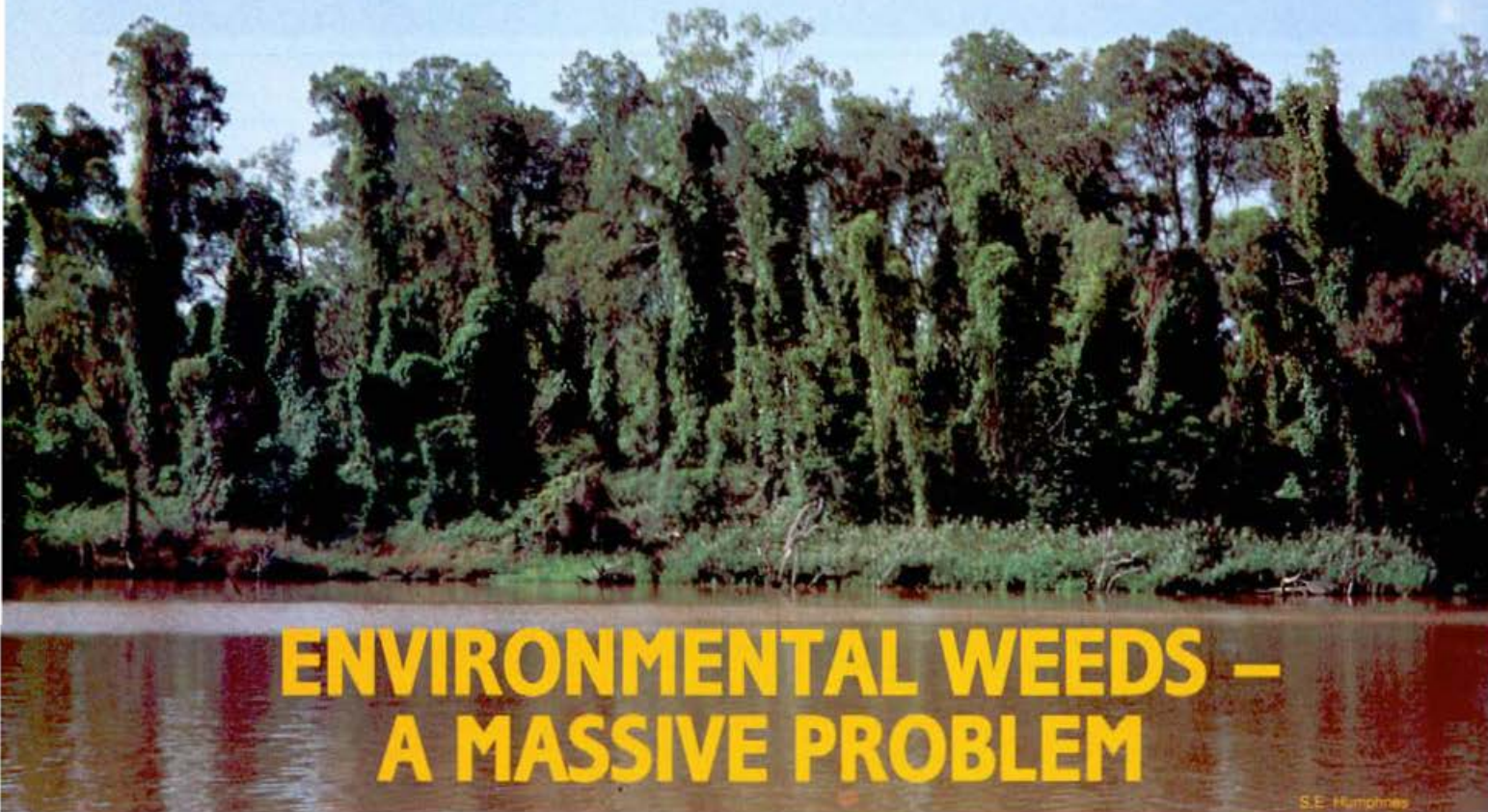


Rubber vine overtopping native vegetation beside the Fitzroy River, near Rockhampton, Qld.



ENVIRONMENTAL WEEDS – A MASSIVE PROBLEM

S.E. Humphries

Ranging from rainforest-strangling vines to grasses that can choke wetlands, introduced plants that have established themselves in the wild have become a major threat to the environment

Some 10–15% of the plant species growing wild in Australia are introductions. And, according to a recent study funded by the Endangered Species Program of the Australian National Parks and Wildlife Service and CSIRO, probably one-quarter of these are weeds posing serious or very serious environmental risks.

For the study, Dr Stella Humphries of CSIRO's Division of Wildlife and Ecology, Dr Richard Groves of its Division of Plant Industry and Dr David Mitchell of the Murray-Darling Freshwater Research Centre gathered details of the damage introduced land and water plants are causing to native flora and fauna throughout Australia. They concluded that introduced plants are an acute and insufficiently appreciated ecological problem posing formidable management and control difficulties that should be addressed through a national approach.

The research team nominated 18 species as Australia's top environmental weeds, and allocated them to five groups according to the relative urgency of the need for action against

them. Species in group 1 require action as soon as possible; the need is critical. Group 2 species require action within 2 years, group 3 within 2–5 years, and group 4 within 6–10 years. For the group 5 species, which include the water weeds salvinia and water hyacinth, control measures are in hand.

Of the group 1 species, probably the one of most concern, the team believe, is the rubber vine (*Cryptostegia grandiflora*). Introduced from Madagascar into Queensland in the 1870s, probably as an ornamental plant, it produces long, upright unbranched leaders 3–7 m long, eventually smothering the trees and other vegetation that it entangles.

Rubber vine has spread through the river systems of southern Cape York and the Queensland end of the Gulf of Carpentaria, and along the coast as far south as the Burnett River (near Bundaberg). Destruction of riverside vegetation, including so-called gallery forest (thin strips of rainforest that support animal life different from that found in the surrounding woodlands), is proceeding apace. In the wetter end of its climatic range, the weed is capable of growing in open country

and is invading remnant dry rainforest patches known as vine thickets — the least conserved and least biologically and ecologically known of all Australia's rainforest types.

No progress has yet been achieved with biological control, but hopes are held for a rust soon to be released as a control agent. The plant's extensive root system and capacity for reshooting after cutting back make rubber vine extremely hard to eradicate. And the vast areas and difficult terrain affected make herbicide control uneconomic.

Also on the group 1 list, this time as potential threats requiring urgent action rather than as plants causing major problems now, are two semi-aquatic grasses — hymenachne (*Hymenachne amplexicaulis*) and Aleman grass (*Echinochloa polystachia*). These species are being promoted for use as 'ponded pasture' plants in the tropics; the idea is that the abundant water available in the wet season will promote rapid growth by the grasses, which will then persist as nutritious green forage into the dry season. However, according to the researchers, the two species — natives of the



Blue thunbergia smothering stream vegetation near Mossman, far northern Queensland.

S. E. Humphries



An athel pine thicket in the Finke River, south of Alice Springs. The plant totally displaces native flora and fauna, salinises the soil surface and changes stream-flow patterns.

Caribbean and tropical America — have the potential to invade and choke wetland systems in the Australian tropics and subtropics.

They regard the risk of invasion of non-target areas as so severe that existing populations should be destroyed and seed removed from sale. They argue that no aquatic or semi-aquatic grass species should be imported for wet pastures, even if the importations are only for experimental purposes.

An imported species that has been planted for some time for ponded pastures, para grass (*Brachiaria mutica*), already poses major environmental

problems. It has spread widely in streams and floodplain habitats in the wet and wet-dry tropics. One effect, the team reports, has been to greatly reduce water-bird habitat, particularly that of the magpie goose. Hymenachne and Aleman grass can grow in much deeper water than para grass; the researchers believe their spread would virtually destroy what is left of these wetland habitats.

Next on their list of weeds in urgent need of control action is the giant sensitive plant *Mimosa pigra* (see page 3). As this species totally displaces native vegetation in the northern floodplain



Fruits of bridal creeper, which is spreading across a range of habitats in southern Australia: it prevents the regeneration of native species by carpeting the ground.



Para grass and cabomba (*Cabomba caroliniana*) naturalised in a stream in the wet tropics. Para grass is promoted for ponded pasture along with recently introduced much larger grasses that could, if present, choke what remains of the flow channel. Cabomba is used by the aquarium trade and intentionally released for cultivation in the wild. These plants illustrate the conflicts of interest that can exist between conservation and agriculture or commerce.



Vegetation along watercourses is particularly vulnerable to invasion. In this stream in the lowland wet tropics, a wide range of exotic species have established including bamboo, para grass and African tulip tree.

habitats that it infests, its removal by herbicide treatment leaves bare ground subject to invasion by more weeds. The researchers stress, therefore, that a program of revegetation research must proceed alongside research already under way on the weed's control.

They see athel pine (*Tamarix aphylla*), also in their group 1, as a threat to all the watercourses of arid Australia. So far this highly invasive species, introduced early this century as a shade tree, has become established along several hundred kilometres of the Finke River, the largest river system in the arid zone (see *Ecos* 63). Infestation displaces native plants, destroys resources for fauna, lowers the water table, salinises the soil and can change river flow and sedimentation regimes.

Because the plant is still in the initial stages of invasion of the Finke River, the researchers say the opportunity for early action against it still exists.

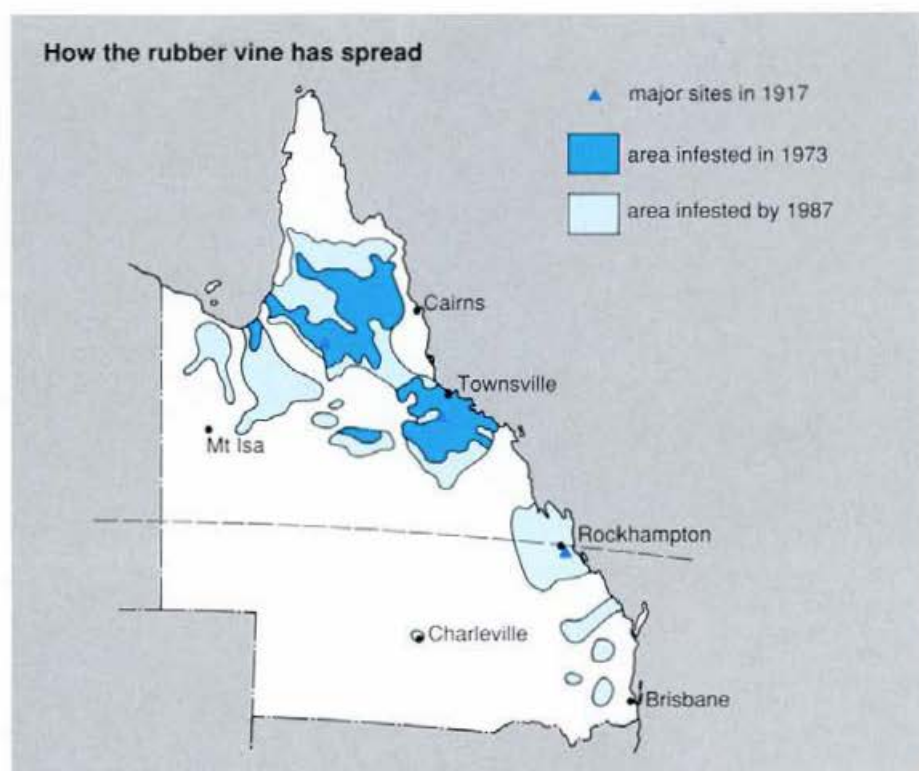
The last species in group 1 is a tropical vine, blue thunbergia (*Thunbergia grandiflora*). Native to northern India, it was introduced as an ornamental plant and has escaped from gardens to become a major threat to the tropical lowland rainforest remnants of far-northern Queensland. It smothers vegetation as far up as tree tops 15 m high, and has been observed to destroy rainforest at a rate of about 0.6 ha per year. Infestations are widely scattered throughout the lowlands, mostly on private land.

Problems with controlling this vine are that it is still sold in nurseries and herbicide application is expensive for private landholders. Moreover, post-control revegetation is needed to prevent re-infestation by weeds.

Other species in the worst-weed list include an introduced pasture grass, buffel grass (*Cenchrus ciliaris*), planted through much of Central Australia, and in the Top End mission grass (*Pennisetum polystachion*), one of the world's worst weeds. Both species are spreading, displacing native plants and dramatically changing fire regimes. In southern Australia, bridal creeper (*Myrsiphyllum asparagoides*) is smothering the ground and shrub layer and preventing regeneration of native species in a range of habitats. Even the ocean isn't immune; a highly fecund kelp (*Undaria pinnatifida*) is colonising uncontrollably the eastern Tasmanian coast and has the potential to spread along most of the southern Australian coastline.

The researchers point to political, technical and resource constraints that inhibit Australia's capacity to control environmental weeds, and say the prognosis for containment of their spread on a continental scale is grim.

According to the team, political constraints arise from conflict



between conservation and agriculture or horticulture; these constraints include promotion of environmentally unacceptable pasture species by government agencies, a lack of legislative controls on the import of ornamental plants and the maintenance of grazing on marginal land where it promotes serious weed invasion. Technical constraints include the logistics of broad-scale weed management in remote areas. On the resources side, the lack of economic benefits and the long-term commitments required result in environmental weed control receiving a low funding priority. 'It is also true', they acknowledge, 'that the costs of control in remote country where enormous areas need to be treated are prohibitive even with the best of will.'

They say current approaches, except where biological control has been successful, constitute rearguard action that is at best only locally effective. And the prospects for biological control need to be kept in perspective; it is expensive and slow-acting, and its success rate is low so far.

The researchers believe that, because the problems are so serious, bold, radical thinking on national approaches is needed. 'Better quantitative definition of the problems, better appreciation of the long-term conservation implications of the status quo and the institution of preventative policies and measures are essential', they argue.

Rubber vine, at the top of the list of problem weeds, infests large areas of Queensland. The map indicates the extent of its spread this century.

They call for the development of integrated approaches involving federal, State and local governments, the agriculture, forestry, horticulture and tourism industries, academia and the general public, and say focused task forces are needed to address problems on an issue-by-issue or species-by-species basis. Prevention of further non-essential introductions should be given top priority, and steps should be taken to ensure early intervention when weed outbreaks are detected.

Dr Humphries and her colleagues believe Australia's plant import legislation is anachronistic and must be updated to reflect current knowledge of the ecological and economic disasters that can flow from injudicious introductions.

Since the publication of their report the federal government has begun preparation of a National Weeds Strategy, due for release for public comment about now.

More about the topic

Plant invasions of Australian ecosystems: a status review and management directions. S.E. Humphries, R.H. Groves and D.S. Mitchell. *Kowari*, 1991, No. 2, 1-127.