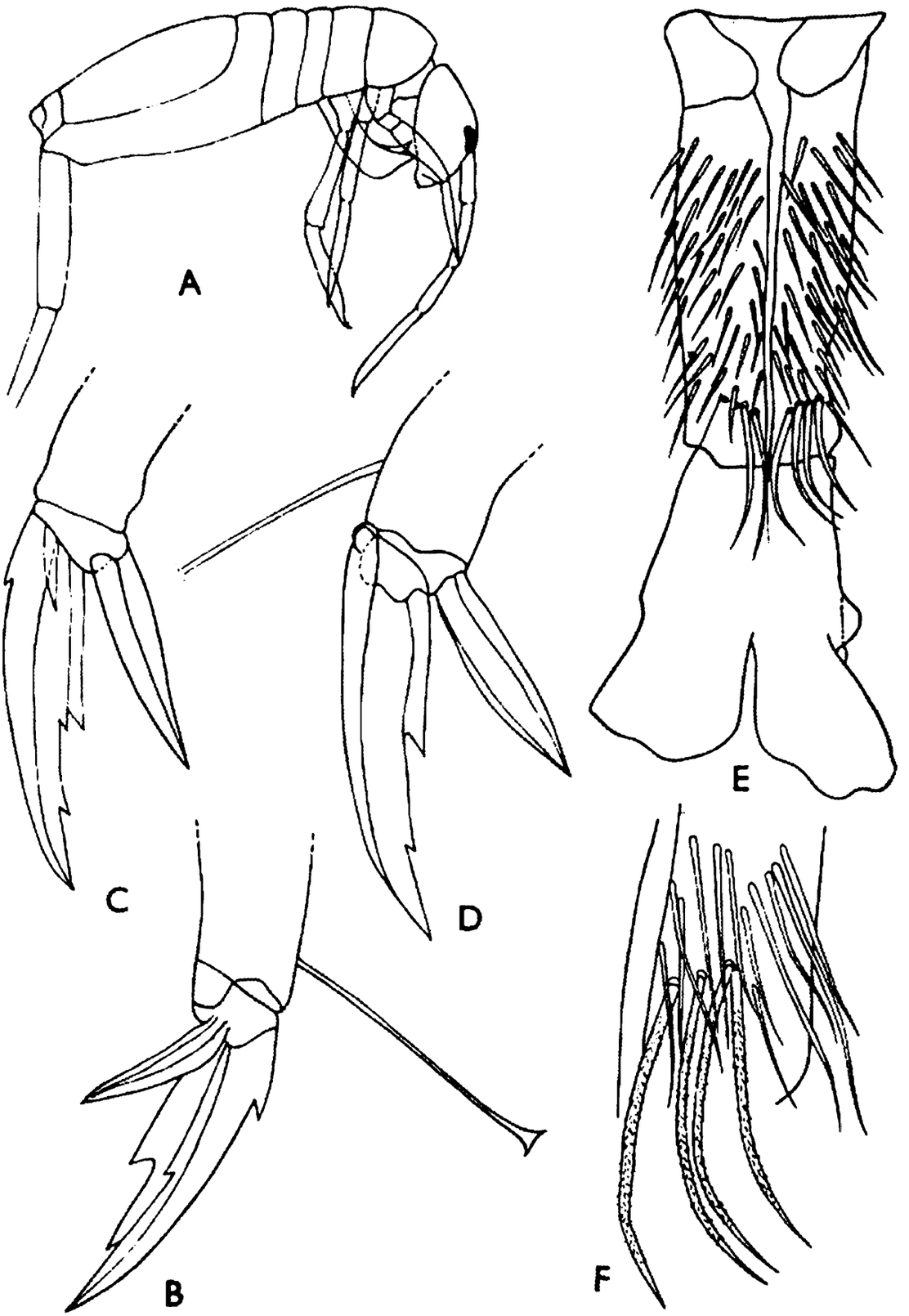

Fig. 1. *Dicranocentruga wahlgreni*,n. sp. : (A) profile; (B) footcomplex of leg I; (C) footcomplex of leg II; (D) footcomplex of leg III; (E) ventral tube (anterior face); (F) chaetotaxy of anterior face of ventral tube.

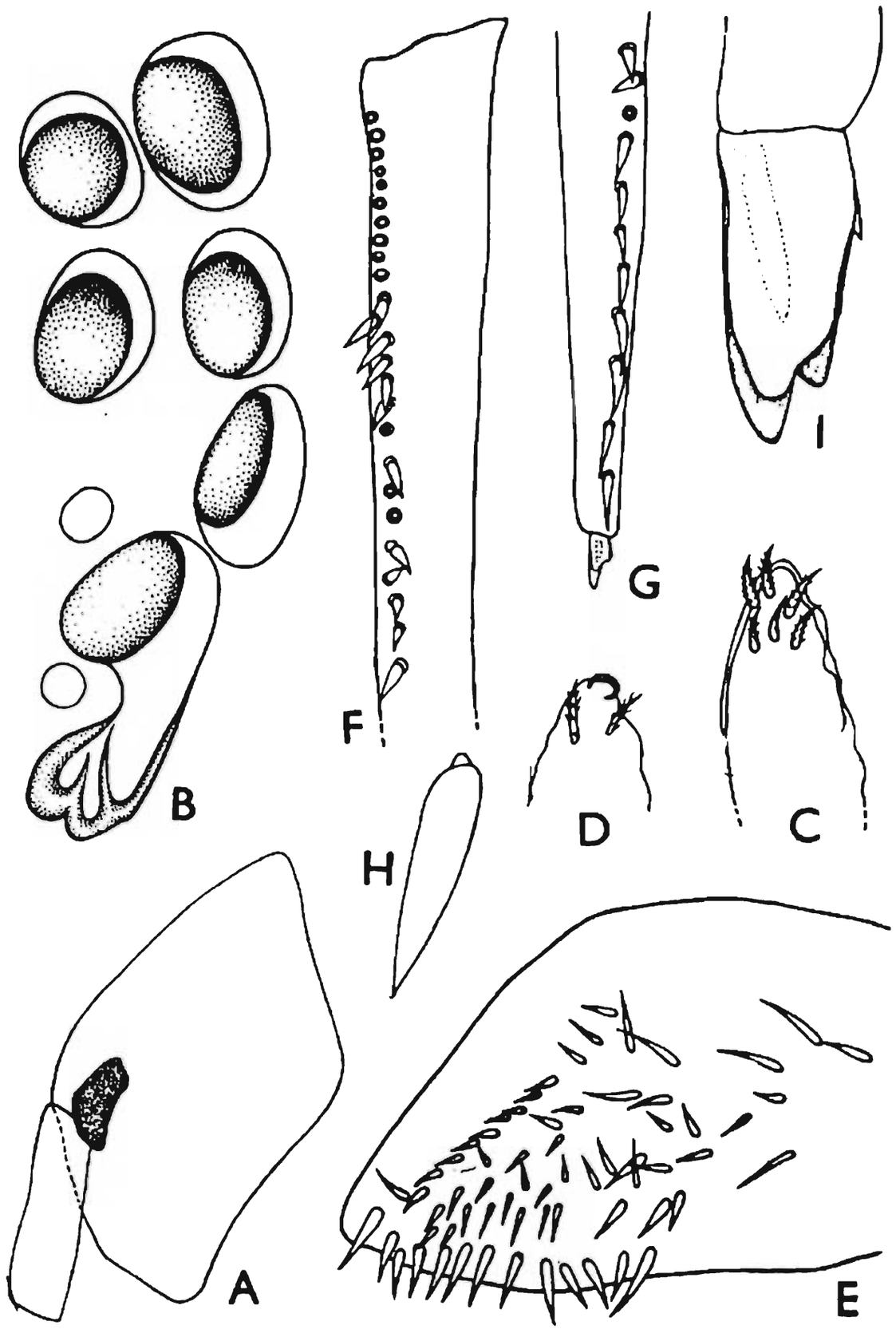

Fig. 2. *Dicranocentruga wahlgreni*, n. sp. : (A) head with pigmented ocellar field; (B) arrangement of ocelli with eos; (C, D) apices of Ant. IV; (E) trochanteral organ; (F, G) nature and arrangement of dental spines; (H) a dental spine (magnified); (I) mucrone.

Dicranocentuga wahlgreni, new species

Material examined : 115 exs. In a single vial from the Swedish Museum Natural History, Stockholm, Sweden, labelled as "*Paronella nigromaculata* Schött, meru, 3, 500 m.,? raguskogen/1, 1906; Colleg. Y. Sjöstedt, Determ. E. Wahlgren"

Colouration : Ground colour uniformly white to pale yellow without any darker pigmented patches on body and appendages; only pigmented regions in the entire body, two ocellar fields, one on each side of head capsule (Text fig. 1, A, 2, A; PL. 1, B).

Clothing : Clothed with scales, scales typical of the tribe Paronellini, being larger, rounded or oval in outline (Text fig. 3); stiff, dark, setae extremely sparse and localised on Th. II, Abds. III, IV (Text fig. 5, B); appendages clothed with slender setae and scales; antennae devoid of smooth erect setae found in other genera; apical sense-knob of Ant. IV not conspicuous, apical smooth erect setae apparently absent.

Head : Pear-shaped dorsally, with two dark ocellar fields, one on each side, each containing 8 ocelli arranged in two longitudinal parallel rows, ocelli G and H reduced (Text fig. 2, B); extra ocular structure short stalked, with 3 conspicuous lobes (Text figs. 2, B;4, B, C; PL 2); inner two lobes closely apposed with each other; antennae sub-equal to half the length of body; relative length index of Ants. I : II : III : IV = 8 : 11 : 9. 5 : 13. 5; Ant. IV apparently appears annulated owing to the presence of whorls of setae, sense-knob at its apex inconspicuous (Text figs. 2, C, D); head diagonal/Ant. I = 20/9; prelabral setae, 4, ciliated labral setae, 5, 5, 4 , smooth; anterior margin of labrum anteriorly with 2 tubercles;chaetotaxy as in Text fig. 5, A.

Thorax : Relative length index of Ths. II : III = 11 : 7; legs all similar; fore unguiculi smaller than those on mid and hind legs, unguiculi lanceolate, nondentate; ungues with large paired inner teeth located at about half of its length followed by a single unpaired tooth, external basolateral teeth well developed; tenent hair long, clavate (Text figs. 1, B, C, D); trochanteral organ with *c.* 66 slender spines arranged in a quadrangle (Text fig. 2, E).

Abdomen : Relative length index of Abds. I : II : III : IV : V : VI = 4 : 5 : 5. 5 : 27 : 3. 5 : 2; ventral tube well developed with 2 protrusible vesicles everted (Text fig. 1, E); anterior face of ventral tube anteriorly with 4 + 4 macrochaetae, rest of the anterior and posterior faces clothed with microchaetae (Text fig. 1, F); rami of retinaculum each with 4 teeth, corpus with a median seta; manubrium and dentes sub-equal in length; dentes with a single inner row of spines which transit distally into stiff, ciliated setae and an outer row of stiff, ciliated setae (Text figs. 2, F, G, H; PL 3, C, D); mucrones with 4 teeth, apical tooth larger than anteapical tooth, V_1 and inner lateral teeth well developed (Text fig. 2 , I).

Length (excluding appendages) : 3 mm.

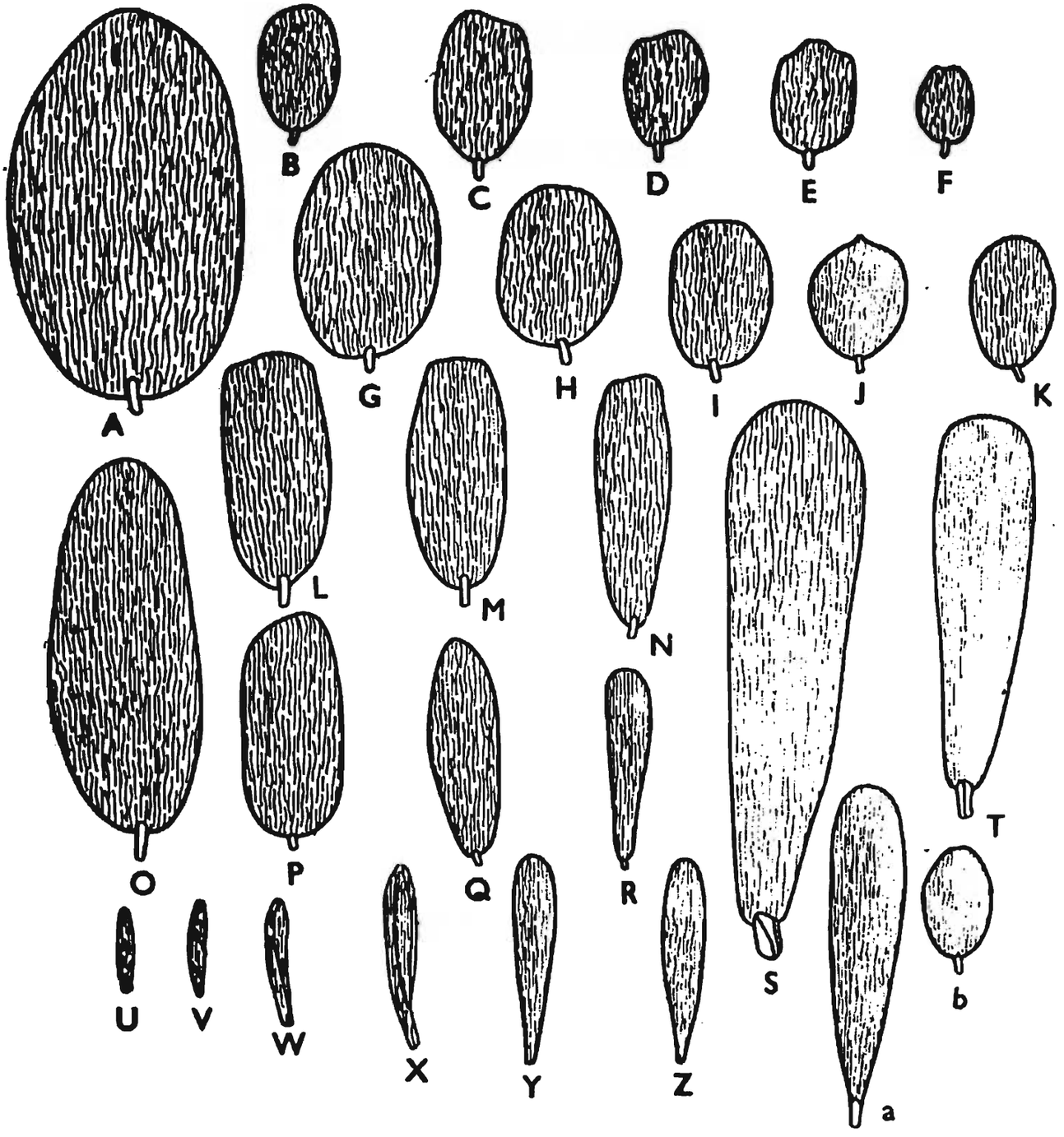

Fig. 3. Typical scales of *Paronella* and *Dicranocentruga*. (A–Q) from body; (R–Z) from dentes; a, b, from dorsal region of manubrium.

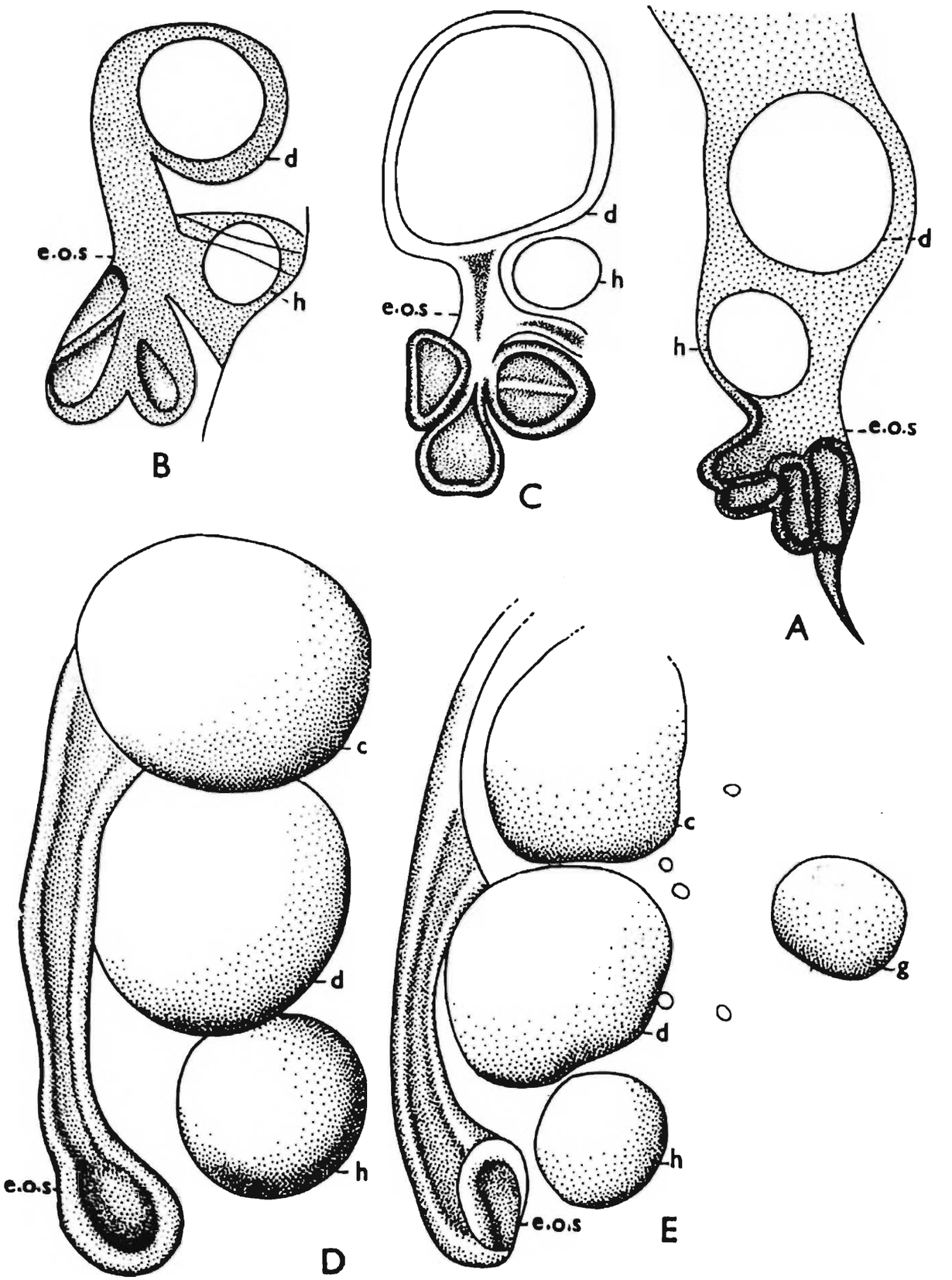

Fig. 4. Extra ocular structures (eos). : (A) *Paronella* Schott; (B, C) *Dicranocentruga*; (D, E) *Campylothorax*.

Type-specimens : Holotype mounted on a slide, 111 paratypes preserved in spirit in a single vial; deposited in the Swedish Museum Natural History, Stockholm, Sweden; single paratype in ZSI, Kolkata.

Type-locality : Meru, Africa (3, 500 m.).

Comparisons : The investigator had an opportunity to examine a vial containing c. 115 examples from the Swedish Museum Natural History, Stockholm, Sweden, which was determined by Wahlgren (1908) as *Paronella nigromaculata* Schött along with a series of syntypes of *Paronella nigromaculata* Schött. A critical examination of those specimens morphologically as well as chaetotaxically reveals that the specimens identified by Schött and Wahlgren involves at least 3 species. The specimens from Meru determined by Wahlgren (1908) as *Paronella nigromaculata* is a new species distinctly differing from *Paronella nigromaculata* species-complex of Schött. Thus the distinctly larger size of *Dicranocentruga wahlgreni* (3 mm. *vs.* 1.5–2 mm.), its totally nonpigmented body and appendages along with the chaetotaxy of head and body (D_3 + D_3 and PO_1 always absent in *M. nigromaculata* species-complex of Schött *vs.* always present in the new species). Moreover, the extra ocular structure in the 2 species is entirely different (in *M. wahlgreni,* the structure is always short-stalked and trilobed *vs.* long-stalked and bilobed in *M. nigromaculata* species-complex). The species is named in honour of Dr. W. Wahlgren who had the first opportunity to describe it.

Interrelationships : The genus *Dicranocentruga* includes most of the species described under Paronella from Africa, South America and adjoining regions. Although it has closest affinity with the genus *Paronella* in the presence of extra ocular structure, it is distinct from the latter in many important characters like—(i) the general body facies and relatively smaller size of the species, (ii) nature of unguis and tenent hair, (iii) absence of manubrial spines and dentes being armed with one inner row of well developed, transiting spines and (iv) nature of mucrones. Moreover, *Dicranocentruga* is distinct from *Paronella* in the nature of extra ocular structure, in the number of macrochaetae anteriorly on the anterior face of ventral tube (4 + 4 vs. 7 + 7) and in the presence of ciliated prelabral setae. Earlier workers (at least Denis, 1933) although noted some of the differences existing between *Paronella fusca* and others, he, however, did not attempt to segregate these heterogeneous species-groups under *Paronella.* The present study demonstrates pointedly the striking differences that exist between the species of the genus *Dicranocentruga* and *Paronella fusca.* Again in the cephalic chaetotaxy, as mentioned earlier, the two genera differ from each other (at least in the orientation of dorsal setae), *Dicranocentruga* is distinct from *Microparonella* in having relatively larger body-size, in the presence of extra ocular structure and in the nature of unguis and ungual teeth. Moreover, the nature of scales, number of ocelli and structure of mucrones are also distinct from *Microparonella.* The new genus is distinct from *Bromacanthus* Schött (1925) and *Lepidonella* Yosii (1960) in many fundamental characters like the structure of foot complex,

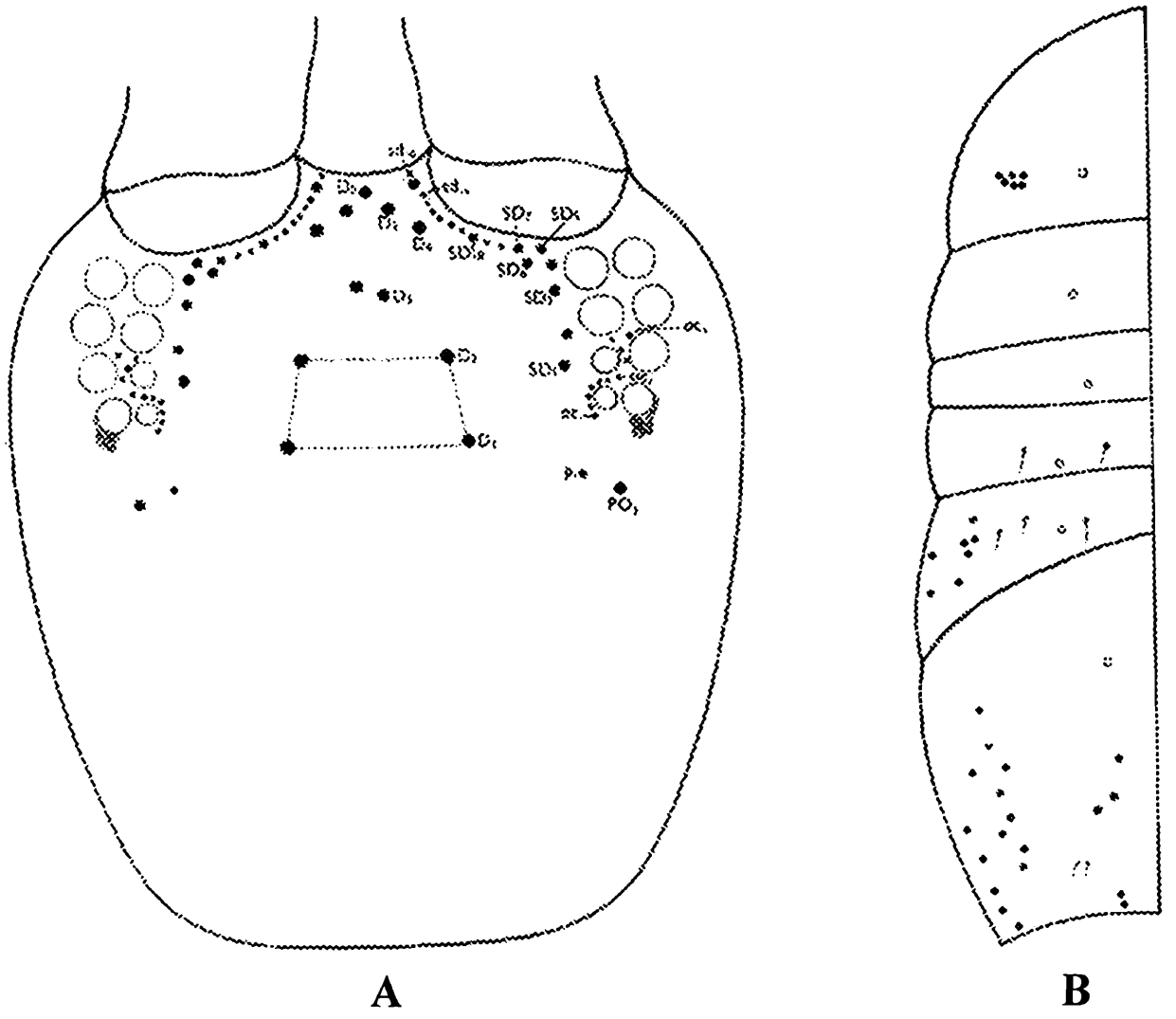

Fig. 5. (A) chaetotaxy of head; (B) chaetotaxy of tergites.

presence of extra ocular structure, arrangement of ocelli (in two longitudinal parallel rows vs. circular arrangement in *Bromacanthus* and *Lepidonella*). Cephalic chaetotaxy in *Dicranocentruga* is also distinct from the two above-mentioned genera.

Distribution : The species belonging to the genus *Dicranocentruga* have been recorded from different parts of Africa, Madagascar and South America. They are widely distributed and are endemic to the Ethiopian and Neotropical Regions.

Species and sub-species included under *Dicranocentruga* Wray, 1953

Borner (1903), Denis (1925, 1933), Marlier (1945) and Delamare Deboutteville (1947, 1950a, b, 1952) described a number of species from the Ethiopian and Neotropical Regions under *Paronella* which agree in all details with the diagnosis of *Dicranocentruga* given in this study. *Aphysa eburnea*, described by Delamare Deboutteville (1951b) from Ivory Coast, has two rows of distinct dental spines and differs from other related species of in the possession of two ventral teeth of mucrones (1 in other species) and longer antennae. Placement of this species in the genus *Aphysa*

Handschin, which does not posses dental spines and has large, complex mucrones, does not appear satisfactory.

D. nigromaculata (Schött) 1903, new combination

D. hirtipes (Handschin) 1924, new combination

D. innominata (Denis) 1933, new combination.

D. penicillata (Schött) 1927, new combination

D. fuelleborni (Börner) 1903, new combination

D. beguei (Delamare Deboutteville) 1950, new combination

D. carpenteri (Denis) 1925, new combination

D. ghesourieri (Marlier) 1945, new combination

D. grassei (Delamare Deboutteville) 1950, new combination

D. lamottei (Delamare Deboutteville) 1950, new combination

D. montana (Delamare Deboutteville) 1950, new combination

D. nigromaculata pallida (Delamare Deboutteville) 1951, new combination

D. penicillata obscura (Delamare Deboutteville) 1950, new combination

D. penicillata pallida (Delamare Deboutteville) 1952, new combination

D. villiersi (Delamare Deboutteville) 1947, new combination

D. villiersi anomala (Delamare Deboutteville) 1951, new combination

D. villiersi pallida (Delamare Deboutteville) 1950, new combination

D. aburnea (Delamare Deboutteville) 1951, new combination.

SUMMARY

In this study, the status of *Paronella* -like species from the Ethiopian and Neotropical Regions has been fixed on the basis of examination of type-specimens and other representative material. The *Dicranocentruga* Wray, 1953 is a valid genus and its concept is precised on the basis of the material from Puerto Rico from where it was described. The eighteen species so far known under *Paronella* from these regions, as this study reveals, belong to *Dicranocentruga* and they, therefore, form new combinations.

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