

**HEMIPHLEBIA MIRABILIS SELYS: NEW LOCALITIES IN
AUSTRALIA AND PERSPECTIVES ON CONSERVATION
(ZYGOPTERA: HEMIPHLEBIIDAE)**

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Until now, *H. mirabilis* was known to survive only at Wilsons Promontory, Victoria. However, although previously thought to have died out in the Goulburn Valley, also in Victoria, the sp. still occurs there – on floodplain lagoons (billabongs) of the Goulburn R. at Alexandra, and lagoons of the tributary Yea R. at Yea, some 30 km downstream from Alexandra. More significant in terms of conservation is its discovery in Mt William National Park, NE Tasmania. *H. mirabilis* can no longer be regarded as an endangered sp.

INTRODUCTION

The tiny, metallic blue-green, green or bronze damselfly *Hemiphlebia mirabilis* Selys is the only Australian odonate included as an endangered species in the I.U.C.N. Invertebrate Red Data Book (WELLS et al., 1983; SANT & NEW, 1988). It is taxonomically isolated, constituting a monotypic superfamily, and its affinities are not understood. At the inaugural meeting of the IUCN Odonata Specialist Group in Kyoto, 1980, determination of its current distribution and abundance was given the highest priority among conservation projects on Odonata

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(MOORE, 1982) but, unfortunately, no funding could be obtained for a detailed survey.

In 1980 no populations were known to exist, although *H. mirabilis* had earlier been present in the Yarra and Goulburn River valleys, Victoria (NEBOISS, 1962; DAVIES, 1985; SANT & NEW, 1988) (Fig. 1). However, R.W. Garrison (unpubl.) reported at the Chur S.I.O. Symposium in 1981 that several years before, a colleague had collected a female of *H. mirabilis* at Sandy Point, near the base of Wilsons Promontory, also in Victoria (Fig. 1). DAVIES (1985) later visited the Promontory and found an active colony there, extensively documented by SANT & NEW (1988). Although several searches in south-eastern Victoria followed the Wilsons Promontory discovery, the population there, including at least

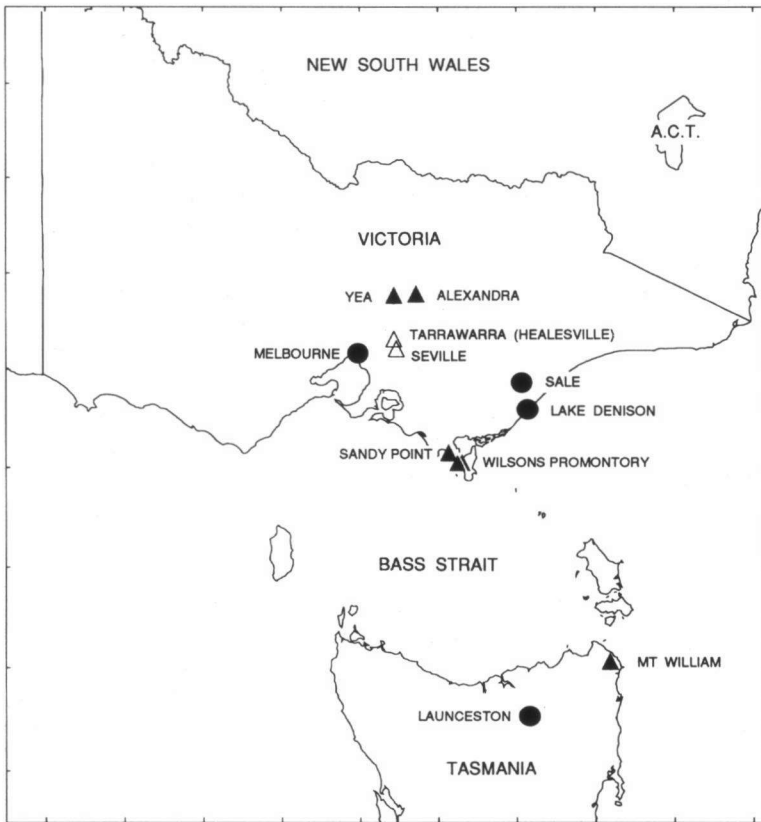


Fig. 1. Map showing localities. ▲ = localities where *Hemiphysalis mirabilis* is known to be present; Δ = localities at which *H. mirabilis* has been recorded, but apparently no longer occurs; ● = reference localities. Mercator projection: 10 mm = ca 85 km in central Victoria.

two colonies, has remained the only one known. This situation is now changed by the rediscovery of *H. mirabilis* in the Goulburn River valley, and its unexpected discovery in Tasmania.

HEMIPHLEBIA IN THE GOULBURN VALLEY

SELYS (1869a) described *H. mirabilis* from "Port Denison (Queensland) Australie" (p.lxxii), now Bowen. This locality is almost certainly erroneous. Lake Denison, in Victoria (Fig. 1) may have been the source, as for *Synlestes w. weyersii*, described from the same collection (SELYS, 1869b), but otherwise known only from southern Victoria (WATSON et al., 1991) (cf. DAVIES, 1985). MARTIN (1901) recorded *H. mirabilis* from Victoria, implying more than one (unspecified) locality (p. 248). He certainly obtained specimens from F.L. BILLINGHURST of Alexandra (Fig. 1) who, in 1902, noted that "during the three summers I have been collecting for Mr. Martin in the Alexandra district... I have forwarded him 41 out of the 107" Australian species that MARTIN (1901) listed. BILLINGHURST (1902) included *H. mirabilis* among "my 41 species" of dragonfly from Alexandra (see also DAVIES, 1985). Tillyard collected *H. mirabilis* at a billabong (lagoon, ox-bow lake) near Alexandra in December 1906, to judge from specimens now in the Australian National Insect Collection (A.N.I.C.) and other collections, and from comments in TILLYARD (1913), who reported that Alexandra was "the only locality where I have met with this species" (p. 463). TILLYARD (1928) described larvae collected at Alexandra in 1927, and provided a photograph of the habitat. He collected further adult specimens there in December 1931, again to judge from specimens in the A.N.I.C.

R. Dobson, A. Neboiss and A.N. Burns, "armed with photographs taken 30 years before by the late Dr Tillyard", visited Alexandra on 6-7 December 1954 and located the billabong (quote from Dobson, unpubl. notes held by J.A.L.W.; BURNS, 1955). They were "able to find a fair number" and collected about 50 specimens, 25 of which are now in the A.N.I.C. Neboiss photographed the habitat (Fig. 2).

DONNELLY (1974) found *H. mirabilis* at Alexandra in 1973, but with difficulty. During a contemporaneous study of Entomostraca in these same billabongs (SHIEL, 1976), R.J. Shiel (pers. comm.) collected larval *Hemiphlebia*, identified by A. Neboiss. However, Watson (unpubl.) failed to find it at the original billabong in the late 1970's; by then the habitat was much degraded by cattle and drainage, but was still identifiable from Dobson's unpublished map and Neboiss' photographs.

In late December 1991 one of us (J.W.H.T.) searched for *Hemiphlebia* in the area of Victoria bounded by Sale, Alexandra and the base of Wilsons Promontory, but without success (Fig. 1). However, on 3 January 1992, J.W.H.T., accompanied by H.E. Trueman and K.L. Gardner, found adult *H. mirabilis* in small numbers

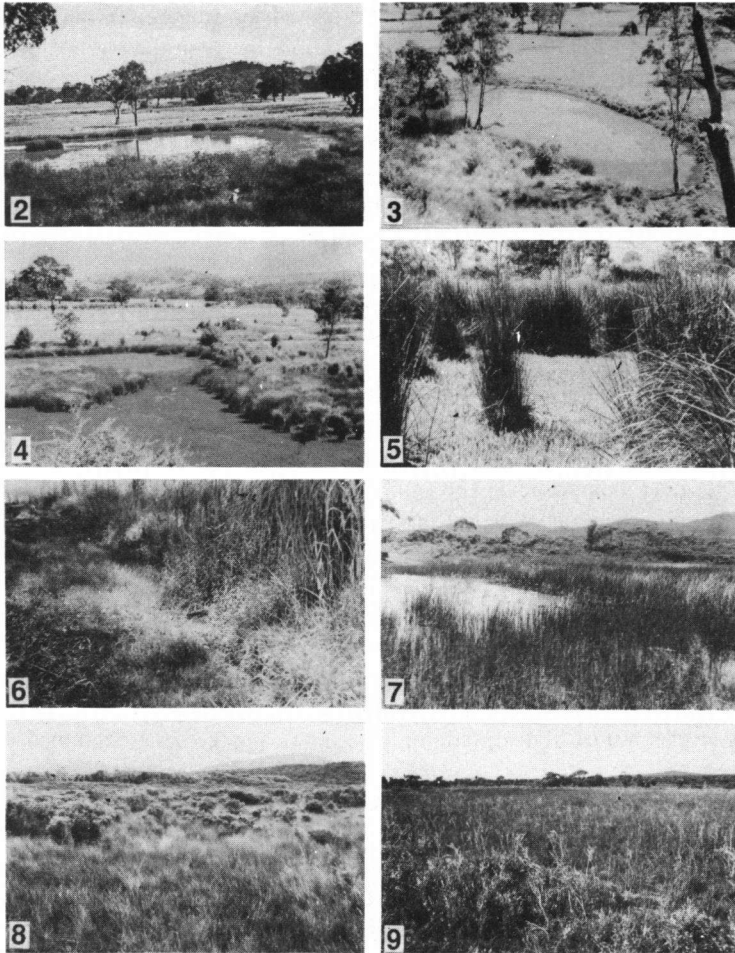
on a billabong beside the Yea River, a tributary of the Goulburn, at Yea (37°13'S., 145°26'E.), ca 30 km downstream from Alexandra (Fig. 1). The billabong is replenished by the Yea, and has marginal shallow areas and reed beds. Principal credit for the find goes to H.E.T., who discovered the first specimen in the deep shade of a reed bed. Further specimens were found in a small, boggy grassed area on the other side of the billabong (Fig. 6). The same party searched other billabongs in the Yea district without finding further colonies, but *Hemiphlebia* is a very small and inconspicuous odonate and the circumstances of the Yea find suggest that its presence at other sites nearby cannot be ruled out.

A few weeks later, following Trueman's lead, J.H.H., T.R.N. and J.A.L.W. also found *H. mirabilis* at the Yea site, coincidentally in the same microhabitat, where it appeared to be very localised, and found further individuals in a seasonally flooded area a few hundred metres to the south. A subsequent check by J.H.H. and J.A.L.W. at the Alexandra billabongs showed that *H. mirabilis* survives there; during several hours of searching, a single male was found in a clump of tall reeds near the margin of the lagoon that SHIEL (1976) had studied and illustrated (Figs 4, 5), although none were found at Tillyard's lagoon, which was still in poor condition (Fig. 3).

The habitats of *H. mirabilis* in the Goulburn Valley (including the adjacent region of the Yea Valley) are primarily riverine billabongs. Most have been degraded severely by the felling of trees, drainage, and trampling by cattle. Observations at these sites, and at Wilsons Promontory, indicate that adults are commonly found away from water, rather than over it. According to the Dobson notes, at Alexandra "*Hemiphlebia mirabilis* was found in the drier areas on the border of the swamp and none was seen over the deeper water. Even on the tiny billabong we worked, the species appeared local, almost all of the 50 or so specimens we took being found in one area directly under the hillside; other parts were worked but with little success". They "fly as little as possible, and then only whilst the sun is out; at other times they disappear into the thick clumps of green reed". Most were "caught as they reached the tops of the 5 ft. reeds after a weak flight from the centre of the clump" (5 ft = ca 1.5 m).

At Wilsons Promontory and at Yea (Figs 6-8) the same generalisations apply, except that the vegetation is shorter. Adults were commonly found in dry or almost dry areas subject to seasonal inundation. At Yea and Alexandra, they often coexisted with *Ischnura aurora* (Br.), *I. heterosticta* (Burm.), *Austrolestes analis* (Ramb.) and *A. leda* (Sel.), plus teneral Anisoptera, in particular *Diplacodes bipunctata* (Br.), *D. melanopsis* (Martin) and *Orthetrum caledonicum* (Br.). However, *Hemiphlebia* has rarely been seen mating in these situations and, although SANT & NEW (1988) suggested that *H. mirabilis* may lay into aquatic vegetation, perhaps *Chorizandra cymbaria* R. Br. at Wilsons Promontory, oviposition has not yet been observed.

TILLYARD (1928) located larval *H. mirabilis* in a billabong where, "during



Figs 2-9. Habitats of *Hemiphysalis mirabilis*: (2) Billabong on the floodplain of the Goulburn River, Alexandra, Victoria, where Tillyard collected *H. mirabilis* in 1906 and later, and Dobson and party found it in 1954, photographed from the hill abutting the reed bed in which *Hemiphysalis* was most abundant; Roderick Dobson in foreground (December 1954, A. Neboiss); - (3) The same billabong in January 1992 (J.A.L.W.); - (4) Nearby billabong where Hawking and Watson located *H. mirabilis* in 1992; the single male specimen was found near the base of the triangular peninsula on the far side of the lagoon (January 1992, J.A.L.W.); - (5) Reeds among which Hawking and Watson found *H. mirabilis* at Alexandra in January 1992 (J.A.L.W.); - (6) Microhabitat at the lagoon on the floodplain of the Yea River, Yea, Victoria, where Trueman and party found *H. mirabilis* in greatest abundance in January 1992 (J.A.L.W.); - (7) Swamp that forms the main habitat of *H. mirabilis* on Wilsons Promontory, Victoria (January 1987: J.A.L.W.); - (8) Cotters Lake, Wilsons Promontory, Victoria; *H. mirabilis* occurs in runnels among the low vegetation in the foreground (January 1987, J.A.L.W.); - (9) Swamp at Mt William National Park, Tasmania (January 1992, G.A.H.).

the periodical droughts that occur, all the rest of the huge backwaters dry up; but, just at this point... there is a rather deep hole between the clumps of reeds, and this serves as a reservoir for the larvae when no other water is available'' (p. 195). However, the occurrence of *H. mirabilis* at sites that dry out in summer, as at the swamps and Cotters Lake on Wilsons Promontory (Figs 7, 8), indicate that immature stages – eggs or larvae – can withstand drought (cf. DAVIES, 1985). The fact that larvae from Wilsons Promontory in early spring (August, September) are small suggests that the drought-resistant stage is the egg (SANT & NEW, 1988).

HEMIPHLEBIA IN TASMANIA

During an informal survey for Odonata in Tasmanian National Parks and reserves, G.A.H. examined some small swamps at Mt William National Park, on the north-east coast (Fig. 1), in mid-January 1992. At one swamp (40°52'S., 148°13'E., near Camp Site 1) (Fig. 9), a small damselfly fitting the description of *H. mirabilis* was encountered among reeds along one part of the shallow margin. The males showed the characteristic behaviour first described by TILLYARD (1913), involving the curving forward of the abdomen and the display of the long, white anal appendages (cf. SANT & NEW, 1988). J.A.L.W. subsequently compared two male specimens from Mt William with Victorian material, and confirmed their identity as *H. mirabilis*. In the reed bed at Mt William *Hemiphlebia* was quite common, with individuals resting on reeds up to ca 600 mm above the water. Males predominated: one sample of 12 contained only a single female.

The swamp where *Hemiphlebia* was encountered is approximately 200 m by 100 m, and up to about 600 mm deep in the centre, rapidly becoming shallower at the edges. It is surrounded by heath, and is superficially similar to the swamps at Wilsons Promontory (Figs 7-9). As at the Victorian localities, no *Hemiphlebia* were seen over the main body of the swamp, but only at the margin, where the water was less than 100 mm deep. There it coexisted with *Ischnura heterosticta* and, in shrubs nearby, *Austrolestes analis*, *A. io* (Sel.) and *A. psyche* (Hag.) were common. *Procordulia jacksoniensis* (Ramb.) was present over the body of the swamp.

A smaller swamp slightly to the north of the main locality also contained *Hemiphlebia* but a search of a similar but drier swamp (near Camp Site 4) was unfruitful. No evidence of *Hemiphlebia* was found in coastal swamps at Cape Portland or the Boobyalla Coastal Reserve north-west of Mt William, nor was it found in any of the other Parks and reserves surveyed.

It may be significant that Mt William lies at the Tasmanian end of the island chain that stretches across Bass Strait from Wilsons Promontory through Flinders Island to north-eastern Tasmania. Tasmania was connected to Victoria by a low

sandy isthmus as recently as ca 12,000 - 13,500 years ago (GALLOWAY & KEMP, 1981), an isthmus that would have enveloped these islands. It is not unreasonable to assume that shallow swamps, of the kind that *Hemiphlebia* inhabits on Wilsons Promontory and at Mt William, would have been present along the isthmus, providing the potential for continuity between Victorian and Tasmanian populations of *Hemiphlebia*.

CONCLUSIONS

The discovery of *Hemiphlebia mirabilis* in Tasmania, apparently in abundance, together with its rediscovery in the Goulburn River system, transforms the conservation status of this taxonomically remarkable odonate. It can no longer be regarded as an endangered species, particularly as the populations at Wilsons Promontory and Mount William occur in National Parks (assuming that appropriate management practices are followed there — cf. SANT & NEW, 1988). *Hemiphlebia* may well be rare, perhaps vulnerable, but the concept of "rarity" has to be applied cautiously, for it may be due more to the size and cryptic coloration of this tiny damselfly than to its actual abundance. We believe that careful surveys elsewhere in central and southern Victoria, on the islands in Bass Strait, and in Tasmania are likely to reveal other populations of this important insect, and we will give priority to searching these areas during the next several field seasons.

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