Waterweeds succumb to weevils

A COLLABORATIVE biological control effort between CSIRO, the Queensland Department of Natural Resources and Maroochy Shire Council has seen two rampant aquatic weeds subdued by weevils.

For decades, salvinia, a South American floating fern, and water hyacinth, have wrought a path of death and destruction across the globe, choking waterways, destroying fisheries and harbouring diseasecarrying mosquitos. In Australia, many dams and watercourses along the eastern part of the continent are affected. But the release of two weevil species, *Cyrtobagous salviniae* and *Neochetina bruchi*, could see an end to such infestations.

The salvinia weevil was first released at Lake Moondara, near Mount Isa, in 1981. Within four months the insect had munched its way through the worst of the weed, and its release at Wappa Dam in Queensland's south-east soon followed. But it took the weevil 18 months to bring the Wappa Dam salvinia problem under control.

While the salvinia weevil eventually triumphed, clearance of the salvinia opened the way for a water hyacinth invasion. A



number of insects were subsequently trialled on the weed, but the greatest success came with the weevil, *N. bruchi*.

By the early 1990s, the combination of *C. salviniae* and *N. bruchi* had reduced the salvinia and water hyacinth to a level where they were no longer an environmental problem. As the weevils cannot eradicate the weeds, however, their continued presence is needed to ensure ongoing biological control.

In 1998, the Wappa Dam Weed Management Advisory Group was formed to implement a long term, self-sustaining and environmentally friendly approach to weed management. The weevils now form the backbone of an integrative weed management program, supported by mechanical harvesting, manipulation of water levels, strategic herbicide use and reduced nutrient inputs.

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Environmental officer at Blair Athol Coal Mine, Andrew Pearce, and University of Queensland zoologist Bill Ellis. Their investigations into the dietary requirements of native animals such as koalas will aid the establishment of native habitat after mining.

Minesite sleuths tail a midnight snacker

New research into the dietary and lifestyle habits of koalas is helping scientists to re-establish the habitat of these vulnerable Australian icons in areas affected by tree clearing.

By examining the faecal pellets of koalas living in bushland near the Blair Athol Coal Mine in central Queensland, University of Queensland zoologist Bill Ellis has been able to identify exactly which species of trees koalas like to munch on.

When this information is combined with observations on the way koalas use trees, their total habitat requirements can be determined, ensuring rehabilitation of a site fulfils all the koalas needs.

Previously, scientists believed that a koala's diet could be predicted from the trees it inhabited during the day. But koalas tend to sleep or 'roost' during the day, and move between trees at night.

Whether they really did prefer breakfast in bed was subject to 'a lot of speculation', says Ellis, as no definitive tests on their diet had been performed. Until now.

To see if roosting trees featured in the koala diet, Ellis and his team collected samples of faecal pellets from each koala at the site, at different times of the year.

The pellets were crushed and examined under the microscope for leaf fragments, then compared with reference slides of leaves taken from trees at the mine site. The species of *Eucalyptus* leaves represented in the pellets were distinguished by the structure of their stomata – the pores through which leaves breathe – and adjacent cells.

'We found that leaf fragments in the pellets did not always correlate with what we predicted from day-time roosting observations,' Ellis says.

'Some koalas did eat the species they were seen roosting in, but others didn't. So inferences about diet composition based on day-time observations can be misleading.'

This knowledge is crucial to the reestablishment of koala habitats lost through mining, agriculture and urban development. For example, if revegetation favours one type of tree over another, it reduces the chances these threatened marsupials have for re-colonisation and survival.

At Blair Athol, the findings have helped the mine's environmental officer, Andrew Pearce, to recreate koala habitat behind the mine front.

'Our goal is to have an ecosystem that can sustain the native animals and plants that were here before we started mining, and there is evidence that koalas are using our older, revegetated sites,' Pearce says.

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