RED *ALDROVANDA* FROM NEAR ESPERANCE, WESTERN AUSTRALIA

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In early November 2000, I discovered *Aldrovanda vesiculosa* L. in a coastal freshwater lake near Esperance, on the south coast of Western Australia. This appears to be the first time this species has been recorded from the southwestern part of the continent and brings the total number of known sites for this species in this country to fourteen (see Figure 1).

The plants at this site were floating just below the water surface or were wedged in between sunken branches on the lake margin. They had weakly branching stems measuring up to 10 cm long, and leaves in whorls of 6 to 8. The oblanceolate leaf blades were up to 4 mm long by 1 mm wide. The snap traps had lobes to 4 mm long by 2 mm wide. There was no sign of flower development at the time. The overall plant colour was an eye catching red throughout. From the short length of the stems, and emergence of some plants from sheltered locations, it appeared that the plants had recently emerged from winter dormancy (see Figure 2).

The lake in which the plants grew was on the coastal plain and appeared to be permanent in nature (see Back Cover). It was relatively shallow, averaging about 1 m deep, with reeds covering much of the lake and growing high above the surface, and local clusters of *Melaleuca* trees grew in the lake centre. A thin layer of plant detritus covered the lake floor in various stages of decomposition, above a quartz-sand substrate. No major creeks flowed into the lake and it appeared that this water body was a window into the local ground water table. From the quartz-sand substrate and abundant organic matter it appears that the water is acidic. Winter frosts in the area are very rare and summer maxima commonly reach the low 30s (°C). The average annual rainfall at the nearest settlement, Esperance, is approximately 600 mm of which about 400 mm fall in the cooler months of the year. Heavy summer rainfall is not uncommon (Bureau of Meteorology, 2002).

The chemistry of the water in the lake is unknown but the South Coast Water and Rivers Commission (2003) have studied other catchments in the region, including the nearby Lake Warden system. This Commission has found that these lakes, intermittent creeks, and rivers are commonly brackish, with highly variable dissolved salt content (ranging from 1.3 to 61.6 milliSiemens per centimetre, based on electrical conductivity at 25°C), and have highly variable seasonal flows. They have measured spot temperatures ranging from 8°C to 24°C; and pH values ranging from 6.9 to 9.9. The ranges for salinity and pH for most of these sites are outside the ranges found for optimum growth of *Aldrovanda* (e.g. Adamec, 1997), so it therefore appears that suitable *Aldrovanda* habitat in this part of the continent is highly localised.

There were several hundred floating stems along a localised section of the lake edge—probably concentrated by the prevailing westerly winds at the time. They grew in the company of *Utricularia australis,* amongst a selection of dead, detached vegetation, including *Melaleuca* leaves. The water in the lake was clear with a weak brown colour, the latter probably due to the presence of tannins. At the time of the visit the area had experienced several months of below average rainfall, and the lake level appeared to be lower than normal. *Drosera pulchella, D. nitidula* subsp. *nitidula* and *Utricularia dichotoma* grew in moist soil on the lake edge.

This population occurs at least 2000 km south of the nearest known *Aldrovanda* populations in the Kimberley Region of northern Western Australia (Fitzgerald, 1918; Lowrie, 1998) and they are approximately 2500 km west of southern-most *Aldrovanda* population currently known, on the south coast of New South Wales (Adamec, 1999). The plants at Esperance develop red pigmentation under exposure to bright sunlight; a feature shared with populations in New South Wales and in the Northern Territory (Wilson, 1995; Adamec, 1999). They also have touches of red pigment on the petals (L. Adamec, pers. comm., 2002). At this early stage it appears that the plants from Esperance develop a deeper red pigment throughout than other populations and are much harder to maintain in cultivation (D. Darnowski, pers. comm., 2002).

The study of herbarium specimens revealed recent collections from hitherto unreported populations in the Northern tablelands of New South Wales. These populations occur above 1000 m altitude,

and thus represent the only non-coastal populations known from Australia. based on the herbarium notes the plants also develop red pigmentation. An additional unique aspect of these elevated populations is that they are subjected to long frosty winters with not infrequent snowfalls.

The plants near Esperance appear to represent a naturally occurring population—they are far removed from large human population centres where this species may be cultivated. The Esperance plants share the red pigmentation found in other Australian populations, which may indicate that they may be derived from the same ancestral stock that has been widely disseminated, possibly by waterfowl (Breckpot, 1997). It is yet another demonstration of how this species is able to be transported over large areas of inhospitable habitat, in this case desert, and become established in suitably clean fresh water habitats. Perhaps seasonally migratory species in the sandpiper family (Scolopacidae), such as the Japanese snipe (*Gallinago hardwickii*), have been involved in spreading this species between Eastern Asia and Australia (Schodde & Tidemann, 1997)?

Aldrovanda has now been collected from eight or nine botanic subdivisions in four states of Australia. (Bailey, 1900; Marchant *et al.*, 1982; Wilson, 1995; Lowrie, 1998; Adamec, 1999). The uncertainty of total number is due to the imprecise location of the location in Fitzgerald (1918). Recent collections and observations have been made in all but southeastern Queensland and the New South Wales North Coast (e.g. Stanley & Ross, 1983; Bourke, 2000); which is surprising given the abundance of clean coastal lakes in this region. Perhaps it is only a matter of time before this species is rediscovered there?

The discovery of *Aldrovanda* in the south west of Western Australia is an exciting, significant range extension. It also provides a remote population to add to on-going study on this species.

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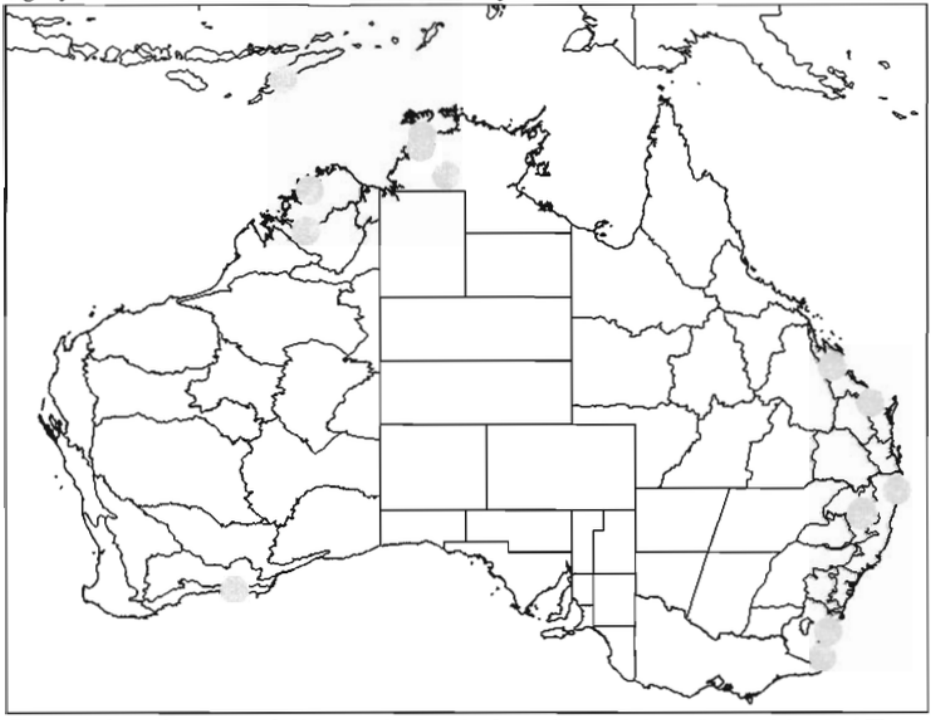


Figure 1: Location map of *Aldrovanda* sites in Australia, and the adjacent island of Timor. State and territory boundaries and botanic subdivisons for all states, except Victoria and Tasmania, are shown. Site locations are based on herbarium study and the literature (Fitzgerald, 1918; van Steenis, 1954; Marchant *et al.*, 1982) and my own observations.



Figure 2: Red plants of *Aldrovanda vesiculosa* growing at the edge of the lake, with *Utricularia australis*.

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Front Cover: *Heliamphora elongata* in habitat on the northern plateau of Ilu-tepui. Photograph by Joachim Nerz. See article on page 111.
Back cover: *Aldrovanda* habitat near Esperance. Note the dark, clear water with emergent reeds and scattered *Melaleuca* trees. *Aldrovanda* is present at the lake edge. Photograph by Robert Gibson. See article on page 119.

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