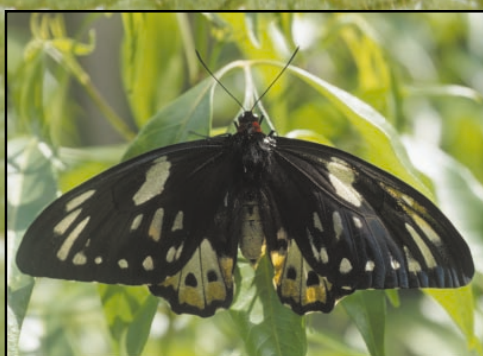


Changing habitat

The revival of the Richmond birdwing butterfly offers hope that through research, education, dedication and teamwork, local communities can secure a future for threatened species.

Wendy Pyper reports.

Photos by Don Sands



A female Richmond birdwing butterfly.

It was a sultry January afternoon when our small group entered the rainforest. In the oppressive heat and the company of a million biting insects, we were soon sweating and swatting ineffectually. But the discomfort wore off when the reason for our expedition was sighted.

Fluttering just above our heads was a magnificent Richmond Birdwing butterfly, its large green and gold wings brilliant against the dark foliage. For our party leader and landowner, Arthur Powter, the sighting was further confirmation that his efforts to help save the butterfly from extinction had succeeded.

Unfortunately, the story of the Richmond birdwing butterfly is a familiar tale. The butterfly, *Ornithoptera richmondia*, was once common in sub-tropical rainforest areas: from Maryborough, in south-eastern Queensland, to Grafton in north-eastern New South Wales.

But the destruction of its habitat and principal food plant, the Richmond birdwing vine, (*Pararistolochia praevenosa*), led to the extinction of the butterfly from two-thirds of its original range and a decline in surviving populations.

This decline was exacerbated by the spread of an introduced vine called Dutchman's pipe (*Aristolochia elegans*), which attracts egg-laying by the female butterfly, but is toxic to the caterpillars when they feed.

For the past eight years, Arthur Powter and his wife Narelle have been turning their 12-hectare property near Queensland's Glasshouse Mountains into a Richmond birdwing sanctuary.

Their quest began when Powter was given three Richmond birdwing vines with a picture of the butterfly attached. He planted the vines and noticed what appeared to be other, much larger specimens on his property.

At about the same time, CSIRO entomologist and butterfly expert, Dr Don Sands, was part way through a campaign to restore the Richmond birdwing to its original range. As part of this campaign Sands had been propagating Richmond birdwing vines through Balunyah Nursery at Coraki in New South Wales – the origin of Powter's three vines.

Sands was also giving talks to national parks authorities and community and school groups on the need to conserve the butterfly's habitat and food plant. Powter met Sands at one such meeting and invited the entomologist to his property. To Sands's delight, he found the butterflies and a number of well-established vines on Powter's land.

Since then, the Powter's have planted more than 200 vines and have joined the Land for Wildlife Scheme. This scheme was set up to by the Natural Heritage Trust to conserve habitat of special significance on private land.

From little things . . .

It seems Powter's enthusiasm is infectious. Five neighbours on adjoining properties have also joined Land for Wildlife and are planting and propagating Richmond birdwing vines on their land.

Graham Cheal and Pam Seddon have each planted hundreds of vines and collect seed for Powter to pot up at the local nursery. The seedlings are then distributed to groups, individuals and the local council, which bought land behind Powter specifically for the protection of the Richmond birdwing and its food plant.



Fine young cannibal: Caterpillars of the Richmond birdwing butterfly turn on one another when supplies of young leaves run out.



Pupa of the Richmond birdwing butterfly.
Just before pupation, caterpillars usually leave the food plant and suspend themselves under leaves via silk threads. Larvae pupating in spring or early summer emerge within 25–40 days, but larvae pupating in late summer or autumn overwinter for 127–275 days, possibly longer.

Tips on making the recovery list

THE FEDERAL and state governments share responsibility for conserving Australia's 657 butterfly species and subspecies, nearly half of which occur nowhere else in the world.

Queensland, New South Wales, Victoria and Tasmania have their own butterfly lists and legislation for protecting them. At the national level, one butterfly, the Bathurst copper, is listed as 'vulnerable' under the Environment Protection and Biodiversity Conservation Act (1999). This listing entitles the butterfly to a recovery plan funded through Environment Australia's Endangered Species Program.

Environment Australia administers the Endangered Species Program through its Wildlife Australia branch. The program is part of the Natural Heritage Trust and is designed to protect and conserve Australia's native species and ecological communities on federal land.

The program achieves this by funding on-ground recovery actions and threat abatement plans for nationally listed species. Twenty-seven recovery plans, covering 48 listed species, are in operation. Six threat abatement plans, addressing problems such as feral cats, rabbits and goats, are also under way.

Sometimes 'action plans' are developed first, to provide broad information on a group of organisms. As well as the Butterfly Action Plan, Environment

Australia has commissioned action plans for rodents, reptiles, marsupials, frogs, freshwater fishes, bats, birds and marine organisms.

The conservation process generally proceeds in the following way:

- A species is nominated for national listing based on IUCN (International Union for the Conservation of Nature) criteria.
- The Threatened Species Scientific Committee considers the nomination and approves or rejects the listing.
- If approved, the species is listed and a recovery plan is implemented. To streamline the process, Environment Australia focuses on 'multi-species' and 'regional' recovery plans.
- Funding is provided to state and territory conservation agencies and community conservation groups to augment recovery plans.
- Recovery plans are reviewed. If the recovery actions have been successful, or if new information on a species has been obtained, the conservation status of the species may also be reviewed. To de-list or reduce the conservation status of a species, new nominations for a change in status must be supplied.
- If a species is de-listed, states and territories take over responsibility for continued conservation management.

'We gave away about 800 vines last year and hope to double that number this year,' Powder says.

As a result of this activity, about 247 hectares of birdwing habitat is now preserved and the butterflies are regularly sited on participating properties.

'Last November we had 14 butterflies – 10 females and four males – feeding on the flowers of the Bauhinia tree near the house,' Powder says.

The area has achieved national significance in terms of its conservation value for the butterfly and its food plant. But the story doesn't end there. Other Richmond birdwing conservation activities initiated by Sands and his CSIRO colleagues back in Brisbane, have also come to fruition.

These include school and community participation in vine plantings across south-east Queensland and northern NSW and monitoring the effects of climate on vine growth and leaf toughness.

'The growth of the vine has a big influence on whether caterpillars are going to be able to eat it,' Sands says. 'Caterpillars are limited by the strength of their mandibles, so there needs to be leaves of the right toughness before they can feed.'

To quantify leaf toughness, Sands and his colleagues developed a device called a 'leaf penetrometer'. Schools are now using these devices to measure seasonal changes in leaf toughness. This information will help scientists understand butterfly-host plant interactions. In addition, the agrichemical

Accolade for a bug man's life

ON AUSTRALIA DAY this year, retired CSIRO entomologist, Dr Don Sands, was rewarded for his outstanding contribution to entomology and the Australian horticultural industry. Sands received a Medal of the Order of Australia in the General Division after 30 years of research that addressed some of the most pressing economic, environmental and conservation problems in Australia and the Pacific region.

Sands' major achievements include the biological control of white scale insects in citrus orchards, green vegetable bugs in pecan orchards, fruit piercing moths in stone fruit orchards, (see *Ecos* 87, 1996), and control of the banana skipper and breadfruit mealybug in Papua New Guinea and Pacific Island states. He identified the weevil that controls the floating weed, salvinia, and has played a pivotal role in the

conservation of the Richmond birdwing butterfly (see main story).

Fittingly, Sands' citation reads: 'for service to the horticultural industry in Australia and the Pacific Region through the development of biological pest control solutions, and to entomology, particularly through conservation projects'.

'I'm thrilled because of the prominence such an award gives to science in Australia,' Sands says.

'But the award is really recognition for the contributions of quite a large number of people in both CSIRO and other agencies who have worked with me over the years to generate the outcomes we have achieved.'

Since his retirement in 1997, Sands and colleagues Dr Tim New and Dr Geoff Clarke, have been working on a Butterfly Action Plan for Environment Australia.



Dr Don Sands

In the future, he hopes to raise awareness of the importance of preserving habitat fragments on private land and encourage joint ventures between municipal councils and landholders to conserve such fragments. He is also keen to ensure proper insect surveys are conducted in national parks to inform future conservation efforts.

company, Bayer Australia, has provided financial support for an 'adopt-a-caterpillar' scheme in schools, hosted by the CSIRO Double Helix science club.

The scheme focuses on growing food plants for the Richmond birdwing, educating students about butterfly lifecycles and teaching them how to improve or maintain their environment.

A community caretaker network has also been established through a grant from the World Wide Fund for Nature and the Natural Heritage Trust. Caretakers' responsibilities include re-planting and enriching Richmond birdwing vine communities and investigating conservation management strategies for private properties.

For Sands, this community involvement reflects the success of the project. 'A key goal of this project was to get the community involved to the point where they could take responsibility for the continued running of it. And we've achieved that,' he says.

Above right: Fatal attraction. The Dutchman's pipe is an introduced vine that tricks the Richmond birdwing female into laying her eggs on its leaves. The vine releases chemicals similar to the butterfly's actual food plant, the Richmond birdwing vine, but contains compounds toxic to the caterpillars.

Right: The Richmond birdwing vine, the main food plant of the Richmond birdwing butterfly, is found in lowland sub-tropical rainforests and increasingly in gardens and forest patches around Brisbane.

