FLORA

REEDIA - A VERY EXTRAORDINARY SEDGE

Cate Tauss

Reedia spathacea is a rare and endangered sedge (Cyperaceae family) that only occurs in the high rainfall zone of Western Australia's globally renowned 'biodiversity hot spot'; the South West Floristic Region. It inhabits two distinct types of habitat in two biogeographical regions of the South West; the sedgy peat slopes of near-coastal areas of the Warren Region between Walpole and Point D'Entrecasteaux and the perennial tributaries of the lower Blackwood River, in the Jarrah Forest Region, south east of Margaret River. Both of these habitats and the biota they support are recognised as Priority Ecological Communities (PECs)*.

The genus *Reedia* has only one species, *R. spathacea*. It was first described by the famous colonial botanist, Ferdinand von Mueller in 1857. Apart from this basic taxonomic description, very little was known of the biology and ecology of this idiosyncratic plant until quite recently. The interest in *Reedia* was rekindled in 1996 by the threats to its survival posed by the Boronia Ridge urban development proposal at Walpole and the generally accelerating pace of the degradation of our natural environment throughout the South West.

In appearance, *Reedia* is strikingly different to other sedges in our region. The fascinating adaptations of this plant equip it well to thrive in its oxygen-deficient, permanently waterlogged and nutrient-limited habitats. *Reedia* forms large leafy shoots with tall flowering scapes to nearly 3m in height. Its long strap-like leaves resemble those of large bromeliads as they are bordered by sharp prickles and the broad sheath at the base of each leaf collects rainwater in a 'phytotelm' (literally a wetland in a plant). Hidden below the leafy canopy of each shoot is a caudex (anatomically most similar to the trunk of grasstrees like *Xanthorrhoea*) that forms the central axis of the plant and produces numerous stilt roots near its apex. The stilt roots anchor the caudex into the mass of slowly decaying organic matter that makes up the ground layer in a *Reedia* habitat. This ground layer includes the dead remains of *Reedia* shoots from previous seasons and the roots of the native rush tanglefoot (*Empodisma gracillimum*), a major component of *Reedia* wetlands that is the ecological equivalent of *Sphagnum* moss in northern hemisphere peat bogs. When the stilt roots reach the ground they branch into horizontal cable roots (with specialised structures called pneumatophores that peep up just above the waterlogged ground surface and aerate the roots) and vertical roots that proceed down deeper into the ground to source the plant's water and mineral needs.

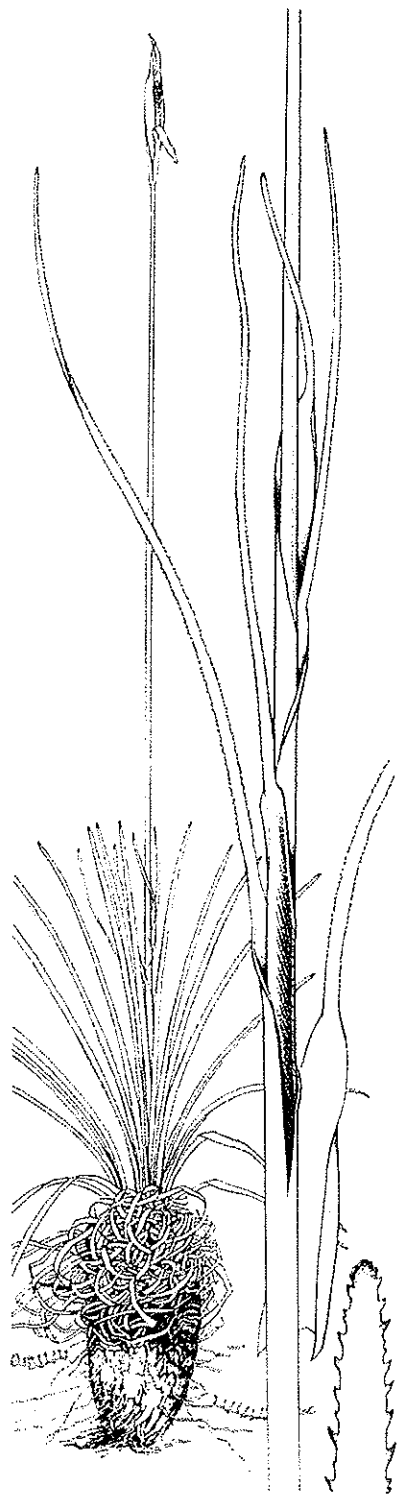

Illustration: M. Menadue

Reedia is a relict of a bygone geological era when the climate of most of Australia was much wetter than today and wetlands (not deserts) probably dominated the landscape. The nearest known relative of *Reedia* is *Gymnoschoenus* (best known as the Buttongrass of the soggy Tasmanian high moorlands). *Reedia* now only persists in a limited number of small wetland refugia that are very atypical of the general conditions in the South West. A number of its populations are known to have become extinct in the last 15 years due to human-mediated factors such as inappropriate fire regimes and the illegal introduction (and subsequent proliferation) of pigs in national parks and state forests.

Prior to the detailed study of *Reedia*, it was a common misconception that the plant possessed rhizomes or underground stems (like most hardy Australian sedges adapted to survive frequent fires by resprouting). In fact, *Reedia* does not possess

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any below-ground storage organs or earth-protected regenerative buds and most of its biomass is stored above the ground. The apical shoots and root initiation zone of *Reedia* are in close proximity to large masses of flammable old leaves (which the plant presumably retains around the caudex to re-use scarce nutrients). Even cool fires have been observed to kill a proportion of the adult *Reedia* plants and most *Reedia* seedlings in the population affected. Flowering in *Reedia* populations is always slow to re-establish after cool fires as the plants take several years to muster the resources from their nutrient-limited environment to repair damages. Hot fires generally cause catastrophic losses with deep burns on the caudices that totally sever the root-to-watertable connection of the plant. When feral pigs graze on *Reedia*, they don't seem to mind chomping through the fierce prickles on the older leaves that surround the sweet, inner shoot. (The latter is rather like the texture and flavour of pandanus 'heart of palm', a northern Australian bush tucker.) The growth characteristics that make *Reedia* vulnerable to fire also mean that feral pig grazing is almost always fatal.

The most common method by which *Reedia* reproduces is by vegetative renewal of its aerial shoots. Despite the resources that *Reedia* invests in its massive flowering scape, the rate of fertile seed set is very low and the recruitment of seedlings is a rare event in undisturbed populations. Unlike most sedges that are wind pollinated, *Reedia* flowers emit a strong fragrance and attract numerous bees that are able to efficiently transport the large pollen grains. Copious pollen also accumulates within the shelter of the spathes around the inflorescence. Beetles and other insects congregate in the mini ecosystem within the spathes at this time. Red-tailed black cockatoos feed on the insect larvae that often colonize *Reedia* scapes.

The peat paluslopes (seasonally waterlogged slopes) of the Warren Region PEC are inhabited by assemblages rich in humid climate endemic flora and fauna species including the Priority Flora fern *Schizaea rupestris* and sundew *Drosera binata* and restricted fauna such as the burrowing crayfish *Engaewa walpolea* and the giant oiligochaete worm *Megascolex swarbrickii*. The perennial tributaries of the Blackwood PEC are inhabited by the rare frogs *Geocrinia vittelina* and *G. alba* and a suite of Priority Flora species.

The maintenance of hydrological processes is essential in sustaining the biodiversity values of both of the *Reedia* PECs.

The peat of the Warren PEC paluslopes forms a perched aquifer that overlies a shallow confined

Blackwood Reedia PEC (Photo: C. Tauss)

aquifer. The maintenance of these aquifers is a function of the humidity of the climate and the topographic and stratigraphic features of the upslope recharge area. The quantity and quality of the water delivered from the upslope recharge areas to the *Reedia* habitats downslope can be influenced by activities in the recharge area such as vegetation clearing, drainage, water diversion and pollution of run off in the course of urban development.

The perennial tributaries of the Blackwood River between Sue's Bridge and Alexandra Bridge that constitute the Blackwood PEC are maintained by localised artesian flow from the Leederville-Yarragadee aquifers of the Perth Basin. Unlike most streams that drain the Blackwood Plateau and the Jarrah Forest, these freshwater tributaries flow throughout the year and the narrow floodplains adjacent to their channels remain waterlogged in the dry months. Drawdown on the deep aquifers that sustain the PEC either by local use or for water supply to the Perth-Yarragadee scheme threatens the maintenance of this PEC. Inappropriate vegetation management and vegetation clearing in the catchments of these streams also threatens the quality of the water in the PEC.

A commitment to understanding the conservation values and the special management needs of vulnerable areas such as the *Reedia* PECs is required to plan a future for our most valuable natural assets.

** Recommended by the WA Threatened Ecological Communities Scientific Committee as a Threatened Ecological Community, but awaiting Ministerial endorsement.*

Cate Tauss currently works as a botanist in environmental assessment and is studying for a PhD in the School of Plant Biology at the University of WA. She is interested in almost anything to do with the native flora of WA. Her research currently includes flora taxonomy, the evolutionary history