NEW ROTIFERS (ROTIFERA) FROM TASMANIA

by W. KOSTE*, R. J. SHIEL + & L. W. TAN + +

Summary

KOSTE, W., SHIEL, R. J., & TAN, L. W. (1988) New rotifers (Rotifera) from Tasmania. *Trans. R. Soc. S. Aust.* **112**, 119-131, 30 November, 1988.

One hundred Tasmanian aquatic habitats were surveyed for Rotifera in spring 1987. Of 168 taxa identified, 59 were first records for Tasmania, 21 new to Australia and four (*Trichotria buchneri* sp. nov., *T. pseudocurta* sp. nov., *Lecane herzigi* sp. nov. and *Notommata tyleri* sp. nov.) new to science. New taxa are described and figured, several of the new records also are figured, and brief ecological information is given.

KEY WORDS: Rotifera, new species, new records, Tasmania, zoogeography.

Introduction

In our first surveys of Tasmanian waters for rotifers (Koste & Shiel 1986), the predominantly humic, acid waters examined contained species assemblages more closely related to those of tropical northern Australia than to the southern fauna (Shiel & Koste 1986), with a small but distinctive endemic component (Koste & Shiel 1987a).

To investigate the apparent abundance of "pantropical" taxa at 42-43°S, and to add to our data on rotifer species diversity and seasonality, a further survey was made in Sept.-Oct. 1987. Most of the 100 habitats visited in the earlier surveys were resampled, and several acid dune lakes on the west coast were included.

This paper reports on the results of the 1987 survey, in particular the Rotifera new to Australia, with relevant ecological details. Full distribution and ecological data are included by family in a continuing revision of the Australian Rotifera (e.g. Koste & Shiel 1987b). Microfauna other than Rotifera will be reported elsewhere on completion of the sampling surveys.

Materials and Methods

Habitats sampled were as reported earlier (Koste & Shiel 1986), with the addition of six sites in the dune lake area north of Strahan on the west coast (Fig. 1). The only change to sampling methods reported previously was the use of a 13 l perspex trap for quantitative collections from some sites.

In the laboratory, subsamples were scanned sequentially in a perspex counting tray using a Zeiss SV-8 stereo microscope. The first 300-400 individual organisms encountered were identified and scored, and the remainder of the tray checked for additional species. A Zeiss Research compound microscope was used to identify selected mounted individuals (or trophi preparations after clearing with sodium hypochlorite), and photomicrographs taken.

Fig. 1. Additional sampling sites in 1987 survey (see Koste & Shiel (1986) for survey sites). Inset: sites referred to in text (a = L. Garcia sites; b. L. Pedder; c. Arthur's Lake.

Selected specimens were prepared for scanning electron microscopy (SEM) according to Amsellem & Clement (1979), and photographed at various magnifications in a Phillips SEM 505. Statistical methods used are described in Hellawell (1978).

Results

Ranges of water quality recorded were as follows: water temperature 4.0-24.0°C; pH 3.1-8.5; conductivity (K_{18}) 9.0-39,100 μS cm^{-1}; turbidity 0.5-160 Hach nephelometric turbidity units (NTU). As in the earlier surveys, most sites sampled had dark, tea-coloured humic waters (78% < pH 7.0) and were low in electrolytes (44% < 100, 46% 100-1000, 10% > 1000 μS cm^{-1}). With the

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exception of one highly turbid stock dam near Karanja (Strathgordon road), turbidities were very low (<10 NTU with the majority <1.0).

One hundred and sixty-eight rotifer species were identified from the 1987 sample series; 59 of these are new records for Tasmania (Table 1), bringing to 249 the known Tasmanian taxa; 21 are new to Australia (total now 644), including four new taxa described here.

Systematics

Notholca squamula (Müller)
FIG. 2

Brachionus squamula Müller, 1786, p. 334, Fig. 47:4-7.

The typical form of this halophile occurs in southern Victoria and Tasmania (Koste & Shiel 1987b). A population (sample 1996) differing from the f. typ. in size and anterior lorica morphology was collected from Boggy Creek, near St Helens.
Measurements: Lorica (length × width) 200×146 μm; anterior median spines 33 μm; submedian spines 18 μm; lateral spines 9-10 μm.
Ecology: 15°C, pH 8.5, K_{18} 13.94 mS cm^{-1}, turbidity 0.5 NTU. Shallow water, entry of creek into estuary, approx. 175m from sea. Emergent macrophytes. The Boggy Creek plankton was simple, dominated by nauplii of an unidentified cyclopoid copepod, with minor components a calanoid, *Gladioferens spinosus*, and another halophile rotifer, *Colurella adriatica*.

Fig. 2. *Notholca squamula* Müller) from St Helens. Lorica, ventral. Scale bar 100 μm.

Remarks: The St Helens specimens exceed the global range of 120-190×96-144 μm (Koste 1978) and are considerably larger than the 132×100 μm *N. squamula* recorded from western Victoria. The anterior margin also is distinctive; whereas the mainland form (and *N. squamula* elsewhere) has lateral occipital spines approximately half the length of the median spine pair, with much shorter submedian spines, the Boggy Creek form has submedian spines exceeding the range of 8-12 μm reported by Koste (1978), and the lateral spines are much shorter. It is likely that these morphological differences are an ecotypic response to estuarine habit.

Subsamples of the St Helens material are lodged with the Koste collection (FRG), the Shiel plankton collection (MDFRC), and a representative series of individuals mounted on a microslide (V.4105) with the South Australian Museum (SAM).

Trichotria buchneri sp. nov.
FIGS 3-5

Material: 16 females in formalin, sample No. 2050.
Holotype: Loricate female on microslide, sample 2050. Coll. 02.×.87, R. J. Shiel, SAM V.4106.
Paratypes: Date and place of collection as for holotype. Two slides in the Collection Rotatoria, Limn. Ecology, Senckenberg Museum, Frankfurt/M. No. 7340 and 7341; one slide SAM V.4107; one slide and one SEM stub Shiel Coll. (MDFRC).
Type locality: Roadside pool west of corner of Lake Rd and Garcia Rd, Lake Garcia, Strahan (42°09'S, 145°19'E).
Description: Rigid lorica (Fig. 5a) of nearly triangular cross-section (Figs 3c, 5b); median keel on dorsal plate, ending in long caudal spine (Figs 3a, b; 5a, c); anterior dorsal margin with deep rounded aperture (Fig. 5d) projecting laterally to pointed, sinuate cusps (Figs 3b, 5d); ventral plate domed medially, with large postero-ventral semicircular foot opening (Fig. 3d); anterior ventral margin with curved aperture between two blunt triangular projections (Figs 3d, 5d); foot two segmented, strongly loricate (Figs 3d, e); toes long, rigid, with acute points; head with rectangular plates (Fig. 3f) which form a pyramidal projection in the contracted state (Figs 5a, b, d); dorsal plate surface with long rows of minute denticles (Fig. 5e); lateral antenna on cuticular papilla; dorsal antenna not visible in contracted state.
Measurements: Lorica length 160-182 μm; width to 115 μm; height to 84 μm; proximal foot segment 24 μm; distal foot segment 15 μm; toes 50 μm.
Ecology: From 0.75 m depth, open water between emergent reeds, over organic silt on sand; dark

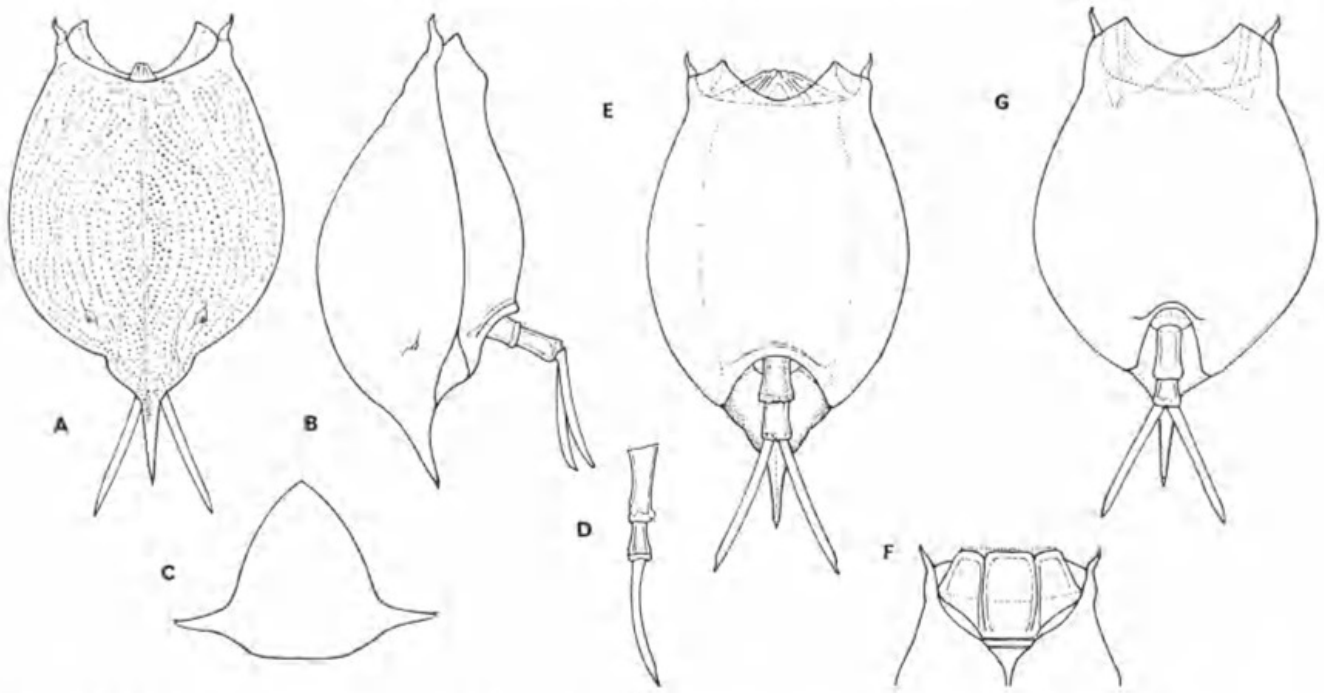

Fig. 3. *Trichotria buchneri* sp. nov. A. dorsal; B. lateral; C. cross-section; D. foot and toe, lateral; E. ventral; F. head, extended; G. ventral, head fully contracted.

Fig. 4. *Trichotria buchneri* sp. nov. Photomicrograph, dorsal.

humic water. 17.0°C, pH 3.1, 80.6 μS cm^{-1}. The most abundant plankter in this collection was a calanoid, *Calamoecia tasmanica* (Smith), however the rotifer assemblage accompanying *T. buchneri* was the most diverse yet recorded from Tasmania: 35 spp. in at least 20 genera, with *Keratella procurva* (Thorpe) the most abundant.

Remarks: The new species apparently is related to the *T. tetractis* group, however their cross section is hexagonal (Fig. 6c), there are two keels, the foot segments are strongly pustulated, with dorsal hooks on the second, and the foot is three-segmented. Paired hooks on the second segment of *T. tetractis caudata* (Lucks, 1812) are shown in Fig. 6. The reflexed caudal spine can be seen in Fig 6, which also shows the more terminal position of the foot groove, ventrally placed in the sp. nov.

Etymology: Dedicated to Professor Hans Buchner, Zoological Institute, Seidlstrasse, University of Munich, in recognition of his investigations of heterogony in rotifers.

Trichotria pseudocurta sp. nov.
FIGS 7–8

Material: 3 loricate females, sample No. 2024, coll. 27.ix.87, R. J. Shiel.

Holotype: Designated by illustration (Fig. 9). All specimens treated for trophi analysis. Trophi preparation in *Trichotria* section, Koste Coll. (FRG).

Type locality: L. Pedder, from Serpentine Dam boat ramp (42°46'S,145°59'E) west of Strathgordon (Fig. 1).

Description: Lorica U-shaped in outline, both surfaces punctate/stippled; short, acute lateral

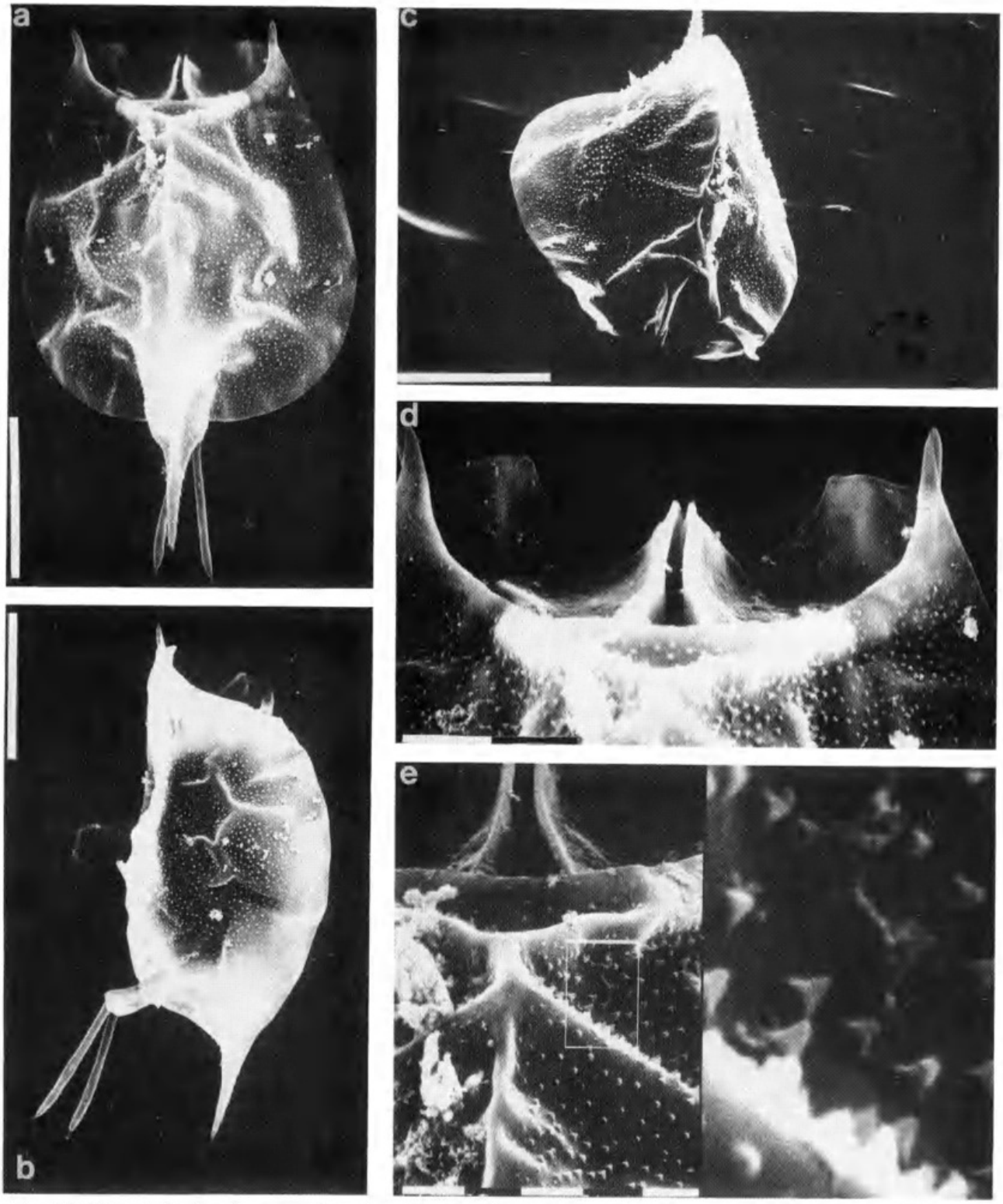

Fig. 5. *Trichotria buchneri* sp. nov. Scanning-electron micrographs a. lorica, dorsal; b. lorica of a second individual, lateral; c. anterior elevation of third individual; d. plates of contracted head of specimen in a; e. dorsal lorica denticulation of same individual, magnified at right. Scale bars a–c 50 μm, d 10 μm, e 5 μm.

spines at anterior margin; dorsal plate with twin keels commencing on either side of median notch in anterior margin, running posteriorly to fuse to single keel before posterior margin; ventral plate with twin ribs terminating at raised ridge at anterior margin of oval foot opening; foot 3-segmented,

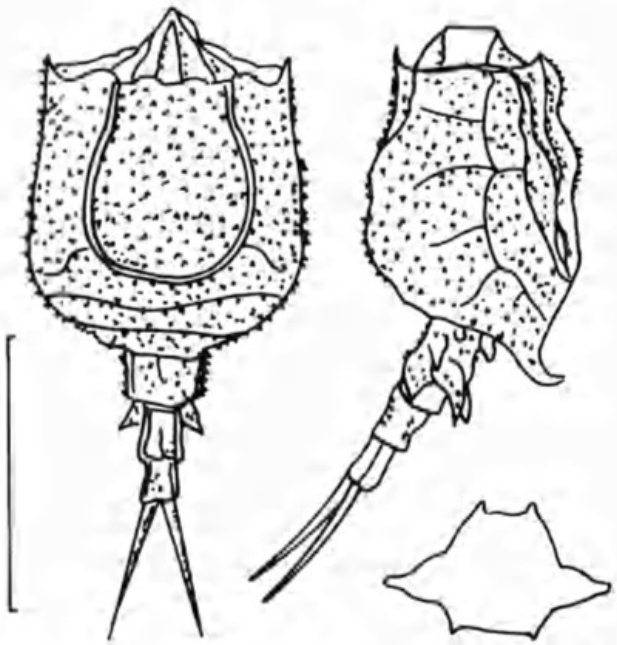

Fig. 6. *Trichoteria tetractis caudata* (Lucks). Dorsal, lateral and cross-section. Redrawn from Wulfert (1967). Scale bar 100 μm.

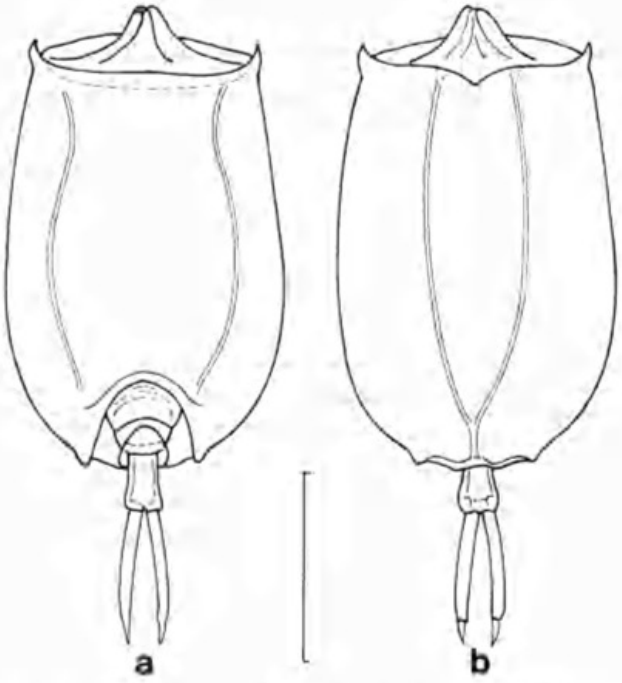

Fig. 7. *Trichotria pseudocurta* sp. nov. a. dorsal; b. ventral. Scale bar 50 μm.

lacks spines on segments; toes with short claws.
Measurements: Lorica length 125 μm; width 74 μm; toes (incl. claws) 36 μm.
Ecology: Collected from 1 m depth over gravel, vicinity of emergent reeds; water dark brown, humic. 21°C, pH 5.2, 32.6 μS cm^{-1}, 0.5 NTU. Rotifers dominated the Lake Pedder plankton at this site, with *Keratella cochlearis* (Gosse) and *K. australis* (Berzins) most abundant of ten species

Fig. 8. *Trichotria pseudocurta* sp. nov. Photomicrograph, dorsal.

identified. Microcrustacean plankters were *Calamoecia australis* (Searle) and *Bosmina meridionalis* Sars.
Remarks: This small species resembles a Volga River species, *T. curta* (Skorikov, 1914), which has a lorica length of 80–110 μm, toes 30–40 μm (Rudescu 1960), however the latter lacks the frontal corner cusps and has more angular lorica morphology.

Squatinella cf. *leydigi* (Zacharias)
FIG. 9

Stephanops leydigi Zacharias, 1886:255, Fig. 9:1, 2.
Squatinella leydigi (Zacharias) after Voigt (1957).

In sample 2050, from a small, humic roadside pool near L. Garcia, north of Strahan (Fig. 1), were several *S. leydigi* resembling the f. *longiseta* described by Pourriot (1971) from Europe. The typical form is not known from Australasia.
Measurements: body 210–235 μm; dorsal spine 270–378 μm; toe length to 37 μm.
Ecology: ca. 0.75 m depth, dark, humic water over silt. 17°C, pH 3.1, 80.6 μS cm^{-1}, 0.5 NTU.
Remarks: In view of the exclusion of "form" under article 16 of the International Code of Zoological Nomenclature (Ride *et al.* 1985), and the considerable variation within *Squatinella* (Koste 1988), this taxon must await more detailed treatment. It is likely that specific status is warranted.

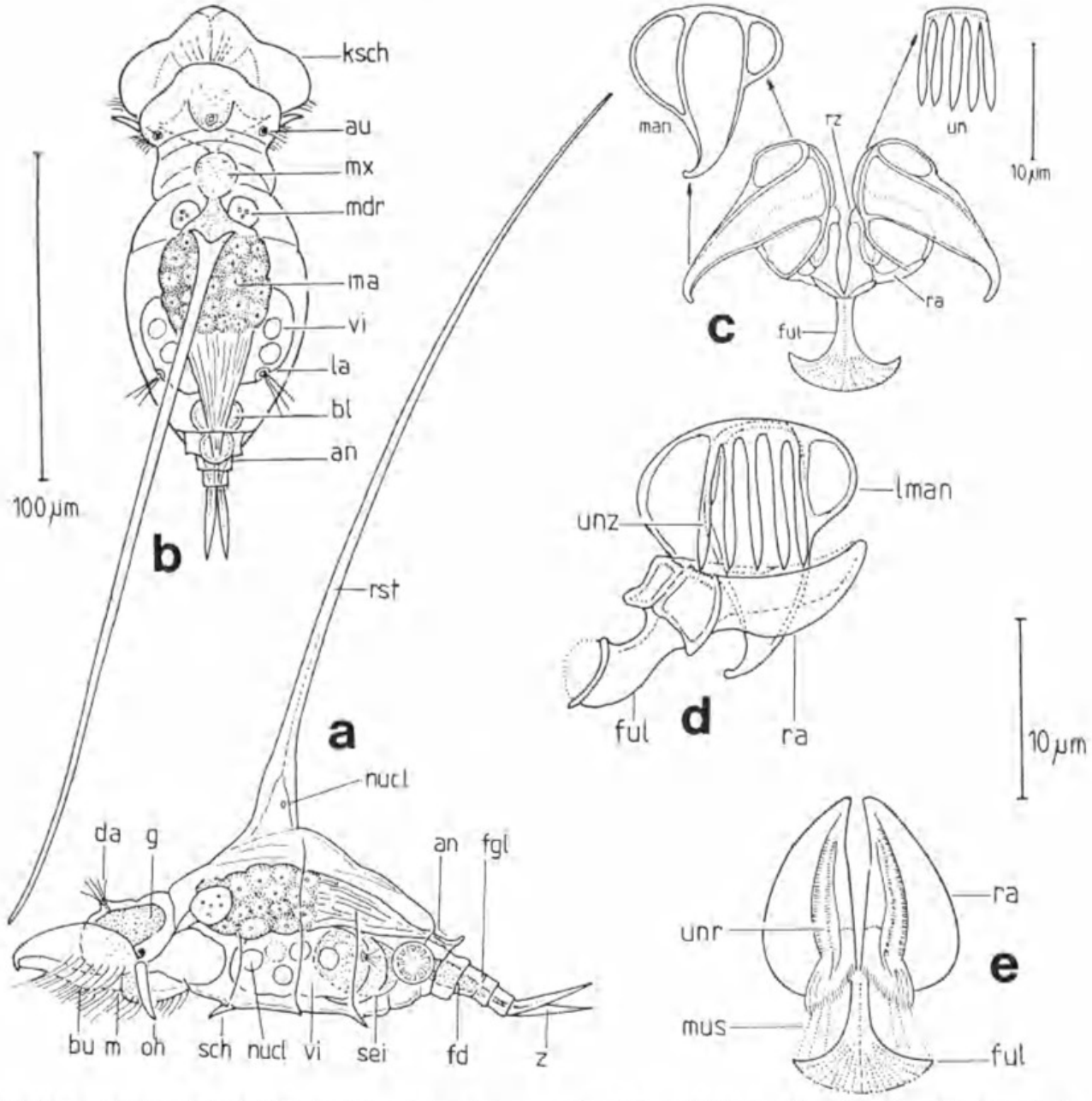

Fig. 9. *Squatinella* cf. *leydigi* (Zacharias). **a.** lateral (an = anus; bu = buccal field; da = dorsal antenna; fd = foot gland; fgl = foot segment; g = subcerebral ganglion; m = mouth; nucl = nucleii; oh = "ear"; rst = dorsal spine; sei = subitaneous egg; z = tow);
b. dorsal (an = anus; au = eye; bl = bladder; ksch = head-shield; la = lateral antenna; ma = stomach; mdr = gastric gland; mx = mastax; vi = vitellarium);
c. trophi (f = fulcrum; ma = manubrium; ra = ramus; rz = ramus tooth; un = uncus);
d. trophi, lateral (ful = fulcrum; lman = left manubrium; ra = ramus; unz = unci teeth);
e. trophi, ventral (ful = fulcrum; mus = musculature; ra = ramus; unr = unci ridge).

Lecane (Monostyla) subulata (Harring & Myers)
FIG. 10

Monostyla subulata Harring & Myers, 1926:410, Fig. 45:3, 4.
Lecane (M.) subulata (Harring & Myers) after Voigt (1957).

Also in sample 2050 were two specimens of this small acidobiont lecanid, known previously from wet *Sphagnum* in Europe and North America. They were within the size range given by Koste (1978:243). Full description and ecology will appear in Koste & Shiel (in press).
Measurements: Total length to 100 µm; lorica to 68 µm long, 65 µm wide; toe to 27 µm; claw to 10 µm.
Ecology: ca. 0.75 m depth, open water between emergent reeds, over organic silt. 17°C, pH 3.1, 80.6 µS cm^{-1}, 0.5 NTU.

Lecane (Lecane) rotundata (Olofsson)
FIG. 11

Cathypna rotundata Olofsson, 1918:593, Fig. 53.
Cathypna Hudson & Gosse (1886) = *Lecane* Nitzsch (1827) by priority.

Collected in a net tow (sample 2027) from L. Pedder, 17 km east of Strathgordon (Fig. 1), this is a surprising record of a species previously known from northern Canada, coastal waters of Novaya Zemla, Spitsbergen, Swedish Lappland and Hokkaido (Koste 1978). Full description and ecology will appear in Koste & Shiel (in press).
Measurements: Dorsal plate 90×105 μm; ventral plate 106×66 μm; toes 31 μm; claws 6 μm.
Ecology: From ca. 2 m deep, dark humic water, no visible vegetation, over rocky/gravel substratum. 14.3°C, pH 6.1, 33.0 μS cm^{-1}. Possibly an incursion dislodged from submerged vegetation by strong wind-induced wave action at the time of collection.

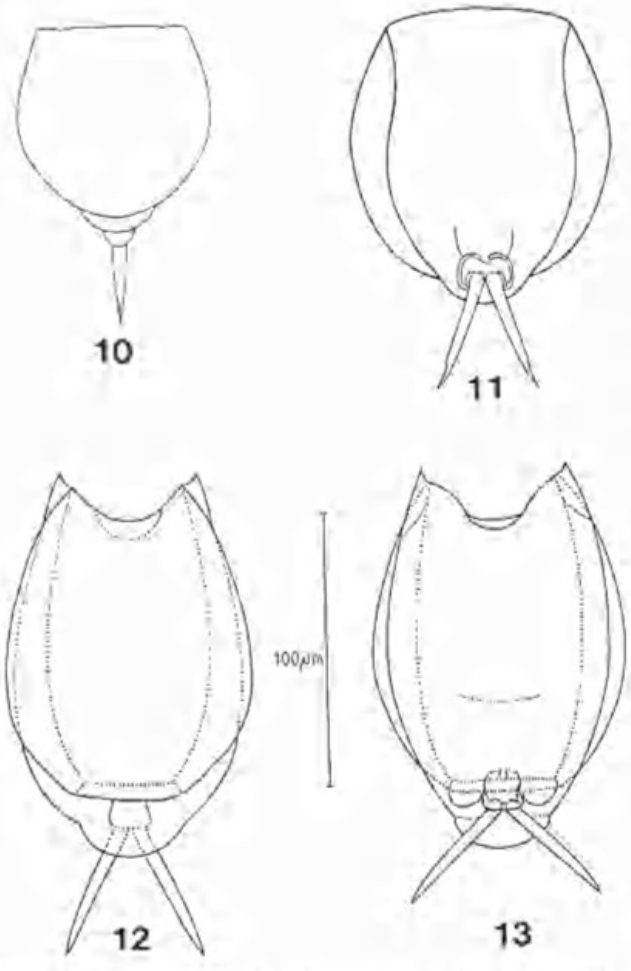

Fig. 10 *Lecane (L.) subulata* Harring & Myers, ventral. Fig. 11. *Lecane (M). rotundata* (Olofsson), dorsal. Fig. 12. *Lecane (L.) herzigi* sp. nov., dorsal. Fig. 13. *Lecane* (s. str) *herzigi* sp. nov., ventral. Scale bar 100 μm.

Lecane (L.) herzigi sp. nov.
FIGS 12–14

Material: 52 loricate females in formalin, sample Nos 2049, 2050.
Holotype: Loricate female on microslide, sample 2050. Coll. 02.×.87, R. J. Shiel. SAM V.4108.
Paratypes: Date and place of collection as for holotype; three slides in the Collection Rotatoria, Limn. Ecology, Senckenberg Museum, Frankfurt/M. No. 7360–62; one slide SAM V.4109; one slide Shiel Coll. MDFRC.
Type locality: Roadside pool west of corner of Lake Rd and Garcia Rd, Lake Garcia, Strahan (42°09'S,145°19'E). Also present in Lake Garcia, ca. 1 km east of the pool.
Description: Lorica outline ovate, widest medially; head aperture margins with deep rounded sinuses, ventral deeper than dorsal; pointed cusps at external angles of head aperture short, incurving; dorsal plate ovate, broadly truncate posteriorly; ventral plate slightly narrower than dorsal, with posterior segment a broadly rounded lobe commencing at second foot segment; deep lateral sulci; coxal plates small; toes straight, acutely pointed, without claws.
Measurements: Dorsal plate 96×74 μm; ventral plate 177×70 μm; width of anterior points 41 μm; toes 38–39 μm.
Ecology: From 0.75 m depth, open water between emergent reeds, over fine organic material/sand. Water very dark, humic. 17.0 °C, pH 3.1–4.3, 80.6–98.3 μS cm^{-1}, 0.5 NTU.
Etymology: Dedicated to Dr Alois Herzig, Biologische Station des Burgenlandes, Illmitz, Neusiedlersee, Austria, in recognition of his work on Rotifera.
Remarks: The new species resembles *L. (L.) mitis* Harring & Myers, 1926, from New Jersey, but differs in the shape of the anterior margins of the lorica and caudal part of the ventral plate, which is not clearly separated into a distinct lobe as in *L. herzigi*.

Notommata tyleri sp. nov.
FIG. 15

Material: 17 females in formalin, sample No. 1987.
Holotype: Part-contracted female on microslide, sample 1987. Coll. 22.ix.87, R. J. Shiel. SAM V.4110.
Paratypes: Date and place of collection as for holotype; one slide SAM V.4111; one slide Shiel Coll. MDFRC (*Notommata* # 1987).
Type locality: Arthur's Lake (41°59'S/146°55'E) (Fig. 1). From shallow water (<1 m) at boat ramp on western margin off Miena-Poatina Rd.
Description: Very small species, body short and stout; greatest width <½ body length (non-ovigerous, Fig. 15b) to slightly more than ½ (with

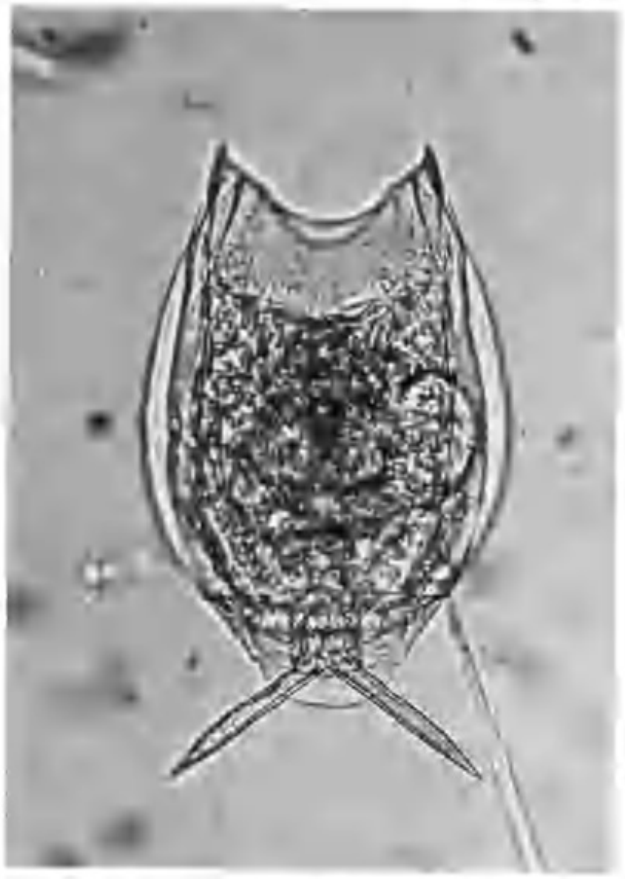

Fig. 14. *Lecane herzigi* sp. nov. Photomicrograph, ventral.

subitaneous egg); integument soft, flexible, but outline constant; head and corona typical for genus, with slight constriction of body ca. ⅓ length (Fig. 15b); body dilated distally to rounded rump with median, indistinctly segmented lobulate foot bearing two short toes (Fig. 15b); toes conical, tapering from broad base to recurved, acute tips (Fig. 15c) (only tips visible in contracted state); dorsal and lateral antennae small, papilliform; mastax (Fig. 15e–g) modified virgate type (cf. Koste & Shiel 1987b); rami strongly convex on outer margins no inner denticulation; fulcrum slender, straight, dilated distally; manubria slender, curved, with distinctive handle-like median structure (Fig. 15g, h); internal organs normal, vitellarium conspicuous; foot glands elongate, club-shaped.

Measurements: Total length 120–139 μm; incus 19μm; toes 12–16 μm, subitaneous egg 30–45 × 50–65 μm.

Ecology: Collected from open water over gravel, no emergent vegetation, 8.0°C, pH 7.7, 17.4 μS cm $^{-1}$, 0.5 NTU. Dominant planktors were rotifers (10 spp.), with most abundant taxa *Polyarthra vulgaris* Carlin and *Gastropus minor* (Rousselet). Dominant microcrustacean was *Boeckella rubra* (Smith).

Etymology: Dedicated to Dr Peter Tyler, Department of Botany, University of Tasmania, in recognition of his continuing contributions to Tasmanian limnology.

Remarks: Nearly all specimens were contracted in the preservative, however analysis of the trophi showed elements resembling those of *N. trypeta* Harring & Myers (1922:602, Fig. 50:5–8), with differences in the rami and manubria. *N. tyleri* sp. nov. is slightly smaller than *N. trypeta* (150 μm) with larger mastax and longer toes (16 μm and 9 μm respectively in *N. trypeta*) Harring & Myers noted that *N. trypeta* appeared to be an obligate parasite of Cyanophycean *Gomphosphaeria*. The animals in our sample were all free-living, and no Cyanophyceae were present. We consider differences in trophi structure and habit to indicate a distinct species.

This animal belongs to a group which could be delineated from *Notommata* and defined as a new genus. It would include *Pleurotrocha (Notommata) vernalis* Wulfert, 1935, *P. (N.) chalicodis* Myers, 1933, *P. robusta* (Glascott, 1893), *Notommata thitasa* Harring & Myers, 1922, and *N. trypeta* Harring & Myers, 1922.

Trichocerca weberi Jennings
FIGS 16–17

T. weberi Jennings, 1903:309–10, Pl. I, Figs 12–14, Pl.XIII, Figs 116–7)

In a formalin-preserved sample, coll. L. Garcia, 25.ix.87, P.A. Tyler, Botany Department, University of Tasmania, (Subsample no. 2049a, Shiel Coll. MDFRC), were several females of a *Trichocera* resembling *T. weberi* Jennings, described from North America. There were appreciable differences in body and trophi measurements.

Measurements: Lorica length 140–148 μm (vs 112–120 μm for *T. weberi*); trophi 47 μm (vs. 42 μm); left toe 60 μm (vs. 40 μm); right toe 50 μm (vs. 30–36 μm); height 47 μm (vs. 45 μm). Ranges in Koste (1978) are: lorica length 95–133 μm; trophi 52 μm; left toe 30–45 μm; right toe to 42 μm; height to 50 μm; anterior cusp to 12 μm).

Remarks: The larger dimensions than the size ranges reported by Koste (1978) are notable, but in the absence of more detailed work on this species, indeed on *Trichocerca* generally, we consider this form may represent ecotypic variation. *T. weberi* is known from Qld (Russell 1961) and a billabong in Vic. (Shiel unpubl.), also from N.Z. (Jennings 1903).

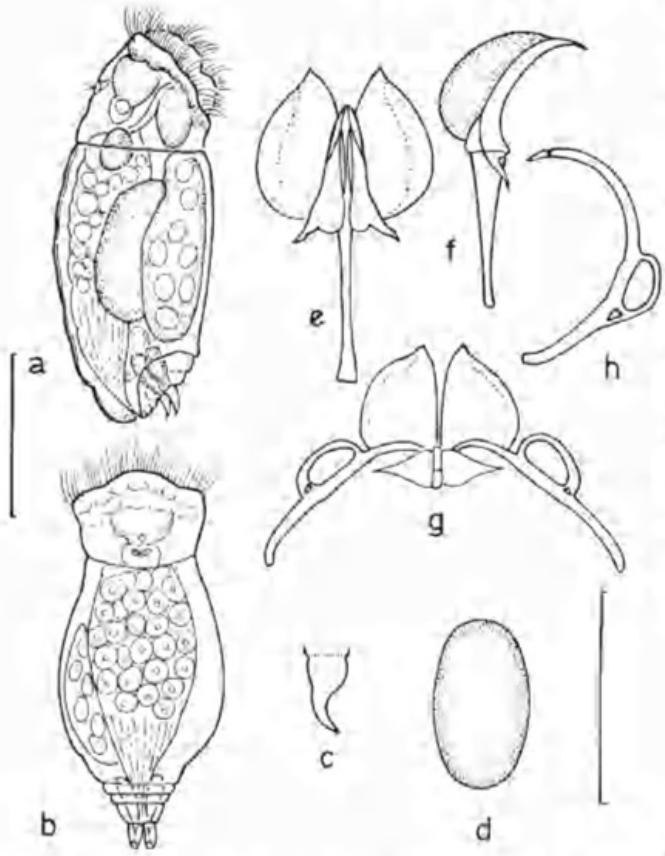

Fig. 15. *Notommata tyleri* sp. nov. a. lateral, semi-contracted; b. dorsal; c. toe, lateral; d. subitaneous egg; e. incus; f. incus, lateral; g. trophi, ventral view; h. manubrium, lateral. Scale bar left 50 μm (a–d), right 10 μm (e–h).

Discussion

Community composition

As in the earlier surveys, there was marked heterogeneity of resident rotifer communities within and between habitat categories (cf. Table 1). From 1-32 rotifer species occurred in each locality (mean = 9.95), with a distinct ranking of species richness according to general habitat type. This did not follow the same sequence as the earlier surveys, where permanent natural lakes had the most diverse rotifer communities (i.e. highest H' index) > rivers flowing from them > permanent stock dams > marshes > streams > vegetated roadside pools > stock dams > ditches.

In the 1987 survey very low species numbers were present in several of the Central Plateau lakes. In Lake St Clair, for example, only two rotifer species were recorded (H' = 0.29), whereas 16 species were present at the same site in Dec. 1985 (H' = 3.15). Extreme wind turbulence at the time of collection is a likely cause for the apparent decline; the rotifers may have been deeper and away from the shoreline, thus avoiding turbulence and abrasion from fine suspensoids.

In all other habitat categories, species diversity was higher than previously recorded, with rivers carrying the widest range of species (H' = 2.8; mean no. of taxa 11.5). Marshes and vegetated roadside pools had comparable communities (H' = 2.7; 11.9 and 9.8 spp. respectively), followed by stock dams (H' = 2.4; 10.3 spp.) > natural lakes (H' = 2.2; 10.3 spp.) > streams (H' = 2.0; 6.5 spp.) > impoundments (H' = 1.9; 7.7 spp.). Where a higher mean species number for the site category accompanies a lower diversity (e.g. impoundments vs. streams), the index used (Shannon-Weaver) (see Hellawell 1978 for comparative indices) has taken into account the relative numbers of individuals. In impoundments, the rotifer community tended to be numerically dominated by one or two species, whereas in streams a more even distribution was apparent. Overall, higher species numbers collected from the same sites by the same methods suggest a seasonal effect, considered later.

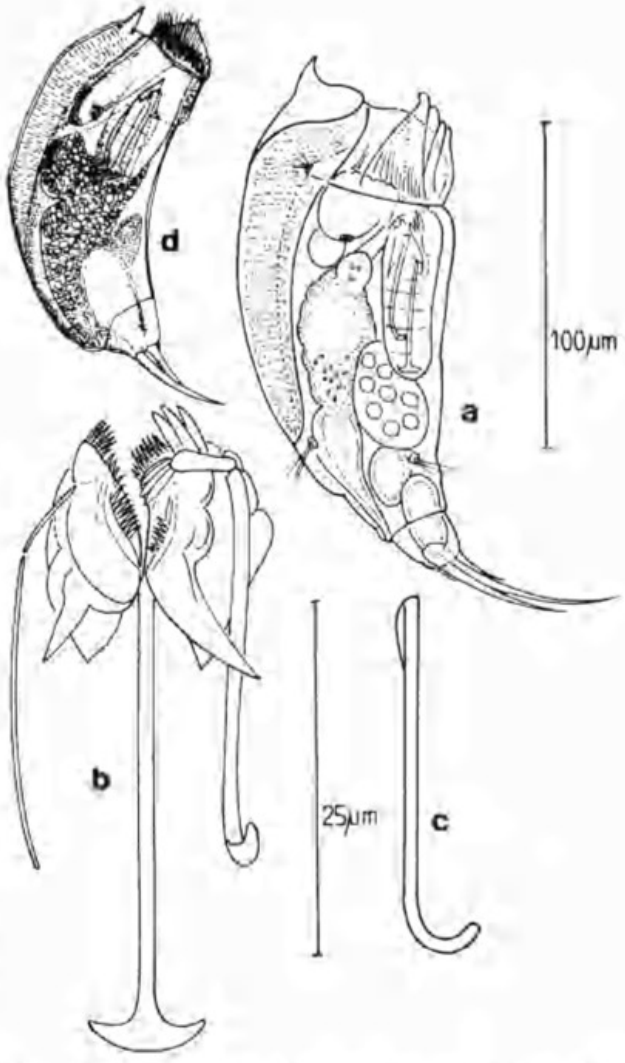

Fig. 16. a–c *Trichocerca weberi* Jennings. a. lateral; b. trophi; c. left manubrium; d. *T. weberi* from Jennings (1903).

Fig. 17. *Trichocerca weberi*, lateral, photomicrograph.

We should note here that in many of these habitat categories rotifers were not dominant in numbers or biomass. In most sites, community dominants were nauplii of the calanoid copepod *Calamoecia tasmanica*, or testate amoebae (e.g. *Difflugia* and *Arcella* spp.) These assemblages will be the subject of a detailed report at a later date (Shiel & Tan in prep.).

The new sites in the dune lake area were unexpectedly rich in species, including many of the new records given in Table 1. Site 2050, a permanent humic roadside pool near Lake Garcia, contained 32 taxa (H' = 3.9), both the highest number of species and H' index we had recorded from a Tasmanian collection. Lake Garcia (site 2049) at that time (02.x.87) contained 25 rotifer species (H' = 2.96), with only seven species common to the two sites. A subsample collected from lake Garcia 25.ix.87, a week before our visit to the same locality, was provided later by Dr P. A. Tyler (Botany Department University of Tasmania). It contained 35 taxa (H' = 4.4), including eight new records (claimed by Dr Tyler to represent "superior methods"!). Remarkably, less than ⅓ of these species (11) were present in our sample the following week. While inter-site community dissimilarity was a feature of earlier surveys, it was unexpected to find >40% similarity between intra-site samples collected a week apart. This possibly reflects a combination of intra-site patchiness of the microfauna and temporal species replacement, both of which are unstudied in Tasmanian waters, and indeed, are poorly known from mainland waters (e.g. Ganf *et al.* 1983, Shiel *et al.* 1987). More intensive study of the species-rich dune lake series clearly is warranted, particularly in view of the probable age, permanence and isolation of these lakes.

Within-habitat patchiness was evident in a series of samples from the northern shores of Lake Pedder (Fig. 1): 10 rotifer spp. occurred in a tow from the Serpentine Dam arm (western end, west of Strathgordon), with *Keratella australis* the dominant (83%). 4.5 km east of Strathgordon, *Conochilus hippocrepis* comprised 81% of the five taxa present, while at the eastern end of the lake, ca. 12 km away, *K. cochlearis* (33%) dominated the 12 taxa recorded, eight of which were not present at the opposite end of the lake.

Given the size of the impoundment, it is not unexpected that its filling submerged a range of waters with diverse planktonic and littoral microfauna. It is, nevertheless, remarkable that in a continuous and presumably mixed water mass, such distinct plankton communities are maintained. The dendritic morphology of Lake Pedder may be a contributing factor, permitting some spatial separation of mixing currents.

In general, high inter-site community dissimilarity held across the 100 localities surveyed, with only a few closely-situated morphologically or chemically similar habitats sharing more than 25% of their rotifer species. Table 2, for example, compares similarity indices of eight arbitrarily selected sites. Shared species tended to be those most widely distributed in the 1987 survey: *Keratella slacki* (44%), *Lecane flexilis* (40%), *K. australis* (38%), *Brachionus angularis* (32%), *K. cochlearis*/*Trichocerca similis* (29%), *Polyarthra dolichoptera* (26%), *Filinia longiseta*/*K. procurva* (24%) and *L. lunaris* (23%). All except *L. flexilis* and *B. angularis* were also the most widely distributed species in earlier surveys; all are widely tolerant endemic or cosmopolitan rotifers, pancontinental on the mainland. Other rotifer species in Tasmania are patchily distributed: 45 of the new records in Table 1 (76%) were collected from single habitats.

Seasonality

Two of our surveys were made in autumn, two in spring. Summer and winter surveys are desirable before more specific comments on seasonality of the Tasmanian rotifer fauna are possible. Nevertheless, different "most abundant" taxa and changes

TABLE 1. *Rotifera recorded from Tasmania for the first time. An asterisk (*) indicates a new record for Australia. Occurrence is shown by + = rare (one locality), ++ = limited distribution (>10% of localities). Habitat is given by S = stock dam, P = pond or small roadside pool, L = lake or large impoundment, R = river or stream (flowing). Known distribution on the mainland is given by state.*

Bdelloidea				
1.	*Habrotrocha angusticollis* (Murray)	+	L	NSW, NT, Qld
2.	*Otostephanus* Milne sp.			
3.	*Philodina megalotrocha* Ehrenberg	++	S	Qld
4.	*Rotaria tridens* Montet*	+	L	
Monogononta				
5.	*Asplanchna girodi* (De Guerne)	+	S	Qld, Vic
6.	*Brachionus quadridentatus ancylognathus* (Schmarda)	+	S	Vic
7.	*Cephalodella auriculata* (Müller)	+	S	Vic
8.	*C. gracilis* (Ehrenberg)	+	P	Vic
9.	*C. megalocephala* (Glascott)	+	R	NSW
10.	*C. sterea* (Gosse)	+	P	NT
11.	*C. tinca* Wulfert	+	S	Vic
12.	*Conochilus hippocrepis* (Schrank)	++	L	Qld, Vic
13.	*Dicranophorus epicharis* Harring & Myers	++	R/L	NT
14.	*D. lütkeni* (Bergendal)	+	P	Vic
15.	*Eothinia elongata* (Ehrenberg)	+	S	Vic
16.	*Euchlanis triquetra* (Gosse)	+	L	NT
17.	*Filinia longiseta limnetica* (Zacharias)	+	L	NSW, SA, Vic
18.	*Gastropus minor* (Rousselet)	++	L	NT, Qld
19.	*Heterolepadella heterostyla* (Murray)	+	P	NSW
20.	*Lecane (M.) elachis* Harring & Myers	+	P	NT
21.	*L. (M.) opias* Harring & Myers*	+	P	
22.	*L. (M.) subulata* (Harring & Myers)*	+	P	
23.	*L. (L.) doryssa* Harring	++	P	NT
24.	*L. (L.) herzigi* sp. nov.*	+	L	
25.	*L. (L.) mira* (Murray)	+	R	Qld
26.	*L. (L.) rotundata* (Olofsson)*	+	L	
27.	*Lindia ecela* Myers*	+	P	
28.	*Macrochaetus collinsi* (Gosse)	+	L	Qld
29.	*Monommata actices* Myers	+	P	NT
30.	*M. aequalis* (Ehrenberg)	+	L	Qld
31.	*M. longiseta* (Müller)	+	R	NSW, Qld, Vic
32.	*M. maculata* Harring & Myers	+	P	Qld
33.	*M. phoxa* Myers*	+	P	
34.	*M. viridis* Myers*	+	P	
35.	*Notommata cerberus* (Gosse)	+	P	NSW, Qld, Vic
36.	*N. cerberus longinus* Wulfert*	+	R	
37.	*N. pseudocerberus* De Beauchamp*	++	R	
38.	*N. tyleri* sp. nov.*	+	L	
39.	*Ploesoma truncatum* (Levander)*	+	L	
40.	*Proalinopsis caudatus* (Gosse)	+	L	NSW, WA
41.	*P. staurus* Harring & Myers*	+	P	
42.	*Ptygura pilula* (Cubitt)	+	P	NSW, NT
43.	*Resticula nyssa* Harring & Myers*	+	L	
44.	*Rhinoglena frontalis* (Ehrenberg)	+	S	
45.	*Squatinella cf. leydigi* (Zacharias)*	+	P	
46.	*Synchaeta grandis* Zacharias	+	S	NSW, Vic, WA
47.	*S. lackowitziana* Lucks	+	P	SA, Vic
48.	*Testudinella ahlstromi* Hauer*	++	L/P/R	
49.	*T. incisa* (Ternetz)	+	L	Qld
50.	*Trichocerca bidens* (Lucks)	++	L/P/S	Vic
51.	*T. braziliensis* (Murray)*	+	P	
52.	*T. dixon-nuttalli* (Jennings)	+	L	Qld
53.	*T. rosea* (Stenroos)*	++	P/R	
54.	*T. scipio* (Gosse)*	+	P	
55.	*T. similis grandis* (Hauer)	++	S	NSW, SA, Vic
56.	*T. weberi* (Jennings)	+	L	Qld, Vic
57.	*Trichotria buchneri* sp. nov*	++	L/P	
58.	*T. pseudocurta* sp. nov.*	+	L	
59.	*T. tetractis similis* (Stenroos)	++	L/P/R	

TABLE 2. *Sörenson indices for eight representative rotifer communities (0 = no species shared; 1 = all species shared).*

							1977 Stream
						0	1991 Stock Dam
					.10	0	2001 R'side Pool
				.28	.13	.21	2002 R'side Pool
			.06	.19	.26	.19	2027 Lake Pedder
		.04	.22	.09	.04	.14	2049 Lake Garcia
	.21	.07	.12	.05	.05	.20	2050 Dune Pool
0	.13	0	.06	.29	.09	.14	2066 R'side Pool
2050	2049	2027	2002	2001	1991	1977	

in species dominants within habitats are indicative of seasonal community responses. Prominent is the appearance of *Lecane flexilis*, which was neither common nor abundant in the three earlier surveys, but was relatively widespread (43 sites) and numerically abundant in many localities in 1987, and is clearly of spring occurrence.

General trends of species replacement were similar in large permanent lakes and smaller water bodies more prone to seasonal extremes, e.g. stock dams, although the species composition differed in each case. In Lake Pedder, for example, the sequence of rotifer community dominants and their proportions over the four surveys were: (1980, 4 spp., H' = 1.49) *K. cochlearis* (62%) > *Trichocerca similis* (20%) > *Pompholyx complanata* (12%); (1984, 8 spp., H' = 1.89) *Filinia pejleri* (37%) > *K. cochlearis* (37%) > *Conochilus dossuarius* (21%); (1985, 8 spp., H' = 0.82) *K. cochlearis* (86%) > *C. dossuarius* (10%) > *Hexarthra mira* (3%); (1987, 10 spp., H' = 2.19) *K. australis* (46%) > *K. cochlearis* (22%) > *C. dossuarius* (16%). Dominants in a stock dam, e.g. Wallaces, Southport (not sampled in the first survey) were: (1984, 10 spp., H' = 2.92) *Brachionus angularis* (31%) > *K. tropica* (16%) > *F. pejleri* (13%); (1985, 4 spp., H' = 1.84) *B. angularis* (46%) > *F. longiseta* (30%) > *K. slacki* (19%); (1987, 6 spp., H' = 1.40) *K. slacki* (65%) > *Polyarthra dolichoptera* (23%) > *B. angularis* (7%).

Zoogeography

Each field survey has added considerably to the known Tasmanian rotifer fauna; 62 spp. in 1980/84, 120 in 1985, 59 in 1987. Predictably, the proportion of first records for the island has declined: 75%..47%..35% as each survey has collected a greater proportion of known species.

To date, 12 new rotifer taxa have been described from Tasmania, with one subsequently recorded from the southeast of S.A. (Koste & Shiel 1986). This represents only 4% endemicity relative to ca. 12% on the mainland, but notably approx. 20% (49 species) of the extant Tasmanian fauna is not recorded from the mainland. Of those remaining species listed in Table 1 which are known from the mainland, 16 (44%) are recorded only from northern N.S.W., N.T. or Qld.

Too many gaps exist in the sampling record to allow more than speculation on the apparent disjunct distribution of many rotifers previously considered tropical taxa. The classification of these species as "pantropical" by reviewers (e.g. Koste 1978) indicates only that they have been collected mainly in the tropics. Interesting anomalies occur; e.g. a distinctively tropical component of the rotifer fauna was recorded downstream of heated outflows from nuclear power plants on the Loire River (Lair 1980), seen as a response to human interference.

The significant "tropical" component in the Tasmanian rotifer fauna may represent relict populations from an earlier period, or opportunist species occupying suitable habitats. Either alternative depends on the moderate environmental conditions of much of Tasmania's "lakeland".

A longitudinal sample series east of the continental divide would determine if the distributions are real, or simply those of collectors! Although some of our mainland samples have been collected from Cape York, at 11°S, and some in this series below 43°S, our most intensive surveys have been west of the continental divide, where alkaline, highly turbid waters bear little resemblance to those of Tasmania.

Acid humic waters certainly occur at higher altitudes along the divide, but little is known of their aquatic microfauna. These waters, or lower altitude sheltered waters east of the divide, may provide refuges for taxa hitherto considered "tropical", and explain the apparent disjunct distributions.

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CONTRIBUTIONS TO THE TAXONOMY OF STIGMODERA (CASTIARINA) (COLEOPTERA: BUPRESTIDAE)

*BY S. BARKER**

Summary

Three new synonyms of *Stigmodera (Castiarina)* are recognised (valid name is given last): *acuta* Deuquet = *delicatula* Kerremans; *tripartita* Kerremans = *deserti* Blackburn = *atricollis* Saunders. *S. mimus* Saunders is resurrected from synonymy. Ten new species of *Stigmodera (Castiarina)* are described: *S. ashburtonensis* sp. nov., *S. deliciosa* sp. nov., *S. distantia* sp. nov., *S. macquillani* sp. nov., *S. mayoiana* sp. nov., *S. murchisonensis* sp. nov., *S. sedlaceki* sp. nov., *S. tepperi* sp. nov., *S. watkinsi* sp. nov. and *S. williamsi* sp. nov.

KEY WORDS: New species, *Stigmodera (Castiarina),* Coleoptera, Buprestidae