

## THE WATER MITES (ACARI: HYDRACHNIDIA) OF NEW GUINEA

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**ABSTRACT.** - Seventy-five species are reported from New Guinea with descriptions of 19 new species and one new subspecies. The most widespread riverine genera were *Australiobates*, *Monatractides* and *Corticacarus*. *Corticacarus* was more frequent at mid and high altitudes, *Albia* at low altitude. The water mite fauna of New Guinea was predominantly Australian, only 2 of 29 genera were not found in Australia. The majority of species were endemic (approximately 69%), 15% shared only with Australia, 9% only with Asia and 6% with both Australia and Asia. The high proportion of endemic species was principally due to species radiation in four genera: *Australiobates*, *Albia*, *Corticacarus* and *Arrenurus*. Webers line was the most likely line of discontinuity between the Asian and Australasian water mite faunas.

**KEY WORDS.** - Water mites, Hydrachnidia, New Guinea, biogeography.

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### INTRODUCTION

New Guinea is the largest tropical island, the highest island and one of only three tropical areas with glaciers. It has a complicated history, some parts are old but most are young with an extremely rich and varied biota (Gressitt, 1982). The biogeography is complex with elements from Africa, Asia and Indonesia, Australia and S. America (from Gondwanaland via Australia). Aquatic habitats are also diverse with high altitude cold mountain streams, swamps, tropical rivers, lakes, chalk streams and peat bogs. However, the freshwater environments have been largely neglected and most invertebrate groups, including the water mites, have received little attention.

The first water mites from the island of New Guinea were reported by Daday (1901) who described three species from sago plantation ponds in German New Guinea (=Papua, =N. E. New Guinea): *Curvipes piersigia* = *Piona piersigia* (Daday), *Atax multiporus* = *Neumania* (*Lemienia*) *multiporta* (Daday) and *Arrenurus* (*Megaluracarus*) *koenikei* Daday, (Walter, 1928). Further collections were made by Imamura in 1974, (Imamura, 1983) who described two more species Brown river, Port Moresby: *Stygotlimnesia baderi* = *Limnesia baderi*

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(Imamura 1983) Cook, 1986, and *Guineaxonopsis cooki* Imamura, 1983.

Water mites have been recorded from a number of adjacent islands. The Bismark Islands are scattered along the north eastern coast of New Guinea, the largest island of which is New Britain (Neu-Pommern) from which 10 species were reported by Piersig (1898, 1904): *Arrenurus dahli* Piersig, 1898, *A. laticodulus* Piersig, 1898, *A. latipetiolatus* Piersig, 1898, *A. altipetiolatus* Piersig, 1898, *A. bicornutus* Piersig, 1898, *A. lohmanni* Piersig, 1898, *A. quadricaudatus* Piersig, 1904, *A. quadricornutus* Piersig, 1904, *A. matupitensis* Piersig, 1904, *Oxus dahli* Piersig, 1904 and the nymph described as *A. coeluripes* Piersig, 1904. The larva of a further species *Limnesia jamurensis* Oudemans, 1905, described by Oudemans (1906) was reported by Walter (1928) as [non *Limnesia*], a view supported by Viets (1932). However, Laird (1947) reports a large adult mite from ponds in New Britain as *L. jamurensis* Oudemans, 1905. This identification cannot be confirmed from his sketch and the species remains dubious.

The Aru Islands lie south of the Vogelkopf area of New Guinea. Nine species were reported by Walter (1911): *Hydrachna (Hydrachna) mertoni*, Walter, 1911, *Mamersa rouxi* Walter, 1911, *Encentridophorus chelatus* Walter, 1911, *Arrenurus (Arrenurus) alatus* Walter, 1911, *A. angustiscutatus* Walter, 1911, *A. (Megaluracarus) dahli* Piersig, 1898, *A. (Micruracarus) pulcher* Walter, 1911, *A. quadricornutus* Piersig, 1904, and *Piona bipunctata* Piersig, 1906 = *P. walteri* Lundblad, 1969 [nov. nom.].

Six species have recently been reported from Waigeo Island which lies to the North of the Vogelkopf, (Smit, 1996). These are *Torrenticola papillata* Smit, 1996, *Limnesia argelooi* Smit, 1996, *Recifella rumei* Smit, 1996, *Axonopsella waigeoensis* Smit, 1996, *Hygrobates australicus* Cook, 1986, and *H. hamatus* Viets, 1935 (Smit, 1996). In addition a specimen of the genus *Australiobates* was found (Smit, pers. comm.).

Far to the south east of New Guinea, (included here for completeness), lie the isolated Islands of New Caledonia where 10 genera and 22 species of water mites have been reported by Walter (1915): *Eylais incerta*, *Oxus orientalis* Walter, 1915, = *O. pictus* (Daday, 1898), *Unionicola longiseta*, *Unionicola crassipalpis*, *Encentridophorus sarasini*, *Neumania neo-caledonica* Walter, 1915, *N. nodosa* (Daday, 1898), *Piona diversa*, *Arrenurus dahli* Piersig, 1898, *Arrenurus depressus*, *Arrenurus multicornutus*, *Arrenurus rouxi* and K.O.Viets (1969): *Aspidobates parvulus*, *A. imamurai*, *A. caeruleus*, *A. serratus*, *A. lundbladi*, *A. motasi*, *A. violaceus*, *A. starmuhlneri*, *A. spatiosus*, *Australiobates longipalpis minor* Lundblad, 1947 = *Coaustaliobates minor* Cook, 1986, and *Hydrodroma despiciens* Müller, 1776. It is unlikely that the *Hydrodroma* species is *H. despiciens*; the taxonomy is particularly difficult (Cook, 1986).

Most of the species reported from the outlying islands are large, conspicuous still-water forms. In this study water mites were collected from various habitats on New Guinea. Collections were made in 1988 from Papua New Guinea and in 1992 from Irian Jaya, the Indonesian half of the island, with the assistance of Trekforce Expeditions. In addition several collections were made by Gayle Yun from the Popendetta region of Papua New Guinea. Water mites of the genera *Albia*, *Corticacarus* and *Australiobates* have been published (Wiles, 1990a, 1990b, 1991, 1994, 1997ab). The remainder of the collections are presented here with descriptions of 19 new species and one new subspecies. New records are reported and a checklist of 79 species listed. The biogeography of the water mite fauna is also discussed.

# MATERIALS AND METHODS

Collections were made using the methods of Wiles (1994). Water mites were cleared in Lundblads solution, dissected, then displayed in glycerine jelly mounts. Each mount was given a unique slide number (Wiles, 1989). A list of collection sites is presented in the Appendix.

Holotypes and Paratypes will be deposited in the Natural History Museum, London, England and the National Zoological Museum, Bogor, Java, Indonesia. Slides not yet deposited in museums are temporarily held at Buckingham University, UK.

Abbreviations and gland homology used are those of Wiles (1997b, 1997c) and Jin & Wiles (1996); A = antennal glandularia, D = dorsoglandularia, L = lateroglandularia, R = ocularia, V = ventroglandularia, I-IV-Leg-3-6 = first to forth leg, segments 3 to 6 (patella to tarsus sensu Harvey (1996)), P = pedipalp; PI-PV = pedipalp trochanter to tarsus; PNG = Papua New Guinea, IJ = Irian Jaya. Leg and pedipalp nomenclature follows Harvey (1996).

## LIST OF SPECIES FROM THE ISLAND OF NEW GUINEA (IRIAN JAYA + PAPUA NEW GUINEA).

### FAMILY HYDRACHNIDAE

*Hydrachna* sp.

### FAMILY EYLAIDAE

*Eylais* sp.

### FAMILY HYDRYPHANTIDAE

*Dipodontus haliki* Lundblad 1947

### FAMILY HYDRODROMIDAE

*Hydrodroma* sp.

### FAMILY ANISITSIELLIDAE

*Mamersopsis viridis* Viets, 1935

*Sigthoria nilotica* (Nordenskiöld, 1905)

### FAMILY OXIDAE

*Oxus rosalingae*, new species

*Frontipoda micheleae*, new species

### FAMILY TORRENTICOLIDAE

*Monatractides* sp.

### FAMILY LIMNESIIDAE

*Limnesia baderi* (Imamura, 1983)

*Limnesia lebangensis* Piersig, 1906.

*Limnesia buruensis* Viets, 1923

*Limnesia shephardi*, new species

*Limnesia suraensis*, new species

### FAMILY HYGROBATIDAE

*Hygrobatas australicus* Cook, 1986

*Hygrobatas hamatus* Viets, 1935

*Australiobates plumosa* Wiles, 1997a

*Australiobates concavipalpis* Wiles, 1997a

*Australiobates convexipalpis* Wiles, 1997a

*Australiobates longiseta* Wiles, 1997a

*Australiobates reticulata* Wiles, 1997a

*Australiobates reticuloides* Wiles, 1997a

*Australiobates varirataensis* Wiles, 1997a

*Australiobates archboldi* Wiles, 1997a

*Australiobates bruijini* Wiles, 1997a

*Coaustraliobates minor* (Lundblad, 1947)

*Coaustraliobates longipalpis* (Lundblad, 1947)

*Corticacarus aureatus* Wiles, 1990 (Wiles, 1994)

*C. irelandi* Wiles, 1994

*C.kingi* Wiles, 1990 (Wiles, 1994)

*C.mcgrathae* Wiles, 1994

*C. mendi* Wiles, 1990

*C. multiscutatus* Wiles, 1990

*C. pinguipalpis* Wiles, 1990

*C. richardsi* Wiles, 1994

*C. yunae* Wiles, 1990

*Caenobates acheronius* K.O.Viets, 1978

*Dropursa babinda* Cook, 1986,

### FAMILY UNIONICOLIDAE

*Encentridophorus sarasini* Walter, 1915

*Unionicola (Pentatax) crassipalpis* Walter, 1915

*Unionicola (Pentatax) minutissima* Lundblad, 1947

*Unionicola (Giselatax) aberrans* K.O.Viets, 1984

*Neumania nodosa* (Daday), 1898

*Neumania (Lemienia) falcipes* Viets, 1935

*Neumania (Lemienia) multipora* (Daday), 1901

*Neumania (Ecpolopsis) multiscutata sepikensis* [n.sub sp.].

*Koenikea (Notomideopsis) daundoensis*, new species

*Koenikea (Notomideopsis) magnunguilata*, new species

*Koenikea (Notomideopsis) timmsi* K.O. Viets, 1977

*Recifella burtoni*, new species

*Recifella curvata*, new species  
*Recifella pinguipalpifera*, new species  
**FAMILY PIONIDAE**  
*Piona piersigia* (Daday, 1901)  
*Piona puripalpis* K.O. Viets, 1984.  
**FAMILY ATURIDAE**  
*Axonopsella novaguinensis*, new species  
*Axonopsella ovalis*, new species  
*Axonopsis (Navinaxonopsis) christopherei*  
 Wiles, 1989  
*Albia (Spinalbia) spinipes* Wiles, 1991  
*A. (Albiella) alexae* Wiles, 1991  
*A. (A.) julieae* Wiles, 1991  
*A. (A.) longipalpis* Wiles, 1991  
*A. (A.) oenakensis* Wiles, 1991  
*A. (A.) suvanopsis* Wiles, 1991  
*A. (A.) vanimoensis* Wiles, 1991  
*A. (A.) wauensis* Wiles, 1991  
*A. (A.) wewakensis* Wiles, 1991  
**FAMILY MOMONIIDAE**  
*Momoniella parva* Cook, 1986

**FAMILY MIDEOPSIDAE**  
*Guineaxonopsis cooki* Imamura, 1983  
*Gretacarus novaguinensis*, new species  
*Gretacarus ravenicroftiae*, new species  
**FAMILY ARRENURIDAE**  
*Wuria sumatrensis* (Viets, 1935)  
*Arrenurus (Arrenurus) bakerae*, new species  
*Arrenurus (Megaluracarus) bunuensis*, new species  
*Arrenurus (Megaluracarus) koenikei* Daday, 1901  
*Arrenurus (Megaluracarus) santaniensis*, new species  
*Arrenurus (Truncaturus) wewakensis*, new species  
*Arrenurus (Micruracarus) foiorum*, new species  
*Arrenurus (Micruracarus) ashei*, new species  
*Arrenurus (Megaluracarus) rostratus* Daday, 1898

## TAXONOMY

Distribution records are presented in Table 1. A list of sites corresponding to site numbers are presented in the Appendix. All measurements are in  $\mu\text{m}$ . Lengths of leg and pedipalp segments are dorsal lengths.

### *Oxus rosalingae*, new species

(Fig. 1)

**Material examined.** - Site 504, slides : Holotype A294 male, Paratype 1 A335 male+female. Site 514, slides : Paratype 2 A332 female, Paratype 3 A333 female.

**Description.** - Male. Colour, black/ dark brown with scarlet excretory organ. Body laterally compressed, length 620-650, width 400-412. Dorsum without plates. Three glandularia, E2, E4 and L2 located on ventral shield. Ventral shield 306 high, extending posteriorly around genital field to a point level with the posterior margins of genital flaps. Genital flaps smaller than female, length 111-120; with 3 pairs of acetabula. Anus free in integument. Pedipalp with long setae on PII, PIII and dorsodistal PIV, length PI-V 35, 37, 36, 49, 13. Legs similar to female but proportionately smaller; I-Leg-4 with 3 long ventral setae, I-Leg-6 short and stocky; IV-Leg-6 long, slender and equal in length to long terminal seta. Swimming setae on II-Leg-5 8, III-Leg-5 10, IV-Leg-5 10.

Female. Similar to male but larger with a proportionately larger genital field extending beyond ventral shield. Body length 821, width 450, height 400. Ventral shield, length 653, width 486, height 300. Genital flap length 180-183. Length PI-V 35, 33, 36, 52, 16. Length I-Leg 3-6 50, 70, 80, 80; II-Leg-3-6 62, 90, 127, 87; III-Leg-3-6 66, 104, 129, 111; IV-Leg-3-6 70, 98, 140, 152, terminal seta 167. Swimming setae II-Leg-5 8, III-Leg-5 10, IV-Leg-5 8-10 (max. length of swimming setae 645).

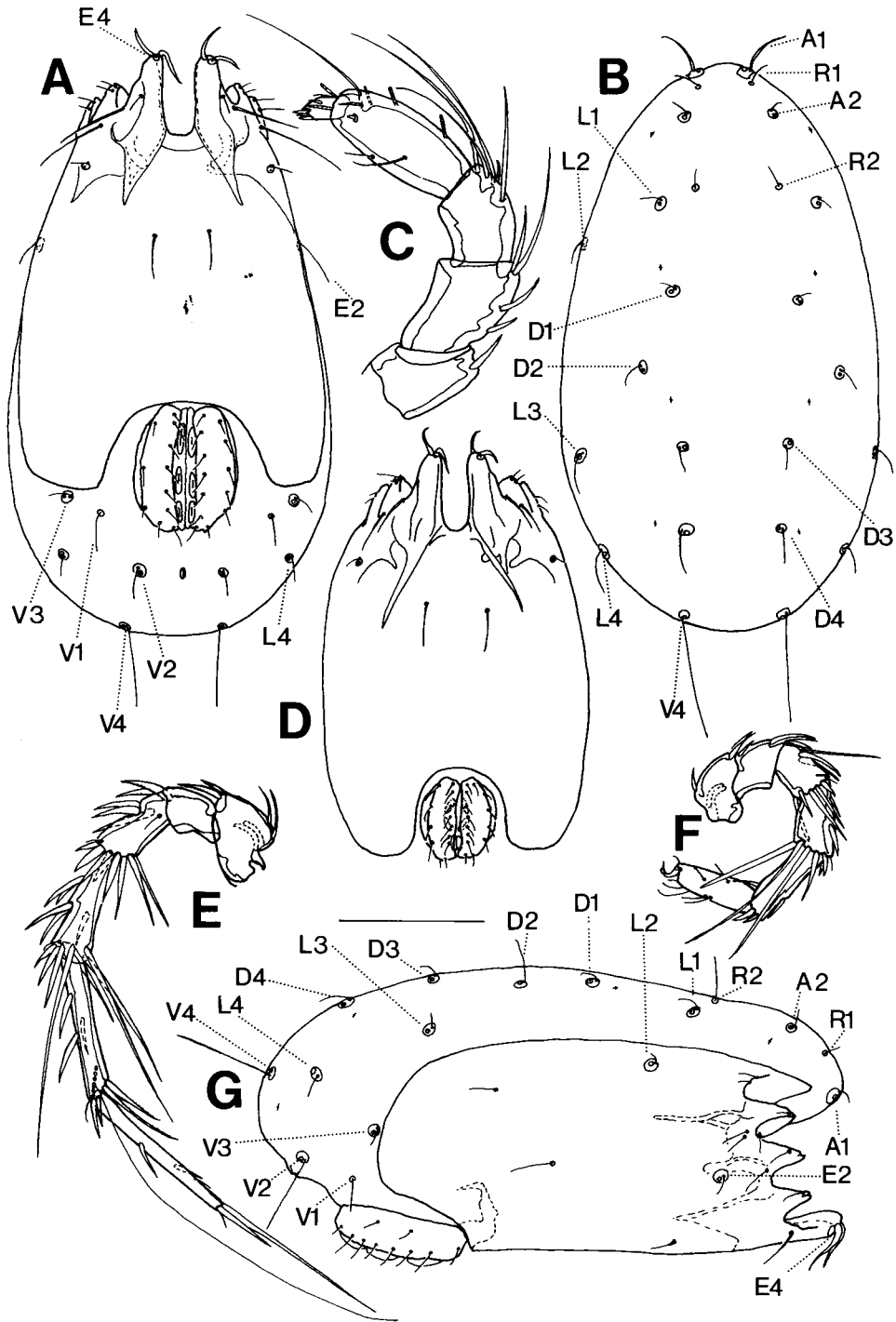


Fig. 1. *Oxus rosalindae*, new species. A. venter female, B. dorsum female, C. pedipalp female, D. venter male, E. IV-Leg male, F. I-Leg male, G. lateral view female. Scale line ABDG 204; CEF 90; (see text for abbreviations).

**Etymology.** - This species is named after Rosalind Portway who collected the material on the 1992 Trekforce expedition to Mt. Trikora.

**Remarks.** - This species is characterised by the slender IV-Leg-6 with a long distal seta, long setae on I-Leg-4 and a short ventral shield with only 3 pairs of glandularia (2 pairs sensu Cook, 1986, who neglects E4). It belongs to the species group which includes the Australian species; *O. australicus* Lundblad, 1947, *O. meridianus* Lundblad, 1947, and *O. tenuipes* Lundblad, 1947, characterised by the long IV-Leg-6 and 3-4 pairs of glandularia on the ventral shield. It can be separated from them by the long terminal seta to IV-Leg-6 and a less arched lateral margin to the ventral shield. It differs from *O. dahli* Piersig, 1904, from the Bismark and Aru Islands in that the ventral shield virtually encloses the genital field.

***Frontipoda michelleae*, new species**

(Fig. 2)

**Material examined.** - Site 35, slide : Holotype A151 male.

**Description.** - Male. Body laterally compressed, length 643, width 394, height 424. Dorsal furrow with two narrow platelets and 5 pairs of lyrifissures. All glandularia fused to ventral shield. Anus on plate behind genital field. Ventral shield enclosing genital field; genital flaps narrow, length 122. PIV short, PV long with small distal spines; length PI-V 36, 36, 45, 43, 23. I-Leg-6 short, IV-Leg slender (terminal seta lost); Length I-Leg-3-6 50, 54, 56, 65; II-Leg-3-6 60, 77, 97, 87; III-Leg-3-6 69, 85, 108, 101; IV-Leg-3-6 74, 87, 100, 104. Swimming setae II-Leg-5 13, III-Leg-5 14, IV-Leg-5 10.

**Etymology.** - This species is named after Dr. Michelle Davenport.

**Remarks.** - This species is similar to the African species; *F. lundbladi* Cook, 1966 and *F. biscutata* Cook, 1966, but it has a shorter PIV than *F. biscutata* and a shorter I-Leg-6 than *F. lundbladi*.

***Limnesia shephardi*, new species**

(Fig. 3)

**Material examined.** - Site 22, slide : Holotype A26 male.

**Description.** - Male. Body narrow, length 680, width 391. Dorsum with 3 central platelets, 3 pairs of small lateral platelets and conspicuous glandularia free in integument; length anteromedian plate 168, width 368. I-II-Leg bases located anterior to dorsal idiosoma, EpIV extending to dorsum. Venter with 2 pairs of small platelets posterior to genital field. Median margin of EpI fused. E4 large with narrow gland pores, located anterolateral to EpIII median seta. Genital field with 3 pairs of acetabula on single genital plate extended through secondary sclerotization, length 209, width 167; posterior acetabula projecting beyond genital pore; V1 located posterior to V3. PII with short ventral spine, PIV ventral setae located on tiny tubercles, length PI-V 28, 83, 58, 100, 36. Claws of I-II-Legs simple, I-II-Leg-6 with several long solenidia, III-Leg-6 with many fine setae ventrally. Distal IV-Leg-6 terminating in long seta, length 100. Length I-Leg-2-6 70, 87, 104, 115, 132; II-Leg-2-6 70, 80, 96, 111, 132; III-Leg-2-6 80, 287, 150, 150, 139; IV-Leg-2-6 80, 90, 139, 167, 137. Swimming setae absent.

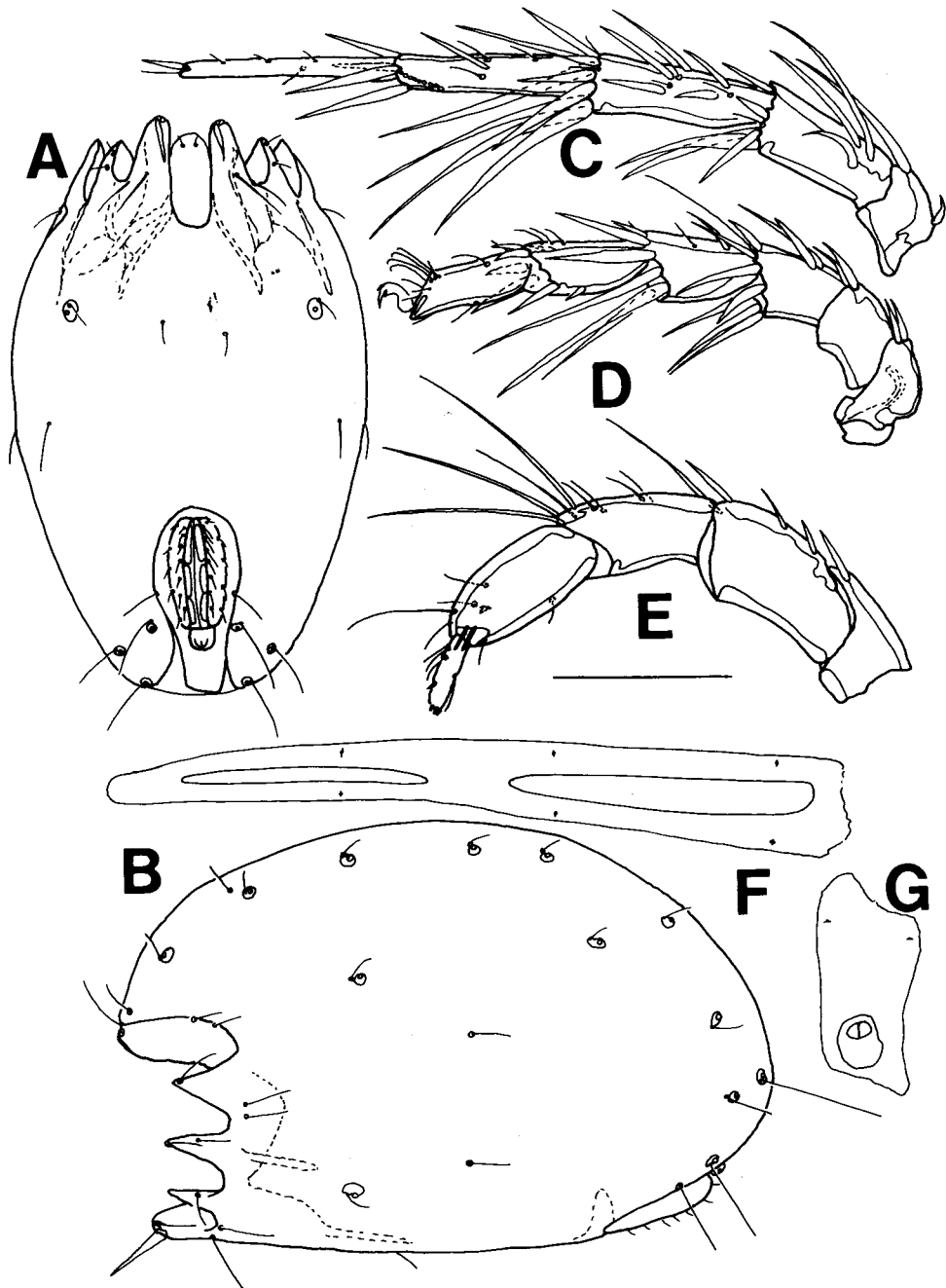


Fig. 2. *Frontipoda micheleae*, new species. A. venter female, B. lateral view female, C. IV-Leg female, D. I-Leg female, E. pedipalp female, F. dorsal platelets female, G. anal plate female. Scale line ABFG 204; CD 90, E 50.

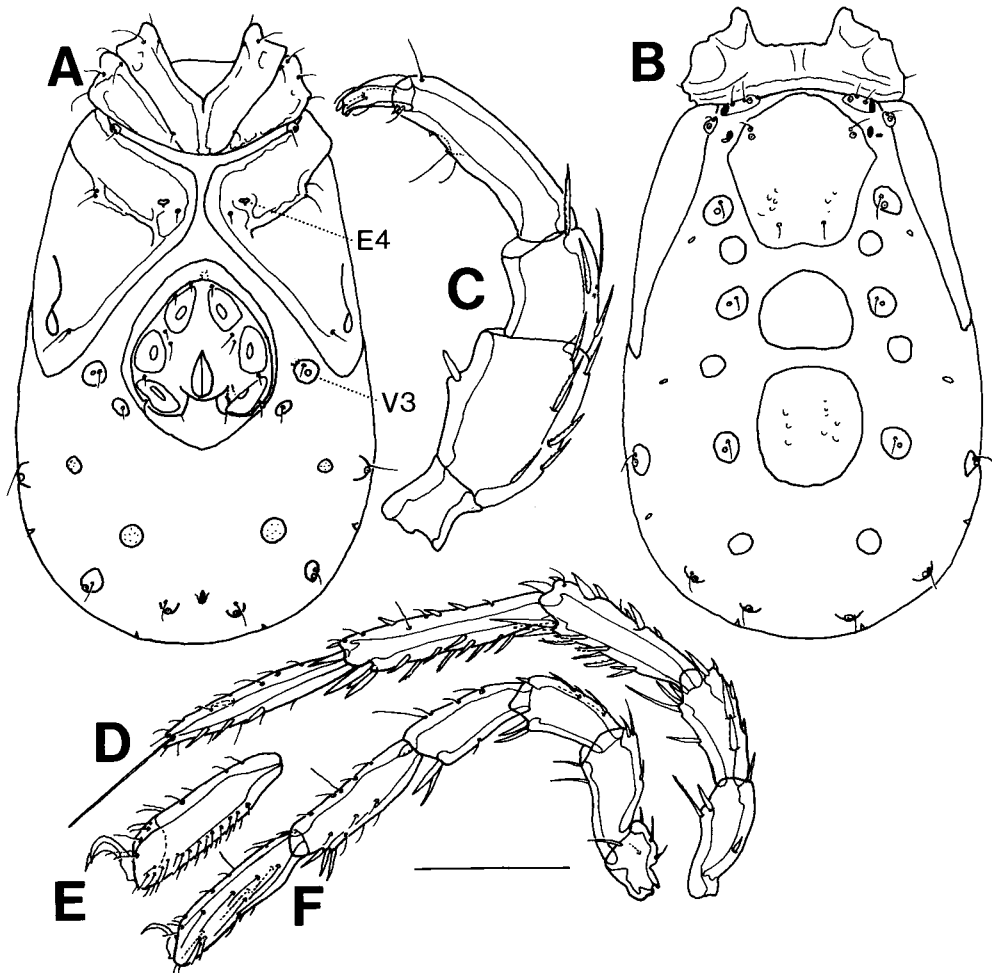


Fig. 3. *Limnesia shephardi*, new species. A. venter male, B. dorsum male, C. pedipalp male, D. IV-Leg male, E. II-Leg-6 male, F. I-Leg male. Scale line AB 204; C 71; DEF 127.

**Etymology.** - This species is named after Dr Kerry Shephard.

**Remarks.** - In this species the genital pore lies at the posterior end of the primary genital plate (i.e. the plate not extended by secondary sclerotization). A number of Australian species exhibit this feature but as yet none have been recorded with the posterior acetabula projecting behind the genital pore.

***Limnesia suraensis*, new species**  
(Fig. 4)

**Material examined.** - Site 18, slide : Holotype, A22 female.

**Description.** - Female. Length 1600, width 1390. Dorsum with one small posterior platelet between D4; all glandularia free in cuticle; length 1261, width 1089. Venter typical with no signs of secondary sclerotization. E4 (glandula *Limnesiae* sensu Cook 1986) located near median edge of EpIII posterolateral to EpIII median seta. Genital field almost round, distance



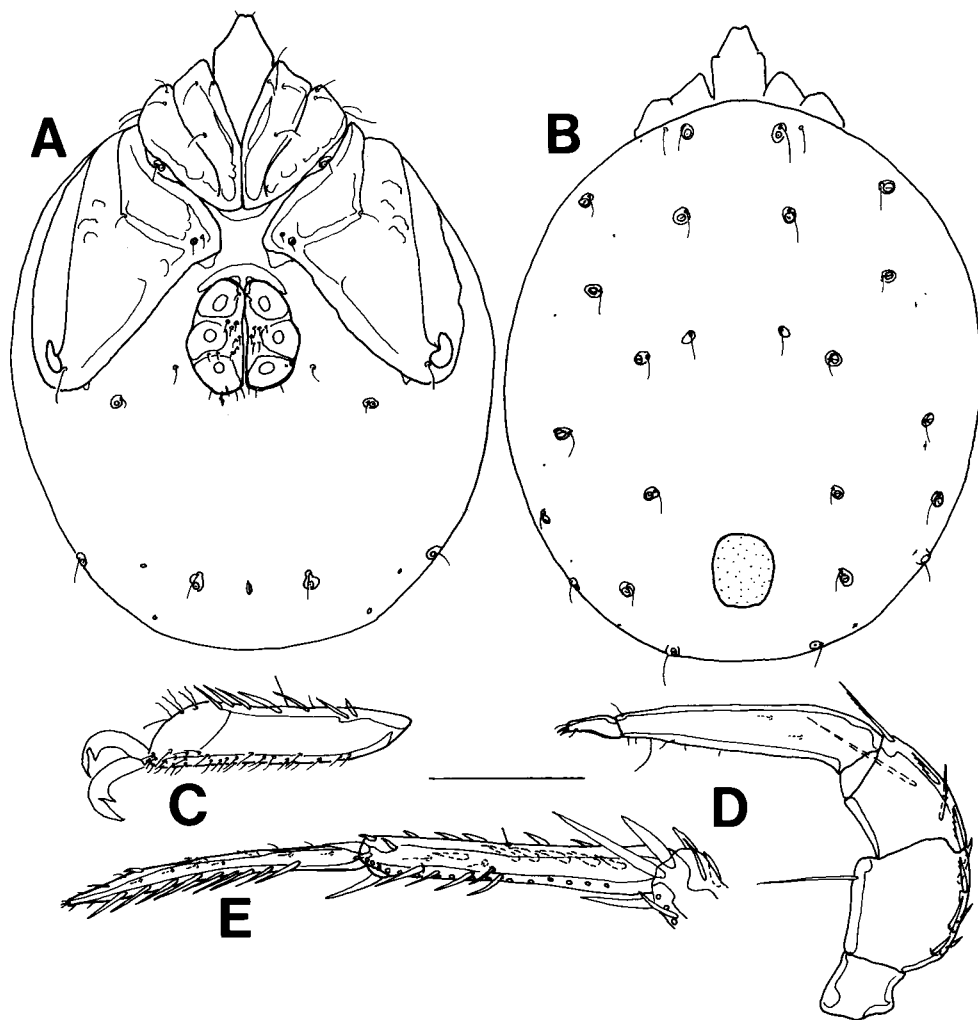


Fig. 4. *Limnesia suraensis*, new species. A. venter female, B. dorsum female, C. III-Leg-6 female, E. IV-Leg-5-6 female, D. pedipalp female. Scale line ABCE 143; D 127.

across genital plates equal to their length, length 243, width of single plate 122, with 3 pairs of broad acetabula. V3 (Epimeroglandularia 2 sensu Cook, 1986, P65) located posterior to the genital plate posterolateral to V1 (perigenital setae sensu Cook 1986). Anus between V2 near end of body. Pedipalp with slender PIV and PII ventrodistal seta long, length PI-V 37, 111, 111, 215, 50. Legs robust with 13 short, thick setae on dorsal IV-Leg-5 and no apparent long distal seta on IV-Leg-6; III-Leg-6 short, I-III-Leg claws with a broad ventral clawlet and no proximal blade; length I-Leg-2-6 96, 139, 191, 200, 226; II-Leg-2-6 122, 156, 234, 278, 252; III-Leg-2-6 113, 156, 261, 278, 235; IV-Leg-2-6 200, 202, 278, 269, 278. Swimming setae plumose, III-Leg-4-5 13, 15; IV-Leg-4-5 11, 10.

**Etymology.**- Named after the river Sura from which the water mites was collected.

**Remarks.** - . The pedipalp is most similar to *L. maceripalpis* K.O. Viets but PIV is shorter, the genital field is more rounded and E4 is closer to the EpIII median seta. The shape of the pedipalp is diagnostic.

*Neumania (Ecpolopsis) multiscutata sepikensis*, new subspecies

(Fig. 5)

(For synonymy see Viets, 1956; Cook, 1986; K.O.Viets, 1987)

**Material examined.** - Site 37, slides : A183 female, A184 two males.

**Remarks.** - There are five proposed subspecies [*N. m. multiscutata* Piersig, 1906, *N. m. bharatensis* Cook, 1967, *N. m. japonica* (Uchida & Imamura, 1953), *N. m. pulcherrima* Viets, 1935, and *N. m. walteri* Cook, 1967] based on the degree of dorsal plate fusion. The unique patterns of dorsal plates in the subspecies *N. m. sepikensis* are given in Fig. 5. This species has been reported from India, Thailand, China, Japan and Sumatra.

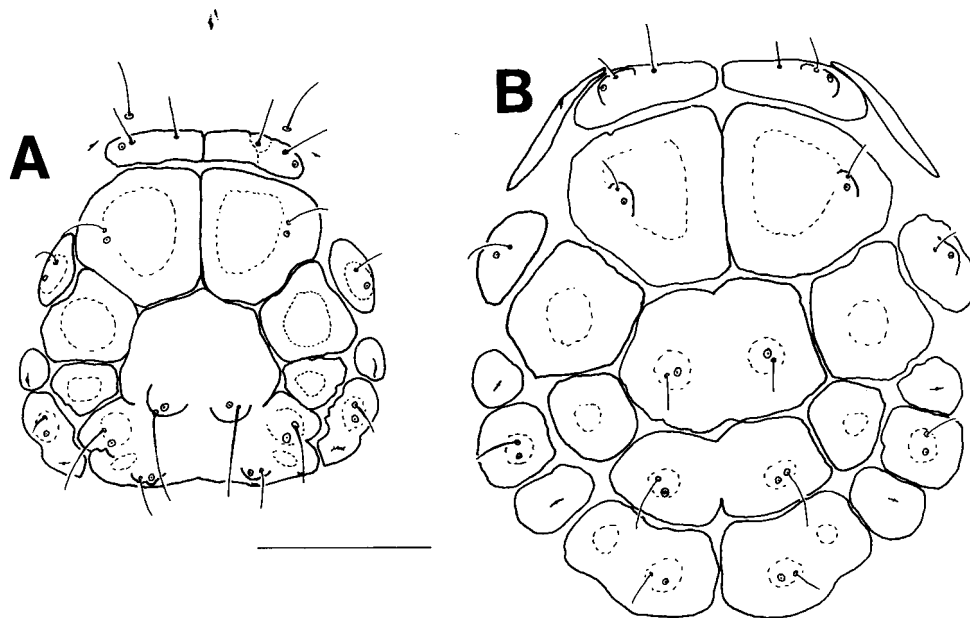


Fig. 5. *Neumania (Ecpolopsis) multiscutata sepikensis*, new subspecies. Arrangements of dorsal plates: A, B. Scale line = 245.

*Koenikea (Notomideopsis) daundoensis*, new species

(Fig. 6)

**Material examined.** - Site 31, slides : Holotype A97 male, Paratype 1 A98 male. Site 34, slides: Paratype 2 A124 male, Paratype 3 A125 male, Paratype 4 A259 male.

**Description.** - Male. Colour, dorsal shield buff/brown, typically with a purple patch posteriorly. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield without apophyses 410 long, 390 wide. Dorsal shield with 6 pairs of glandularia, A2, D1-D4 and L3; Line joining L3, D2 and D3 making an equilateral triangle. Ventral shield oval, length 470, width 417. Suture lines between epimera indistinct. Apodemes of EpI extending to EpIV; EpIV strongly tapering to midline. Spines associated with L3-4, D3-4, V3-4. V2 located in genital field; approximately 19-25 acetabula on each side of genital pore. Anus terminal. Dorsodistal seta of PIII long, ventral PIV with spine on small tubercle, dorsal claw of PV longer than ventral claws; length PI-PV 13, 55, 26, 62, 31. IV-Leg-6 not exhibiting sexual dimorphism. Well developed rillborsten (sensu Cook, 1986) on I-II-Legs. Length I-Leg-2-

6 75, 82, 100, 98, 130; II-Leg-2-6 63, 80, 103, 97, 132; III-Leg-2-6 66, 66, 97, 97, 120; IV-Leg-2-6 73, 87, 116, 129, 136. Swimming setae on 2; III-Leg-4-5 3, 3; 1V-Leg-3-5 1+1, 3+2, 3+2.

Female. Dorsal shield similar to male, length 487, width 129. Ventral shield broad, length 511, width 536. Venter similar to male. Spines associated with glandularia shorter than in male. V2 located in genital field; approximately 20 acetabula on each side of genital pore. Anus terminal. Pedipalp similar to male, length PI-V 14, 57, 28, 62, 35. Legs similar to male. Length I-Leg-2-6 76, 93, 119, 109, 128 claw 17; II-Leg-2-6 77, 83, 118, 115, 129; III-Leg-2-6 87, 94, 125, 139, 143; IV-Leg-2-4 78, 89, 122, 135, 140 claw 20. Swimming setae on II-Leg-4-5 1, 1; III-Leg-3-5 1, 3, 3; 1V-Leg-3-5 1+1, 3+2, 3+2. Egg diameter 89.

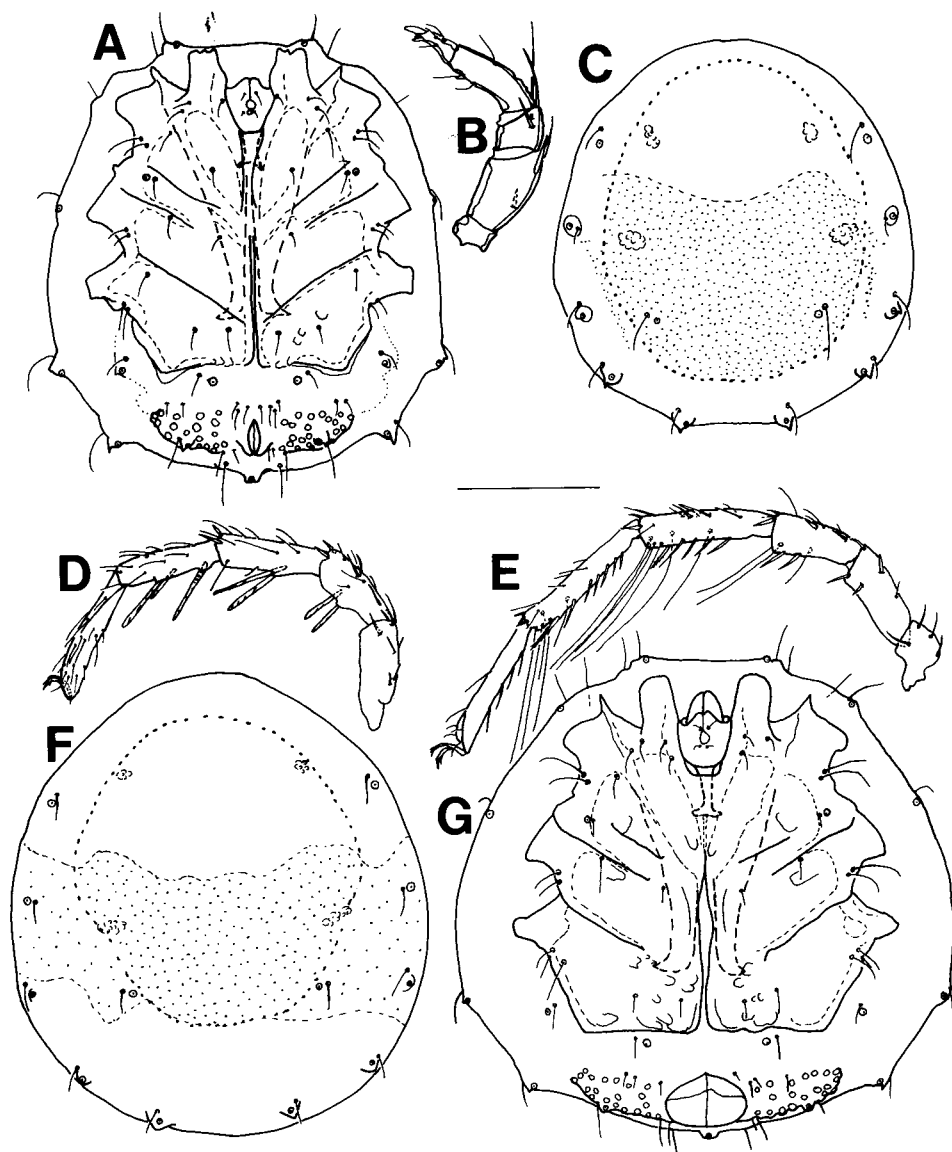


Fig. 6. *Koenekia daundoensis*, new species. A. venter male, B. pedipalp male, C. dorsum male, D. I-Leg male, E. IV-Leg male, F. venter female, G. venter female. Scale line ACFG 204; DE 127; B 90.

**Etymology.** - This species is named after R. Daundo.

**Remarks.** - The distribution of glandularia on the dorsal plate is unique. Only *K. decapora* Cook, 1986, has tapering EpIV but the genital field of both sexes and the configuration of dorsal shield glandularia are different.

***Koenikea (Notomideopsis) magnunguilata*, new species**

(Fig. 7)

**Material examined.** - Site 38, slide : Holotype A258 male, Paratype 1 A257 female, Paratype 2 A256 female, Paratype 3 A255 female; site 39, slides : Paratype 4 A251 female, Paratype 5 A249 female, Paratype 6 A248 female; A243 female?

**Description.** - Male. Colour buff/brown. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield without apophyses 556 long, 142 wide. Dorsal shield with 6 pairs of glandularia, A2, D1-D4 and L3; L3 located just in front of D3. Ventral shield slightly broader posteriorly, length 580, width 540. Suture lines between epimera indistinct. Apodemes of EpI extending to EpIV; EpIV broad. V2 located in genital field; >50 acetabula on each side of genital pore. Ventral PIV with spine on tubercle, claws of PV of similar length; length PI-PV 18, 82, 41, 83, 37. IV-Leg-6 exhibiting sexual dimorphism; ventrodistal margin concave, claw large. III-Leg-5, short and tapering proximally (weak sexual dimorphism). Well developed rillborsten (sensu Cook 1986) on I-II-Legs and claw size increasing from first to forth legs. Length I-Leg-2-6 115, 118, 177, 170, 212, claw 24; II-Leg-2-6 108, 118, 173, 181, 195 claw 26; III-Leg-2-6 104, 96, 153, 157, 143 claw 38; IV-Leg-2-6 120, 146, 188, 219, 177, claw 68. Swimming setae on II-Leg-4-5 3, 2; III-Leg-4-5 3, 3; IV-Leg-4-5 3+1,3+1;

Female. Dorsal shield similar to male but some specimens with striate pattern on central portion (original dorsal plate), length 598 (530-598), width 539 (460-539). Ventral shield variable in shape: broad and tapering to oval, length 629 (591-629), width 673 (556-617). Venter similar to male. V2 located in genital field; approximately 50 acetabula on each side of genital pore. Anus or genital pore, terminal. Pedipalp similar to male, length PI-V 22, 74, 36, 74, 39. PII can be tapered or nearly cylindrical. I-II-Legs similar to male, III-IV-Legs typical. Claws of I-II-Legs smaller than claws of III-IV-Legs. Length I-Leg-2-6 99, 127, 163, 143, 146, claw 24; II-Leg-2-6 97, 111, 146, 158, 158, claw 24; III-Leg-2-6 87, 94, 125, 139, 143 claw, 31; IV-Leg-2-4 97, 123, 153, 177, 177 claw, 38. Swimming setae on II-Leg-4-5 3, 2; III-Leg-4-5 3, 3; IV-Leg-4-5 3+1,3+2.

**Etymology.** - The name "*magnunguilata*" describes the large claw of the fourth leg.

**Remarks.** - Similar to Australian species with large claws; *K. distans* K.O. Viets, 1980 (only) and *K. pseudodistans* Cook, 1986. Ventral IV-Leg-6 is concave in male *K. magnunguilata* but straight in *pseudodistans* and the genital field is wider. Females have a much wider genital field than *K. pseudodistans* and *K. distans*. The combination of a wide genital plate and the configuration of glandularia on the dorsal shield will separate females from other species.

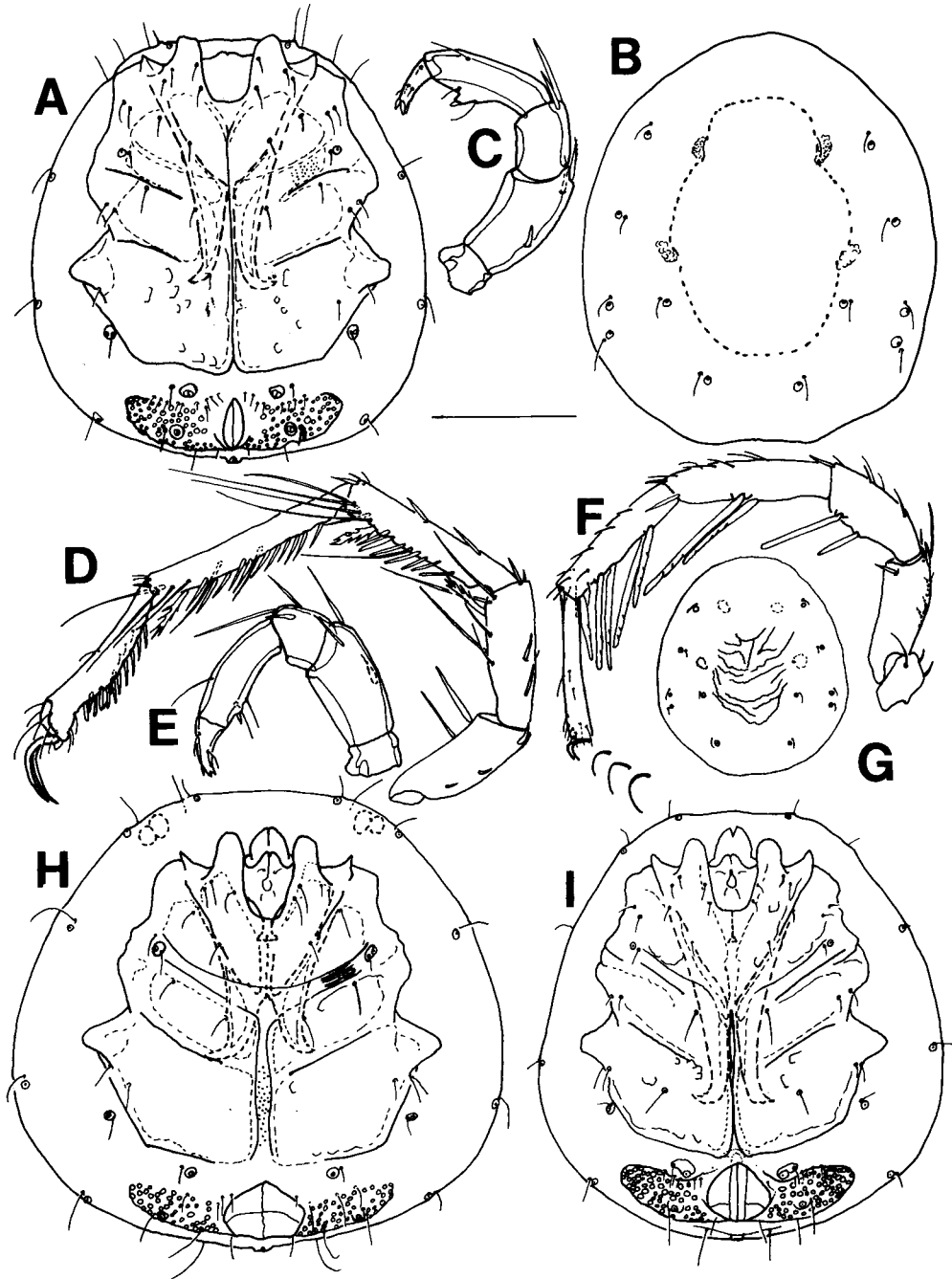


Fig. 7. *Koenikea magnunguilata*, new species. A. venter male, B. dorsum male, C. pedipalp male, D. IV-Leg male, E. pedipalp female, F. I-Leg female and claws of II-IV-Leg, G. dorsum female, H. dorsum [wide form] female, I. venter [typical] female. Scale line C-F 88; ABHI 100; G 356.

***Recifella burtoni*, new species**

(Fig. 8)

**Material examined.** - Site 32, slide : Holotype A106 female.

**Description.** - Female. Colour buff/brown. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield without apophyses 780 long, 664 wide. Dorsal shield with 3 pairs of glandularia, D1-D3; D4 located in dorsal furrow. Other glandularia located on ventral shield. Ventral shield slightly broader posteriorly, length 810, width 750. Apodemes of Epl extending to EpIII; EplIV broad. V2 located posterior to genital field; approximately 25 acetabula in narrow genital field on each side of small genital pore, length 115. Pedipalp slender, dorsal claw of P $\overline{V}$  much larger than the ventral claws; length PI-PV 31, 139, 76, 148, 46. Legs slender with small setae. Length I-Leg-2-6 156, 187, 278, 299, 212; II-Leg-2-6 143, 165, 217, 252, 217; III-Leg-2-6 135, 139, 200, 235, 200; IV-Leg-2-6 130, 174, 226, 295, 226. Swimming setae on II-Leg-4-5 1, 3; III-Leg-3-5 1, 3, 3; IV-Leg-3-5 1+1, 3+3, 3+1.

**Etymology.** - This species was named after James Burton who made collections on the 1992 expedition to Irian Jaya.

**Remarks.** - This species may be separated from others by the small genital pore, narrow genital field, slender pedipalp and long PV claw.

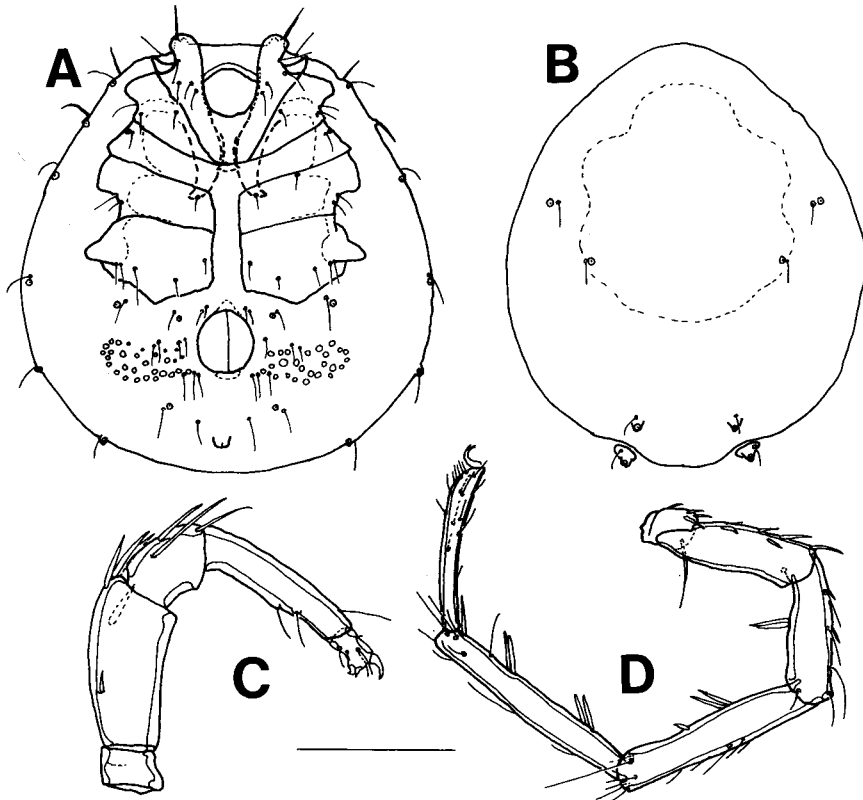


Fig. 8. *Recifella burtoni*, new species. A. venter female, B. dorsum female, C. pedipalp female, D. IV-Leg female. Scale line AB 286; CD 204.

*Recifella curvata*, new species

(Fig. 9)

**Material examined.** - Site 34, slides : Holotype A276 male + two females, Paratype 1 A261 female, Paratype 2 A260 female.

**Description.** - Male. Colour. Brown with purple brown patch on posterior dorsum. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield without apophyses 382

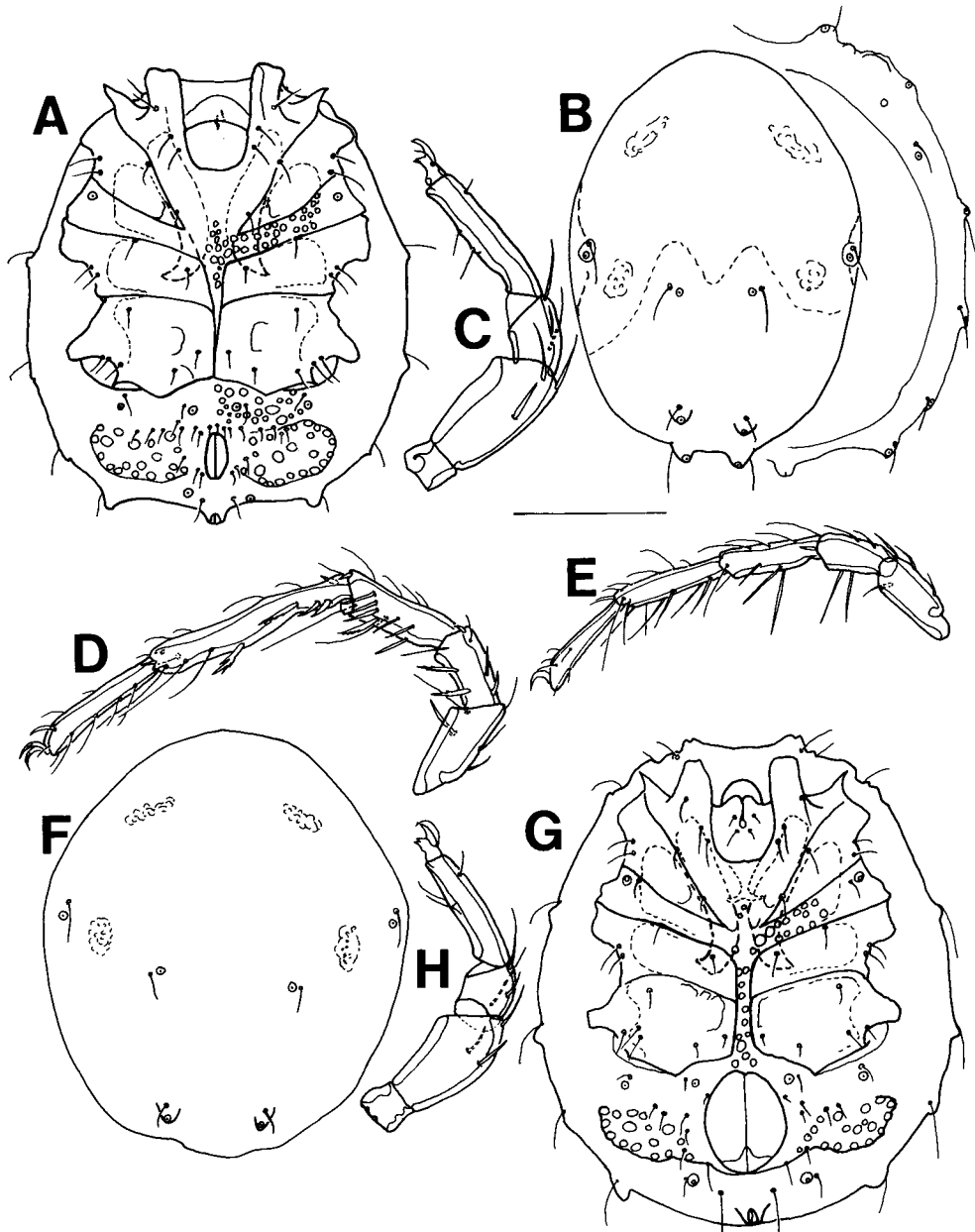


Fig. 9. *Recifella curvata*, new species. A. venter male, B. dorsum male, C. pedipalp male, D. IV-Leg male, E. I-Leg male, F. venter female, G. dorsum female, H. pedipalp female. Scale line ABFG 143; CDEH 90.

long, 273 wide. Dorsal shield with 4 pairs of glandularia, D1-D4; D4 being lightly fused to the posterior margin. Other glandularia located on ventral shield. Most glandularia with tubercles. Ventral shield length 421, width 350. Apodemes of EpI extending to EpIII; EpIV broad. V2 located posterior to genital field; <25 acetabula lateral to genital pore. Anus terminal. Pedipalp slender, dorsal claw of PV much larger than the ventral claws; length PI-PV 20, 78, 48, 89, 30. I-Leg with short, slender rillborsten. IV-Leg-5 exhibiting sexual dimorphism, posteroventral surface concave. Length I-Leg-3-6 73, 100, 118, 118; II-Leg-3-6 77, 109, 115, 118; III-Leg-3-6 70, 71, 118, 118; IV-Leg-3-6 77, 118, 198, 125. Swimming setae on I-Leg-4-5 1,2; II-Leg-4-5 1, 2; III-Leg-4-5 2, 3; IV-Leg-4-5 2, 3.

Female. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield 397 long, 337 wide. Dorsal shield with 3 pairs of glandularia, D1-D3; D4 located in dorsal furrow. Other glandularia located on ventral shield. Ventral shield length 452, width 390. Apodemes of EpI extending to EpIII; EpIV broad. V2 located posterior to genital field; approximately 16-20 acetabula in narrow genital field on each side of large genital pore, length 94. Pedipalp slender, dorsal claw of PV much larger than the ventral claws; length PI-PV 20, 74, 31-38, 74, 24. Legs slender with small setae. Length I-Leg-3-6 70, 97, 104, 103; II-Leg-3-6 73, 100, 111, 114; III-Leg-3-6 59, 101, 111, 111; IV-Leg-3-6 69, 118, 156, 132. Swimming setae on I-Leg-5-6 1, 2; II-Leg-4-5 1, 2; III-Leg-4-5 3, 3; IV-Leg-4-5 3, 2.

**Etymology.** - The name refers to the curved IV-Leg-5 of males.

**Remarks.** - Male similar to *R. agnosta* Cook, 1986, from Australia (not known). The dorsal shield of *R. curvata* is not fused to the ventral shield posteriorly, IV-Leg-5 has a more posteriorly placed curve and the anterior margins of EpI extend beyond the anterior of the idiosoma. Females most closely resemble *R. baltoona* Cook, 1986, but the PV claw is longer and the dorsal shield wider. The structure of the male forth leg suggests that both *R. curvata* and *R. pinguipalpifera* (see below) belong to the subgenus *Eorecifellida*. Based on present knowlege, the Australian subgenus *Recifellida* does not occur in New Guinea, but it seems likely that it is present.

***Recifella pinguipalpifera*, new species**  
(Fig. 10)

**Material examined.** - Site 38, slide : Holotype A247 male. Other Material examined; site 21, A143 male; site 29, slide A169.

**Description.** - Male. Colour uniform buff/brown. Dorsal and ventral shields present, dorsal furrow complete; dorsal shield without apophyses 717 long, 619 wide. Dorsal shield with 3 pairs of glandularia, D1-D3; D4 and other glandularia located on ventral shield. Ventral shield oval, length 835, width 740. Apodemes of EpI extending to EpIII; EpIV broad. V2 located posterior to genital field; > 100 acetabula in narrow genital field on each side of genital pore. Anus terminal. Pedipalp stocky, PII broad with broad ventrodistal seta; PIV ventral setae on tubercles posterior to a small recurved spine, dorsal claw of PV much larger than the ventral claws; length PI-PV 22, 126, 48, 100, 47. I-Leg with short rillborsten. Length I-Leg-2-6 97, 132, 184, 149, 160; II-Leg-2-6 122, 122, 169, 156, 191; III-Leg-2-6 117, 118, 156, 165, 200; IV-Leg-2-6 139, 160, 208, 215, 226. Swimming setae on I-Leg-4-5 1,2; II-Leg-4-5 1, 3+(1?); III-Leg-3-5 1+(2?), 3+(3?), 3+(3?); IV-Leg-3-5 1+2, 3+3, 3+3. [figures in brackets might not be true swimming setae.]



**Etymology.** - The name "*pinguipalpifera*" means "bearing a fat pedipalp".

**Remarks.** - The shape of the pedipalp and the narrow genital field with numerous small acetabula distinguish this species.

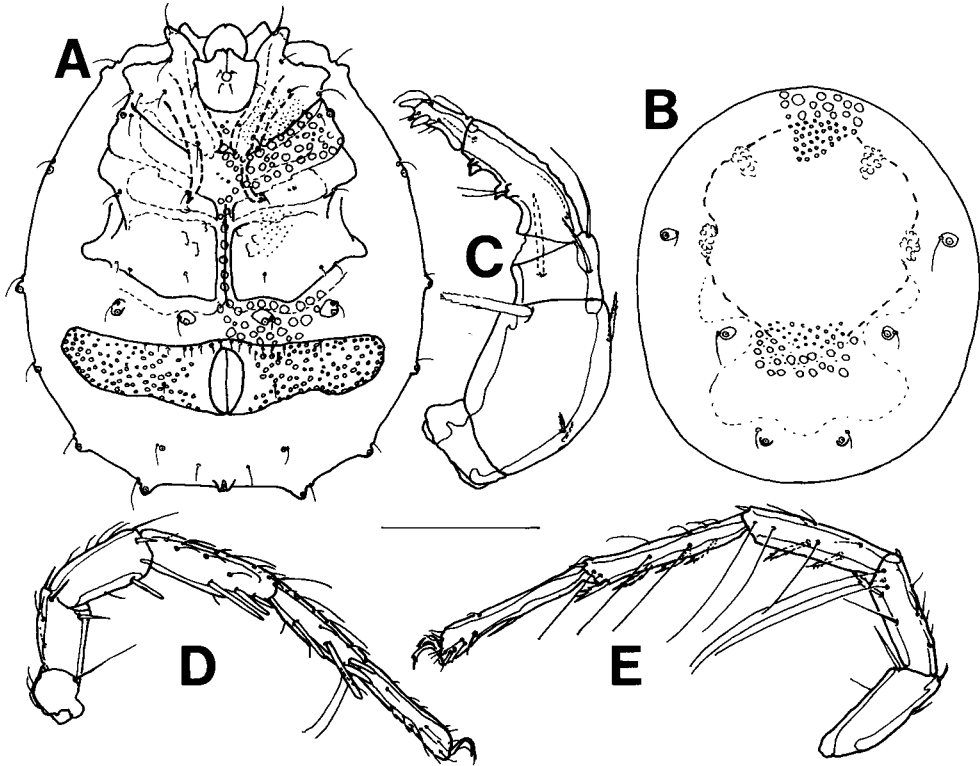


Fig. 10. *Recifella pinguipalpifera*, new species. A. venter female, B. dorsum female, C. pedipalp female, D. I-Leg female, E. IV-Leg female. Scale line AB 286; CDE 204.

***Gretacarus novaguinensis*, new species**

(Fig. 11)

**Material examined.** - Site 22, slide : Holotype A33 male. Other material collected; site 28, slide: Paratype 1 A80 female.

**Description.** - Male. R2, D1, D2 and D4 located on dorsal shield, length 500, width 443. Lateroglandularia on small posteriorly pointing projections on ventral shield, length 954, width 522. Sutures between epimera incomplete and indistinct. Lateral margins of epimera not extending in a ridge posterior to IV-Leg sockets. Numerous genital acetabula distributed in a narrow line along the anterior half of the gonopore broadening to a wide oval around the posterior half. E4 (Epimeroglandularia 2 sensu Cook, 1986, P289) located at the anterior end of the gonopore and not hidden by ridges. Length genital field 104, maximum width 107. Anus immediately posterior to the genital field. Infracapitular bay shallow and broad. Pedipalp PII broad and PIV with a large ventral spatulate seta; length PI-PV 26, 70, 36, 48, 43. Legs exhibiting sexual dimorphism; Large sickle-shaped seta located at dorsodistal margin of IV-Leg-4. I-II-Legs-6 short and bulging ventrally, III-IV-Legs-6 slender. Length I-Leg-

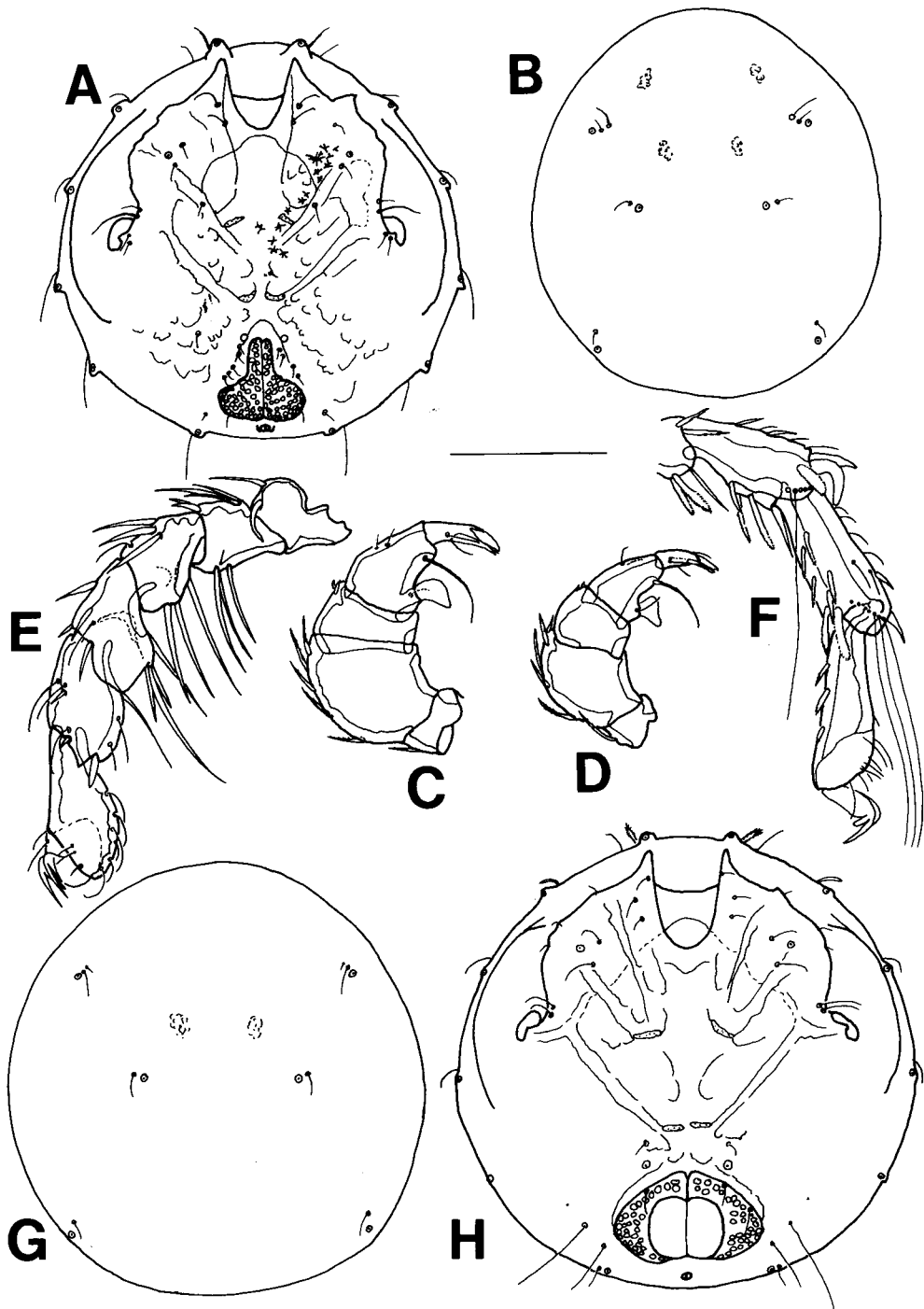


Fig. 11. *Gretacarus novaguinensis*, new species. A. venter male, B. dorsum male, C. pedipalp female, D. pedipalp male, E. I-Leg female, F. IV-Leg male, G. dorsum female, H. venter female. Scale line ABGH 204; E 127; CDF 100.

3-6 52, 59, 67, 102; II-Leg-3-6 59, 70, 77, 117; III-Leg-3-6 70, 103, 113, 118; IV-Leg-3-6 57, 80, 111, 117. Swimming setae III-Leg-4-5 4, 8; IV-Leg-4-5 5, 7.

Female. Idiosoma similar to that of the male but broader and with a different genital field. Length dorsal shield 549, width 525. Ventral shield length 577, width 577. Genital acetabula in a broad arc (approximately 4 acetabula wide at widest point) around the anterior portion of a large genital pore; length genital pore 76, width 97. Pedipalp similar to that of the male; length PI-PV 27, 88, 39, 64, 51. IV-Leg typical and with no sickle-shaped seta on IV-leg-4. I-II-Legs-6 short and bulging ventrally, III-IV-Legs-6 slender. Swimming setae III-Leg-4-5 4, 6; IV-Leg-4-5 4, 6.

**Etymology.** - The species is named after New Guinea.

**Remarks.** - See discussion under *G. ravenscroftae*. One male and one female were collected from different localities. The idiosoma and pedipalp of these specimens are similar and are here considered to be the same species.

***Gretacarus ravenscroftae*, new species**

(Fig. 12)

**Material examined.** - Site 30, slides : Holotype A89 male, paratype 1 A90 female. Other material examined; site 32, slide A242 female.

**Description.** - Male. Colour. Posterior dorsal shield red/ brown with patches of red pigment associated with epimeral apodemes on venter. R2, D1, D2 and D4 located on dorsal shield, length 462, width 403. Lateroglandularia located on ventral shield, length 500, width 445. Sutures between epimera incomplete and indistinct. Lateral margins of epimera not extending in a ridge posterior to IV-Leg sockets. Numerous genital acetabula distributed in a narrow line along the genital pore. E4 with long setae (epimeroglandularia 2 sensu Cook, 1986), located at the anterior end of the gonopore (not hidden by ridges) anterior to a tuft of fine setae. Length genital field 83, maximum width 27. Anus immediately posterior to the genital field. Infracapitular bay shallow and broad. PII broad, large PIV ventral seta anvil-shaped; length PI-PV, 19, 43, 25, 14, 25. Legs exhibiting sexual dimorphism; IV-Leg-2 with approximately 12 ventral setae longer than the combined length of IV-Leg-3-5. Large sickle-shaped seta located at the dorsodistal margin of IV-leg-4. I-II-Legs-6 short and bulging ventrally, III-IV-Legs-6 slender. Length I-Leg-3-6 48, 45, 50, 83; II-Leg-3-6 50, 53, 63, 87; III-Leg-3-6 59, 87, 102, 96; IV-Leg-3-6 41, 82, 74, 93. Swimming setae III-Leg-4-5 6, 9; IV-Leg-4-5 3, 5.

Female. Idiosoma similar to male but broader with a different genital field. Length dorsal shield 441, width 403. Ventral shield length 466, width 440. Genital acetabula in an arc (approximately 2 acetabula wide at widest point) around the anterior portion of a large genital pore; length genital pore 77, width 83. Pedipalp similar to that of the male; length PI-PV 19, 43, 23, 41, 25. I-II-Legs-6 short and bulging ventrally, III-IV-Legs-6 slender; IV-Leg typical, sickle-shaped seta absent. Swimming setae III-Leg-4-5 6, 7; IV-Leg-4-5 3, 5-6.

**Etymology.** - This species is named after Judy Ravenscroft.

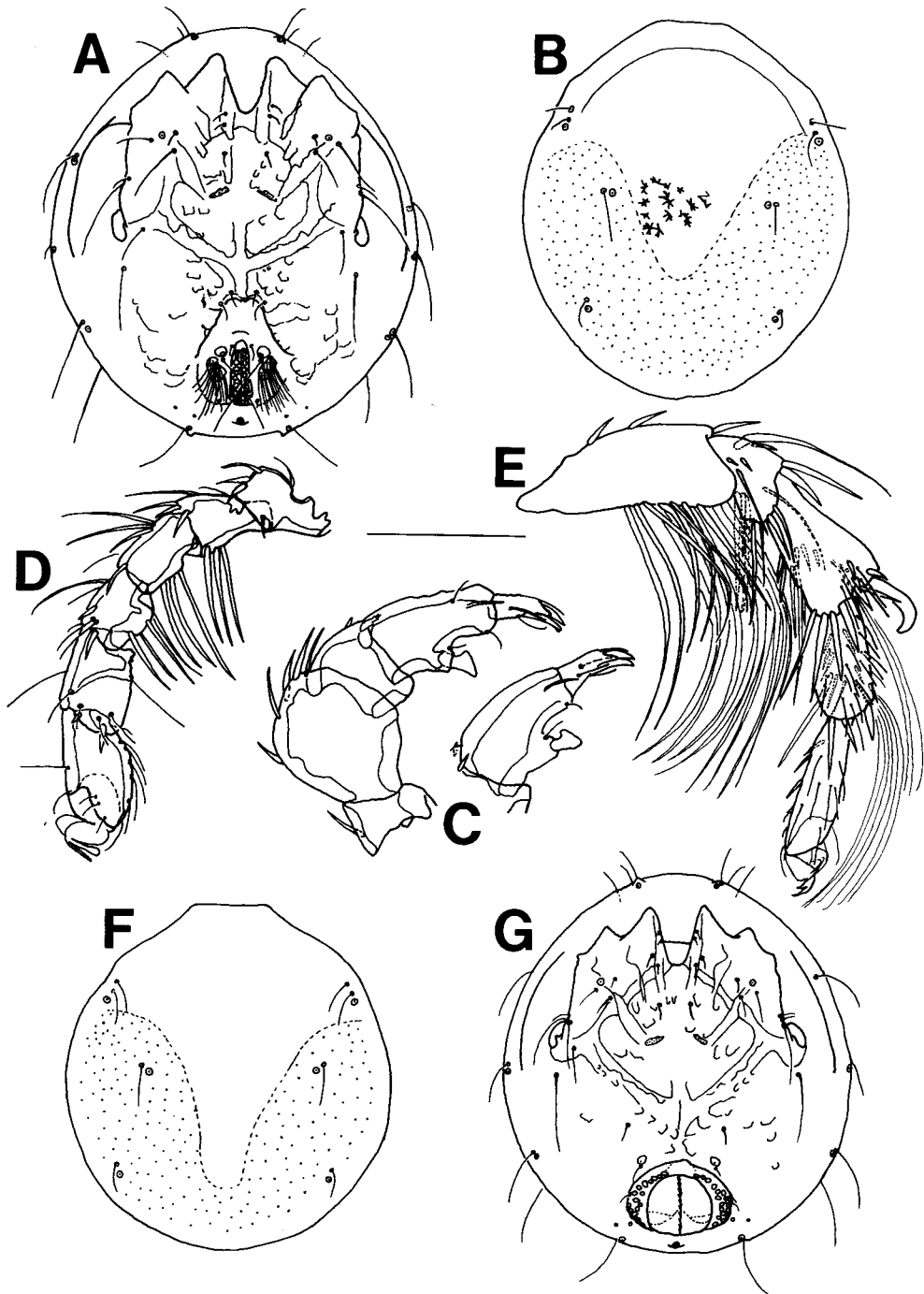


Fig. 12. *Gretacarus ravenicroftae*, new species. A. venter male, B. dorsum male, C. pedipalp female, inset pedipalp male, D. I-Leg male, E. IV-Leg male, F. dorsum female, G. venter female. Scale line ABFG 143; C 50; DE 90.

**Remarks.** - The pedipalp shape is similar to that of *G. australicus* K. O. Viets, 1978, and *G. novaguinensis* but the genital field differs in both sexes. Acetabula in male *G. australicus* are nearly uniformly distributed along the genital pore but lateral tufts of setae are absent. Tufts of setae are present in *G. novaguinensis* but are absent in *G. ravenscroftae* which has a posterior bulge to the genital field. In *G. australicus* the female genital pore tapers anteriorly unlike *G. ravenscroftae* and *G. novaguinensis*. *G. ravenscroftae* has narrow band of acetabula around the genital pore seldom more than two acetabula wide whereas *G. novaguinensis* has acetabula in a broad band, often more than 4 acetabula wide.

***Axonopsella novaguinensis*, new species**

(Fig. 13)

**Material examined.** - Site 22, slides: Holotype A36 male, Paratype 1 A29 female, Paratype 2 A32 female. Additional material. Site 27, slide A79 female; site 35, slide A145 female; site 28 slide A84 female.

**Description.** - Male. Colour: plain buff sometimes with red/brown patches on the dorsal shield. A2, R1, R2, D1-4 and L3 located on large dorsal shield, length 358, width 268. A1 on indistinct plate attached to ventral shield above the infracapitulum. Length ventral shield 372, width 289. Epimeral sutures indistinct but internal skeleton of EpI/II meeting at midline with a median suture connected posteriorly with the posterior sutures of EpIV. E4 anterolateral to posterior apodemes of EpIV and V2-V4. Genital plates not defined; 4 pairs of acetabula; one pair lie above the apodemes of EpIV, 3 pairs are located at the posterior margin of the idiosoma anterior to the anus. Genital pore small, length 35, and located posterior to the median suture and adjacent to the anterior acetabula. Pedipalp with denticles on ventral PII, length PI-V 31, 62, 34, 75, 33. Legs exhibiting sexual dimorphism: IV-Leg-4 with large hooked distal seta; I-III-Leg-5 with ventroproximal extensions. Length I-Leg-3-6 46, 65, 87, 27; IV-Leg-2-6 89, 87, 26, 80, 74. Swimming setae absent.

Female. A2, R1, R2, D1-3 on dorsal shield, L3 and D4 in dorsal furrow; length dorsal shield 366-410, width 302-358. Anus located dorsally, posterior to dorsal shield. A1 on plate on the ventral shield above the infracapitulum; length ventral shield 389-452 width 337-400. Epimeral sutures indistinct but EpI/II joining with median suture, posterior suture of EpIV in horizontal line above genital field; E4 and V3 located on EpIV; L3 and V4 located lateral to four pairs of acetabula on indistinct genital plates, terminal genital pore broad. Pedipalp similar to male, length PI-V 27-30, 56-61, 25-31, 72-76, 34-36. I-IV-Legs-5 with prominent ventroproximal extensions. IV-Leg sockets partially covered, IV-Leg-4 lacking large terminal seta. Length I-Leg-3-6 43-48, 57-70, 70-80, 65-76; IV-Leg-2-6 57-67, 70-83, 67-85, 80-98, 82-100.

**Etymology.** - The species is named after New Guinea.

**Remarks.** - Uncommon but widely dispersed species. The homology and distribution of ventroglandularia is difficult to interpret and the nomenclature given here is arbitrary. The large size of acetabula and the configuration of the genital field in males and the straight posterior margin of EpIV in females are diagnostic. Cook (1986) points out the problems of associating males and females. Many species are found in Australia and it may also be the case in New Guinea. Further collections are required to confirm the females are the same species as the male.

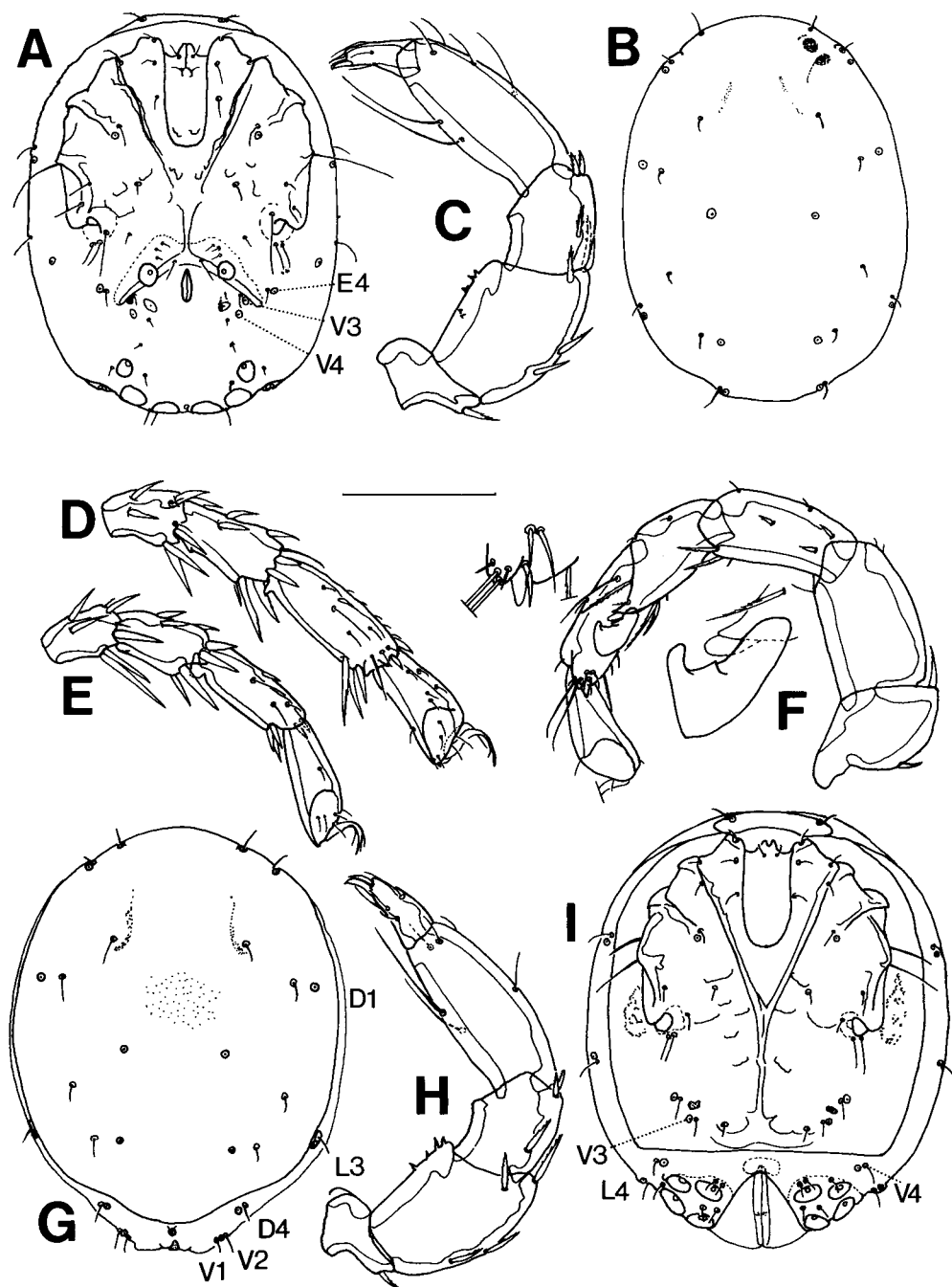


Fig. 13. *Axonopsella novaguinensis*, new species. A. venter male, B. dorsum male, C. pedipalp male, D. II-Leg male, E. II-Leg female, F. IV-Leg male, G. dorsum female, H. pedipalp female, I. venter female. Scale line DEF 90; F insert 36; ABGI 143; C, H 51.

*Axonopsella ovalis*, new species

(Fig. 14)

**Material examined.** - Site 21, slide : Holotype A75 two females.

**Description.** - Female. Body with dorsal and ventral shields. R1 anterior to, and D4 posterior to, dorsal plate on oval dorsal shield; length of dorsal shield 504, width 330. R2 adjacent to D1. Anus at posterior margin of dorsal shield. Ventral shield tapering posteriorly, A1 not located on distinct plate. EpI/II, median suture and posterior margin on EpIV distinct; E4 anterior to V3 at posterior EpIV. V4 anteriolateral to, and V1 and V2 posterior to, genital field; four pairs of acetabula. Pedipalp without denticles, PIV with two long ventral setae; length PI-V 22, 57, 26, 71, 33. I-IV-Legs-5 without ventroproximal extensions; length I-Leg-3-6 52, 49, 65, 64; II-Leg-3-6 65, 78, 96, 103; III-Leg-3-6 59, 74, 91, 89; IV-Leg-3-6 70, 70, 84, 70. Swimming setae II-IV-Legs-5 2.

**Etymology.** - The name refers to the oval shape of the idiosoma of this species.

**Remarks.** - Without a male it is not possible to compare this species with those of Australia. The females collected are clearly a different species to *A. novaguinensis* described above. The R. Cum runs through Mt Hagen and it should be possible to find males in the future.

*Arrenurus (Arrenurus) bakerae*, new species

(Fig. 15)

**Material examined.** - Site 37, (7 males 15 females), slides : Holotype A173 male, Paratype 1 A178 male, Paratype 2 A179 two females, Paratype 3 A180 two males.

**Description.** - Male. Colour blue-green. Length excluding petiole 518, width 459, depth 278 declining posteriorly. Dorsal furrow incomplete, R2, D2-D4 located on dorsal plate; width dorsal plate 265. No humps associated with glandularia except for small pygal lobes. Posterior idiosoma between pygal lobes straight. Epimera with numerous muscle scars; Median length EpI 122, EpIII 48-62, EpIV 97-100, EpIII shorter than EpI and EpIV. Genital plates arc dorsoanteriorly. V3 gland located above genital plate. Petiole long, 126-147 with lateroproximal teeth and voluminous petiole membrane (which shrinks in preserved material). V1 seta long and bristle-like, V2 seta short, thick and truncated; short fine V3 seta located on pygeal lobe and long V4 seta extending beyond the petiole. Pedipalp typical, length PI-PV 26, 58, 26-32, 57, 35. IV-Leg 5-6 short, length I-IV-Leg-3-6 (not including distal spur): 66, 80, 83, 132; 80, 88, 104, 143; 80, 104, 122, 136; 90, 125, 69, 59. Legs with swimming setae on II-, III-, and IV-Leg 3-5 : 1,3,3; 3,5,6; 3,9,9+4.

Female. Colour blue green. Length 539-556, width 478-494. Idiosoma without humps. Dorsal furrow incomplete, width of dorsal plate 369. Epimera with numerous muscle scars, Median length EpI 101, EpIII 62-70, EpIV 103-104. Length genital plate 100, width 125. Anal pore at the posterior margin of the idiosoma. Pedipalp typical, length PI-PV 26, 56, 43, 65, 41. Length I-Leg-3-6 : 69, 87, 90, 125; II-Leg 3-6 69, 73, 87, 108; III-Leg 3-6 73, 90, 96, 113; IV-Leg 3-6 83, 104, 94, 90. Legs with swimming setae on I-, II-, III-, and IV-Leg 3-5 : 0, 2 vestigial, 2 vestigial; 2,2,3; 3,4,5; 3,5,6.

**Etymology.** - The species is named after Dr. A. Baker of the Natural History Museum, London.

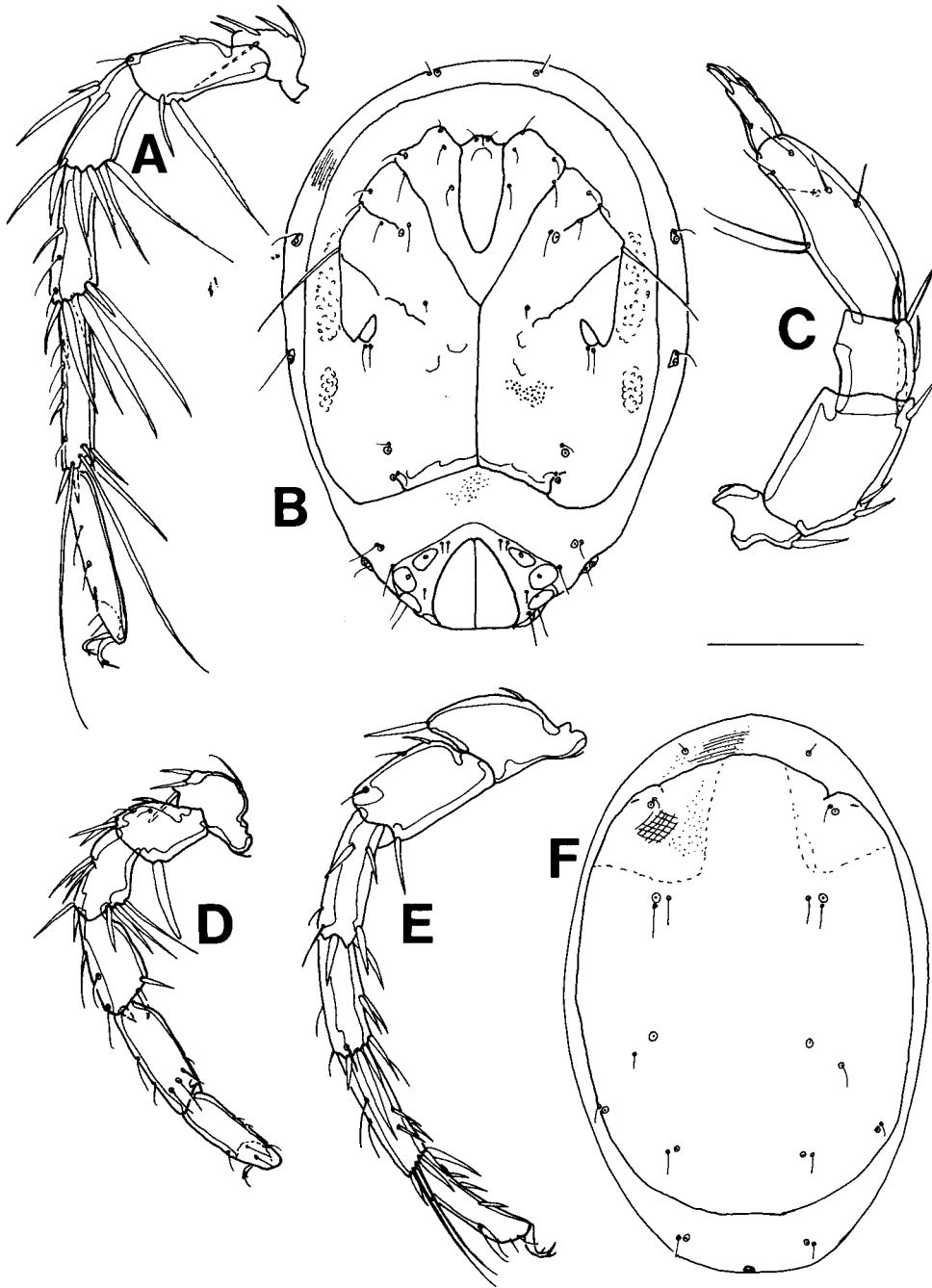


Fig. 14. *Axonopsella ovalis*, new species. A. II-Leg female, B. venter female, C. pedipalp female, D. I-Leg female, E. IV-Leg female, F. dorsum female. Scale line BF 143; ADE 90; C 51.



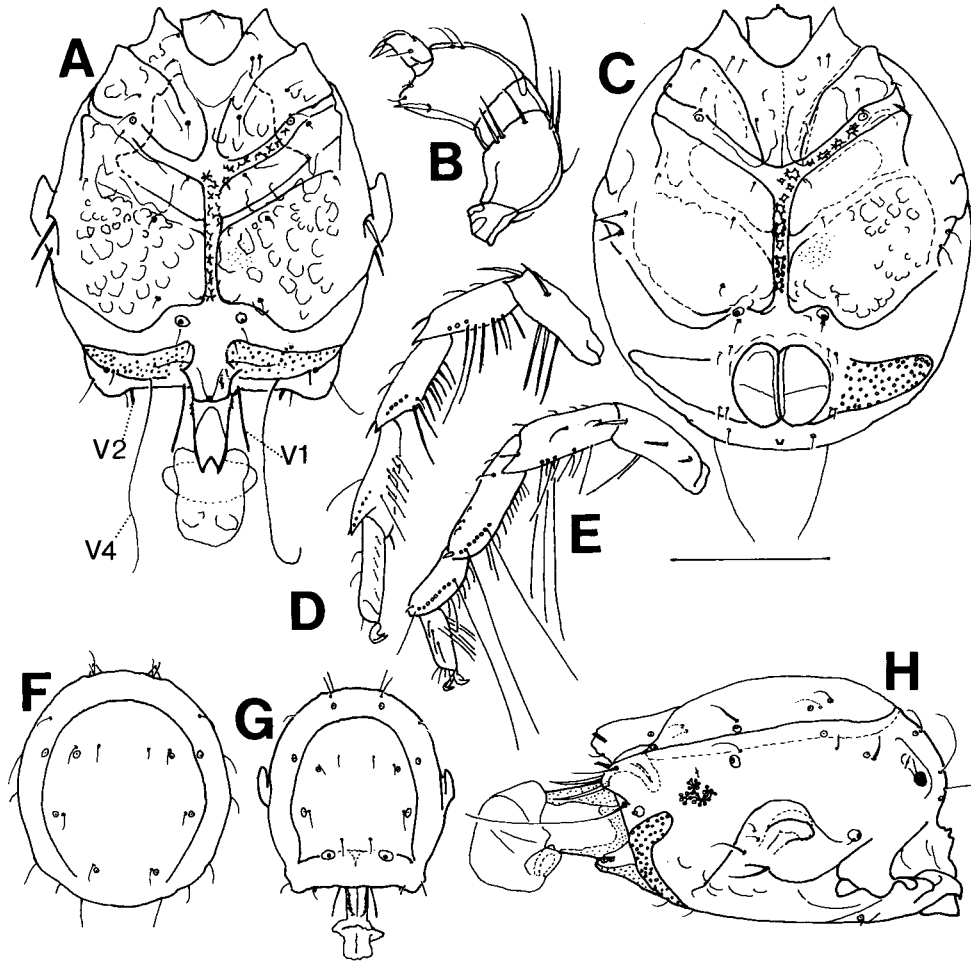


Fig. 15. *Arrenurus bakerae*, new species, A. venter male, B. pedipalp male, C. venter female, D. III-Leg female, E. IV-Leg male, F. dorsum female, G. dorsum male, H. lateral view female. Scale line ACH = 100, B = 89, FG 357, DE = 143.

**Remarks.** - Similar to *A. meyeri* Wiles, 1993, from Peninsula Malaysia but, in males, the body, pygal lobes and petiole are longer; in females EpIV is broader and the ventrodistal seta of PIV is much longer.

***Arrenurus (Megaluracarus) bunuensis*, new species**  
(Fig. 16)

**Material examined.** - Site 45, slide : Holotype A240 female.

**Description.** - Female. Colour brown. Body large, subspherical, length 1460, width 1200, depth 1150. Dorsal furrow complete. R2, D2-D4 located on flat, oval, dorsal plate, length 900-915, width 590. D1 and L4 on prominent humps; L1, V2 and V4 on small humps. Venter typical, median length EpI 217, EpIII 78, EpIV 130. Genital pore length 165, width 191. Genital plates extending below genital pore towards the lateral body margins. V3 located

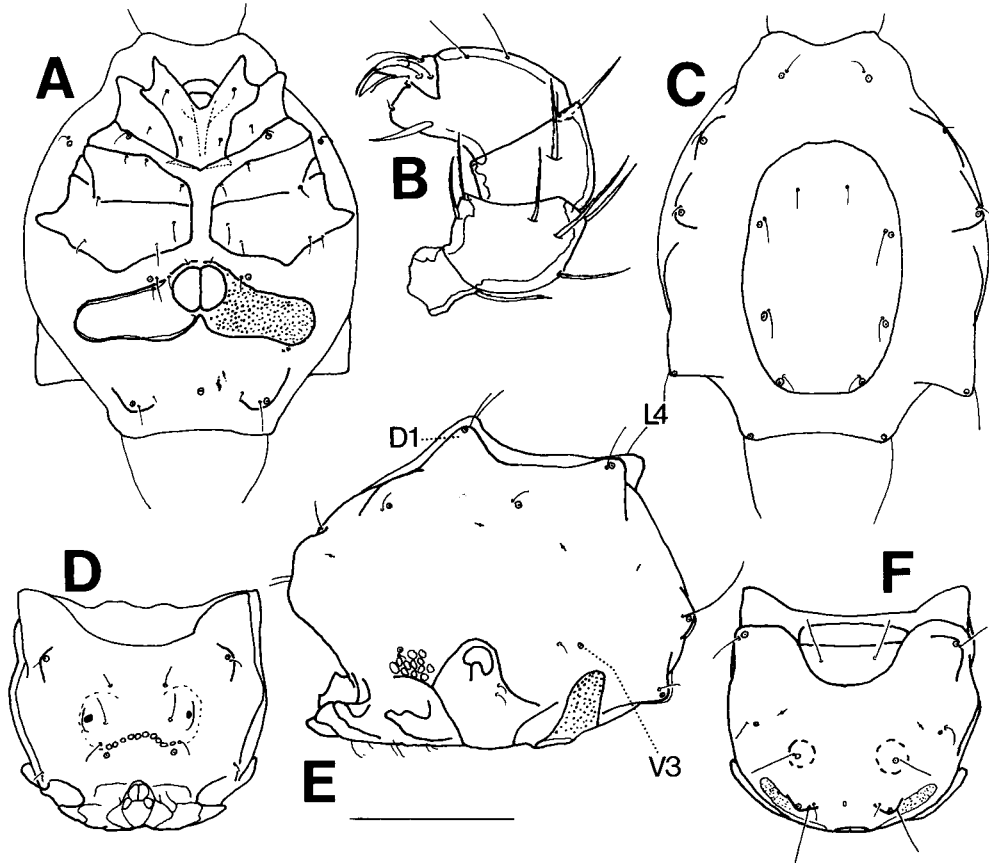


Fig. 16. *Arrenurus bunuensis*, new species. A. venter female, B. pedipalp female, C. dorsum female, D. anterior view female, E. lateral view female, F. posterior view female. Scale line ACE = 584, B = 127, DF = 829.

lateral to genital plates. Pedipalp typical; length PI-V 43, 97, 82, 139, 67. Legs typical; length I-Leg-3-6 174, 210, 182, 208; II-Leg 3-6 183, 261, 234, 261; III-Leg 3-6 200, 234, 234, 261; IV-Leg 3-6 260, 278, 261, 252. Swimming setae on all legs; I-II-Leg-4-5 3, 3; 12, 12; III-IV-Leg-3-5 5, 12, 12; 13+11, 14+12, 12.

**Etymology.** - This species is named after the type locality.

**Remarks.** - This species can be clearly separated from the similar species, *A. hamiger* Viets, 1926, and *A. laticodulus* Piersig, 1898, by the lack of D4 humps, narrow dorsal plate and genital plates which do not curve posteriorly.

***Arrenurus (Megaluracarus) santaniensis*, new species**  
(Fig. 17)

**Material examined.** - Site 508, slide : Holotype A318 male, Paratype 1 A319 male + female, Paratype 2 A339 three females.

**Description.** - Male. Colour green-brown. Length of body 885, width across EpIV 508,

height from D1 to venter 410. Dorsal furrow complete; R2, D2 and D3 located on oval dorsal plate, length 345, width 295; D3 on humps. Cauda long and cylindrical, D4 located dorsally at posterior end of cauda with the seta on a hump above the gland; in dorsal view the posterior margin of cauda is straight, at right angles to the body axis; the caudal slot is deep but in young animals can be small; cauda length 365, width 200. Suture line EpII/III is at  $90^{\circ}$  to the body axis; EpIV rectangular, median length EpI 100, EpIII 347, EpIV 122; L3 seta displaced anterior to the gland, V3 gland located posterior to the genital plate with the V3 seta near the posterior end of the cauda. Anus at base of caudal slot. Pedipalp typical, length PI-V 30, 54, 37, 78, 37. Legs exhibiting sexual dimorphism, Length I-IV-Leg-3-6, 86, 114, 114, 114; 100, 125, 136, 129; 89, 136, 143, 146; 150, 260, 118, 139. Swimming setae I-Leg-4-5 1, 1; II-Leg-3-5 2, 3, 4; III-Leg-3-5 4, 5, 6; IV-Leg-3-5 7+8, 10+3, 16+3.

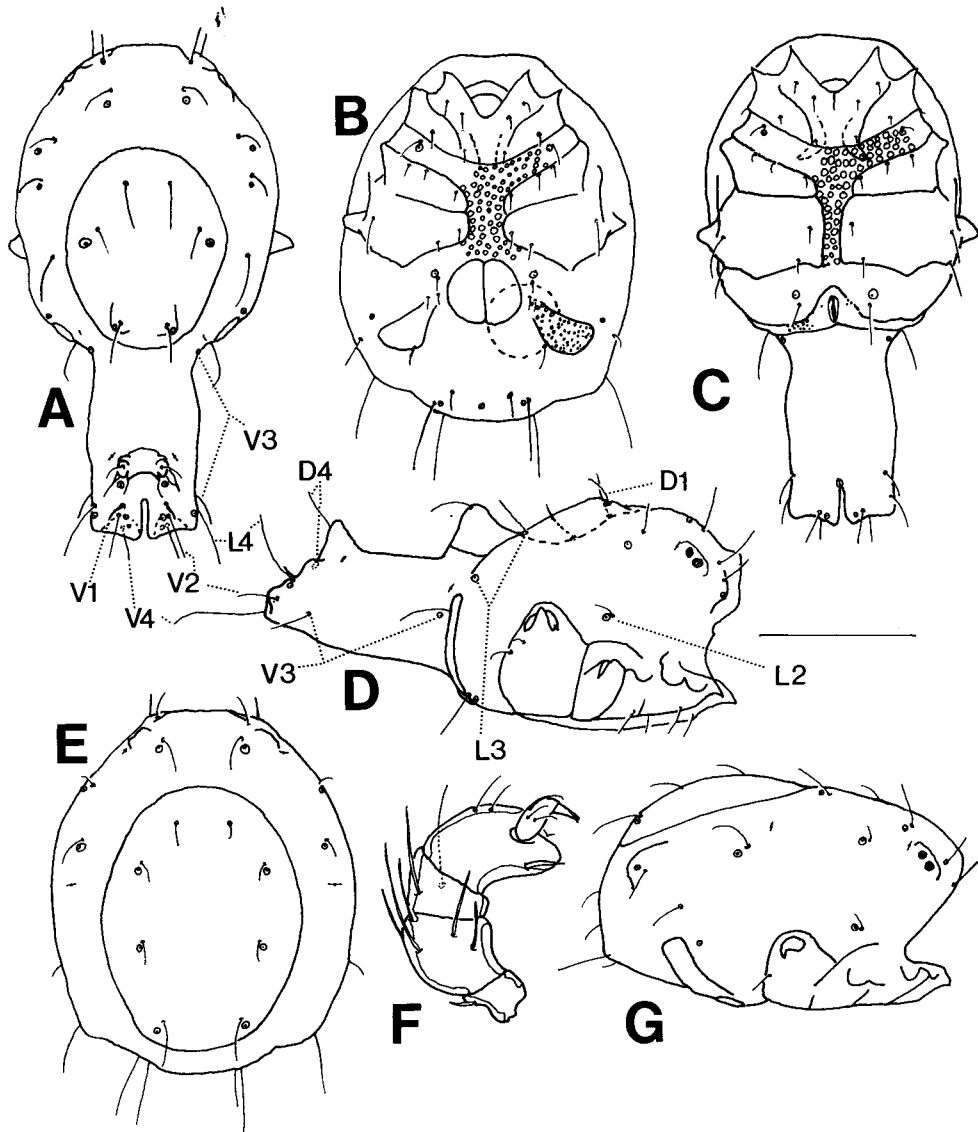


Fig. 17. *Arrenurus (Megaluracarus) santaniensis*, new species. A. dorsum male, B. venter female, C. venter male, D. lateral view male, E. dorsum female, F. pedipalp male, G. lateral view female. Scale line A-E, G = 282, F = 89.

Female. Body oval without conspicuous humps, length 679, width across EpIV 543, height from D1 to venter 415. Dorsal furrow complete; R2 D2-D4 located on oval dorsal plate, length 451, 364. L4 on low humps at the posterior end of the body. Posterior EpIV sloping posteriorly from the median margin, length EpI 87, EpIII 35, EpIV 42. Genital pore width 66, length 59. Genital plates sloping posteriorly and broader at the distal ends. Anus subterminal. L3 gland anterior to, and L3 seta above, the genital plate. Pedipalp similar to male, length PI-V 26, 63, 32, 79, 35. Legs typical, length I-Leg-3-6, 123, 102, 102, 76; II-Leg 3-6 125, 116, 104, 72; III-Leg 3-6 135, 123, 108, 80; IV-Leg 3-6 149, 128, 135, 101. Swimming setae I-Leg-5 ?2; II-Leg-4-5 ?1, ?2; III-Leg-3-5 2, 6, 5; IV-Leg-3-5 5, 6, 6.

**Etymology.** - This species is named after the type locality.

**Remarks.** - This species is similar to *A. dahli* Piersig, 1901 (see Piersig, 1904) from Matupi, (New-Pommern Isles) in the Bismark Archepelego and *A. aliaensis* Wiles, 1993 from N. Sulawesi. In dorsal view, males of *A. santaniensis* have a square shaped end to the cauda and the cauda is not strongly constricted behind the genital field. The cauda of both *A. aliaensis* and *A. dahli* tapers to the caudal slot and the cauda is constricted behind the genital plate, strongly so in *A. aliaensis*. The EpII/III of both *A. aliaensis* and *A. santaniensis* is at 90° to the midline but slopes medially in *A. dahli*. *Arrenurus koenikei* Daday, 1901, from German New Guinea (Papua) also has a long cauda but there is no caudal slot or D3 humps. Female *A. santaniensis* lack the large humps of *A. aliaensis* and *A. dahli*. Female *A. aliaensis* have a large gonopore in comparison with *A. dahli* and *A. santaniensis*. They are smaller in size and the posterior idiosoma is more strongly tapered behind the genital field.

***Arrenurus (Truncaturus) wewakensis*, new species**

(Fig. 18)

**Material examined.** - Site 32, slide : Holotype A105 female.

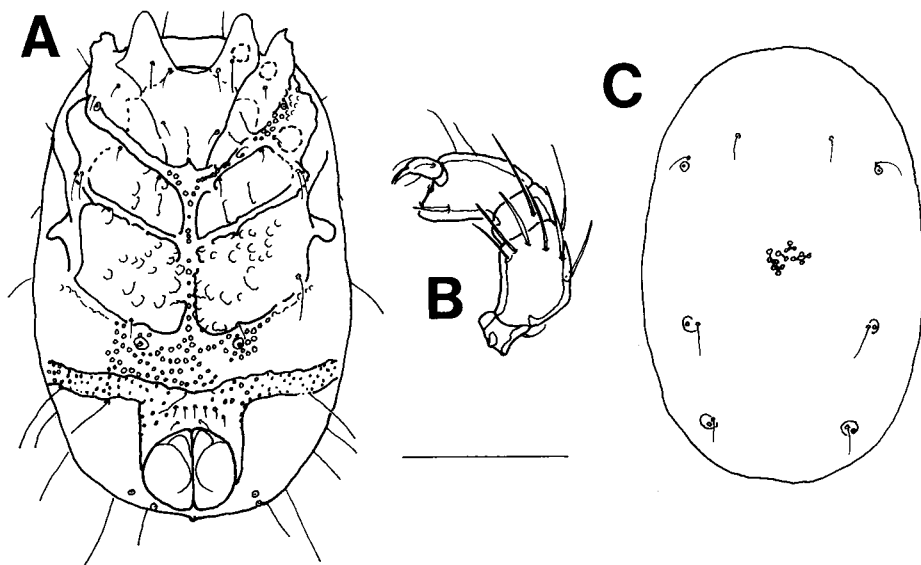


Fig. 18. *Arrenurus wewakensis*, new species. A. dorsum female, B. pedipalp female, C. dorsal plate female. Scale line AC = 204. B = 89.

**Description.** - Female. Colour blue green. Body narrow, length 614, width 109. Idiosoma without humps. Dorsal furrow complete, R1, D2-D4 on oval dorsal plate, length 522, width 344. Epimera with numerous muscle scars, Median length EpI 115, EpIII 63, EpIV 109. Genital pore located posterior to narrow genital plates, length genital pore 100, width 125. Anus at the posterior margin of the idiosoma. Pedipalp typical, length PI-PV 21, 54, 28, 53, 31. Length I-Leg 3-6 : 52, 74, 80, 109; II-Leg 3-6 57, 78, 91, 109; III-Leg 3-6 54, 85, 98, 117; IV-Leg 3-6 76, 108, 113, 128. Legs with swimming setae on IV-Leg 3-5 : 1?, 2, 5.

**Etymology.** - This species is named after the type locality.

**Remarks.** - Similar to *A. (Truncaturus) alpapetirolatus* from India. The New Guinea species has a narrower body, a genital pore which is more posteriorly located and a narrower genital plate.

***Arrenurus (Micruracarus) foiorum*, new species**

(Fig. 19)

**Material examined.** - Site 39, slides : Holotype A197 two males, Paratype 1 A196 male, Paratype 2 A195 female, Paratype 3 A246 female; A336 female, A337 female lateral views.

**Description.** - Male. Colour, blue. Idiosoma long without humps and with a well developed caudal region, length 804, width 543, height 494. Three pairs of setae, R2 D2 & D3, located on small dorsal plate, length 250, width 244. D4 on ridge anterior to cauda. Large, complex petiole dorsally located in cup shaped caudal development. V1 small and located above small posterior slot in cauda. Anus located ventrally. Epimera not extending beyond the body margins, median length EpI 122, EpIII 83, EpIV 56. Genital acetabula in narrow bands extending up the lateral margins. Genital pore 56 long. Pedipalp typical, length PI-V 29, 67, 78, 41. IV-Leg sexually dimorphic, IV-Leg-4 with 5 anterior swimming setae and medium length ventral projection bearing 5-6 flat setae; IV-Leg-5 small with many long serrulate setae located ventrally. Length I-Leg-3-6 94, 111, 108, 140; II-Leg-3-6 101, 136, 146, 174; III-Leg-3-6 87, 115, 122, 122; IV-Leg-3-6 160, 170, 98, 146. Swimming setae on II-IV-Legs-3-5; 2, 2 (4), 2 (5?); 4, 6, 5; 3, 4-5, 7.

Female. Body rounded without pronounced humps, length 890, width 700, height 522. Four pairs of setae, R2, D2-D4, located on large dorsal plate, length 765, width 504. Epimera not projecting beyond the body margins. Median length EpI 146, EpIII 66, EpIV 490. Genital pore small, length 120, width 136; genital acetabula extending posterior to the genital pore and broadening to the lateral body margins. V3 at posterolateral edge of genital plate. Anus located ventrally. Pedipalps same as male, length PI-V 33, 74, 30, 85, 39. Legs typical, length I-Leg-3-6 101, 122, 115, 143; II-Leg-3-6 101, 139, 136, 150; III-Leg-3-6 108, 132, 132, 146; IV-Leg-3-6 139, 163, 143, 136. Swimming setae on II-IV-Legs-3-5, 2,6,4; 2,4,5; 5+2, 7+5, 4.

**Etymology.** - Named after the Foi people, the people of the three villages, who inhabit the region around L. Kutubu.

**Remarks.** - The structure of the male cauda is unique. This species may be distantly related to *A. soochowensis* Marshall and *A. gibberifrons* Piersig. The present taxonomy is based on male characters and females alone may not be identified with certainty.

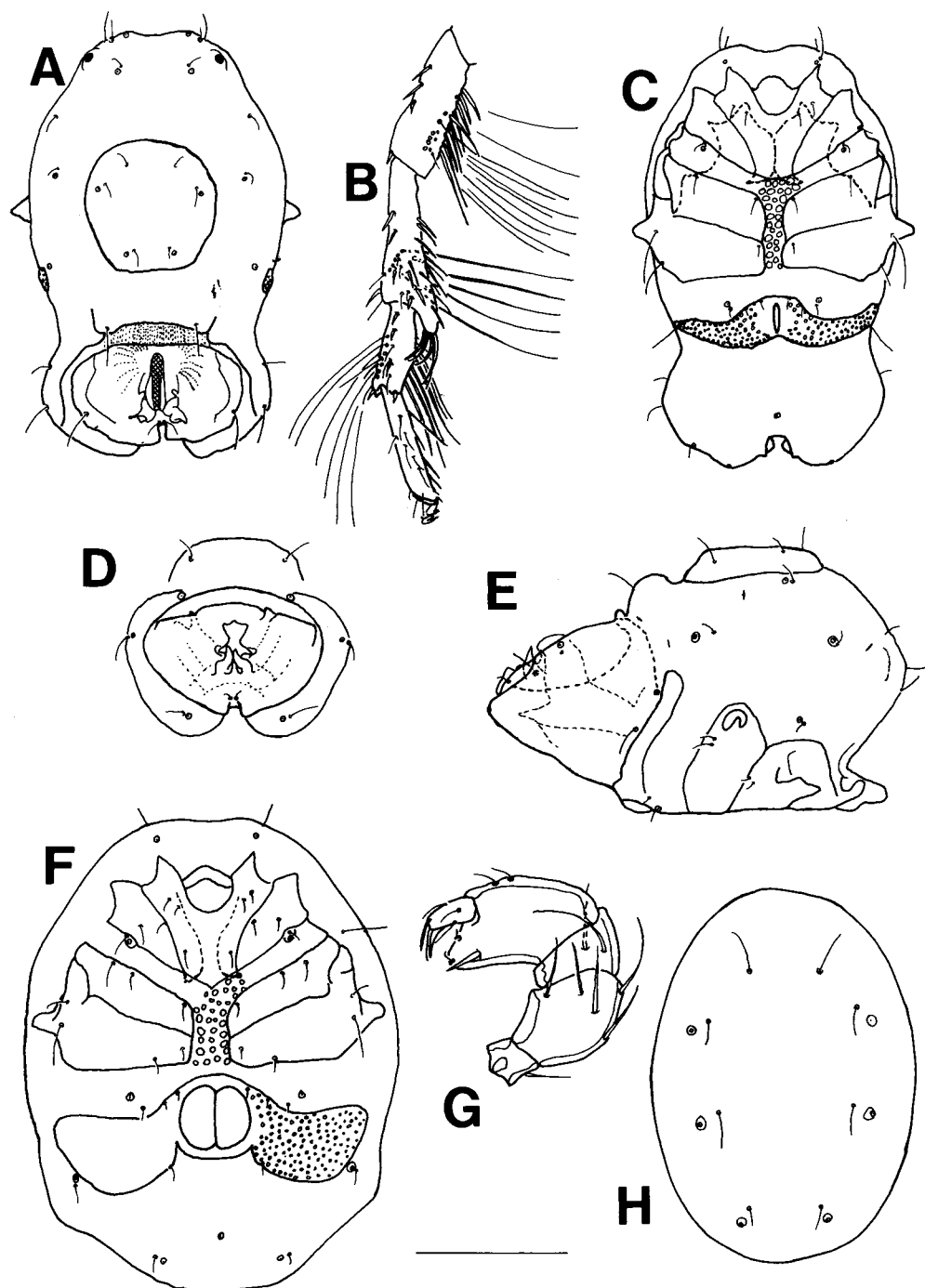


Fig. 19. *Arrenurus foiorum*, new species. A. dorsum male, B. IV-Leg male, C. venter male, D. posterior view of male cauda, E. lateral view male, F. venter female, G. pedipalp male, H. dorsal plate female. Scale line ACDEFH = 282, B = 178, G = 89.

*Arrenurus (Micruracarus) ashei*, new species  
(Fig. 20)

**Material examined.** - Site 39, slides : Holotype A241 three males, Paratype 1 A245 three females, Paratype 2 A244 three males.

**Description.** - Male. Colour, pale brown. Body without humps, length 470, width 358, height 383. Three pairs of setae, R2, D2 & D3, located on medium size, rounded, dorsal plate. D4 on ridge above and anterior to the petiole. Petiole simple, located above ventral slot in a broad pocket which is open dorsally and posteriorly. Epimera projecting to body margins, EpIV extending beyond margins lateral to IV-Leg socket, EpIV tapering to median margin, median length Epl 87, EpIII 52, EpIV 21. Genital pore small, acetabula in narrow bands extending laterally up the sides of the body. Anus immediately anterior to ventral slot on venter. Pedipalp typical, length PI-V, 26, 56, 33, 63, 28. Legs exhibiting sexual dimorphism, IV-Leg-5 with long, narrow ventrodistal extension bearing 7 flat setae and without swimming setae. Length I-Leg-3-6 70, 87, 104, 125; II-Leg-3-6 73, 97, 111, 125; III-Leg-3-6 69, 100, 111, 122; IV-Leg-3-6 101, 122, 83, 111. Swimming setae on I-IV-Leg-3-5, 0,1,1; 0,3,4; 0,4,4; 4-6+3-5, 0+7, 7.

Female. Body round to oval, without humps, length 522, width 417, height 382. Dorsal plate round to oval, similar to male, length 368 (351), width 290 (115). V3 located above the genital plate below L4. Epimera not extending beyond the the body margins. Median length Epl 83, EpIII 49, EpIV 20. Genital pore large, length 118, width 132. Acetabula on broad genital plate extending posterolaterally up the sides of the body. Pedipalp similar to male, length PI-V 26, 54-56, 31-41, 68, 30. Legs typical, length I-leg-3-6 65, 91, 65, 108; II-Leg-3-6 59, 85, 100, 119; III-Leg-3-6 65, 96, 104, 117; IV-Leg-3-6 91, 109, 117, 113. Swimming setae I-IV-Legs-3-5 10,1,1; 1,2,3; 2,4,3; 3+2, 5+4,4.

**Etymology.** - This species is named after Dr P. Ashe (Project Wallace expedition to Sulawesi, 1985).

**Remarks.** - The form of the male cauda is characteristic. Females are difficult to identify with certainty.

**NEW RECORDS FOR NEW GUINEA.**

**FAMILY HYDRACHNIDAE**

***Hydrachna* sp.**

**Material examined.** - Site 37, 1 nymph.

**FAMILY EYLAIDAE**

***Eylais* sp.**

**Material examined.** - Site 45, slide A404

**Remarks.** - Specimen badly damaged.

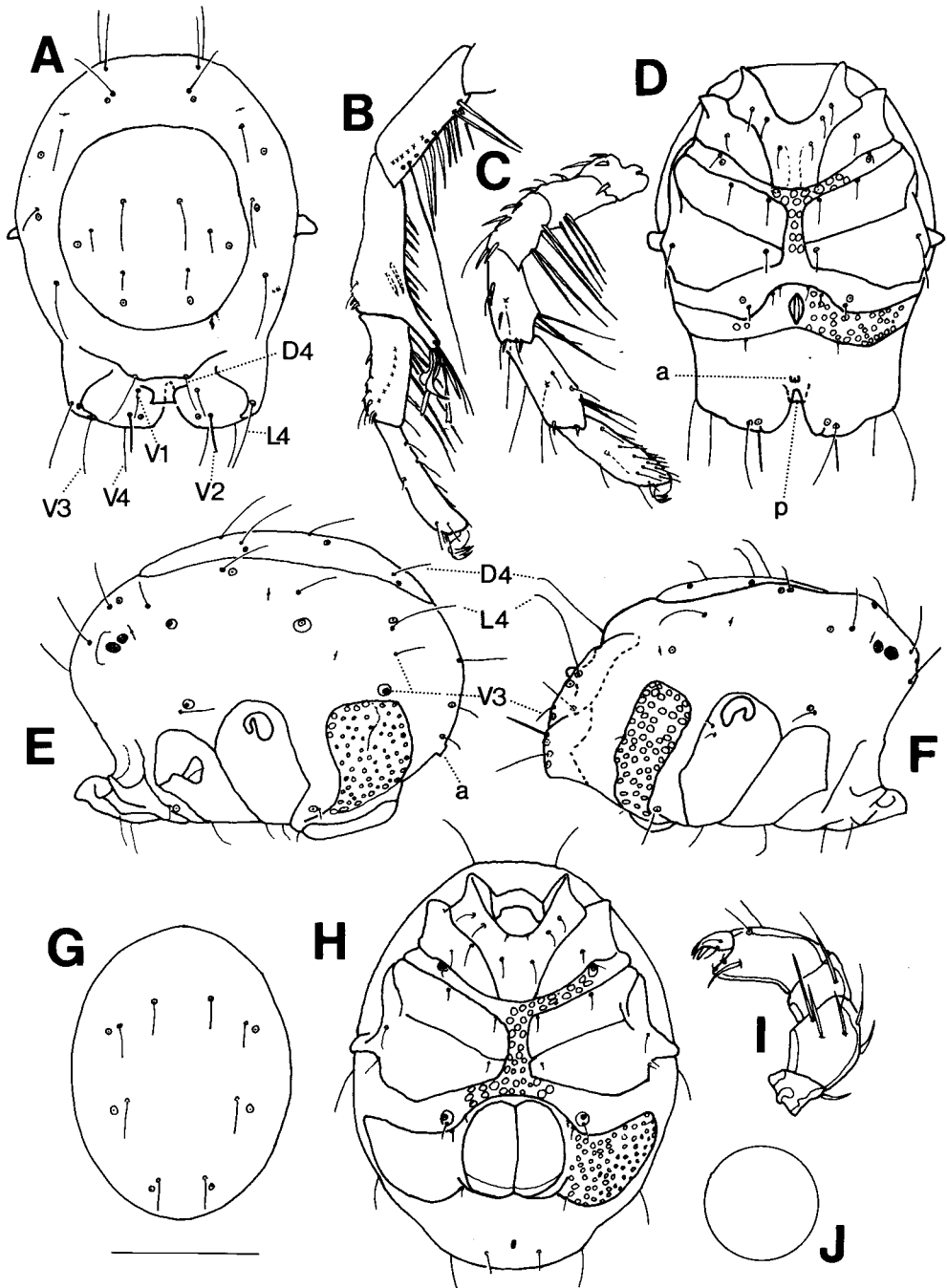


Fig. 20. *Arrenurus ashei*, new species. A. dorsum male, B. IV-Leg male, C. I-Leg male, D. venter male, E. lateral view female, F. lateral view male, G. dorsal plate female, H. venter female, I. pedipalp male, J. egg; - a anus, p petiole above caudal slot. Scale line ADEFGHJ = 184, CD = 117, I = 89.



FAMILY HYDRYPHANTIDAE  
*Diplodontus haliki* Lundblad, 1947

**Material examined.** - Site 19, slide A3&.

**Remarks.** - Reported from Australia (Cook, 1986).

FAMILY HYDRODROMIDAE  
*Hydrodroma* sp.

**Material examined.** - Site 29, slides A88, A304, A306.

**Remarks.** - The taxonomy of *Hydrodroma* is particularly difficult (Cook, 1986). It is unlikely that *H. despiciens* is found in Asia/Australasia.

FAMILY ANISITSIELLIDAE  
*Mamersopsis viridis* Viets, 1935

**Material examined.** - Site 508, slide A317.

**Remarks.** - The type locality is Sumatra. Two other species are known from Africa.

*Sigthoria nilotica* (Nordenskiöld, 1905)

**Material examined.** - Site 37, slide A176 female.

**Remarks.** - Widely distributed species reported from Africa; (Cook, 1966, 1974, 1979; K.O.Viets, 1970, 1981; Rensburg, 1974, 1976); Asia [Sumatra and Java] (Piersig, 1906; Viets, 1935), [Burma] (Lundblad, 1969) and Australia (K.O. Viets, 1981; Harvey, 1990).

FAMILY TORRENTICOLIDAE  
*Monatractides* sp.

**Remarks.** - *Monatractides* are one of the most common elements of the fauna in fast flowing streams in New Guinea. There are at least two species. However, it is not clear how these relate to each other and to the Australian and Oriental species. They will be described at a later date. [note that the *Monatractides* has been elevated to genus by Wiles (1996)].

FAMILY LIMNESIIDAE  
*Limnesia baderi* (Imamura, 1983)

*Stygolimnesia baderi* Imamura, 1983 : PNG  
*Limnesia baderi* (Imamura 1983) Cook, 1986

**Material examined.** - Site 21, slide A17 female. Site 29, slide A127 female. Site 507, slide A313 female.

Wiles: The water mites of New Guinea

**Remarks.** - Endemic.

***Limnesia buruensis* Viets, 1923**

*Limnesia longipora* Wiles 1990b [new synonymy]

**Material examined.** - Site 37, slide A181&. SULAWESI, 26 Oct.1985, Lake Alia, nr. Kotomabagu, Indonesia; slides S249 male, S251 female, S250 male, S329 female. CHINA, slides of D.C.Jin 60-1 female, 119-1 male.

**Remarks.** - The type population from Buru, Indonesia is very similar to the population from a crater lake on the nearby island of N. Sulawesi. The specimen from New Guinea is slightly smaller than the holotype. *Limnesia buruensis* is similar to undescribed specimens collected by D. C. Jin in China. These Chinese specimens have smaller acetabula and longer setae on IV-Leg-6 of males.

***Limnesia lembangensis* Piersig, 1906**

**Material examined.** - Site 39, slide A254 male. Site 38, slides A193 male, A215 male, A217 female, A218 male.

**Remarks.** - Reported widely from Asia; India, Sri Lanka, Thailand, Malaysia, Sulawesi, New Caledonia and Australia (Imamura, 1964; Cook, 1967, 1986; Wiles, 1990b; Gledhill & Wiles, 1997).

FAMILY HYGROBATIDAE

***Hygrobates australicus* Cook, 1986**

**Material examined.** - Site 29, slides A168 male; site 40, slide A201 male.

**Remarks.** - Only the female has been reported. The male from New Guinea is very similar to the female described by Cook (1986) from Australia except for small differences in the shape of the genital plate.

***Hygrobates hamatus* Viets, 1935**

For synonymy see K.O.Viets, 1987.

**Material examined.** - Site 38, slides A189 male, A211 female, A212 female, A213 male. Site 29, slides A157 male, A165 male.

**Remarks.** - This is a common Asian species recorded from India to Indonesia and Australia.

***Dropursa babinda* Cook, 1986**

**Material examined.** - Site 27, slides A76 male, A77.

**Remarks.** - Previously recorded from Australia.

***Coaustraliobates minor* (Lundblad), 1947**

**Material examined.** - Sites 38, slide A214 male, A186 male, A187 male, A190 male, A216 female, A272 female. Site 39, slides A210 male + female.

***Coaustraliobates longipalpis* (Lundblad), 1947**

**Material examined.** - Site 22, slide A27 female. Site 28, slides A206 nymph, A207 nymph

***Caenobates acheronius* K.O.Viets, 1978**

For synonymy see K.O.Viets, 1987.

**Material examined.** - Site 23, slides A37 male, A38 female, A39 male.

**Remarks.** - New Guinea specimens are probably a race of the Australian *C. acheronius* K.O.Viets. The acetabula are larger in New Guinea males than in Australian specimens and the genital pore of the female is more pointed anteriorly. V4 and L4 are close together lateral to the genital plate (a feature not shown on descriptions by K.O.Viets, 1978, and Cook, 1986).

FAMILY UNIONICOLIDAE

***Encentridophorus sarasini* Walter, 1915**

**Material examined.** - Site 37, slide A177 male.

**Remarks.** - Previously recorded from India, New Caledonia and Australia (Lundblad 1947; Cook, 1967; Cook, 1986).

***Unionicola (Edwardsatax) crassipalpis* Walter, 1915**

**Material examined.** - Site 39, slide A252 female.

**Remarks.** - Widespread species reported from New Caledonia, Australia and Sulawesi (Wiles, 1990b; Cook, 1986).

***Unionicola (Smithatax) minutissima* Lundblad, 1947**

**Material examined.** - Site 32, slides A102 female, A208 female. Site 39, slides A19 female, A262 female.

**Remarks.** - Reported from Tasmania and Queensland, Australia (Cook, 1986). Specimens from L.Kutubu have a more slender pedipalp. They are tentatively assigned to *U. minutissima*.

***Unionicola (Giselatax) aberrans* K.O.Viets, 1984**

**Material examined.** - Site 39, slides A253 female, A209 female, A194 male.

**Remarks.** - Reported from Australia (Cook, 1986).

***Neumania (Neumania) nodosa* (Daday, 1898)**

**Material examined.** - Site 45, slides A264 female, A265 female, A271 male.

**Remarks.** - Widely distributed in Asia and reported from Australia.

***Neumania (Lemienia) falcipes* Koenike, 1906**

**Material examined.** - Site 45, slides A266 female, A270 male.

**Remarks.** - Five subspecies are described for this species. Specimens from New Guinea are similar to both *N. (L.) falcipes directa* Viets, 1935, (genital field and pedipalp) from Java and *N. (L.) falcipes concava* Viets, 1935, (IV-Leg) from Sumatra and Java. The New Guinea specimen has a few more acetabula than the other subspecies, 19-20 acetabula on each genital plate.

***Koenikea (Notomideopsis) timmsi* K.O. Viets, 1977**

**Material examined.** - Site 508, slide A334 male + female .

**Remarks.** - This species is very common in Lake Santani. It is similar to both the holotype female and the male described by Cook, 1986, from Queensland, Australia. Males differ from the Australian examples only in that the size of L3 is of equal size to D3 in New Guinea specimens.

**FAMILY PIONIDAE**

***Piona puripalpis* K.O. Viets, 1984**

**Material examined.** - Site 39, slides A192 male, A250 male.

**Remarks.** - Reported from Australia.

FAMILY ATURIDAE

*Axonopsis (Navinaxonopsis) christopheri* Wiles, 1989

**Material examined.** - Site 35, slides A144 male, A147 male, A148 male, A238 male. Site 29 A232 female. Site 28, slide A126 female.

**Remarks.** - Previously reported from Sulawesi (Indonesia), this was the only species of *Axonopsis* found in New Guinea and none have been reported from Australia. The genus is well represented on other continents. The New Guinea populations are approximately 25% smaller than those from N. Sulawesi but are otherwise indistinguishable. The holotype material was wrongly placed in the subgenus *Kalobrachypoda* by Wiles, 1989.

FAMILY MOMONIIDAE

*Momoniella parva* Cook, 1986

**Material examined.** - Site 20, slide A13 male.

**Remarks.** - Previously recorded from Australia.

FAMILY ARRENURIDAE

*Wuria sumatrensis* (Viets, 1935)

**Material examined.** - Site 37, slides A175 male, A185 two females, A174 female.

**Remarks.** - The females collected from the Sepik river cannot be separated from the holotype female collected by Viets (1935) from a lake in Sumatra. Given that several species in the collection from the Sepik river are common in Asia it seems likely that specimens collected are *W. sumatrensis*. A more certain designation requires males from Sumatra.

The male from New Guinea has the characters of the genus *Wuria* Viets, 1916 and confirms Cooks' (1974) suggestion that *Wuria* and *Wuriella* Viets are congeneric. The absence of a median margin to EpII in males, the more slender PV and the location of setae at the distal margin of PII in females separates *W. sumatrensis* from *W. falciseta* Viets from Africa.

*Wuria boutit* Harvey, 1989, has been reported from the Northern Territories of Australia. It has narrower genital plates than *W. sumatrensis* from New Guinea and Sumatra.

*Arrenurus (Megaluracarus) rostratus* Daday, 1898

(for synonymy see Cook, 1967; K.O.Viets, 1987)

**Material examined.** - Site 37, (4 males 1 female), slide A182 two males + one female. 9 Jul.1988, L. Kutubu, W.Highlands; slide A263 male + female.

**Remarks.** - This species has been widely reported in Asia; India, Sri Lanka, Burma, China, Singapore, Sumatra and Java. It was recorded in Queensland, Australia by K. O. Viets (1975, p93).

## ECOLOGY

The water mites of New Guinea show the classical decline in species diversity with altitude in both lakes and rivers. In the highland acid and alkaline streams between Lake Habbema (3400 m) and Wamena (2400 m), one to four species were found per collection and a total of ten species. Only one species, *Oxus rosalindae*, was found in Lake Habbema. At medium altitudes between Mount Hagen and Lake Kutubu and around Wau, two to ten species per stream collection and a total of forty species were collected. Near the coasts below 1000m three to fourteen species per stream collection and a total of fifty three species were found. Temperatures around Lake Habbema could drop to 3°C at night, water temperatures were generally 8-16°C. On the coast temperatures never dropped below 18°C and were commonly 19-21°C. A list of species found at different altitudes is given in Table 1.

A low species diversity at high altitude was also reported for the alpine vegetation (Smith, 1982) and Coleoptera (Gressitt, 1982) which was thought to reflect the relative youth and isolation of the central mountain ranges which are still rising. In contrast to the beetle fauna which mostly came from the west and north west (Indonesia/Asia) over the past 3.5 million years, the water mite fauna colonised from the south (Australia) [see below].

## BIOGEOGRAPHY

The most widespread riverine genera were *Australiobates* which occurred in 78% (29/37) of collections, *Monatractides* found in 71% of collections and *Corticacarus* in 46% of collections. All three genera were common at all altitudes but *Corticacarus* was more frequent at mid and high altitudes. *Albia* occurred in 35% of collections and is clearly a low altitude genus, 92% of the collections containing the genus were from lowland locations and 70% of lowland collections contained *Albia* species.

The dominant genera by number of species were the typically Australasian genera: *Albia* (*Albiella*) (10 spp.), *Australiobates* (9 spp.) and *Corticacarus* (9 spp.). Of the 29 genera collected, all have been reported from Australia. Eight Australian genera reported from New Guinea are not reported from Asia whereas one typically Asian genus found on New Guinea is not reported from Australia (*Axonopsis*). The common Asian genera which are conspicuously absent from New Guinea are *Atractides*, *Torrenticola*, and *Neoatractides* which are widespread West of Sulawesi and Java. Clearly New Guinea has a typically Australian derived water mite fauna.

However, only twenty one percent (16/75) of species are common to both Australia and New Guinea and the majority of species are endemic (approximately 69%). Fifteen percent are shared only with Australia, nine percent only with Asia and six percent with both Australia and Asia. The high proportion of endemic species is principally due to species radiation in four genera: *Australiobates*, *Albia*, *Corticacarus* and *Arrenurus*. The total number of species reported for New Guinea (75) is low when compared to the 301 Australian species (Wiles, 1990b) but the collections from both islands are far from complete.

The area between New Guinea and Australia across the Torres Straits was at times a land bridge connecting the North eastern part of Australia with New Guinea. Most of the New Guinean water mites found in Australia have only been reported from Queensland. These include: *Hygrobates australicus*, *H. hamatus*, *Koenikea timmsi*, *Dropursa babinda*,

Table 1. The distribution of water mites collected from New Guinea. L=low altitude (0-1000m), M = mid altitude (1000m-2000m), H=high altitude (2500m-3600m); R= river, La=lake

SPECIES	ALTITUDE	HABITAT	FREQUENCY OF OCCURRENCE (TOTAL NUMBER OF SITES = 42)
<i>Corticacarus mcgrathae</i>	H	R	3
<i>Oxus rosalingae</i>	H	RLa	2
<i>Australiobates reticulata</i>	HM	R	4
<i>Corticacarus aureatus</i>	HM	R	3
<i>Dropura babinda</i>	HM	R	8
<i>Australiobates plumosa</i>	HM	R	8
<i>Corticacarus irelandi</i>	HML	R	27
<i>Australiobates archboldi</i>	HML	R	5
<i>Monatractides</i> sp.	HML	R	8
<i>Corticacarus yunae</i>	HML	R	6
<i>Unionicola (Giselatax) aberrans</i>	M	La	1
<i>Arrenurus (Micruracarus) ashei</i>	M	La	1
<i>Arrenurus (Micruracarus) foiorum</i>	M	La	1
<i>Corticacarus kingi</i>	M	R	1
<i>Axonopsella ovalis</i>	M	R	1
<i>Australiobates retuloides</i>	M	R	1
<i>Corticacarus multiscutatus</i>	M	R	1
<i>Limnesia suraensis</i>	M	R	1
<i>Limnesia shephardi</i>	M	R	1
<i>Coenobates acheronius</i>	M	R	2
<i>Corticacarus mendi</i>	M	R	2
<i>Diplodontus haliki</i>	M	R	3
<i>Coaustralibates minor</i>	ML	La	2
<i>Hydrodroma</i> sp.	ML	R	8
<i>Axonopsella novaguinensis</i>	ML	R	16
<i>Limnesia baderi</i>	ML	R	2
<i>Australiobates concavipalpis</i>	ML	R	2
<i>Coaustralibates longipalpis</i>	ML	R	2
<i>Albia (Albiella) wauensis</i>	ML	R	2
<i>Gretacarus novaguinensis</i>	ML	R	2
<i>Gretacarus ravenicroftae</i>	ML	R	2
<i>Australiobates bruijni</i>	ML	R	3
<i>Albia (Spinalbia) spinipes</i>	ML	RLa	2
<i>Piona puripalpis</i>	ML	RLa	3
<i>Koenikea (Notomideopsis) magnunguilata</i>	ML	RLa	4
<i>Australiobates longiseta</i>	ML	RLa	3
<i>Sigthoria nilotica</i>	ML	RLa	5
<i>Limnesia lebangensis</i>	ML	RLa	2
<i>Unionicola (Pentatax) crassipalpis</i>	ML	RLa	5
<i>Recifella pinguipalpifera</i>	ML	RLa	3
<i>Hygrobates hamatus</i>	ML	RLa	2
<i>Arrenurus (Megaluracarus) rostratus</i>	ML	RLa	2
<i>Mamersopsis viridis</i>	L	La	1
<i>Eylais</i> sp.	L	La	1
<i>Arrenurus (Megaluracarus) bunuensis</i>	L	La	1
<i>Neumania (Neumania) nodosa</i>	L	La	1
<i>Neumania (Lemienia) falcipes</i>	L	La	1
<i>Arrenurus (Megaluracarus) santaniensis</i>	L	La	1
<i>Koenikea (Notomideopsis) timmsi</i>	L	La	1
<i>Neumania (Ecpolopsis) multiscutata sepikensis</i>	L	R	1
<i>Corticacarus pinguipalpis</i>	L	R	1
<i>Albia (Albiella) wewakensis</i>	L	R	1
<i>Axonopsis (Navinaxonopsis) christopherei</i>	L	R	1
<i>Albia (Albiella) alexae</i>	L	R	1

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SPECIES	ALTITUDE	HABITAT	FREQUENCY OF OCCURRENCE (TOTAL NUMBER OF SITES = 42)
<i>Australiobates convexipalpis</i>	L	R	1
<i>Australiobates variataensis</i>	L	R	1
<i>Momoniella parva</i>	L	R	2
<i>Corticacarus richardsi</i>	L	R	2
<i>Albia (Albiella) vanimoensis</i>	L	R	1
<i>Encentridophorus sarasini</i>	L	R	1
<i>Koenikea (Notomideopsis) daundoensis</i>	L	R	4
<i>Albia (Albiella) longipalpis</i>	L	R	6
<i>Recifella curvata</i>	L	R	3
<i>Hydrachna</i> sp.	L	R	3
<i>Frontipoda michellae</i>	L	R	3
<i>Limnesia buruensis</i>	L	R	1
<i>Recifella burtoni</i>	L	R	1
<i>Arrenurus (Truncaturus) wewakensis</i>	L	R	1
<i>Albia (Albiella) suvanopsis</i>	L	R	1
<i>Wuria sumatrensis</i>	L	R	1
<i>Albia (Albiella) oenakensis</i>	L	R	1
<i>Hygrobatas australicus</i>	L	R	1
<i>Albia (Albiella) julieae</i>	L	R	1
<i>Unionicola (Pentatax) minutissima</i>	L	R	1
<i>Arrenurus (Arrenurus) bakeri</i>	L	R	1

*Encentridophorus sarasini*, *Unionicola crassipalpis*, *U. minutissima* and *U. abberans*. *Coaustraliobates minor* was found in Queensland and southern Australia. Only *Coaustraliobates longipalpis* and *Caenobates acheronius* which are common in Tasmania, Victoria and New South Wales have not been reported from Queensland but are present on New Guinea. It would appear that the connection between Queensland and New Guinea was an important route of colonisation for the water mites.

The fauna of aquatic insects which inhabit N. E. Australia is an impoverished derivation of the south eastern one (Bănărescu, 1995). The collections of Cook (1986) indicate that this may also be true of water mites where more species were reported from Tasmania than from Queensland. Therefore, the pool of colonising species from northern Australia might be restricted. Cold adapted species from southern Australia, which might have found suitable habitats in New Guinea, were restricted to southern continental areas and Tasmania. It is probable that the Queensland species above will have a wider distribution in Australia as most are lake dwelling species and still waters of Australia have not been extensively surveyed for water mites.

To the north, the distribution of plants and animals across the islands of Indonesia has been the topic of much interest since the times of Alfred Russell Wallace. Different taxa have spread from island to island at different rates and the faunal and floral assemblages reflect this. A number of lines of discontinuity between the Asian and Australasian fauna have been proposed. Wallaces' line runs between Borneo and Sulawesi and between Bali and Lombok. Lydekker's line (Lydekker, 1896) passes west of the islands of Waigeu, Misool and Aru, and to the east of the Moluccan islands of Helmehera and Seram. It becomes indistinct in the area of the Kei islands which are difficult to classify as either Papuan or Wallacean (McAlpine 1982). Webers line lies between Sulawesi and the Moluccas. Bănărescu (1995), considers Lydekker's line to be the major line of faunal discontinuity for both terrestrial and freshwater animals. To the north east there is a less distinct line since the inland water fauna of the Bismark Islands, Solomon Islands and New Caledonia include



representatives of predominantly Australian lineages. The present state of knowledge of water mite distributions indicate that this is true for the water mite fauna. However, recent collections by the author, from Seram and Buru, indicate that Webers line may be a more appropriate line of discontinuity for the water mites.

# APPENDIX

**A list of collection sites.**- (PNG = Papua New Guinea, IJ = Irian Jaya. Numbers in bold are collection site numbers quoted in species descriptions).

**18** PNG, 8 July 1988, R. Sura, Pomaga, S. Highlands; **19** PNG, 6 July 1988, R. Mendi, Mendi, S. Highlands; **20** PNG, 23 June 1988, R. Varirata, Port Moresby, Central; **21** PNG, 4 July 1988 R. Cum, Mt. Hagen, W. Highlands; **22** PNG, 7 July 1988, R. Sura, Ba-amo, Pomaga, S. Highlands; **23** PNG, 2 July 1988, Golf club stream, Mt. Hagen, W. Highlands; **24** PNG, 26 June 1988, Tana Creek, Trib. Of R. Bulolo Wau, Morobe; **25** PNG, 28 June 1988, Small stream above mines, Hidden Valley, Wau, Morobe; **26** PNG, 28 June 1988, Small stream above mines, Hidden Valley, Wau, Morobe; **27** PNG, 6 July 1988, tributary of R. Mendi, Mendi, S. Highlands; **28** PNG, 18 July 1988, waterfall stream, Ossima Rd., Vaimo, W. Sepik; **29** PNG, 26 July 1988, R. Hohoman, Maprik Rd., Wewak, E. Sepik; **30** PNG, 27 July 1988, R. Kambagora, Angorum Rd., Wewak, E. Sepik; **31** PNG, 19 July 1988, R. Daundo, Vaimo, W. Sepik; **32** PNG, 25 July 1988, stony stream, Angorum Rd., Wewak, E. Sepik; **33** PNG, 18 July 1988, Usipi Creek, (400 m), Wasau Hills, (141° 16' x 2°45') Vaimo, W. Sepik; **34** PNG, 20 July 1988, Mushu Beach, Vaimo, W. Sepik; **35** PNG, 2 July 1988, small stream, nr refugee camp, Vaimo, W. Sepik; **36** PNG, 26 June 1988, Iwalewi Creek, tributary of R. Bulolo, Wau, Morobe; **37** PNG, 25 July 1988, R. Sepik, near Angorum, E. Sepik; **38** PNG, 9 July 1988, L. Kutubu, S. Highlands; **39** PNG, 10 July 1988, L. Kutubu near R. Sorrel, S. Highlands; **40** PNG, July 1989, small stream, Popendetta, Northern District (Coll. Gayle Yun.); **41** PNG, July 1989, small stream, Popendetta, Northern District (Coll. Gayle Yun.); **42** PNG, July 1989, small stream, Popendetta, Northern District (Coll. Gayle Yun.); **43** PNG, July 1989, small stream, Popendetta, Northern District (Coll. Gayle Yun.); **44** PNG, July 1989, Double Cross, Popendetta, Northern district (Coll. Gayle Yun.); **45** PNG, 21. vi. 1988, L. Bunu, Jaraguma Hill, Port Moresby, Central; **500** IJ, 17 October 1992, Small stream between L. Habbema and R. Uwe, (8-12°C); **502** IJ, 24 October 1992, R. Uwe, Trib. of R. Wamena; **503** IJ, 16 October 1992, small stream, (3390 m) near L. Habbema, Wamena; **504** IJ, 19 October 1992, L. Habbema outflow stream; **505** IJ, 7 October 1992, R. Holima, Wamena; **506** IJ, 12 October 1992, Small stream, Pabylilo, Wamena; **507** IJ, 5 October 1992, R. Ewe, inflow to L. Santani, Jayapura; **508** IJ, 5 October 1992, L. Santani, Jayapura; **509** IJ, 21 October 1992, R. Wekikama, Wamena; **510** IJ, 25 October 1992, R. Tailarek, Iballi Valley, Wamena; **511** IJ, 7 October 1992, R. Ibele (= R. Benimi) Wamena; **512** IJ, 24 October 1992, Small stream, Trib. of R. Wamena (2400 m), Wamena; **513** IJ, 18 October 1992, L. Habbema, Wamena; **514** IJ, 16 October 1992, small stream near L. Habbema, Wamena.

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