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PARONELLIDES SCHÖTT (1925)—*PSEUDOPARONELLIDES* SALMON (1941)—*MICRONELLIDES* SALMON (1944) COMPLEX FROM AUSTRALIA, TASMANIA AND NEW ZEALAND

[Collembola : Entomobryidae : Paronellinae]

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The genus *Peterikrypta* was erected by Ritter (1911) with the description of two new species *viz.*, *Pterikrypta sulcata* and *Pterikrypta fasciata* from Ceylon. *Pterikrypta* unquestionably is a synonym of *Salina* (in part) and the species *sulcata* is referable to the *celebensis* group (Mitra, 1973) by the nature of its mucrones and dental scale appendage and seems to be allied with the species *S. celebensis* (Schäffer, 1989). Ritter's (1911) other species *viz.*, *P. fasciata* is worth-including in the genus *Callyntrura* Börner by the nature of its mucrones.

Schött (1917) although used the name *Pterikrypta* of Ritter in describing his new species *mjöbergi*, he, however, inadvertently spelled the name as *Pericrypta*. Thus the name (i. e. *Pericrypta* Schött, 1917) exists in the literature due to the subsequent mispelling of *Pterikrypta* Ritter, 1911 by Schött, 1917. This emendation (i. e. from *Pterikrypta* to *Pericrypta*) was by no means intentional as is evident from Schött's (1917) clear indication, "Gen. *Pericrypta* Ritter" (*Ark. Zool.*, *11* : 22-24, 1917). Schött (1925) again used the same incorrect subsequent spelling (i. e. *Pericrypta*) and conceived that his species "*mjöbergi*" belongs to a genus other than the genus of Ritter, 1911 (i. e. *Pterikrypta*) and thus proposed the name *Paronellides* for this species. Obviously, *Pericrypta* Schött (1917) is a case of incorrect subsequent spelling and it has no status in nomenclature [Article 33 (C), I. C. Z. N., 1985]. *Paronellides*, therefore, is the valid name of the genus with the type-species *Pericrypta mjöbergi* Schött, 1917 and *Pericrypta* Schött, 1917 has no status in the meaning of the code and therefore, is not available.

Salmon (1944) described the genus *Micronellides* with the type-species *M. oliveri* not differing significantly from *Paronellides* except in the smaller size of its body and shorter antennae. Examination of a paratype (Dominion Museum, Slide No. N. Z. 3/1353 ; Photomicrograph on Pl. 1, D) of *Micronellides oliveri* reveals that it represents a juvenile stage of a *Paronellides* sp. (cf. *novaezealandiae* Salmon) which is indicated by its usual juvenile body facies (head appears larger in relation to the total length of body), shorter antennae, undifferentiated flexed macrochaetae and dental

spiny appendages, poorly developed trochanteral organ (with *c.* 2-3 spines), sub-lanceolate unguiculi and poorly developed or not developed ungual teeth.

Salmon (1941) established the genus *Pseudoparonellides* with the type-species *Pseudoparonellides badia*. This genus is found to differ from *Paronellides* in the possession of 3 mucronal teeth. Since the difference of one mucronal tooth only can not justify the establishment of an independent genus, *Pseudoparonellides*, therefore, is considered as a subgenus of *Paronellides* pending further investigations on other characters, based on specimens preserved in alcohol.

Paronellides Schött, 1925

1925. *Paronellides* Schött, *Sarawak Mus. Journ.*, 3 : 107-127.
1925. *Pericrypta* Schött, 1925, *ibid.* [*Lapsus* for *Perikrypta* Ritter, 1911. Unavailable name.]
1944. *Micronellides* Salmon, *Rec. Dom. Mus., N. Z.*, 1 (2) : 123-182. New Synonymy.

Redefinition : Antennae equal or subequal to the length of head and body ; antennae and appendages without stiff outstanding darker macrochaetae ; body clothed with obliquely truncated and club-shaped macrochaetae ; frontal spines absent ; 8+8 ocelli present ; prelabral setae 4, apparently smooth, labral setae, 5, 5, 4, smooth ; tibiotarsi may be superficially segmented ; ventral tube anteriorly on anterior face with 5+5 macrochaetae ; dentes not annulated, without spines ; dental spiny appendages present ; dental scale appendage absent ; mucro small, with 2-3 teeth ; abd. IV medially with a transverse row of macrochaetae.

Type-species : *Pericrypta mjöbergi* Schött, 1917, by monotypy and O. D.

Sub-genus 1 : *Paronellides* Schött, 1925. New Status.

Material Examined : *Paronellides mjobergi* (Schött) : Slide No. 1300 labelled as "*Pericrypta mjöbergi* n. sp. austr. H. Schött." Slide No. 1301, labelled as "*Pericrypta mjöbergi* ; alk. H. Schött". Slide No. 1302, labelled as "*Pericrypta mjöbergi*, austr". (the specimen does not belong to *Paronellides*). Slide No. 4170, labelled as "*Pericrypta mjöbergi* Schött, 1917. Lectotype, Lamington Plateau, Queensland. E. Mjöberg. Oct. 1912". Slide No. 4171, labelled as "*Pericrypta mjöbergi* Schött, 1917. Paratype, lamington Plateau, Queensland. E. Mjöberg. Oct. 1912".

Paralectotypes (in spirit) : Vial No. 1, 3 exs., labelled as "*Pericrypta mjöbergi* n. sp. Cedar creek, Queensland. Mjöberg., mars". Vial No. 2, 6 exs., labelled as "*Pericrypta mjöbergi* n. sp. Lamington Plat., Queensland. Mjöberg, April".

Paronellides novaezealndiae Salmon : 1 paratype mounted on a slide No. Dominion Museum, N. Z. 3/850, labelled as "*Paronellides novaezealandiae*. Loc. Maruia Valley. In leaf mould, 9/2/1940, coll. J. T. Salmon. Det. J. T Salmon. Mounted Euparal (P-type)".

Paronellides noveaezealandiae purpurea Salmon : 1 specimen mounted on a slide No. Dominion Museum, N. Z. 3/1571, labelled as "*Paronellides novaezealandiae*, ssp. *purpurea*. Loc. Homer, beaten from grass, 1/1/1944, coll. J. T. Salmon. Mount J. T. Salmon, Diaphane. Det. J. T. Salmon, 1945".

Micronellides oliveri Salmon : 1 paratype (No. 3/1353) on slide from Dominion Museum, Wellington, New Zealand.

Diagnosis : Species in the sub-genus *Paronellides* relatively larger in size ; antennae shorter or subequal to the length of body ; flexed macrochaetae usually with subobliquely truncated to obliquely truncated apices ; microchaetae acuminate of various sizes, coarsely or finely ciliated ; unguis with inner paired basal teeth always well developed, distal unpaired tooth present, external basolateral teeth normal ; unguiculus lanceolate ; dental spines absent ; tenent hairs clavate ; 1-2 dental spiny appendages large, minutely ciliated ; mucro moderately long with two teeth.

Type-species : *Pericrypta mjöbergi* Schött, 1917, by monotypy.

DESCRIPTION OF THE TYPE-SPECISS

Paronellides (Paronellides) mjöebergi (Schött) 1917

1917. *Pericrypta mjöbergi* Schött, *Ark. Zool.*, 17 (8) : 60 ; 1925, *Sarawak Mus. Journ.*, 3 : 107-127 ; Womersley, 1934, *Trans. Proc. Roy. Soc. Sth. Austr.*, 58 : 86-138.

1925. *Paronellides mjöbergi* Schött, *Sarawak Mus. Journ* 3 : 107-126 ; Womersley, 1939, *Primitive Insects of South Australia*, Adelaide, 322 pp.

1936. *Perictypta tasmaniae* Womersley, *Rec. Sth. Austr. Mus.*, (4) 5 : 175-485 *sensu* Womersley, 1939.

1936. *Perictypta tasmaniae maculata*, Womersly, *ibid.*

1937. *Perictypta lineata maculata*, Womersley, *Trans. Proc. Roy. Soc. Sth. Austr.*, 61 : 154-157 *sensu* Womersley, 1939.

1937. *Perictypta lineata tasmaniae*, Womersley, *ibid.*

1939. *Perictypta dandenongensis tasmaniae*, Womersley, *Primitive Insects of South Australia, Adelaide*, 322 pp.

1939. *Paronellides dandenongensis maculata*, Womersley, *ibid.*

Material Examined : As mentioned above.

Colouration : Ground colour pale yellow to white with violet to dirty brown blue-black patches ; dark violet pigment on genae posteriorly to ocellar fields, vertex and at antennal bases, a longitudinal nonpigmented zone behind vertex ; Ths. II, III, Abds. I, II, with longitudinal patches or streaks dorsolaterally, Abd. III dorsomedially with two rectangular patches, in addition, two longitudinal streaks, one on each side,

present ; colour pattern of Abd. IV extremely variable, Abd. IV anteromedially with a few longitudinal strands which unite with several other patches present posteriorly, lateral margins of Abd. IV also with dark blue pigment ; in some specimens Abd. IV

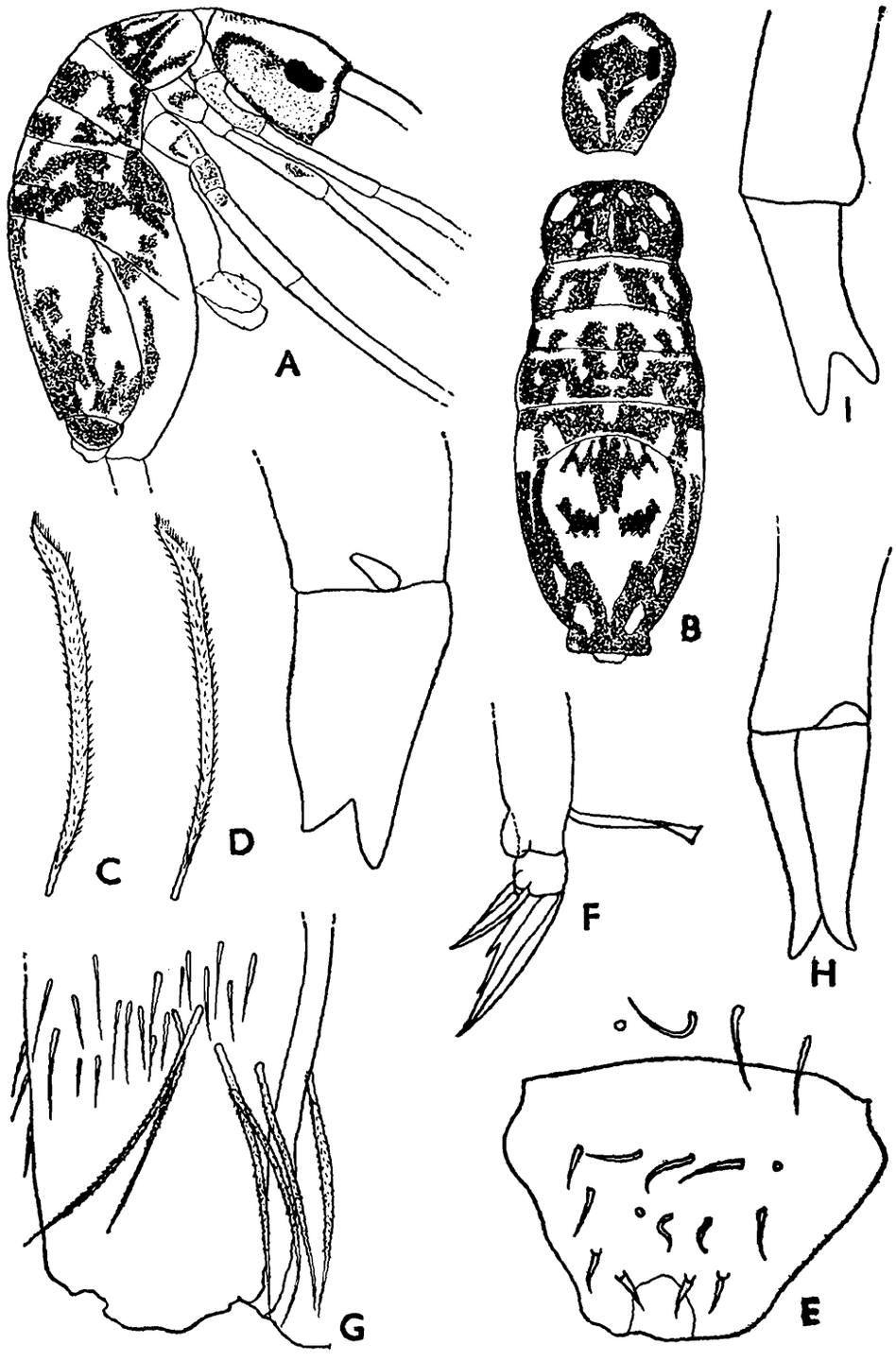


Fig. 1. Features of *Paronellides* (*Paronellides*) *mjöebergi* (Schött). A, profile (lateral) showing pigmentation (from a paralectotype, in alcohol) ; B, profile (dorsal) showing pigmentation (from a paralectotype, in alcohol) ; S, D, flexed macrochaetae from thorax ; E, labral chaetotaxy ; f, footcomplex from leg III ; G, chaetotaxy of the anterior face of ventral tube ; H, I, mucrodens from the lectotype ; J, mucrodens from a paralectotype.

may be completely devoid of pigment except the anterior longitudinal and lateral patches ; Abd. V with violet pigment and with two nonpigmented symmetrical zones, one on each side ; precoxae, coxae and trochanter heavily pigmented, femora laterally with violet pigment, tibiotarsi usually nonpigmented ; colour pattern of the species extremely variable specially in relation to Abd. IV ; general distribution of pigmented patches on each tergite usually following a course in the form of "W" (Fig. 1. B, PL. 1, A).

Clothing : Body in general clothed with short, accuminate microchaetae ; macrochaetae present in the middle of Abd. IV and posteriorly on Abds. V and VI ; obliquely truncated, flexed, ciliated macrochaetae present on Ths. II, III, Abds. I, II and III (Fig. 1 C, D).

CHAETOTAXY

Head : Vertex with V_0+V_{1-6}, all of which macrochaetae, V_1, V_2 arranged in a trapezoid fashion and V_0 falls medially on the line joining V_1-V_1 ; dorsal region represented by D_0+D_{1-9}, all of which macrochaetae ; subdorsal region represented by 8 setae of which SD_{5-8} macrochaetae ; ocular region has 4 setae (oc_{1-4}), all microchaetae ; postocular region represented by a single macrochaeta on either side (PO) ; parietal region represented by a single macrochaeta on each side (P_1) ; occipital region with O_{1-10} ; all macrochaetae, arrangement of which characteristic ; area cervicalis represented by macrochaetae, (C_{1-5}) ; area genalis represented by 3 macrochaetae (G_{1-3}) [Fig. 2].

Body : Number of macrochaetae on each targite ranges from Ths. II (68—69), III (46—47), Abds. I (23—26), II (10—11), III (9—10) ; Abid. IV medially has a transverse row of at least 7 macrochaetae on either side.

The genus is polychaetoic in the presence of a large number of macrochaetae on each tergite.

Paronellides mjöbergi, type-species, has the largest number of macrochaetae on head and body (Fig. 3).

Head : Usually pear-shaped with 1+1 blue-black ocellar field, each field containing 8 ocelli, G and H being smaller than the rest ; frontal spines absent ; Ants. II, III and IV broken in all examples ; Head/Ant. I=45/50 ; prelabral setae 4, apparently smooth, slender ; labral setae, 5, 5, 4, all short, slender and smooth ; anterior labral margin without tubercles, median intursion of labrum inverted ''U''-shaped (Fig. 1, E).

Thorax : Relative length index of Ths. II : III = 30 : 23 ; tibiotarsai longer, superficially divided distally ; ungues and unguiculi slender ; unguis moderately curved, with paired inner teeth at almost the middle of the claw, middle unpaired tooth

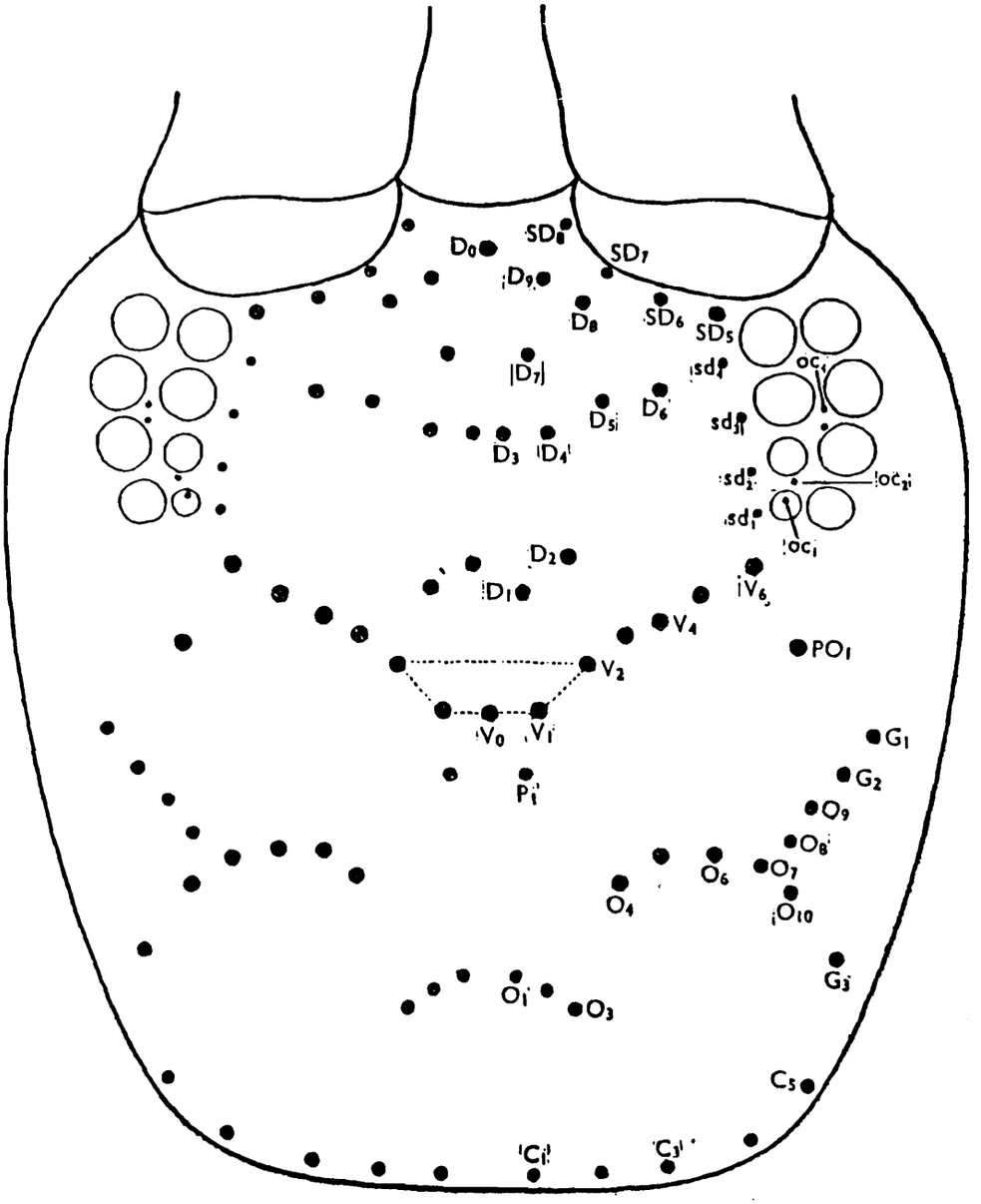


Fig. 2. Cephalic chaetotaxy in *Paronellides* (*Parouellides*) *mjöebergi* (Schött).

prominent, distal tooth absent, external basolateral teeth present ; inner tibiotarsal lobe well developed ; unguiculi lanceolate, non-dentate ; tenent hair relatively short, moderately clavate (Fig. 1, F)

Abdomen : Abds. I : II : II : IV : V : VI = 17 : 16 : 9 : 61 : 15 : 5 ; ventral tube appreciably long with 3 protusible vesicles, external vesicle shorter ; anterior face of

ventral tube anteriorly with 5+5 macrochaetae and with slender microchaetae (Fig. 1, G), posterior face clothed with slender setae ; rami of retinaculum each with 4 teeth, corpus with a median seta ; dentes appreciably long, slightly tapers distally,

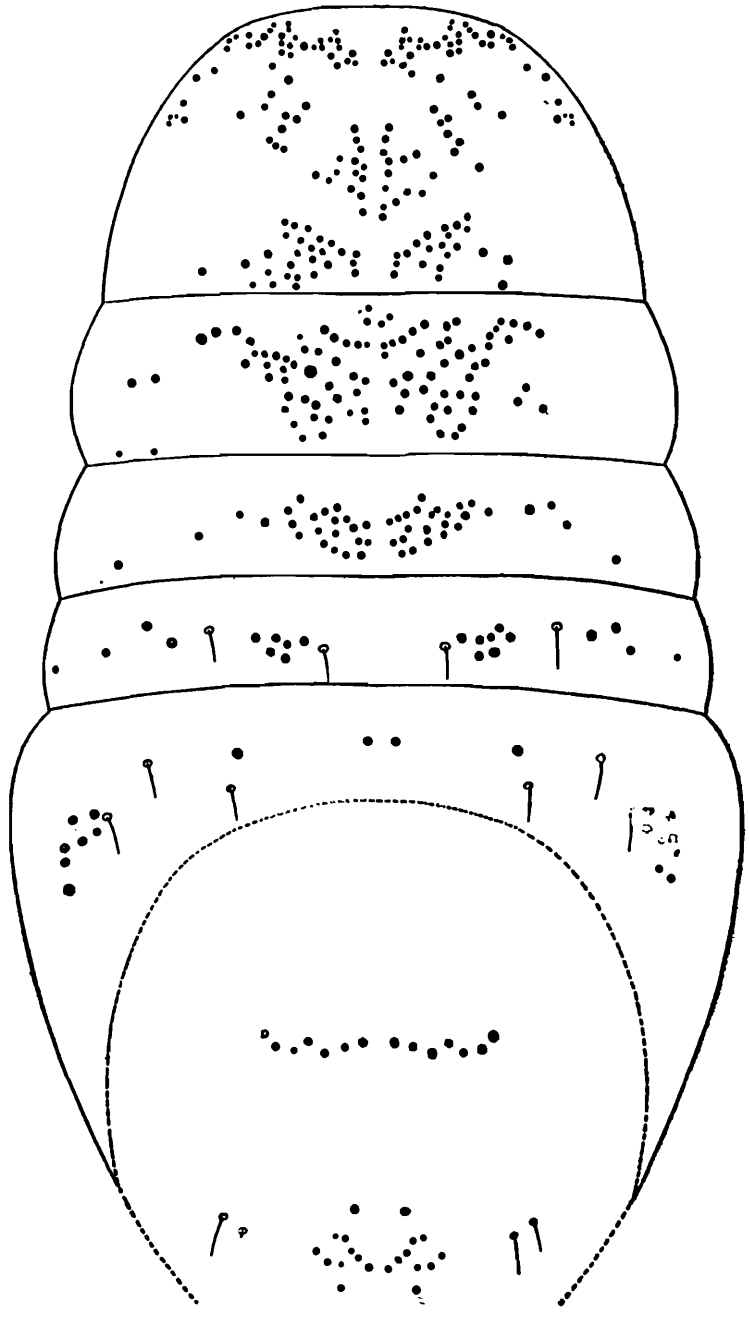


Fig. 3. Chaetotaxy of Ths. II, III and Abds. I-IV in *Paronellides* (*Paronellides*) *mjöebergi* (Schött).

relative length index of manubrium : mucrodens = 51 : 79 ; dentes without spines and scale appendage ; mucro bidentate, located apically on dentes, a prominent socket of dental spiny appendage located dorsally near base of mucro (Fig. 1, H-J).

Length (excluding appendages) : 1-1.5 mm.

Type-specimens : Lectotype and four paralectotypes mounted on slides ; 6 paralectotypes in spirit, in two vials ; nothing is available from the label of the slide and also from literature as to who designated the lectotype. All remain preserved in the Swedish Museum Natural History, Stockholm, Sweden.

Type-locality : Lamington Plateau, Queensland, Australia.

Comparisons : The species is interesting from the point of view of its colour variations. Several of the paralectotypes examined exhibit colour pattern corresponding to the colour pattern of *P. tasmaniae* and *P. maculata*. Furthermore, the chaetotaxy of all those colour variants is identical. Womersley (1939) himself synonymised the colour forms which he previously had described as new with *P. mjöebergi* as mentioned above.

Interrelationships : In the gross morphological characters and in the chaetotaxy of vertex, the sub-genus *Paronellides* is apparently related to *Pseudosalina* from India. However, the absence of dental scale appendage, frontal spines and the nature of chaetotaxy of other regions of head in the sub-genus differentiate it from the Indian genus. It differs from *Paronana* Womersley of New Zealand in the absence of dental scale appendage and dental spines.

Distribution : Members of the sub-genus *Paronellides* remain restricted to Australia, Tasmania and New Zealand. *Paronellides alticola* (Arle, 1939) from South America is a dubious one and the type-specimens of the species were not available for examination inspite of the best endeavour.

Comments on Species and Subspecies of Subgenus *Paronellides*

Paronellides (Paronellides) dandenongensis (Womersley, 1934)

Womersley (1934) described the species from Australia (Kalorama, Mount Dandenong, Victoria) on the basis of single example. The species was characterised by its yellowish ground colour of body and in the presence of blue pigment on Th. III, Abds. I, II, III and "some time on sides of Abd. IV" (Womersley, 1937). Womersley (1934, 1937) although did not indicate the presence of blue pigment on Th. II, his illustrations, however, clearly indicate its presence anteriorly and laterally on the segment. Foot complex, as depicted by Womersley (1934) (Fig. 16, b), indicates that the unguis of the species is armed with paired external basolateral teeth, paired inner basal and two distal unpaired teeth, nondentate lanceolate unguiculus and clavate

tenet hair, the distal end of which is not appreciably dilated. The mucrones in the species are typical in the presence of two, almost equal teeth. Simultaneously, Womersley (1934) described the other species, *viz*, *Paronellides* (Paronellides) *lineata* from Tasmania (Trevallyn) which was characterised by its larger and stout body facies, yellowish ground colour of body and having a single irregular bluish band mid-dorsally. The unguis in the species is provided with reduced external baso-lateral, paired inner basal teeth and a vestigial, almost obscure, unpaired subapical tooth also on inner margin. Unguiculus in the species is lanceolate, non-dentate and the tenent hair is long and slightly expanded distally. Mucrones in the species are as characteristic of the genus. Womersley (1936) added another species, viz., *Paronellides* (*Paronellides*) *tasmaniae* and its two varieties, *viz*, *maculata* and *fasciata* from Tasmania (Mt. Wellington). The principal form was differentiated by its yellow ground colour and the blue pigment all over the body with non-pigmented or pale spaces on each segment. Unguis in the species is provided with reduced external basolateral teeth, small paired inner basal teeth and 2 inner unpaired teeth closely loaced subapically. Unguiculus in the species is lanceolate, broader at base, nondentate and the mucrones are typically bidentate. The variety "*muculata*" was differentiated from the principal form by its pale pigmentation involving blue and brown pigment of which the later was found to remain restricted on the lateral edges of head, Ths. II, III, Abds. I-II and to form two parallel dorsomedian interrupted bands from the posterior margin of Th. II – Abd. III and constitute the central portion of a wavy band present anteriorly on Abd. IV including paired submedian patches on Abd. III and lateral patches on Abd. V. Rest of the wavy band on Abd. IV including the other patches on Abds. III, IV were stated to be represented by blue pigment. The other variety "*fasciata*" was characterised by its entirely blue black head which is lighter medially and in the presence of blue black pigment on Th. III, Abds. I-III and lateral margins of Abd. IV which is intruding on the segment dorsally in the posterior region and Abd. V is also with the same pigment. Womersley (1937) described a new variety of *P. lineata, viz., tristriata* from Tasmania (Risdon) which was characterised by its bright yellow ground colour with three dark stripes (median and 2 lateral) on body. In the same paper, he decided to consider *P. tasmaniae* as a variety of *P. lineata* and also linked two other varieties of *P. tasmaniae* (i. e. "*maculata*" and "*fasciata*") as the varieties of *P. lineata*. Womersley (1939), however, recognised only two species under the genus (i. e., *P. mjöebergi* and *P. dandenongensis*) and treated all the species and their varieties under the latter.

A detailed analysis on the basis of available informations of all the species and varieties, described by Womersley, reveals that *P. dandenongensis* s. str. (Womersley, 1939) represents a species—complex. Thus *P. lineata* and *P. lineata var. tristriata* can be characterised by their larger, bulky body facies and the structure of ungues from the other species and their varieties. Further, *P. dandenongensis* has an ungual structure

which is entirely different from others although its colour pattern and body facies, as depicted by Womersley (1939), appear strictly similar to *P. tasmaniae* var. *fasciata*. It must be noted that in *P. dandaneongensis* the location of two unpaired teeth on inner margin of ungues in relation to basal paired teeth is entirely different from *P. tasmaniae* (principal form). Over and above, it is difficult to link *P. tasmaniae* (principal form) and its variety *maculata* as the varieties of either *P. dandenongensis* or *P. lineata* owing to the absence of intermediate colour forms and in the existence of structural differences, mentioned above. A critical study on the chaetotaxy of head and tergites of all these species and their varieties on the basis of topotypes is required to solve the *P. dandenongensis* species-complex conclusively.

Paronellides (Paronellides) alticola (Arle, 1939)

Arle (1939) described the species together with a variety, *viz*, *pallida* under the generic name *Pericrypta* (*lapus* for *Pterikrypta* Ritter, 1911 by Schött, 1917) from Caxambu, Rio de Janeiro, Brazil, South America. He assigned this species to this genus owing to the absence of scales on body. The species radically differs from other species of this genus in the presence of very reduced stumpy mucrones and a number of strong ciliated spines ventrally near the end of dentes (vs. 1 or 2 dorsal dental spiny appendages in *Paronellides* s. str.). The presence of this Australian element in the Neotropical region is extremely interesting from the biogeographical view point and further investigations on the topotypes of *P. alticola* are required to confirm its placement under the genus.

Paronellides (Paronellides) novaezealandiae Salmon, 1941

Salmon (1941) based the description of the species on the basis of several examples from various localities of New Zealand. The author examined single paratype of the species mounted on a slide (No. Dominion Museum, N. Z. 3/850, labelled as : "*Paronellides novaezealandiae*. Loc. Maruia Valley. In leaf mould. 9/2/1940"). Following details are given to supplement the original description of the species.

Distribution of pigment on body very similar to *P* (*P.*) *dandenogensis* (Womersley, 1934) ; in the paratype examined, pigment reduced on Th. III, Abd. I and found restricted to margins only (Fig. 4, A, PL. 1, C) ; general body surface thickly clothed with short, coarsely ciliated some what broadly accuminate setae (Fig. 4 B), interspersed profusedly with obliquely truncated ciliated flexed macrochaetae (Fig. 4 C), head, cervix and Abds. IV, V, VI, in addition, with flexed accuminate macrochaetae (Fig. 4 D), antennae thickly clothed with short accuminate ciliated setae, Ants. I, II, in addition, with some very long ciliated outstanding macrochaetae, some apparently

smooth erect microchaetae present on Ants. III, IV being very predominant distally on Ant. IV ; apical sense knob of Ant. IV not prominent ; legs clothed with delicate

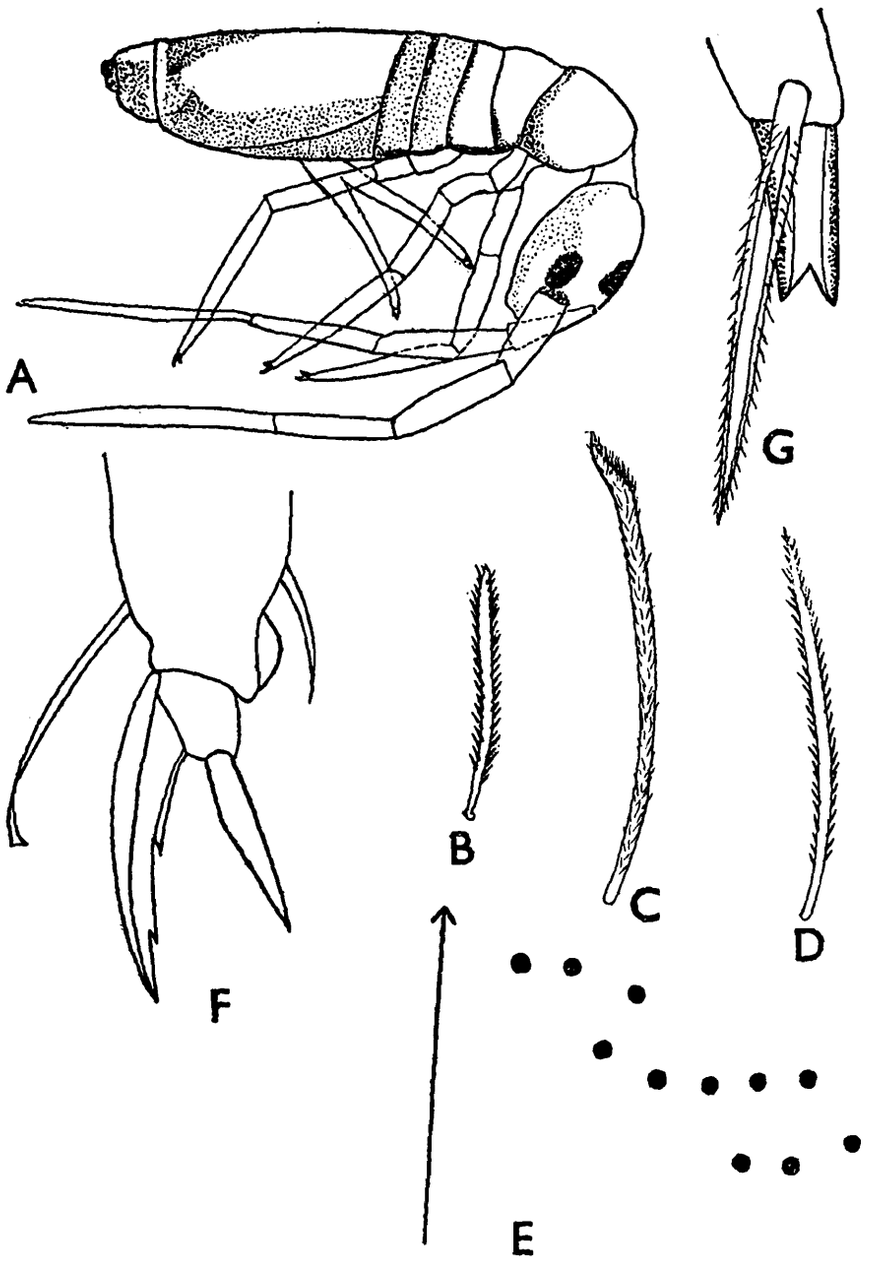


Fig. 4. Features of *Paronellas* (*Paronellidides*) *novaezealandiae* Salmon. A, profile showing pigmentation (Paratype, slide No. 3/850, Dominion Museum, N. Z.) ; D, a seta from general surface of body ; C, a flexed macrochaeta ; D, a flexed accuminate macrochaeta from cervix ; E, arrangement of macrochaetate anterodorsally on Abd. IV ; F, footcomplex from leg I.

acuminate ciliated setae interspersed with certain long ciliated outstanding setae specially on femora and tibiotarsi ; furcula uniformly clothed with short acuminate ciliated setae ; trochanteral organ consists of short spines exact number of which alongwith chaetotaxy of tergites could not be ascertained from the mounted specimen, however, arrangement of macrochaetae in 3 transverse rows anterodorsally on Abd.

IV is quite, characteristic (Fig. 4, E) ; unguis with paired inner basal teeth located almost near the middle and single unpaired distal tooth, single external basolateral tooth present almost near the middle of the outer lamella on each side, unguiculus sublanceolate, nondentate, tenent hair appreciable long, slender clavate on all legs, a prominent tibiotarsal lobe overhanging the base of each unguiculus present (Fig. 4, F) ; furcula well developed, mucrones bidentate, teeth subequal, single ciliated dorsal dental spiny appendage present distally near the base of each mucrone. [Fig. 4, G]

Length (excluding appendages) : *c.* 1.63 mm.

Remarks : The species comes close to *Paronellides* (*Paronellides*) *dandenongensis* (Womersley, 1934) in colour pattern, in general body facies and in the structure of mucrones. However, *P.* (*P.*) *novaezealandiae* differs from the cited species in the possession of single unpaired tooth on inner margin of unguis (*vs.* 2 in the cited species) and in little paler pigmentation of body. Studies on the chaetotaxy of both the species only can precise the status of *P.* (*P.*) *novaezealandiae.*

Paronellides (Paronellides) novaezealandiae purpurea Salmon, 1941.

Salmon (1941) described the subspecies from New Zealand (Monkey flat, Hollyford Valley) on the basis of its colour pattern specially that of the general body surface. The author had an opportunity to examine a specimen of the subspecies mounted on a slide (No. Dominion Museum, N. Z. 3/1571, labelled as "*Paronellides novaezealandiae*, ssp. *purpurea*, Loc. Homer, beaten from grass, 1/1/1944. Ceoll., mount & Det. J. T. Salmon, 1945"). A short redescription of the subspecies, based on the above-mentioned specimen, is given below and its status is also discussed. [Fig. 5 A ; PL. I B]

Stout, bulky body facies cf. *Peronellides* (*Paronellides*) *lineata* (Womersley, 1934) ; ground colour of body and appendages including furcula bright yellow or dark orange brown with a dark mid-dorsal longitudinal band passing from Th. II to the tip of Abd. VI and two lateral bands one on each side from head to the end of abdomen ; in general, ground colour of body including the distribution of pigmented patches quite identical to *Paronellides* (*Paronellides*) *lineata* var. *tristriata* (Womersley, 1937) ; in "*purpurea*", however, lateral bands on body originate from head *vs.* from Abd. II in "*tristriata*" ; general surface of body thickly clothed with short, thin finely ciliated setae interspersed profusedly with flexed, ciliated macrochaetae on head and body segments apices of which may be of two following configurations : (a) subobliquely truncated, present on head, body segments excluding Abds. IV, V, VI (Fig. 5, A, B), (b) accuminate ones mostly remain distributed on Abds. IV, V, VI and a few of such

setae also present on head and cervix (Fig. 5, D) ; antennae clothed with ciliated, accuminate setae interspersed with some long outstanding macrochaetae on Ants. I, II, in addition Ants. II, III, with some erect apparently smooth setae specially conspicuous at apex of Ant. IV, Ant. IV apically with an indistinct sense knob guarded with a few

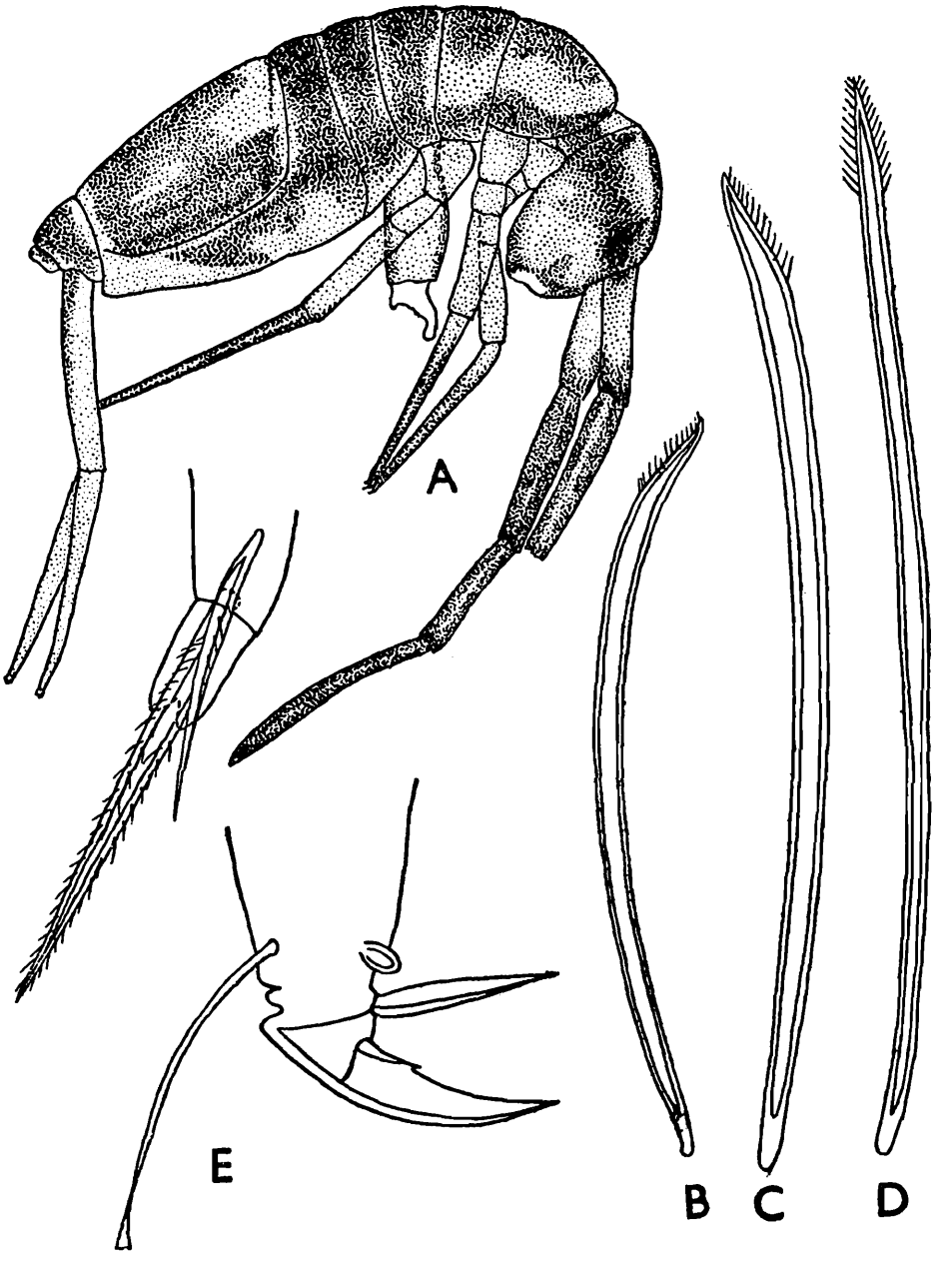
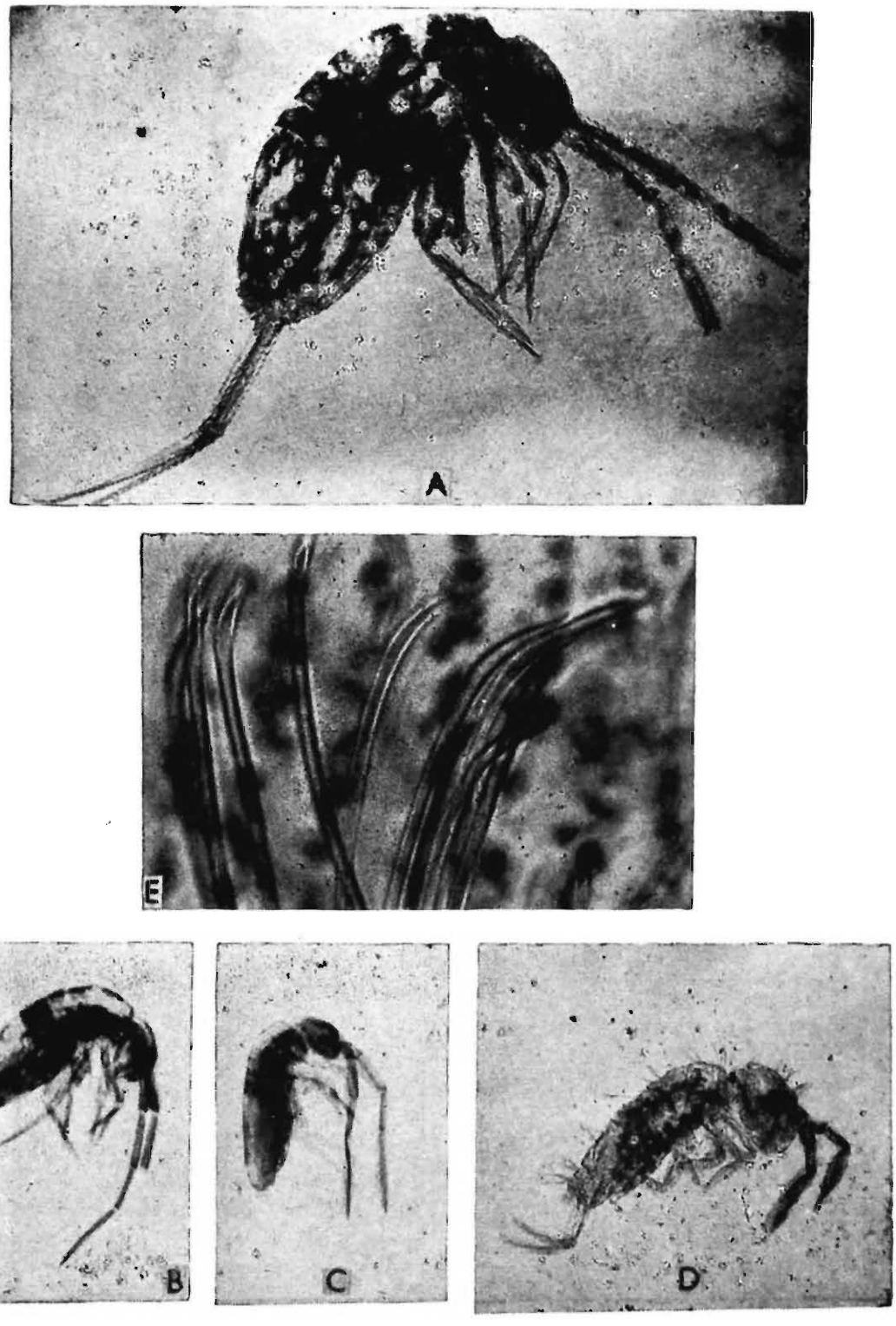
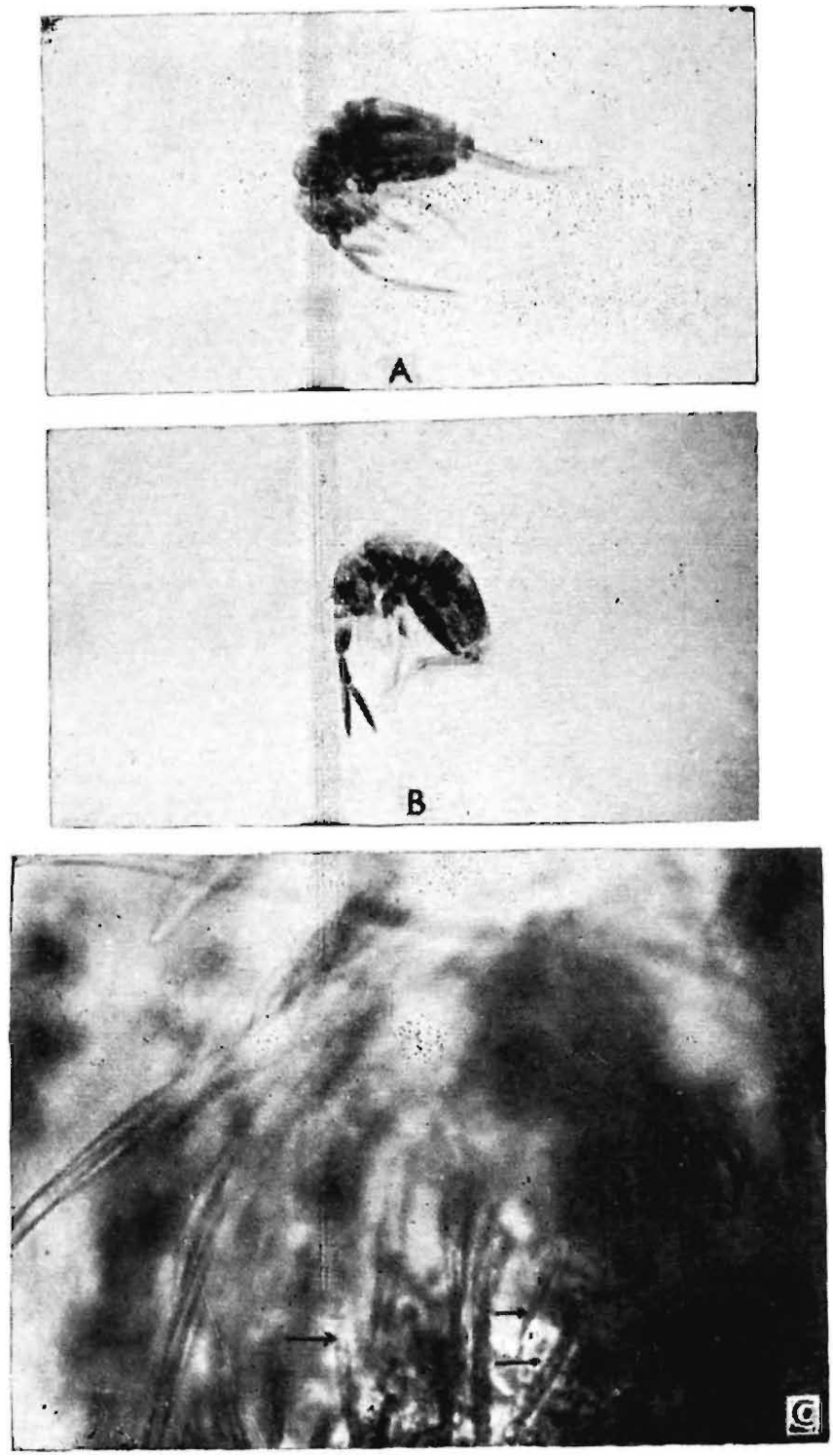


Fig. 5. Features of *Paronellides* (*Paronellides*) *novaezealandiae purpurea* Salmon, 1941. A, profile showing pigmentation (Paratype, slide No. 3/1571, Dominion Museum, N. Z.) ; B, a macrochaeta from head ; C, a macrochaeta from Abd. I ; D, a macrochaeta from Abd. IV ; E, footcomplex from leg III ; F, mucrodens complex.

smooth setae ; nature of trochanteral organ and chaetotaxy of body could not be determined owing to the mounted nature of the specimen ; unguis little curved with paired inner basal teeth small, distal tooth not resolvable, unguiculus lanceolate, tibiotarsal lobe overhanging the unguiculus small, tenent hairs long, clavate [Fig. 5, E],



PL. 1. A, a paralectotype of *Paronellides* (*Paronellides*) *mjöebergi* (Schött) (Slide No. 4171) in Swedish Museum Natural History, Stockholm) ; *Paronellides* (*Paronellides*) *novaezealandiae purpurea* Salmon (Slide No. N. Z. 3/1571, Dominion Museum, New Zealand) ; C, *Paronellides* (*Paronellides*) *novaezealandiae* Salmon (Paratype, slide No. N. Z. 3/850, Dominion Museum, New Zealand) ; D, *Micronellides oliveri* Salmon (=*Paronellides*) cf. *novaezealandiae*, juvenile. Paratype, slide No. N. Z. 3/1353, Dominion Museum, New Zealand) ; E, flexed macrochaetae from Th. II of *Paronellides* (*Paronellides*) *badius* (Salmon).



PL. 2. A, *Paronellides* (*Pseudoparonellides*) *badius* (Salmon) (Paratype, slide No. N. Z. 3/862, Dominion Museum, New Zealand); B, *Paronellides* (*Pseudoparonellides*) *cryptodontus* (Salmon) (Paratype, slide No. N. Z. 3/1562, Dominion Museum, New Zealand); C, microchaetae from Th. III of *P.* (*P.*) *badius* (note : arrows)

mucrones bidentate, apical tooth appears some what truncated in one of the mucrones, single dorsal dental spiny appendage conspicuous, another short but easily distinguishable from the general setae. [Fig. 5, F].

Length : *c.* 1.8 mm.

Remarks : The subspecies is similar to *Paronellides* (*Paronellides*) *lineata* var. *tristriata* in the ground colour of body and appendages as well as in the general pattern of pigmentation. Over and above, the structure of its footcomplex also appears to be similar to "*tristriata*". Further studies on the chaetotaxy of head and tergites of *P.* (*P.*) *novaezealandiae purpurea* may justify the last two categories as the colour variants of the former.

Sub-genus 2 : Pseudoparonellides Salmon, 1941. New Status.

1941. *Pseudoparonellides* Salmon, *Trans. Roy. Soc., N. Z.*,70 : 282-431 ; 1944, *Rec. Dom. Mus., N. Z.*, 1 : 123-182.

Material Examined : *Pseudoparonellides badius* Salmon : 1 paratype mounted on a slide, labelled as "Dominion Museum, N. Z. 3/862 : *Pseudoparonellides badia.* Loc. Weheka, in leaf mould in bush, 17/2/1940, coll. J. T. Salmon. Det. J. T. Salmon. Mounted Euparal (Fig. P-type)".

Pseudoparonellides cryptodontus Salmon : 1 paratype mounted on a slide, labelled as "Dominion Museum, N. Z. 3/1562 ; *Pseudoparonellides cryptodonta.* Loc. Bold Peak, 3000 ; in leaf mould in beach forest, 11/2/1943, coll. J. T. Salmon. Det. J. T. Salmon. Mounted Diaphane (Fig. 6, A Paratype)".

Salmon (1941) erected *Pseudoparonellides* as an independent genus differing from *Paronellides* only in the number of mucronal teeth (viz., 3 *vs.* 2). Salmon (1944) further reported the presence of "characteristic flattened ciliated scale-like setae" in the genus. In the present study it is felt pertinent to consider *Pseudoparonellides* as a sub-genus of *Paronellides* since the character like the difference of one tooth only in the mucro does not appear to be a sufficiently sound character for generic separation. Salmon (1946) also emphasised such character as an insignificant one for generic separation. Moreover, it is observed that characteristic flattened ciliated scale-like setae, mentioned and illustrated by Salmon (1944), do not conform to any type of setae actually present on body in *Pseudoparonellides badius* and *Pseudoparonellides cryptodontus.*

Salmon (1944) although in *Paronellides novaezealandiae* and *Pseudoparonellides cryptodontus* mentioned the scale-like setea to be ciliated, in fact, the setae he depicted

appear serrated (Pl. 62, Figs. 154, 155, 157). The setae, that Salmon (1944) described, are actually somewhat folded, cylindrical and coarsley ciliated on margins and not flattended (Fig. 6, E, F, PL. 2, C).

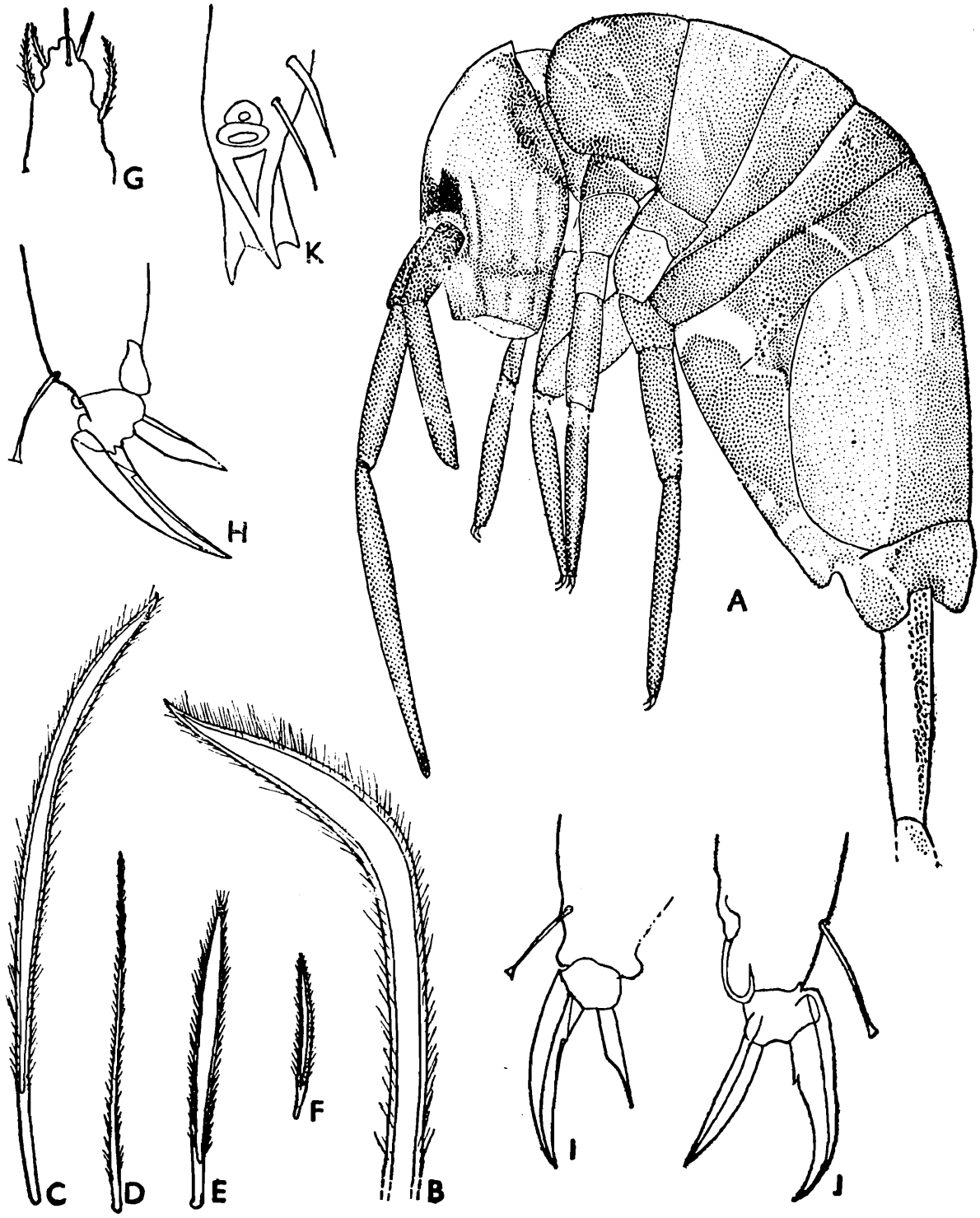


Fig. 6. Features of *Paronellides* (*Pseudoparonellides*) *badius* (Salmon). A, Profile, showing colour pattern (Paratype, slide No. 3/862 N. Z., Dominion Museum, New Zealand) ; B, apex of a flexed macrochaeta from Th. II ; C, a flexed macrochaeta from Th. II (front view) ; D, E, F, various microchaetae from body ; G, apex of Ant. IV ; H, footcomplex from leg I ; I, footcomplex from leg II ; J, footcomplex from leg III ; K, mucrodens.

However, the tridentate mucro in *P. badius* and *P. cryptodontus* is quite characteristic in the nature of orientation of the teeth and justifies their placement in a separate sub-genus under *Paronellides*.

Redefinition : Species in the sub-genus relatively smaller in size than the members of the subgenus *Paronellides* ; antennae shorter than body ; flexed macrochaetae, obliquely truncated, club-shaped (Fig. 6, B, C : PL. 1, E) ; microchaetae acuminate of various sizes, coarsely or finely ciliated, sometime folded (Fig. 6, D, E, F : PL. 2, C) ; unguis with inner paired basal teeth reduced or well-developed, distal unpaired tooth present or absent, external basolateral teeth reduced ; unguiculus lanceolate to sublanceolate ; dental spines and dental scale appendage absent ; dental spiny appendages short, ciliated, may be slightly flattened ; tenent hair clavate ; mucro short with 3 teeth, located characteristically in the form of 3 triangular ridges, all the teeth being posteriorly directed.

Type-species : *Pseudoparonellides badius* Salmon, 1941, by original designation.

DESCRIPTION OF THE TYPE-SPECIES

Paronellides (Pseudoparonellides) badius (Salmon) 1941, new comb.

1941. *Pseudoparonellides badius* Salmon, *Trans. Roy. Soc., N. Z.*, 70 : 398-407 ; Salmon, 1944 *Rec. Dom. Mus., N. Z.*, 1 : 123-182.

1964. *Pseudoparonellides badius* Salmon, *Bull. Roy. Soc., N. Z.*, (7) 2 : 145-644.

Material Examined : As mentioned above.

Colouration : Entire body of the paratype examined pigmented with moderately dark bluish pigment with faint brownish tinge in suffusion, legs and antennae more intensely pigmented than body, furcula brownish ; Th. III, Abds. I, II, III anteriorly lighter and posteriorly darker ; certain longitudinal strands of dirty bluish pigment descend from the anterior margin of Abd. IV and unite posteriorly with pigmented patch covering the entire surface of Abd. IV, interstitial spaces of such longitudinal strands exhibit the yellowish ground colour (Fig. 6, A ; PL. 2, A).

Clothing : Clothed with flexed club-shaped macrochaetae, conspicuously ciliated with longer cilia at apex (Fig. 6 B, C ; PL. 1. E) ; each such marcochaeta either conspicuously or slightly curved sub-apically and thus appears club-shaped ; general surface of body clothed with microchaetae of various sizes, which appear folded and cylindrical rather than flattended, coarsely ciliated at margins (Fig 6, E,F) ; delicate long and finely ciliated microchaetae also to be observed on the general

surface of body (Fig. 6, D) ; antennae and legs with ciliated, acuminate microchaetae ; Ant. IV, in addition to usual ciliated setae, with slender apparently smooth microchaetae.

Head : Slightly larger in comparison to the total length of head and body ; ocelli 8+8 in 2 dark pigmented ocellar fields, on each side of the head capsule ; antennae shorter than body, relative length index of Ants. I : II : III+IV=14 : 27 : 53 ; Ant. IV apically with a retractile senseknob guarded with a few erect, smooth setae (Fig. 6, G).

Thorax : Relative length index of Ths. II : III=20 : 15 ; legs somewhat shorter, unguis little curved, with inner paired basal teeth reduced, inner unpaired distal tooth absent, external basolateral teeth not discernible ; unguiculi sublanceolate on fore and mid legs, but lanceolate on hind legs (Fig. 6, H-J) ; tenent heir slender, short and slightly flattened and apex (Salmon, 1941, mentioned tenent hairs as absent) ; tibiotarsal lobe overhanging base of unguiculus well developed ; trochanteral organ not clearly determinable from the mounted paratype, but provided with fewer setae.

Abdomen : Relative length index of Abds. I : II : III : IV : V : VI=12 : 11 : 9 : 52 : 8 : 6 ; ventral tube short, nature of chaetotaxy not discernible from the mounted specimen ; relative length index of manubrium : mucrodens=33 : 47 ; dentes not appreciably tapering distally ; mucro small with three prominent ridges each of which terminating posteriorly in the form of a tooth, such characteristic three-winged mucrone is the specialisation of the sub-genus (Fig. 6, K) ; dentes dorsally with 2 spiny appendages as indicated by the presence of two larger sockets ; dental spines and scale appendage absent.

Length (excluding appendages) : 1.2 mm.

Type-specimens : Holotype (Slide No. 3/861) and paratype (Slide No. 3/862, examined) remain deposited in the Dominion Museum, Wellington, New Zealand.

Type-locality : Weheka, New Zealand.

Comparisons : The sub-genus *Pseudoparonellides* is known by two species *viz.*, *P. badius* (type-species) and *P. cryptodontus*. Although the type-species resembles to *P. cryptodontus* in colour pattern, however, it is distinct from the latter in the absence of inner unpaired ungual tooth and in the presence of reduced paired inner teeth. Moreover, in *P. badius* all the mucronal teeth are equally developed in contrast to *P. cryptodontus* in wich the median tooth is smaller and indistinct.

Paronellides (Pseudoparonellides) cryptodontus (Salmon)

1944, new comb.

1944. *Pseudoparonellides cryptodonta* Salmon, *Rec. Dom. Nus., N. Z.*, **1** : 123-182.

Material Examined : One paratype mounted on a slide, No. 3/1562, Dominion Museum, N. Z., details mentioned above under subgenus. Paratype examined (Fig. 7)

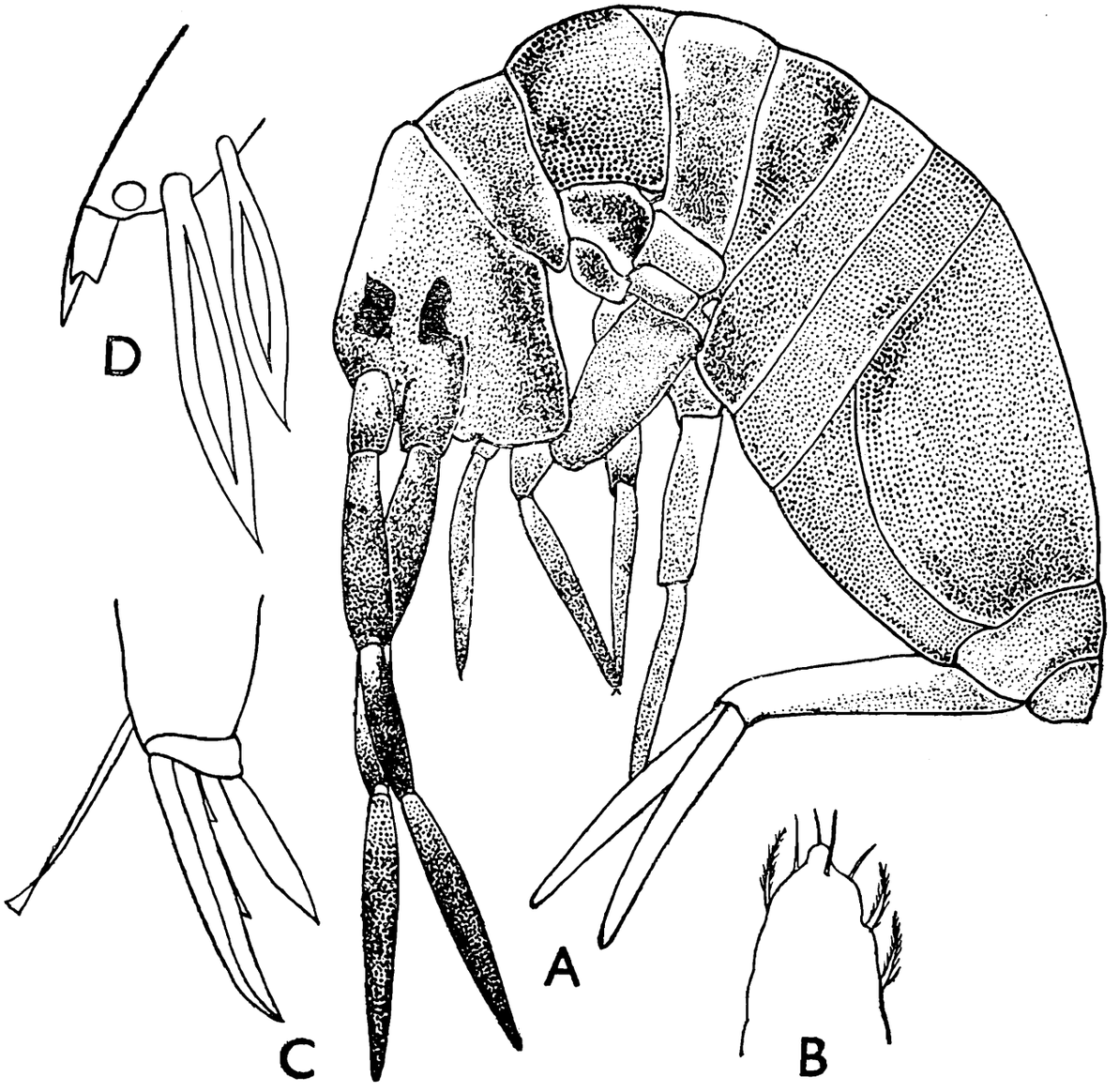


Fig. 7. Features of *Paronellides* (*Pseudoparonellides*) *cryptodontus* (Salmon). A, profile showing pigmentation (Paratype, slide No. 3/1562, Dominion Museum, N. Z.) ; B, apex of Ant. IV ; C, footcomplex of leg I ; D, mucrodens complex.

uniformly pigmented with bluish pigment all over the head, body, antennae and legs (Fig. 7, A). General features of the species same as the type-species except the foot

complex bearing besides paired inner ungual teeth, a distinct median unpaired tooth, slightly longer tenent hair expanded apically (Fig. 7, C) ; the mucrone of the species characteristically differs having a reduced median tooth though structurally mucronal pattern same as the type-species (Fig. 7, D).

Interrelationships : *Pseudoparonellies* resembles closely to *Paronellides* in all the general characters and differs from it and other related genera in the possession of specialised mucrones only.

Distribution : The sub-genus is endemic to New Zealand and mainly restricted to South Island. *Pseudoparonellides bulbosa*, described by Salmon (1957) from Assam, India, is a species worth-including in the genus *Salina* in the nature of its mucrones and in the presence of distinct dental scale appendage.

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SUMMARY

In this investigation, the concept of *Paronellides* Schöt (1925) has been precised on the basis of the examination of type-specimens of the type-species with a discussion on the species-complex, known under *Paronellides* (*Paronellides*). *Pseudoparonellides* Salmon (1941) is considered as a subgenus of *Paronellides* since the difference of one tooth on mucrones is not a sufficiently strong character for generic separation. *Micronellides* Salmon (1944) established on the basis of juvenile individuals, is found to be a synonym of *Paronellides* s. str. Redescriptions of the type-species and other species, based on the type-specimens, are incorporated.

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