

NEW SPECIES OF WATER MITES FROM NEW ZEALAND, WITH REMARKS ON THE WATER MITES FROM PONDS AND LAKES (ACARI, HYDRACHNELLAE)

BY Harry SMIT *

WATER MITES
NEW SPECIES
NEW ZEALAND

ABSTRACT : Five new species are described from the Southern Island, New Zealand, i.e. *Zelandothyas hyporheica*, *Notopanisus shewell*, *Australiobates lacustris*, *Arrenurus longipetiolatus* and *A. schuckardi*. *Eylais waikawae* Stout is considered a junior synonym of *E. schauinslandi* Koenike. *Limnochares australica* is recorded for the first time for New Zealand. Finally, some remarks are made on the water mites from lentic habitats.

ACARIENS D'EAU DOUCE
ESPÈCES NOUVELLES
NOUVELLE-ZÉLANDE

Résumé : Cinq espèces nouvelles sont décrites de l'Île Sud de la Nouvelle-Zélande, à savoir *Zelandothyas hyporheica*, *Notopanisus shewell*, *Australiobates lacustris*, *Arrenurus longipetiolatus* et *A. schuckardi*. *Eylais waikawae* Stout est considéré comme un synonyme junior d'*Eylais schauinslandi* Koenike. *Limnochares australica* est trouvé pour la première fois en Nouvelle-Zélande. Finalement, quelques remarques sont faites sur les acariens d'eau douce et stagnante.

Very few water mites have been reported from the lentic waters of New Zealand. KOENIKE (1900), described one species from a pond on D'Urville Island, Marlborough Sounds, WALTER (1929), reported one species from a pond in the vicinity of Christchurch and STOUT (1953a,b) studied a small number of ponds in the area around Wellington. CROWELL (1990) reported two sponge-associated water mite species from lakes. COOK's (1983) extensive studies of New Zealand water mites were all but one confined to flowing water situations.

For these reasons I concentrated on collecting water mites in ponds and lakes. Of 38 localities examined for water mites, twenty-six were lentic waters. All were located on the South Island, and the collecting was carried out in the austral summer of 1991/1992. The localities and the water mites are listed in the appendix. Five new species are described, and some taxonomic remarks are made on a number of other species

Holotypes are deposited in the Museum of New Zealand, Wellington, paratypes and all other material in the Zoological Museum of the University of Amsterdam. All measurements are given in micrometres (µm).

Zelandothyas hyporheica n. sp.

(Figs. 1-4)

Holotype : Male from interstitial of Taiperie Bay Creek, Marlborough Sounds, 27-xii-1991 (leg. H. SMIT).

Paratypes : 1 male and 1 female from same location as holotype.

Male : Body soft, integument papillate, colourless. Body 1152 (paratype 1128) in length, 744 (912) in width. Lateral eyes pigmented, lying on a narrow sclerite. Glandularia of holotype large, those of paratypes much smaller. Dorsum with a

* Emmastraat 43-a, 1814 DM Alkmaar, The Netherlands.

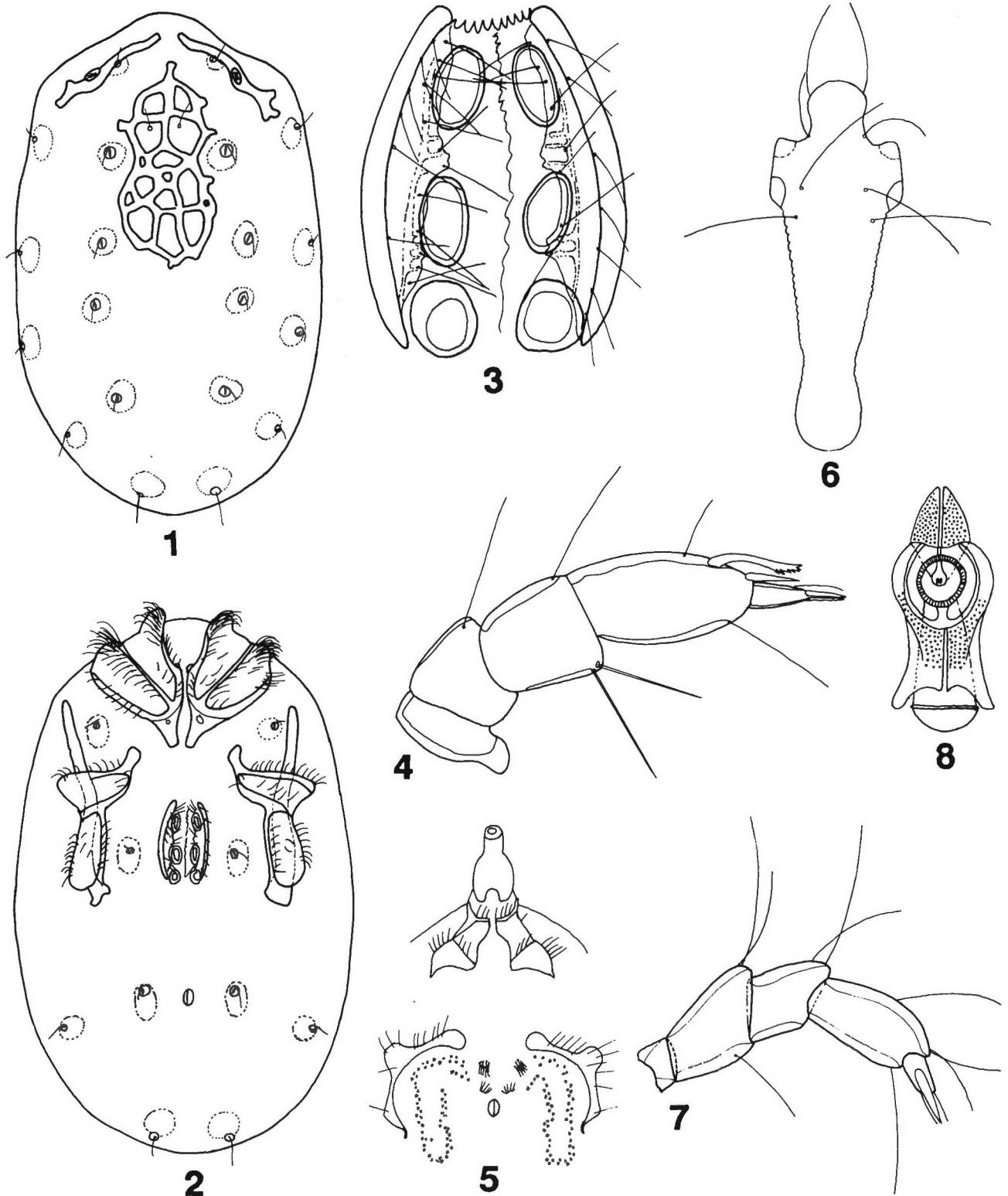


FIG. 1-4 : *Zelandothyas hyporheica* n. sp., male.

1. — Dorsal view. 2. — Ventral view. 3. — Genital field. 4. — Palp.

FIG. 5-7 : *Limnocharaes australica* Lundblad, male.

5. — Ventral view. 6. — Ocular plate. 7. — Palp.

FIG. 8 : *Eylais schauinslandi* Koenike, male, pharynx.

reticulate sclerite, 446 in length, 320 in width. Postocularia surrounded by this sclerite. Coxae with extensive apodemes, especially anterior of third coxae. Coxae with numerous setae, especially at anterior tips of first and second coxae. Genital field with two well-developed genital flaps with irregular medial margins, 184 in length; genital flaps with long setae. Three pairs of acetabula, which are shortly stalked. Excretory pore is a slit in a non-papillate part of the integument. Capitulum attached to a tube of soft integument forming protrusible mouthparts. Dorsal lengths of palp segments : PI 7, PII 30, PIII 26, PIV 53, PV 23. PIV stocky, with two dorsal thickened setae, the most anterior of these with a serrated tip. Dorsal lengths of distal segments of first leg : I-leg-4 132, I-leg-5 144, I-leg-6 144. Dorsal lengths of distal segments of fourth leg : IV-leg-4 180, IV-leg-5 197, IV-leg-6 142. Legs with numerous setae (not swimming setae), claws with serrations.

Female : Like the male, therefore only some measurements of the female are given. The dorsal sclerite of the collected female is not yet complete. Dorsal lengths of palp segments : PI 11, PII 31, PIII 29, PIV 60, PV 24.

Etymology. The species is named after its occurrence in the interstitial.

Discussion : The hyporheic *Zelandothyas hyporheica* is close to *Z. diamphida* Cook. It differs most noticeably in the form of the palp, which is much stockier. *Z. hyporheica* is colourless, while *Z. diamphida*, which occurs in the same area, is orange. *Z. hyporheica* is smaller, with a more slender body. The form of the dorsal sclerite of *Z. hyporheica* is variable, none of the three sclerites is alike. The form of the coxae with associated apodemes and the genital field is similar to *Z. diamphida*. Only the setae of the genital flaps of *Z. hyporheica* are longer.

Limnochares (Cyclothrix) australica
Lundblad, 1941
(Figs. 5-7)

The first record of this genus for New Zealand. The species found is similar to *L. australica* described from Australia. This species has a considerable

morphological variation (LUNDBLAD, 1947; HARVEY, 1990). *L. crinita* Koenike, reported by COOK (1967) from India, falls within the variation of *L. australica*. The main reason for separating the two species has been a disjunct distribution, as the genus has not been found in Indonesia. All species of water mites described so far from New Zealand are endemic, so it is likely that *Limnochares australica* is a different species. However, morphological characters are insufficient to separate the Australian and New Zealand specimens. HARVEY (1990) suggested that the larvae might provide more useful characters to distinguish the different populations, but as they are not known yet, I provisionally assigned the New Zealand specimens to *L. australica*.

Male (from Pond Whariki Beach, south of Farewell Spit) : Body 2568 in length. Ocular plate 427 in length and 160 in width; four pairs of setae on ocular plate. Acetabula (approximate 90) on short stalks, arranged in a loop. Four patches of setae surrounding the gonopore, the posterior pair with 8 setae, the anterior with approximate 15 setae. Capitulum 446 in length. Dorsal lengths of palp segments : PI 19, PII 62, PIII 48, PIV 70, PV 41. Dorsal lengths of distal three segments of first leg : I-leg-4 132, I-leg-5 165, I-leg-6 149. Dorsal lengths of distal three segments of fourth leg : IV-leg-4 339 m, IV-leg-5 349, IV-leg-6 320. Third and fourth legs with numerous swimming setae.

Female : Similar to male, only with two groups of setae surrounding the gonopore, with 10 setae each.

Material examined : 1 male, Pond Whariki Beach, south of Farewell Spit, 5-i-1992 (leg. H. SMT); 1 male, Lake Mistletoe near Te Anau Downs, 21-i-1992 (leg. H. SMT); 3 males, 1 female, Pond along road to Honeycomb Cave, 1 km. from main road, north of Karamea, 16-i-1992 (leg. H. SMT).

Eylais schauinslandi Koenike, 1900
(Fig. 8)

Eylais waikawae Stout, 1953 **new syn.**

KOENIKE (1900) described *E. schauinslandi*, collected on D'Urville Island, Marlborough Sounds;

his description and illustrations are inadequate. STOUT (1953a) described the closely related *E. waikawae* from the vicinity of Wellington.

In my collection a fairly large number of *Eylais* specimens is present. The pharynx and the palp show a remarkable sexual dimorphism. The palp of the female is more slender compared to the male, especially PIV. The pharynx of the female is broader than that of the male, which is always very slender (see fig. 8). In my opinion they all belong to one species. Neither KOENIKE (1900) nor STOUT (1953a) mention these differences between the male and the female. Unfortunately the type material of *E. waikawae* could not be found. My females agree with STOUT's description, except that two, rather than three, setae are on the most posterior smaller sclerites of the genital area. The description of *E. schauinslandi* by KOENIKE (1900) is mainly based on the male. The males I found agree with KOENIKE's description. STOUT's illustration of the male genital area of *E. waikawae* shows a more rounded and less higher funnel-shaped genital plate. However, both forms can be found at the same location, the one described by KOENIKE being the most common. Most of the differences given by STOUT (1953a) between the two species are considered of minor importance nowadays, e.g. the form of the eye-bridge (including accompanying setae) and the number of setae on the palp. I consider both species conspecific, with *E. schauinslandi* having priority.

Notopanisus shewell n. sp.

(Figs. 9-13)

Holotype : Female from small stream east of Te Towaka, on Mount Shewell, Marlborough Sounds, South Island, 24-xii-1991 (leg. H. SMIT).

Paratype : Male from same location as holotype.

Female : Body 1096 in length and 786 in width. Body soft, integument papillate. Median eye with two dark spots. Six pairs of dorsoglandularia, five pairs of lateroglandularia and five pairs of ventroglandularia. Sclerites associated with the glandularia rounded. Capitulum 300 in length. Chelicera 310 in length (including cheliceral claw); cheliceral claw with 10 short teeth. Genital field 339 in length and

213 in width. Three pairs of ovoid acetabula. Anterior of first pair of acetabula a small sclerite with four stout setae. Genital flaps with stout setae on mesal edge. Dorsal lengths of palp segments : PI 53, PII 115, PIII 62, PIV 175, PV 43; PII with two setae on medial side. Dorsal lengths of three distal segments of first leg : I-leg-4 126, I-leg-5 165, I-leg-6 145. Dorsal lengths of three distal segments of fourth leg : IV-leg-4 320, IV-leg-5 204, IV-leg-6 223. Legs without swimming setae, claws without serration.

Male : Body soft, 1057 in length and 766 in width. Dark spots on median eye not visible. Mesal edge of genital flaps with more setae than female. Otherwise very similar to female. Dorsal lengths of palp segments : PI 50, PII 113, PIII 65, PIV 180, PV 43. Dorsal lengths of last three distal segments of first leg : I-leg-4 130, I-leg-5 168, I-leg-6 146. Dorsal lengths of last three segments of fourth leg : IV-leg-4 330, IV-leg-5 214, IV-leg-6 216.

Etymology : The species is named after the type locality (noun in apposition).

Discussion : This is the third species of the genus *Notopanisus*, the other two are known from South America and Tasmania. It can therefore be regarded as a Gondwana element, like HARVEY (1988) already mentioned for *Notopanisus vinnulus* Harvey, 1988 from Tasmania. It differs from the latter species in having rounded sclerites associated with the glandularia instead of crescent-shaped sclerites.

Australiobates lacustris n. sp.

(Figs. 14-15)

Holotype : Male from Lake Brunner, 17-i-1992 (leg. H. SMIT).

Male : Body soft, 941 in length and 786 in width; dorsalia absent. Capitulum with its long posterior projection 310 in length. Posterior apodemes of fourth coxae short. Gonopore 136 in length. Three pairs of large acetabula. Genital field with long, stiff setae, especially on anterior margin. Chelicera 388 in length, cheliceral claw 149 in length. Dorsal lengths of palp segments : PI 67, PII 187, PIII 122, PIV 132, PV 41. PII with 5 moderate long setae,

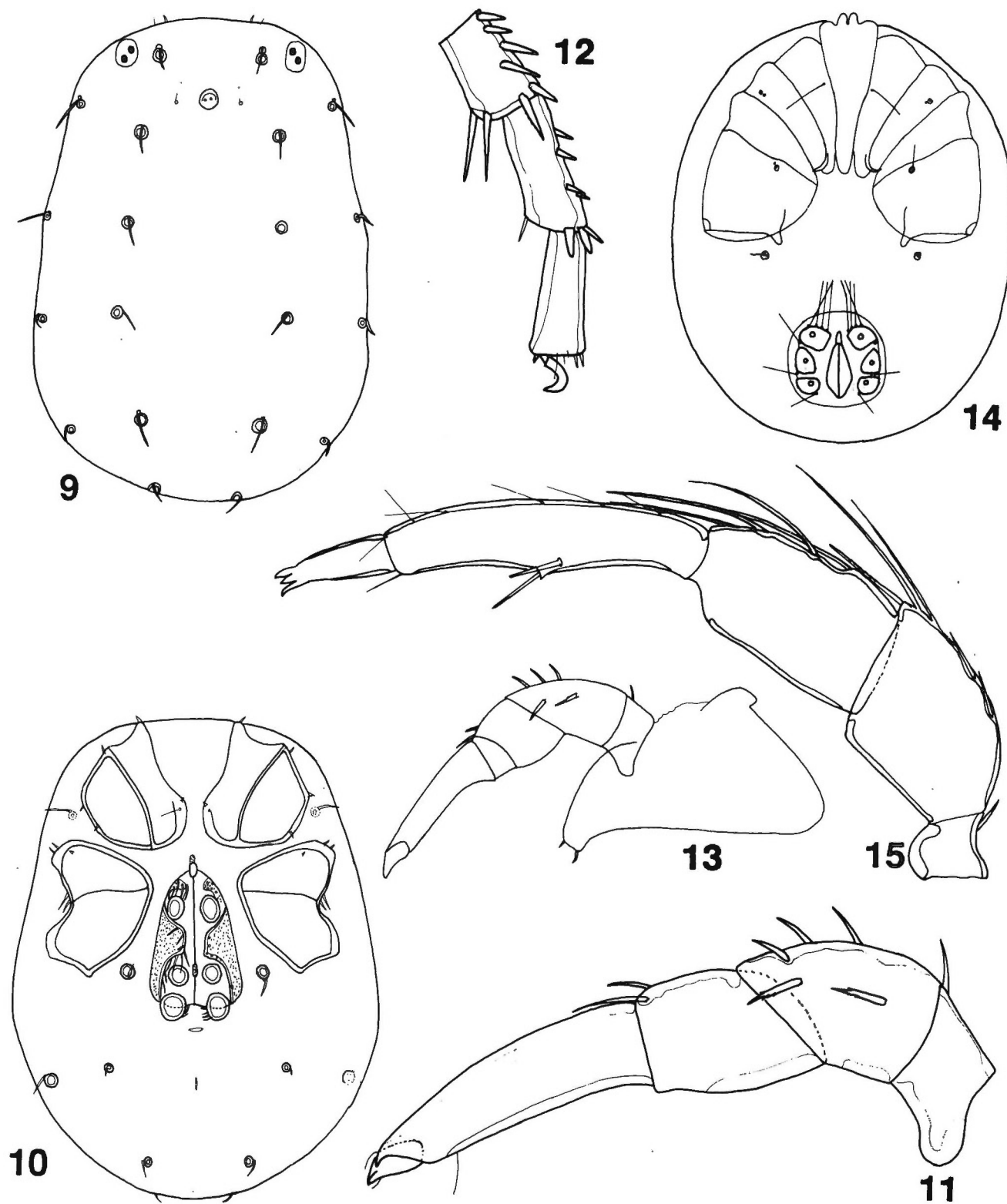


FIG. 9.-13 : *Notopanisus shewell* n. sp., female.

9. — Dorsal view. 10. — Ventral view. 11. — Palp. 12. — Distal segments of first leg. 13. — Capitulum

FIG. 14-15 : *Australiobates lacustris* n. sp., male.

14. — Ventral view. 15. — Palp.

PIII with 12 moderate long setae, more or less in two rows. (Not all setae visible on illustrated palp). Long setae of dorsal side of PIII approximately on distal 3/4 of segment. PIV with a short tubercle on ventral margin. Dorsal lengths of three distal segments of first leg : I-leg-4 272, I-leg-5 301, I-leg-6 262. Dorsal lengths of distal three segments of fourth leg : IV-leg-4 388, IV-leg-5 and IV-leg-6 446 ; IV-leg-5 with 1 long, stiff, swimming seta.

Female : Unknown.

Etymology : The species is named after its occurrence in a lake.

Discussion : This is the first *Australiobates* species from New Zealand which occurs in lentic waters. It can be separated from other New Zealand species of the genus by its large acetabula and the long, stiff setae of the genital field.

Arrenurus (Arrenurus) longipetiolatus n. sp.

(Figs. 16-19)

Holotype : Male from pond along road to Honeycomb Caves, 1 km. from main road, north of Karamaea, 16-i-1992 (leg. H. SMIT).

Paratypes : Three males from same location as holotype.

Male : Body, including petiole, 1154 in length and 718 in width. Colour of body purple. Pygal lobes well-developed ; distance between pygal lobes 412. Non-caudal portion of dorsal shield with two pairs of glandularia, the most posterior pair associated with pointed humps. Petiole 272 in length, measured from ventral view. Petiole mushroom-shaped in dorsal view, with a brush of setae at distal end, the medial setae shorter than the lateral setae. Petiole bowed dorsally in lateral view. Hyaline membrane well-developed. Acetabular plates extending onto lateral side of body. Gonopore 58 in length. Dorsal length of palp segments : PI 36, PII 65, PIII 60, PIV 86, PV 48. PII with three setae on medial side. Dorsal lengths of last three distal segments of first leg : I-leg-4 158, I-leg-5 146, I-leg-6 168. Dorsal lengths of last three segments of fourth leg : IV-leg-4 281, IV-leg-5 180, IV-leg-6 204 ; IV-leg-4 with a distal projection. Swimming hairs present on second, third and fourth legs.

Female : Unknown.

Etymology : The species is named for its long petiole.

Discussion : *A. longipetiolatus* is close to *A. stouti* Cook, 1983, but differs most noticeably in the shape of the petiole and the hyaline membrane. The shape of the body is similar to that of *A. stouti*.

Arrenurus (Arrenurus) schuckardi n. sp.

(Figs. 20-23)

Holotype : Male from moorland pool near Waioitota, south of Haast, 24-i-1991 (leg. R. SCHUCKARD).

Paratypes : Three males and one female from type locality.

Male : Body, including petiole 1106 in length and 669 in width. Colour of body red-brown. Pygal lobes well developed ; distance between pygal lobes 456. Non-caudal portion of dorsal shield with two pairs of glandularia, the most posterior pair associated with pointed humps. Acetabular plates extending onto lateral side of body. Acetabular plates broadened near medial side. Gonopore 48 in length. Petiole 223 in length, with two hyaline lamellar plates and a brush of short setae near posterior end. Dorsal lengths of palp segments : PI 38, PII 67, PIII 55, PIV 84, PV 41 ; PII with 3-4 setae on medial side. Dorsal lengths of three distal segments of first leg : I-leg-4 161, I-leg-5 142, I-leg-6 146. Dorsal lengths of three distal segments of fourth leg : IV-leg-4 240, IV-leg-5 130, IV-leg-6 163 ; IV-leg-4 with a distal projection. Swimming hairs present on second, third and fourth legs.

Female : Body 921 in length and 815 in width. Dorsal shield 718 in length ; colour of body red-brown. Three pairs of glandularia on dorsal shield, the two posterior pairs on small bumps. Lateral edges of body with well developed humps. Acetabular plates swollen. Anterior pigmented area of genital valve larger than posterior pigmented area. Dorsal lengths of three distal segments of first leg : I-leg-4 146, I-leg-5 137, I-leg-6 132. Dorsal lengths of three distal segments of fourth leg : IV-leg-4 204, IV-leg-5 190, IV-leg-6 156. Swimming hairs present on second, third and fourth legs. Dorsal lengths of palp segment not measurable.

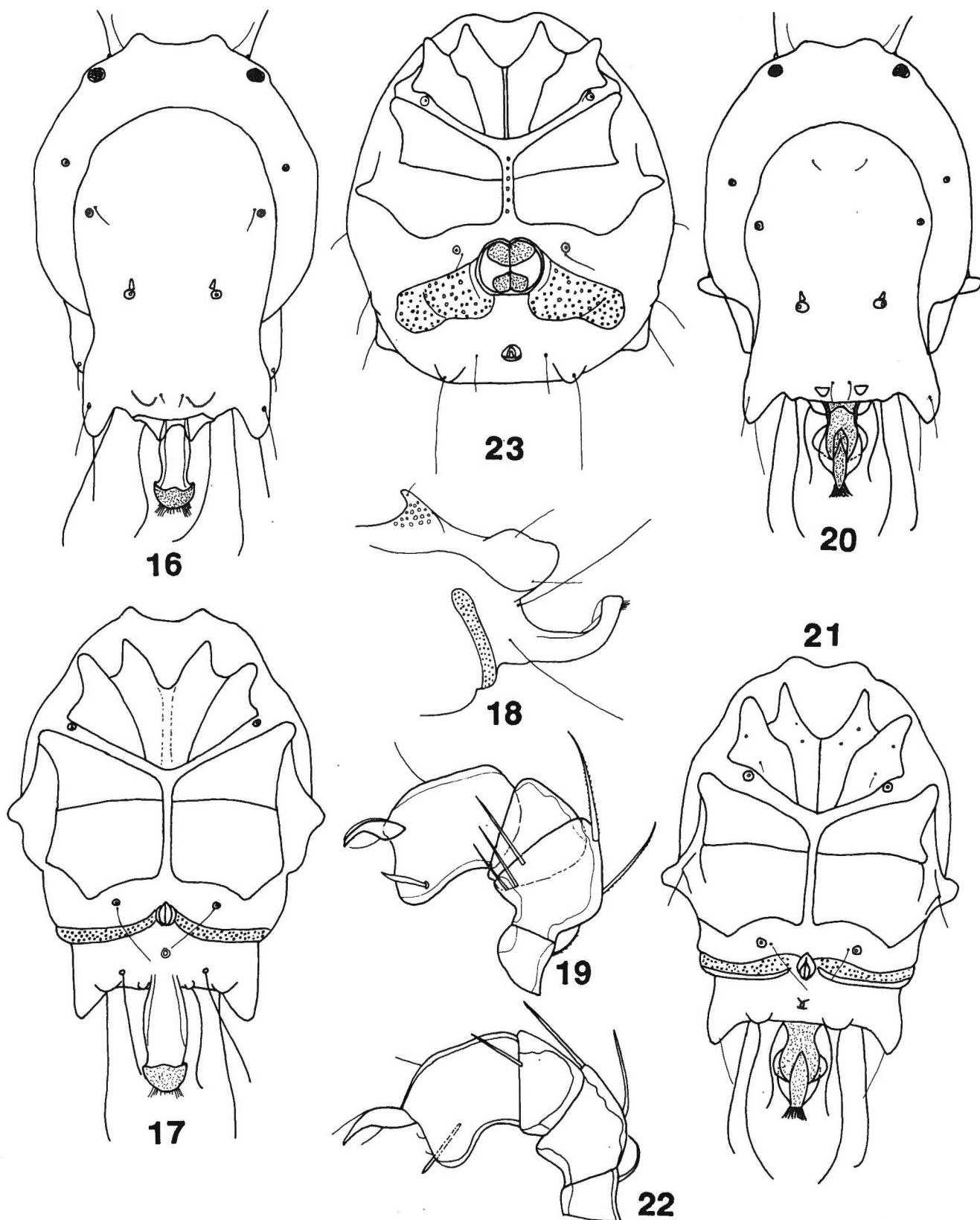


FIG. 16.-19 : *Arrenurus (Arrenurus) longipetiolatus* n. sp., male.
16. — dorsal view. 17. — Ventral view. 18. — Lateral view of petiole. — 19. — Palp

FIG. 20.-23 : *Arrenurus (Arrenurus) schuckardi* n. sp.,
20. — Male, dorsal view. — 21. *Idem*, ventral view. 22 — *Ibid.*, palp. 23. — Female ventral view.

Etymology : The species is named after Rob SCHUCKARD, the collector of the material.

Discussion : The new species is close to *Arrenurus stouti*. However, the petioles of the two species are very different. The petiole of *A. schuckardi* measures 223 in length, the petiole of *A. stouti* measures 151-155 in length. The sharp, spine-like integumental projections on ventral side of the petiole of *A. stouti* are absent in *A. schuckardi*. Further, males and females of the two species differ in the shape of the acetabular plates. The shape of the body of both male and female of the two species, as well as the palps, are very similar.

THE WATER MITES OF LENTIC WATERS

The twenty-six lentic waters of the South Island visited during this study were poor in species. Only 9 species of water mites have been collected, of which three species are new to science. The suggestion of COOK (1983) that many more new species could be collected in New Zealand lakes, is not supported by this study.

Most common of the lentic species is *Arrenurus stouti* Cook, 1983, occurring in nearly 70 % of the lentic waters, ponds as well as large lakes. Confined to ponds and small lakes are *Hydrachna marauensis* Stout, 1953 (found in 8 localities), *Arrenurus rotoensis* Stout, 1953 (7 localities), *Eylais schauinslandi* Koenike, 1900 (7 localities) and *Piona exigua* Viets, 1949 (6 localities). *Flabellifrontipoda lacustris* Cook, 1983 and *Australiobates lacustris* n. sp. are confined to large, clear lakes. The other species collected are rare, and occurred in a few ponds only. *Arrenurus lacus* Stout, 1953, described from a reservoir near Wellington, is the only lentic species which has not been re-collected.

ACKNOWLEDGEMENTS

I am indebted to Rob SCHUCKARD for collecting water mites at a number of localities, to Vida STOUT for her comment on the manuscript and to Truus VAN DER PAL for assisting me with the fieldwork.

REFERENCES

- COOK (D. R.), 1983. — Rheophilic and hyporheic water mites of New Zealand. — Contr. Amer. Entom. Inst., 21 : 1-224.
- CROWELL (R. M.), 1990. — *Unionicola (Pentatax) bilieaehonore* n. sp. a sponge-associated Hydracarina (Acari : Unionicolidae) from New Zealand. — N. Zeal. J. Zool., 17 : 265-269.
- HARVEY (M. S.), 1988. — Three new unusual water mites from Australia (Chelicerata : Acarina : Hydryphantidae, Hygrobatidae and Athienemannidae). — Mem. Mus. Vict., 49 : 355-361.
- HARVEY (M. S.), 1990. — A review of the water mite family Limnocharidae in Australia (Acarina). — Inv. Taxon., 3 : 483-493.
- KOENIKE (F.), 1900. — Eine unbekannte Eylais-Form nebst einer Notiz zur Synonymie einer verwandten Art. — Ergebnisse einer Reise nach dem Pacific (Schauinsland 1896-1897). — Zool. Jb. Syst. Okol. Geogr. Tiere, 13 : 125-132.
- LUNDBLAD (O.), 1947. — Zur Kenntnis australischer Wassermilben. — Ark. Zool. 40 A : 1-82.
- STOUT (V. M.), 1953a. — *Eylais waikawae* n. sp. (Hydracarina) and some features of its life history and anatomy. — Trans. r. Soc. New Zealand, 81 : 389-416.
- STOUT (V. M.), 1953b. — New species of Hydracarina, with descriptions of the life history of two. — Trans. r. Soc. N. Zeal., 81 : 417-466.
- WALTER (C.), 1929. — Hydracarinen aus Java. — Treubia, 11 : 211-273.

APPENDIX : LIST OF LOCALITIES

All localities are located on the South Island. Collections from January 1991 are made by R. SCHUCKARD, all others by the author. A number of localities on Stewart Island were visited, but no water mites could be collected there ; these localities are not listed below.

1. Pond with *Myriophyllum*, Arawata, 24-i-1991. *Arrenurus stouti*, 2 ♂.
2. Pond with *Sphagnum*, Waioitoto, south of Haast, 24-i-1991. *Arrenurus schuckardi* n. sp. 4 ♂♂, 1 ♀.
3. Haast River at Blue Duck Flat, 25-i-1991. *Zelandobates clevatus* Cook, 1 ♀.
4. Old river branch Matukituki River, east of Wanaka, 26-i-1991. *Arrenurus stouti*, 1 ♀.
5. Small stream east of Te Towaka, on Mount Shewell, Marlborough Sounds, 24-xii-1991. *Notopanisus shewell* n. sp. 1 ♂, 1 ♀ ; *Zelandobates clevatus* Cook, 2 ♀♀.

6. Southern creek at Papanui Bay, Marlborough Sounds, 26-xii-1991. *Flabellifrontipoda zelandica* Hopkins, 2; *Nudomideopsis forkensis* (Imamura), 1 ♀; *Zelandothyas diamphida* Cook, 1.
7. Northern creek Papawai Bay, Marlborough Sounds, 26-xii-1991. *Pseudotryssaturus indentatus* (Hopkins), 1 ♀.
8. Interstitial of Taiperie Bay Creek, Marlborough Sounds, 27-xii-1991. *Piotaturus alvecaudatus* Cook, 1 ♂, 1 ♀; *Zelandothyas hyporheica* n. sp., 2 ♂♂, 1 ♀.
9. Pond at Te Towaka, Marlborough Sounds, 28-xii-1992. *Arrenurus* sp., 1 nymph.
10. Greenburn Creek, at crossing with highway 70, west of Kaikoura, 1-i-1992. *Pseudotryssaturus dapsilus* Cook, 1 ♀.
11. Cattle pond Clarence Reserve, west of Kaikoura, 1-i-1992. *Arrenurus rotoensis* 1 ♂, 1 ♀; *Hydrachna maramauensis*, 9 ♂♂, 12 ♀♀.
12. Deer Valley Creek, Lewis Pass, 2-i-1992. *Apeltosperchon zelandicus* Cook 1; *Zelandobates crinitus* Hopkins, 12 ♀♀.
13. Black Valley Stream, St Arnaud, 3-i-1992. *Apeltosperchon zelandicus* 1; *Zelandobates cleavatus*, 1 ♀.
14. Takaka River, at crossing with highway 60, 4-i-1992. *Zelandobates cleavatus* 2 ♀♀.
15. Pond near campsite Golden Bay, north of Takaka, 5-i-1992. *Arrenurus stouti* 4 ♂♂, 6 ♀♀.
16. Pond Whariki Beach, south of Farewell Spit, 5-i-1992. *Hydrachna maramauensis* 3 ♂♂, 1 ♀; *Limnochares australica*, 1 ♂.
17. Pond south of Farewell Spit, 5-i-1992. *Eylais schauinslandi*, 5 ♂♂, 1 ♀, 2 nymphs.
18. Pond 35 km. south of Karamea, 9-i-1992. *Arrenurus rotoensis*, 2 ♀♀; *A. stouti*, 3 ♂♂, 8 ♀♀; *Eylais schauinslandi*, 2 ♂♂, 1 nymph.
19. Pond 9 km. west of Honeycomb Caves, north of Karamea, 16-i-1992. *Arrenurus stouti*, 9 ♂♂, 2 ♀♀.
20. Pond along road to Honeycomb Caves, 1 km. from main road, north of Karamea, 16-i-1992. *Arrenurus longipetiolatus* n. sp., 4 ♂♂; *A. rotoensis*, 2 ♂♂; *A. stouti*, 3 ♂, 10 ♀♀; *Limnochares australica*, 3 ♂♂, 1 ♀.
21. Lake Poerua, east of Greymouth, 17-i-1992. *Arrenurus stouti*, 5 ♂♂, 6 ♀♀.
22. Lady Lake, east of Greymouth, 17-i-1992. *Arrenurus stouti*, 1 ♂.
23. Lake Mahinapoua, south of Hokitika, 17-i-1992. *Arrenurus stouti*, 1 ♂; *Piona exigua* 1 ♂, 1 ♀.
24. Lake Brunner, 17-i-1992. *Arrenurus stouti*, 2 ♂♂, 11 ♀♀; *Australiobates lacustris* n. sp. 1 ♂; *Flabellifrontipoda lacustris* Cook, 3 ♀♀; *Piona exigua*, 6 ♂♂, 2 ♀♀.
25. Lake Mistletoe at Te Anau Downs, 21-i-1992. *Arrenurus stouti*, 4 ♂♂, 1 ♀; *Limnochares australica*, 1 ♂.
26. Cattle pond, Mount Aspiring Road, west of Wanaka, 18-i-1992. *Hydrachna maramauensis*, 3 ♂♂, 1 ♀; *Eylais schauinslandi*, 8 ♂♂, 9 ♀♀.
27. Waiau River, 10 km. south of Te Anau, 19-i-1992. *Zelandobates cleavatus* Cook, 3 ♂♂, 11 ♀♀.
28. Cleddau River, 5 km. east of Milford, 20-i-1992. *Zelandobates crinitus*, 1 ♀.
29. Pond with *Elodea* sp, west of Fergus Lake, Eglinton Valley, 21-i-1992. *Arrenurus stouti*, 1 ♀; *Piona exigua* 2 ♂♂, 5 ♀♀.
30. Cattle pond near Bluff, 22-i-1992. *Arrenurus rotoensis*, 1 ♂, 2 ♀♀; *A. stouti*, 2 ♂♂; *Hydrachna maramauensis*, 1 ♂, 2 ♀♀.
31. Old river branch of River Clutha at Balclutha, 27-i-1992. *Arrenurus rotoensis*, 1 ♂, 1 ♀; *A. stouti*, 1 ♀; *Eylais schauinslandi*, 1 ♂, 1 ♀; *Piona exigua*, 26 ♂♂, 19 ♀♀.
32. Pond 5 km. south of Taranui, 29-i-1992. *Eylais schauinslandi*, 3 ♂♂, 1 ♀, 1 nymph; *Hydrachna maramauensis*, 1 ♂, 1 ♀; *Piona exigua*, 11 ♂♂, 5 ♀♀.
33. Twin Lakes, Twizel, 30-i-1992. *Arrenurus stouti*, 1 ♂.
34. Fraser Stream, Twizel, 30-i-1992. *Zelandobatella naias* Hopkins, 2 ♀♀.
35. Lake McGregor, 31-i-1992. *Arrenurus stouti*, 1 ♂; *Eylais schauinslandi*, 1 ♂; *Hydrachna maramauensis*, 1 ♂; *Piona exigua*, 23 ♂♂, 10 ♀♀.
36. Cattle pond, Okuti Valley, Banks Peninsula, 1-ii-1992. *Arrenurus rotoensis*, 1 ♀; *Hydrachna maramauensis*, 8 ♂♂, 7 ♀♀.
37. Halswell River, Matuhara, 1-ii-1992. *Arrenurus stouti*, 1 ♂, 2 ♀♀; *Hydrachna maramauensis*, 4 ♂♂, 4 ♀♀.
38. Pond in Rakaia River bed, 6 km. west of Rakaia, 1-ii-1992. *Arrenurus rotoensis*, 2 ♂♂, 2 ♀♀; *A. stouti*, 9 ♂♂, 2 ♀♀; *Eylais schauinslandi*, 6 ♂♂, 3 ♀♀; *Hydrachna maramauensis*, 2 ♀♀.

Lentic localities : Nos. 1, 2, 4, 9, 11, 15-26, 29-33, 35-38.