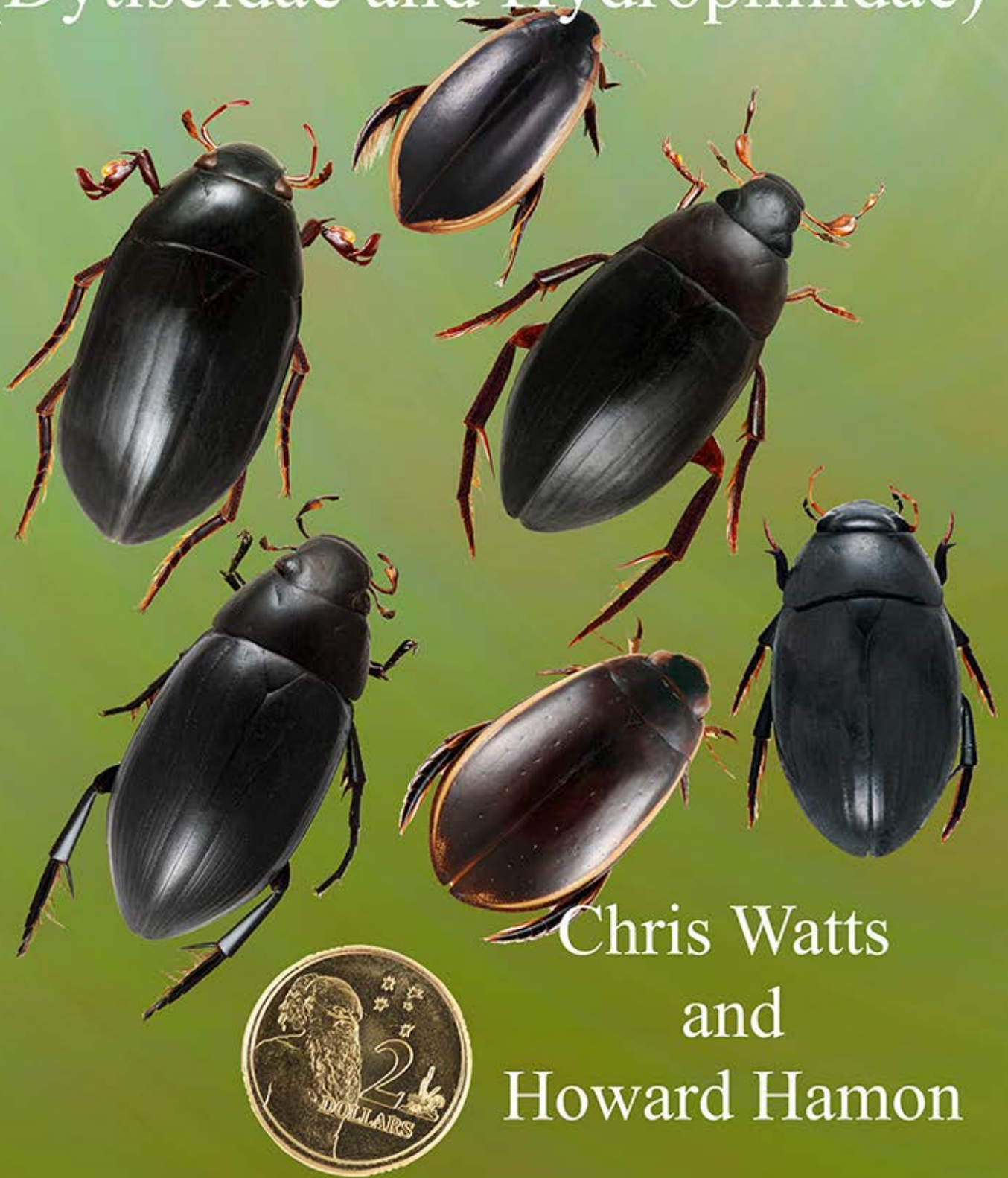


Pictorial Guide to the
Large Water Beetles of Australia
(> 17 mm in length)
(Dytiscidae and Hydrophilidae)



Chris Watts
and
Howard Hamon

Pictorial Guide to the large water beetles of Australia (those > 17mm in length)

Families Dytiscidae and Hydrophilidae

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Introduction and scope

There are several hundred water beetles known from Australia. Most are small, many less than 2mm long, and as a consequence are not easy to put a name to and without a name they are for all intents and purposes invisible. They can't usefully be talked about or utilized in environmental projects or just admired for their own intrinsic selves. Some groups are physically distinctive - such as the whirligig beetles (family Gyrinidae) or the crawling water beetles (family Haliplidae) lending themselves more easily to study. Sometimes, by dealing with a restricted area, it is possible to construct a pictorial guide to some of the area's aquatic beetle inhabitants. The present guide takes another approach by restricting the number of species by size – those over approximately 17mm long with many >20mm long. By doing this we hope that all the larger water beetles of Australia can be identified pictorially and hence contribute to environmental studies by Water Watch groups, school groups, environmental studies groups and generally take their place as interesting and assessable subjects of natural history activities in Australia.

This guide covers all the Australian water beetles longer than 17mm. These belong to two families: the predaceous diving beetles, family Dytiscidae, (sometimes called predaceous diving beetles or just diving beetles) and the scavenger water beetles, family Hydrophilidae. The only other large, adult, aquatic insects in Australia are in the order Hemiptera commonly called bugs, the most spectacular being the giant water bug (*Lethocerus* sp.), which reaches a massive 70mm long, from northern Australia although occasional specimens have been found as far south as Adelaide. Mature bugs, both terrestrial and aquatic, can be distinguished from beetles most easily by the way their fore-wings (elytra in beetles) are folded when not flying. In bugs these are crossed over their backs whereas in beetles they come together in a straight line. Another way is to remember that 'bugs suck and beetles chew' which is represented by the sharp piercing beak in bugs (think bedbug) and jaws in beetles which, in larger species, can deliver a sharp nip. There are a few species of beetle not included here that approach 17mm in length with the occasional large individual reaching this size. So be a bit careful when trying to identify a beetle close to 17mm long as it might not be included in this guide. The majority of these possible species have colour patterns on their elytra in contrast to the unicolor or unicolor with yellow margins of the species dealt with in this guide.

Other guides in the series. <http://www.samuseum.sa.gov.au/research/biological-sciences/terrestrial-invertebrates>

- Pictorial Guide to the Australian Whirligig Beetles. Chris Watts & Howard Hamon. 2010.
- Pictorial Guide to the Diving Beetles (Dytiscidae) of South Australia. Chris Watts & Howard Hamon, 2014.
- Pictorial Guide to the Haliplidae (crawling water beetles) of Australia. Chris Watts & Howard Hamon, 2015.
- Pictorial Guide to the Screech beetles (Hygrobiidae) and Burrowing water beetles (Noteridae) of Australia. Chris Watts & Howard Hamon, 2019.
-

Predaceous water beetles (Dytiscidae) of Australia

Notes and Life history. Predaceous water beetles can be found in almost all fresh water habitats from rapid rivers, slow moving creeks, ponds, swamps, the sides of waterfalls and even underground aquifers. In all these their life histories are similar with three larval instars, a pupal stage out of water usually in a mud cell, followed by the adult stage (Yea, 2014). Adults return to the water but most species are strong flyers and can disperse widely, often being collected at lights at night. Both the adult and larval stages are air breathing and most have to come to the surface of the water to replenish their air supply which in adults is held beneath their wing cases. Size is important with many of the smaller species not requiring to replenish their air supplies but, in both adult and larval stages, can exchange gases directly with the water. The larvae are active carnivores preying on everything from small crustaceans and worms to small fish. The larger species such as those included here have larvae with hollow or grooved mandibles and inject digestive fluid into the body of the prey before sucking the part-digested material into their mouths. Adults simply catch and chew, with many species targeting freshly dead insects and small vertebrates.

In southern areas with a seasonal climate adults appear to overwinter in sheltered places, and in the spring, lay their eggs in water on aquatic plants or debris, with larvae appearing soon after. The three larval stages take about 1–2 months. In the north adults can be found all year round but larvae are more seasonal and found predominately during the ‘wet’ summer season. However no systematic study of the life history of predaceous water beetles in Australia has been made with the exception of the very atypical subterranean fauna in Western Australia. Here seasons are muted and breeding seems to be related to water surges through the underground aqueducts caused by high local rainfall. This is an area where good, regular recording would be valuable.

Most predaceous water beetles, other than the subterranean ones, particularly the larger ones included here, are strong fliers and are often attracted to lights. Species found in inland areas such as *Cybister tripunctatus*, can fly long distances and are often the first insects to colonize newly available water. Adults are also strong swimmers using their large paddle-shaped back legs. The larvae of the large species included here also swim well.

Taxonomy. The naming of Australian predaceous water beetles and the working out of their relationships to each other (Phylogeny) is relatively settled (Miller & Bergsten, 2016). The species level taxonomy of the beetles included in this guide is also relatively settled but even with the large beetles included in this guide two new species have been found and described recently (Hendrich, 1997, 2003). Six genera are included here: *Austrodytes*, *Cybister*, *Hyderodes*, *Onychohydus*, *Spencerhydus* and *Sternhydus*. *Cybister* is a large genus with species in most of the warmer parts of the world. The others are restricted to Australia except for one species of *Onychohydus* in New Zealand and with three poorly known species of *Sternhydus* in western New Guinea (Papua). The taxonomy of the larvae is less well developed but all genera other than *Austrodytes* are at least superficially known to a level that will allow identification (Watts, 2002).

Scavenger water beetles (Hydrophilidae) of Australia

Notes and Life history. Species in the genus *Hydrophilus* are large to very large water beetles found throughout the world. They are often relatively common – so common that some species are sold as food in street markets in Southeast Asia.

Adult scavenger water beetles are relatively weak swimmers with most of the small species restricted to very shallow water or vegetation-rich water. However the larger species included in this guide have quite robust swimming hind legs which enable them to reach the surface when in deeper water. Eggs are laid in late winter or spring in silk cocoons attached to underwater plant stems, often with a silken tube/snorkel leading to the surface to provide air. The grub-like larvae swim weakly if at all and are more or less restricted to areas where they can crawl to the surface to obtain fresh air, which they do through a rather complex apical opening of their two main breathing tubes. Several small to moderate sized species have lateral gills through which they exchange gases, i.e. breathe, allowing these larvae to remain under water hunting for their invertebrate prey.

The larvae of a number of species of Australian *Hydrophilus* are known (Watts, 2002) but specific details have not yet been described.

Taxonomy. All the species included in this guide belong to the genus *Hydrophilus* which can be separated from the predaceous water beetles included here by their club-shaped antennae rather than the long and thin ones of the predaceous diving beetles. Their upper surfaces are all uniformly shiny black, sometimes with a distinct greenish tinge.

Their identification is predominately based on males; their genitalia, morphology of their front feet and the form of their maxillary palpi, often to the extent that identifying females is difficult. With a limited number of species in Australia, large size differences between the species and the restricted distribution of some species we hope their identification using this guide will be possible without resorting to detailed examination of the male genitalia or front feet (tarsi).

Plate 1

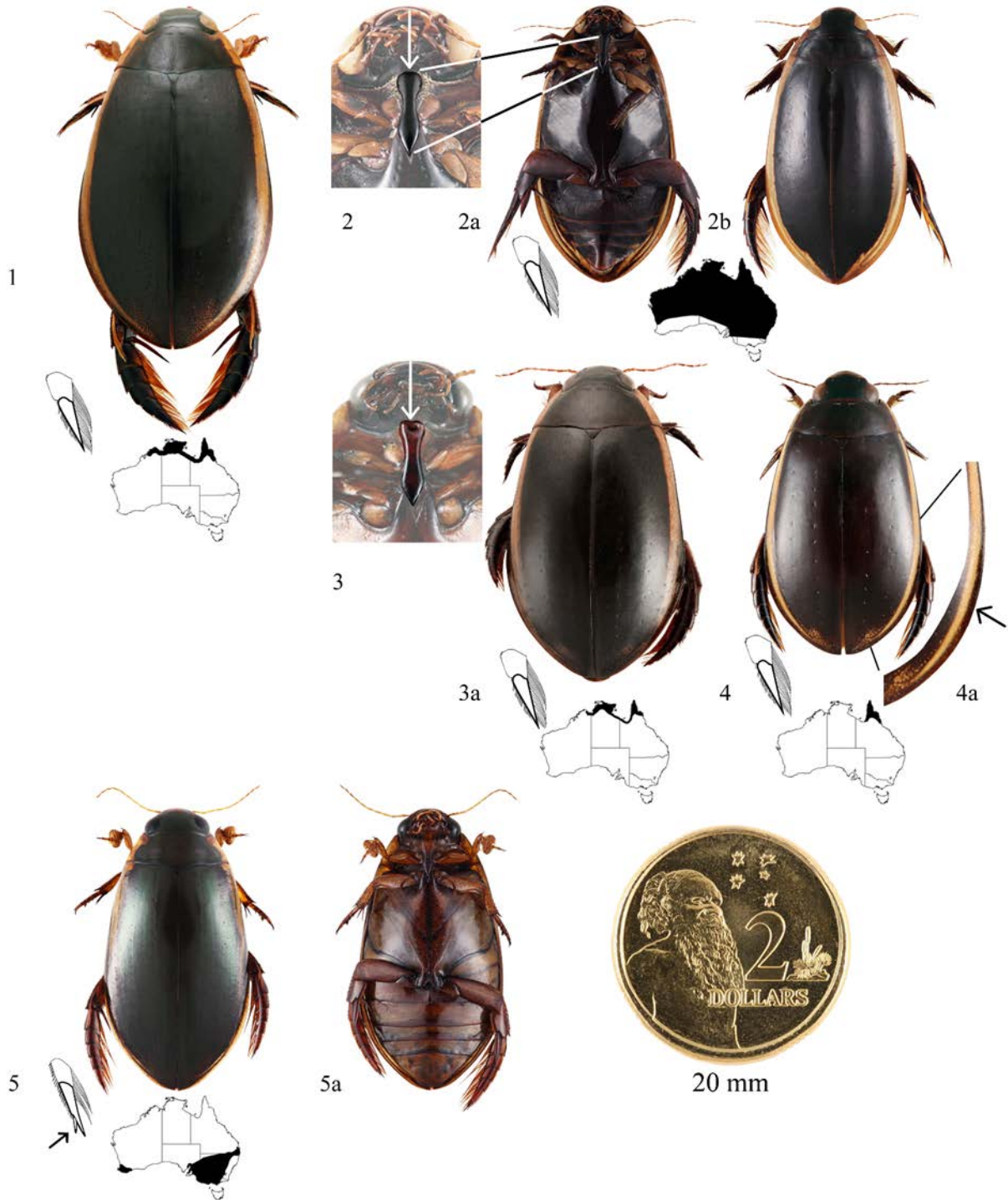


Plate 1, Figs 1–5. Predaceous water beetles of Australia, the largest species (22–36mm long). Distribution maps and line drawings of the hind claws – one in the genus *Cybister*, two in the genus *Onychohydrus*. 1, *Cybister godeffroyi*. 2a and 2b, *Cybister tripunctatus* dorsal and ventral views, 2c, portion of ventral surface showing absence of a groove at the front of the pronotal process. 3a, *Cybister yulensis*, 3b, arrow points to groove at the front of the pronotum process (marked in dark). 4. *Cybister loxidiscus*, 4a, enlargement of lateral edge of elytra. 5, *Onychohydrus scutellaris* dorsal and ventral views nb. two hind claws and yellowish ventral surface.

Plate 2

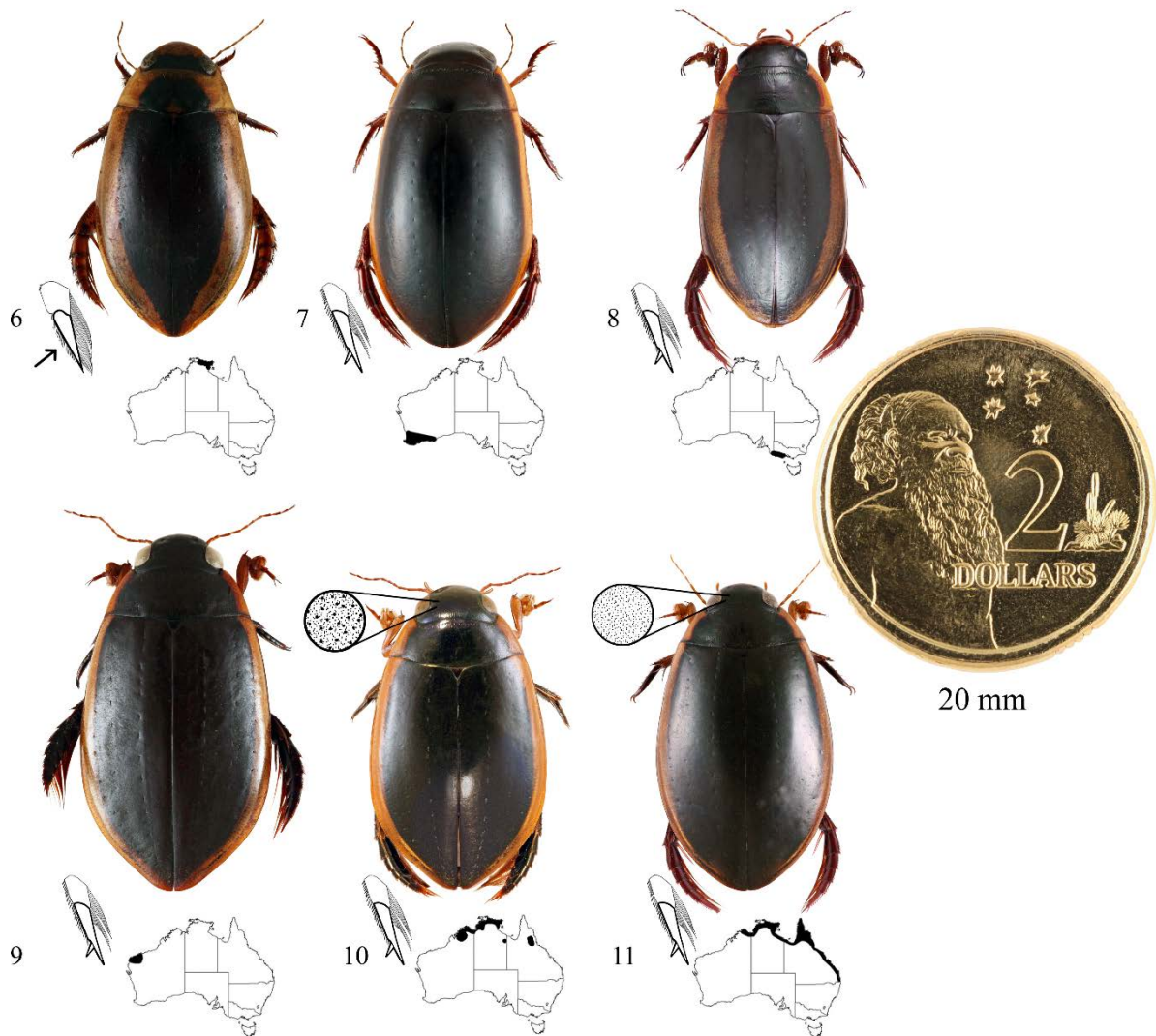


Plate 2, Figs 6–11. Predaceous water beetles (17–21mm long) of Australia. Distribution maps and line drawings of the hind claws – one in the genus *Cybister*, two in other genera. 6, *Cybister weckwerthi*. 7, *Spencerhydrus pulchellus*. 8, *Spencerhydrus latecinctus*. 9, *Austrodytes platoni*. 10, *Austrodytes insularis*. 11, *Sternhydrus attratus*. Circles show enlargement of prortal punctation.

Plate 3

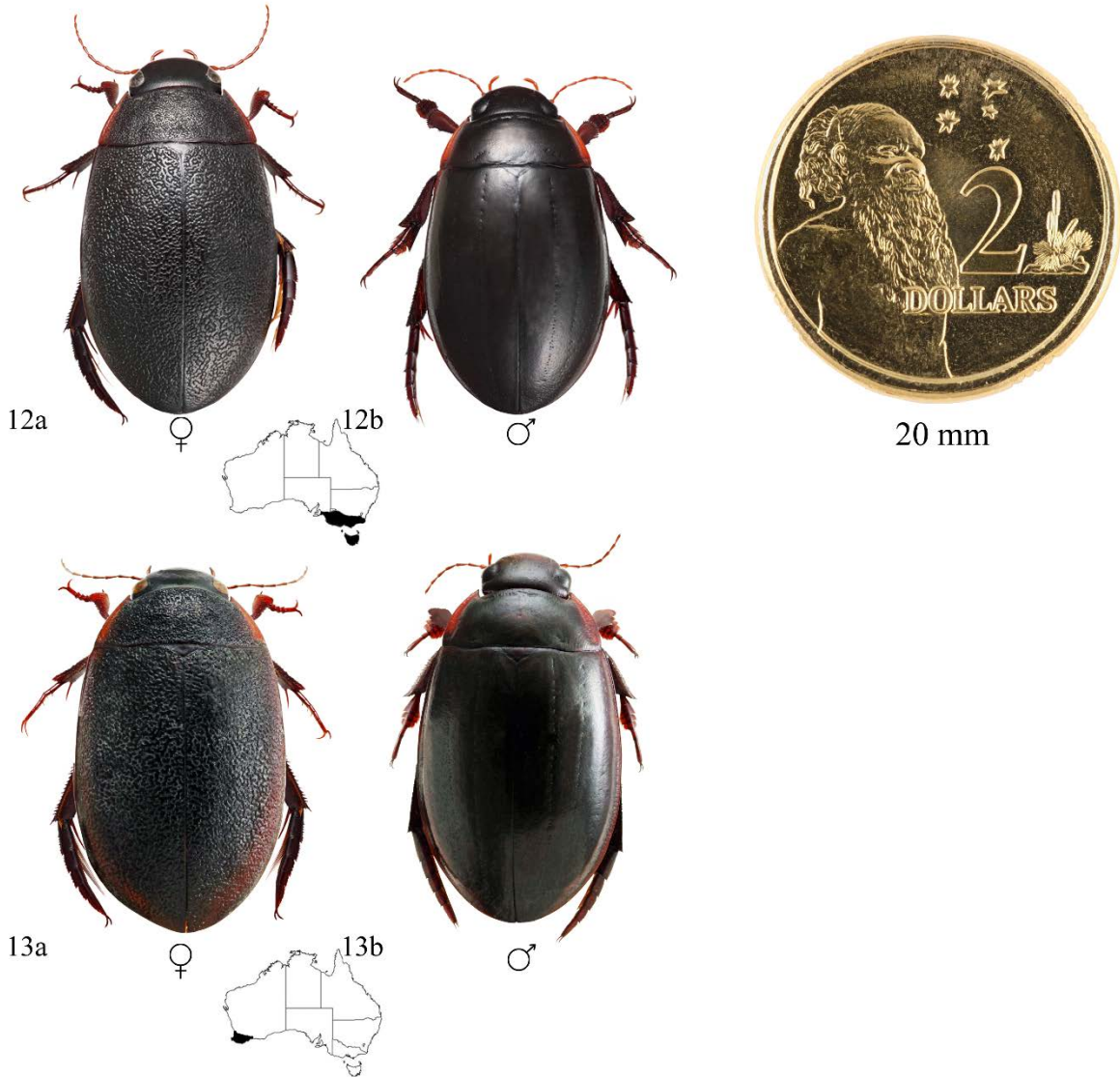


Plate 3, Figs. 12–13. Predaceous water beetles (17–21mm long) of Australia, continued.
12, *Hyderodes shuckardii*, a, female, granulated form, b, male. 13, *Hyderodes crassus*, a, female, granulated form, b, male.

Plate 4

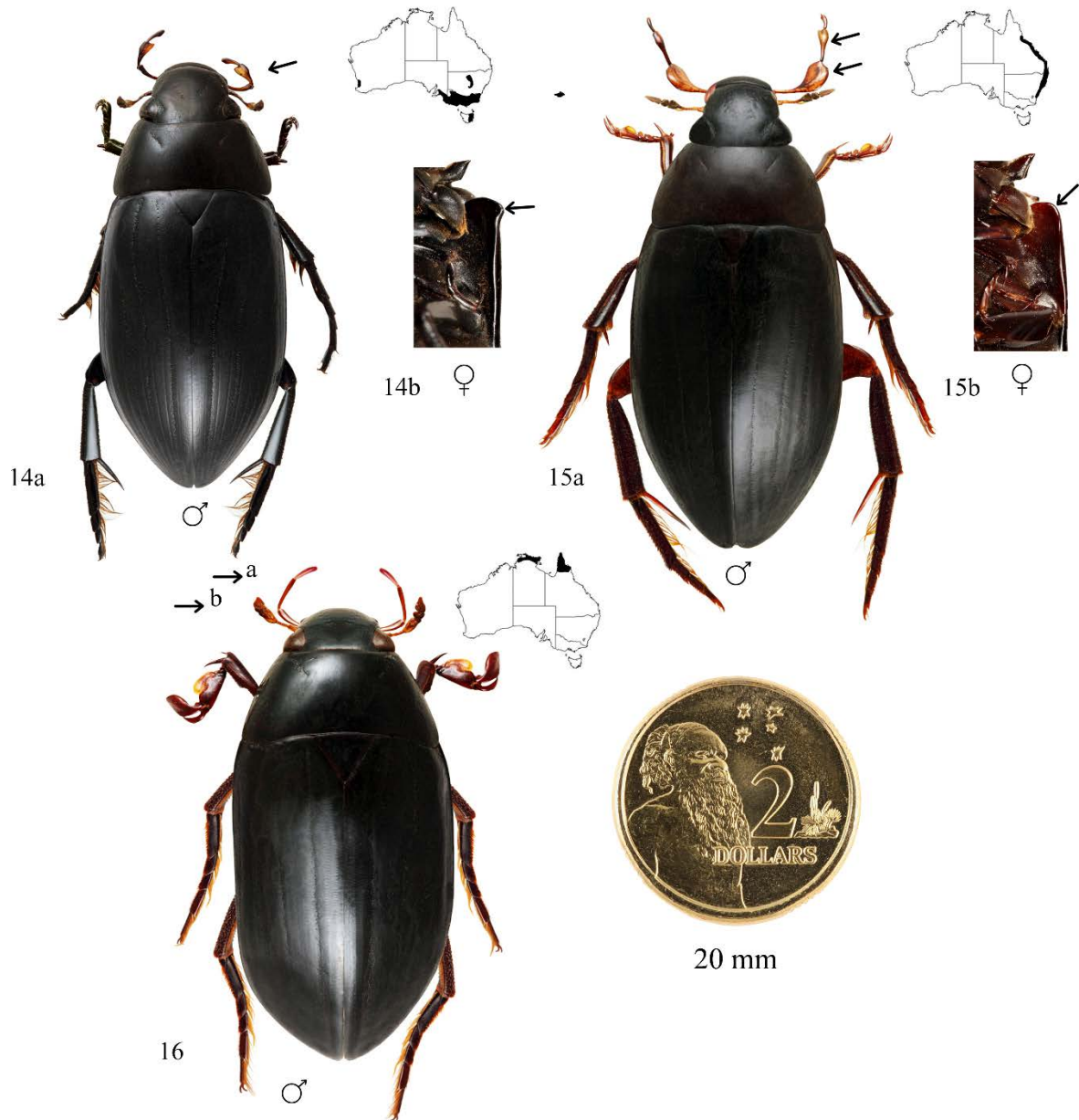


Plate 4, Figs 14–16. Scavenger water beetles of Australia; the three largest species (30–40mm long). 14, *Hydrophilus latipalpus*, a, male, b, side view of front of pronotal keel in female showing slight bulge. 15, *Hydrophilus pedipalpus*. a, male, b, lateral view of pronotal keel in female, showing absence of bulge. 16, *Hydrophilus macronyx*, male, a, maxillary palpus; b, antenna.

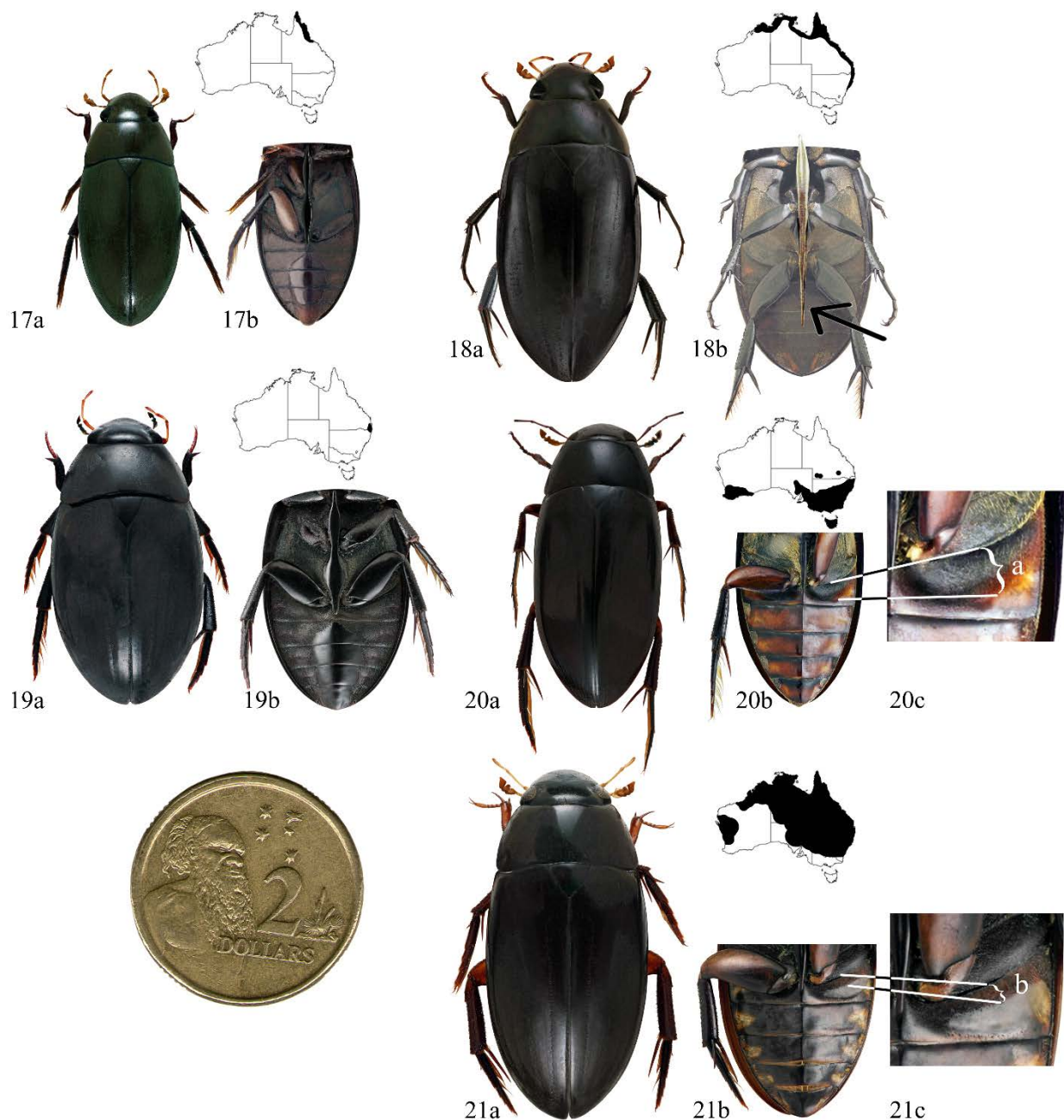


Plate 5, Figs. 17–21. Scavenger water beetles of Australia (17–35mm long). 17, *Hydrophilus watsi*, a, dorsal view, b, ventral view of basal half showing extent of rugose sculpture on abdomen. 18, *Hydrophilus bilineatus*, a, dorsal view, b, ventral view showing very long ventral spine. 19, *Hydrophilus infrequens*, a, dorsal view, b, ventral view showing extent of rugose sculpture on abdomen. 20, *Hydrophilus albipes*, a, dorsal view, b, ventral view showing relatively narrow basal segment of hind leg, c, ventral view showing wide rugose portion on first abdominal segment (a). 21, *Hydrophilus breviceps*, a, dorsal view, b ventral view showing broad basal segment of hind leg, c, enlargement showing relatively narrow area of rugose sculpture on first abdominal segment (b).

Predaceous water beetles (Family Dytiscidae) of Australia (Figs 1–13)

Fig. 1. *Cybister godeffroyi*

The largest (33–36mm long) of the Australian species of predaceous diving beetles is found in shallow, still water on Cape York and in coastal areas of the Northern Territory. Its large size separates it from all other Australian predaceous diving beetles. Larvae known (Watts, 2002).

Fig. 2. *Cybister tripunctatus*

By far the commonest large (25–28mm long) predaceous diving beetle in Australia, found in still or slowly moving water over most of the warmer areas of the continent. It, or closely related species, are found in southern Asia, North Africa and even southern Europe. The other five species of the genus *Cybister* in Australia are only rarely encountered and are restricted to the north coast. In the south *Cybister tripunctatus* overlaps in distribution with a more southern species of predaceous diving beetle, *Onychohydrus scutellaris*, a similar sized beetle with near identical dorsal colouring but easily separated by its lighter ventral colour in contrast to the near black ventral surface in *Cybister tripunctatus*. A good flyer it is often attracted to lights. Larvae known (Watts).

Fig. 3. *Cybister yulensis*

A large beetle (30–32mm long) found in still water in coastal regions of the Northern Territory and coastal regions of Cape York south as far as Cairns. It also occurs in New Guinea. Separated from *Cybister tripunctatus*, which is often found with it, by a distinct pit in the front portion of the pronotal process which often has a greenish tinge and, in the female, by both the pronotum and the base of the elytra having deep longitudinal scratches. Larvae not known.

Fig. 4. *Cybister loxidiscus*

Smaller than *Cybister tripunctatus* (25mm long) and restricted to swampy areas of Cape York and southern New Guinea. An almost black, oval, deep bodied species. From the much commoner *Cybister tripunctatus* it differs in the lateral bands of yellow on the elytra not reaching the sides of the elytra, darker dorsal colour and a chunkier shape. A little known species. Larvae not known.

Fig. 5. *Onychohydrus scutellaris*

One of the largest (25–29mm long) predaceous diving beetle in Australia, *Onychohydrus scutellaris* is a southern species which is found relatively commonly in warmer months in still water from the southwest of Western Australia around the coast almost to Brisbane. In more northern parts of its distribution it overlaps with the similar sized and dorsally coloured *Cybister tripunctatus* from which it can be separated by its lighter coloured ventral surface and having one rather than two claws on its hind feet. Larvae are known Watts (2002). The genus has only one other species; *Onychohydrus hookeri* (White) which is restricted to New Zealand.

Fig. 6. *Cybister weckwerthi*

The smallest of Australian *Cybister*, *Cybister weckwerthi* is recognised by its parallel sided shape, (17–18mm long) and localised distribution. It is found, rarely, in billabongs in coastal Arnhem Land. It can be separated from the similar sized *Austrodytes insularis* and *Sternhydrus atratus* by the hind legs having only one claw, and, from the species of *Austrodytes* by the weak pronotal punctuation. Larvae not known.

Fig. 7. *Spencerhydrus pulchellus*

Among the smaller species (15–19mm long) included in this guide, *Spencerhydrus pulchellus* is restricted to the southwest of Western Australia. Here it can be relatively common in spring in shallow well-vegetated often seasonal water bodies. The only species in this size range and colour in southern Western Australia it is easily recognized by the broad yellow band on its dorsal surface and rather parallel-sided body. It is very similar to *Spencerhydrus latecinctus* from southeast Australia but apart from its locality can be recognised by its more strongly flanged pronotum. The width of the yellow band on the elytra is quite variable in both species of *Spencerhydrus* and cannot be used to distinguish them as once thought (Watts, 1978). The genus *Spencerhydrus* is restricted to southern Australia. Larvae known.

Fig. 8. *Spencerhydrus latecinctus*

This southeastern Australian species (17–20mm long) closely resembles the Western Australian *Spencerhydrus pulchellus*, differing from that species most noticeably in the less strongly flanged pronotum. Most commonly found in the more acidic swamps of the southeast of South Australia and adjacent Victoria. There are occasional records from further east in Victoria. Relatively rare except in specific locations. Larvae known (Watts, 2002).

Fig. 9. *Austrodytes platoni*

Found in cool, spring-fed pools in rivers and creeks in the Pilbara region of Western Australia. It is the only small (17–20mm long) predaceous water beetle with a greenish dorsal surface bordered with yellow known from this region. It is also larger than the more northern, *Austrodytes insularis*, which potentially could also occur in the Pilbara, but it can be further separated from this species by the micro reticulation on the dorsal surface giving it a matt finish. Larvae not known.

Fig. 10. *Austrodytes insularis*

A relatively small species (17–18mm long), rather flat and distinctly wider behind the middle. *Austrodytes insularis* is found in small creeks and streams, often in rocky areas, around the north coast from the Kimberley to Cape York. In overall size resembling both *Cybister weckwerthi* and *Sternhydrus atratus* but differs from these species in its general shape and in having both large and small punctures on the pronotum and elytra and, from *Cybister weckwerthi*, by the presence of a second claw on the hind leg about half the length of the longest. From the only other species of *Austrodytes*, *Austrodytes platoni*, it is noticeably smaller and differs in distribution with *Austrodytes platoni* not yet being found outside of the Pilbara region of Western Australia. Larvae not known.

Fig. 11. *Sternhydrus atratus*

One of a group of moderate sized predaceous water beetles (15–19mm long) with a greenish dorsal surface with a yellow border. *Sternhydrus atratus* is widespread and relatively common in the coastal areas of the Northern Territory and south around the coast to northern New South Wales. It is found in shallow, still or slowly moving water in creeks. Superficially resembles *Cybister weckwerthi* and *Austrodytes insularis* but it can be separated from these species by the uniformly small pronotal punctures and, in the case of *Cybister weckwerthi*, two hind claws rather than only one. In older literature the species was included in the genus *Onychohydrus* (and before that *Homoedytes*). Larva known (Watts, 1965).

Fig. 12. *Hyderodes shuckardii*

(17–21mm long). A close relative of the Western Australian *Hyderodes crassus*, *Hyderodes shuckardii* is found in still water in southeast South Australia, Victoria, southern New South Wales and Tasmania, particularly during late winter and spring. It can be common in some water bodies. It was once (1950s) found in the Adelaide hills but appears to be extinct there. Very similar morphologically to *Hyderodes crassus* but its prosternal process is narrower and more convex and the flanges on the elytra are slightly stronger. Like its Western Australian relative, females are dimorphic, some with smooth wing-cases and others with strongly crinkled surfaces. This may be a result of a “sexual arms race” (see under *Hyderodes crassus*). Larvae known (Watts, 2002).

Fig. 13. *Hyderodes crassus*

A moderately large (18–21mm long), compact, black species restricted to the southwest of Western Australia. Found in shallow, still, water bodies it is the only all black, or nearly so, predaceous diving beetle in the southwest although there are three large black scavenger water beetles known from the region (see below). Females are dimorphic, one form with and one form without extensive dorsal rugosity (Fig. 13). It is thought that this may be due to a “sexual arms race” with a rough surface being more difficult for the suckers on the male front legs to gain a grip during mating (Bergsten & Miller 2007). Very similar morphologically to *Hyderodes shuckardii* but has a wider, flatter prosternal process and stronger side flanges to the elytra. Larvae known (Watts, 2002).

Scavenger water beetles (Family Hydrophilidae) of Australia (Figs 14-21)

Fig. 14. *Hydrophilus latipalpus*.

Hydrophilus latipalpus is a large (35–40mm long) species with an extensive distribution throughout Victoria and Tasmania and in the south of Western Australia, South Australia, and New South Wales. It is the only large *Hydrophilus* species over most of this area but it is likely that it overlaps with *Hydrophilus pedipalpus* in the south coast region of New South Wales. In the southeast of South Australia it is common in shallow water in spring and in some years large numbers can be seen flying around street lights in spring and summer. Males are easily recognised by the enlarged second segment of the maxillary palpus in contrast with the first segment in *Hydrophilus pedipalpus*. Females have a downward bulge at the front of the sternal carina absent from *Hydrophilus pedipalpus*. Larvae known.

Fig. 15. *Hydrophilus pedipalpus*

One of a trio of large (32–36mm long) species (the others being *Hydrophilus latipalpus* and *Hydrophilus macronyz*). *Hydrophilus pedipalpus* occurs quite commonly in swamps and at lights up the east coast from the Victorian border to Cairns. In the south its range may just overlap that of *Hydrophilus latipalpus* and in the north that of *Hydrophilus macronyz*. Males can be separated from both of these species by the form of the maxillary palpi in which the first segment is greatly enlarged. The relatively simple form of the front claws in the male also separates it from *Hydrophilus macronyz*. Females however are hard to distinguish. There are differences in the extreme front of the sternal carina which is slightly raised in female *Hydrophilus latipalpus* but rounded and flat in female *Hydrophilus pedipalpus*, a character best seen when specimens of both species can be directly compared. Usually the location can be used to identify the females but in southern New South Wales the two species probably overlap in distribution. Larvae not known.

Fig. 16. *Hydrophilus macronyz*

One of the largest species (34–40mm long) of Australian *Hydrophilus* but also one of the rarest, *Hydrophilus macronyz* has been collected spasmodically from coastal swamps in the Northern Territory and Cape York. The only large *Hydrophilus* in the north it can be recognized by its robust hind legs in both sexes and the enlarged front claws in the male. Larvae not known.

Fig. 17. *Hydrophilus wattsi*

A relatively small (18–20mm long), narrow species from swamps on Cape York and coastal areas as far south as Townsville. The distinct greenish tinge particularly when dry and extensive area of rugosity on the abdomen, separates it from all other Australian *Hydrophilus* except the more southerly and broader *Hydrophilus infrequens*. First described by Watts as

Hydrophilus viridus to reflect its green tinge, the name was changed to *Hydrophilus wattsi* as the original name was already in use for a different species of *Hydrophilus*. Larvae not known.

Fig. 18. *Hydrophilus bilineatus*

A relatively small, narrow species (20–30mm long) found across the tropical north of Australia and as far south as northern New South Wales. Easily recognized by the very long spine-like sternal carina which reaches nearly half way along the abdomen. Commonly collected from shallow well-vegetated swamps. It is also common at lights. Outside of Australia it has a wide distribution occurring in Fiji, New Guinea, Indonesia, South East Asia, India, China, Philippines, Taiwan, Japan and Korea. Larvae not known.

Fig. 19. *Hydrophilus infrequens*

A medium sized (24–25mm long), rather chunky, distinctly greenish species known only from a few specimens from near the Queensland-New South Wales border. The large extent of rugosity on the abdomen and pronounced greenness when dry separate the species from all other Australian *Hydrophilus* except the slimmer and more northern *Hydrophilus wattsi*. Very little is known about this species except that specimens have been collected from slow moving weedy creeks near the coast. Larvae not known.

Fig. 20. *Hydrophilus albipes*

A medium sized (20–30mm long) rather elongate species. It is the only *Hydrophilus* species of this size in Victoria and Tasmania and in southern areas of Western Australia and South Australia. In the north of its range it overlaps with the slightly larger and more robust *Hydrophilus brevispina* but differs from this species in the narrower hind legs (femurs) and more extensive area of rugosity on the first abdominal segment. Larvae known.

Fig. 21. *Hydrophilus brevispina*

A medium sized (25–33mm long), rather solid species with a more inland distribution than other species in the genus. It is found across most of inland Australia but is absent from the far south. Its distribution overlaps that of another common medium sized species; *Hydrophilus albipes*. It differs from this species by being a bit larger and more oval, in having much wider hind legs (femurs) and a less extensive rugose region on the first abdominal segment which reaches less than half way across the segment. Found in still or slowly moving water. In inland areas, often in temporary water or dams. Larvae known.

Acknowledgements

We would like to acknowledge the help of Eleanor Adams of the South Australian Museum for advice on the photographic equipment in the museum's imaging centre. Peter Hudson, collection manager in entomology at the museum is thanked for facilitating access to the significant collection of Australian aquatic insects in his care, as is Debbie Churches for help with the setting out of the manuscript.

Further Reading and References

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Check list of Australian Species of Dytiscidae and Hydrophilidae

Predaceous water beetles, family Dytiscidae, of Australia

Austrodytes Watts

Austrodytes insularis (Hope).

Austrodytes platoni Hendrich.

Cybister Curtis.

Cybister tripunctatus (Olivier).

Cybister godeffroyi Wehncke.

Cybister loxidiscus White.

Cybister weckwerthi Hendrich.

Cybister yulensis Guignot.

Hyderodes Sharp.

Hyderodes crassus Sharp.

Hyderodes shuckardii (Hope).

Onychohydrus Schaum & White. .

Onychohydrus scutellaris (Germar).

Spencerhydrus Sharp.

Spencerhydrus latecinctus Sharp.

Spencerhydrus pulchellus Sharp.

Sternhydrus Brinck.

Sternhydrus attratus (Fabricius).

Water scavenger beetles, family Hydrophilidae, of Australia

Hydrophilus Geoffroy

Hydrophilus albipes Castelnau.

Hydrophilus bilineatus (MacLeay).

= *Hydrophilus picicornis* Chevrolat.

Hydrophilus brevispina Fairmaire.

Hydrophilus infrequens Watts.

Hydrophilus latipalpus Castelnau.

Hydrophilus macronyz (Regimbart).

Hydrophilus pedipalpus (Bedel).

Hydrophilus wattsi Hansen.

= *Hydrophilus viridus* Watts.