Answer to ‘What Rotifer is that?’

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Walter Koste solved the problem of the interested Pond Hunter very neatly. For 20 years he has written regular articles about his favourite animals for his local naturalist/microscopist journal Mikrokosmos ('Microcosm'). These were titled 'Das Radertier Portrait' ('A rotifer portrait'), dealing with the peculiar habits of particular species of rotifer, on the diversity of species in a genus, and so on. About 30 of these small natural history papers were prepared between his larger monographs and classic 1000 page, 2 volume treatise on the rotifers of middle Europe, which was published in 1978.

What has all this effort produced? When Dr Koste saw his first Australian rotifers in 1976, there were about 250 named species known from Australian waters (there are more than 2000 rotifer species known globally). Many of these species had been named by early visitors to our shores, who compared them to familiar animals "back home", and often named them for the species they most closely resembled. This is like calling an echidna a porcupine — they are superficially similar, but are not closely related. The widespread use of northern hemisphere taxonomic works such as Ward and Whipple's 'Freshwater Biology', as mentioned above, or Pennak’s ‘Freshwater Invertebrates of the United States’ has further encouraged the spread of northern hemisphere names for animals which may be as distinctively Australian as kangaroos and koalas. 16 years, 3500 samples and 24 publications later, we now know about 700 rotifer species from Australia, with more than half the species in some genera apparently indigenous. There are very distinctive biogeographical associations in some areas, e.g. Kakadu, N.T., Tasmania's west coast dune lakes, southwest W.A. It is likely that less than half of the existing species have been described, and it is also probable that many have been lost already, unseen.

For the interested pond hunter, the task of finding out which rotifer lives in his neighbourhood pond or dam becomes a

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major task when 50-60 species may co-occur, with seasonal appearances of possibly 100-150 other species. The reason for this species richness is seen in the specialization of these small animals, most less than 0.5 mm. They occupy all available spaces in their 3-dimensional world — the more diverse that world is, the more spaces there are for them to occupy: herbivores floating in open water graze on small algae, bacteriovores graze bacterial films from submerged leaves, omnivores burrow in sediment on the bottom to eat dead and decaying organic matter, carnivores prey on sessile or free-swimming rotifers or microcrustacea, and parasites live on or in various other aquatic plants and animals. Closely related species may partition their habitat spatially by feeding on something slightly bigger or smaller than do their ‘cousins’, or temporally by hatching at a different time of the year.

A general review of Australian rotifers, among other groups, is given by Bill Williams (1980) in ‘Australian Freshwater Life’ (Macmillan). To identify the level of family may be possible with the northern hemisphere works mentioned above, but to identify to genera or species, the keys of Walter Koste are required. Only about half of the planned Australian papers have been published, the others are in various stages of preparation. The published papers can be obtained from R.J. Shiel, and interested readers can be placed on a mailing list for the remainder as they are produced. Ultimately the group will be reviewed in the Fauna of Australia series (Australian Biology Resources Study, Canberra). Should there be sufficient interest, a small field guide to families and genera could be produced.

Now, you may guess that I have been avoiding the original question - to identify your rotifer is relatively simple if it has a lorica, a hard proteinaceous 'shell', into which it withdraws if threatened. Most common loricate rotifers in Victorian waters are the Brachionidae, particularly the genera Brachionus and Keratella, the Euchlanidae and the Mytilinidae, all readily identified from the patterning, spines, etc. of their lorica. Keys are available for most of these loricate families. The illoricate rotifers, those without a firm casing, present more of a problem. They are best studied alive to determine their extended morphology, which is necessary to place them into family and genus. Preservation usually leaves a contracted blob and considerable frustration to the pond hunter. To determine species, it may be necessary to preserve and clear the rotifer to examine its specialized mouthparts — the trophi of rotifers appear to be species-specific. Since these are tiny structures, sometimes as small as 20 μm, oil immersion or scanning electron microscopy is necessary. Some of the illoricate family keys are already available, with the rest due in the next two years.

My answer at our present stage of understanding of these tiny animals is: identify them as far as you can using available literature, with due caution if it is not an Australian publication. If you can make permanent mounts, do so, or if you can make a sketch or have access to a microscope-mounted camera, take photographs. Failing all else, send your photograph, drawing, mounted slide, or original water sample to R.J. Shiel, P.O. Box 921, Albury 2640 to help answer the question!

References
Note that all parts of ‘Rotifera from Australian Inland Waters’ issued to date, are in the FNCV Library and are available to members of the Club, or an inquiry at the Municipal, TAFE or University Libraries will give information where the various parts may be seen.

Koste, W. and R.J. Shiel. ‘Rotifera from Australian Inland Waters’-


