



Dori Sands

The mere flapping of a butterfly's wing can have far-reaching effects, according to chaos theorists. Indeed, the so-called 'butterfly effect' has real meaning for at least one CSIRO entomologist. His off-duty partiality for a rare butterfly has sparked an environmental chain reaction which will not only secure its future, but yield a valuable scientific tool and teach teenagers about science in the process.

The endangered Richmond birdwing has come under increasing pressure from the razing of remnant rainforest verges in southern Queensland and northern New South Wales. In addition, a Brazilian vine sold in nurseries has distracted the butterfly away from the native vine on which it normally lays its eggs. The introduced vine, known as Dutchman's pipe, is toxic and poisons the emerging caterpillars which feed on it.

Dr Don Sands, a senior principal research scientist with the Division of Entomology, studied birdwings in Papua New Guinea before arriving in Brisbane a decade ago to work on biological pest control. The Papuan family of birdwing species includes the world's biggest butterfly, Queen Alexandra's birdwing, which has a wingspan of 27 centimetres and yields more than \$1000 on the black market. Birdwings, of which especially the slightly smaller males display brilliant green, blue or gold markings, are found only in south-east Asia, Papua New Guinea the Solomons and north-east Australia.

Upon finding the family's southernmost member, the Richmond birdwing, flitting about in his Brisbane backyard, Sands planted native vines to coax the butterflies to breed. To his pleasure, they did. Soon he was spending his spare time to seek out other colonies along the coast.

However, one day he visited the northernmost colony near Maryborough only to find that the rare stands of vine, *Aristolochia praevenosa*, had vanished, along with their resident butterflies. Within years, sites at Rainbow Beach and Noosa were also bulldozed so that the butterfly's range had suddenly shrunk by about 160 kilometres. When the fluttering in his own backyard ceased, he decided enough was enough.

Using simple seed selection techniques, Sands bred a drought-resistant variety of the native rainforest vine. Within years, his modest scheme to recolonise some degraded areas received a boost when National Parks rangers from both states took up the running.

'It quickly became too big a hobby for me,' says Sands. 'Fortunately Sue Scott (CSIRO's Double Helix officer) got involved to co-ordinate the campaign.'

Scott evidently wasted little time. Presently 130 schools across the butterfly's

former range, between Grafton and Maryborough, have planted at least 12 vines each.

'It's been a wonderful project for the kids,' she says. About 15 000 vines – descendants of the cultivar bred by Sands – have so far been raised in a bush nursery run by an Aboriginal co-op.

Already, some of the first stands planted (in 1991) near Lismore in northern New South Wales are bristling with birdwings. Sands says areas where the butterflies do not return naturally could be restocked when a mooted birdwing nursery gets the go-ahead. At Caboolture, seven hectares have been set aside for a birdwing reserve.

At the same time, community efforts to remove the imported Dutchman's pipe, *A. elegans*, are starting to have an impact. The vine also poses a threat to Australia's largest butterfly, the closely related Cairns birdwing, which feeds mainly on the native *A. tagala* found north of Mackay. The Dutchman's pipe exudes an aroma similar to the endemic *Aristolochia* species, but sheep as well as butterfly caterpillars have died eating its toxic leaves.

However, the campaign has gone beyond planting natives and removing exotics. As if to underline the serendipitous nature of science, the entomologist's hobby, which was inspired by his work with insects to begin with, has now come full circle by providing an important spin-off for his profession. Recognising that the birdwing caterpillars prefer relatively soft vine leaves, Sands has developed a 'leaf penetrometer' to measure their physical toughness. While the penetrometer will ensure that vines planted in future will provide near-perfect dining conditions for birdwings, the device will also have broader applications.

'In the past we have tended to focus on secondary chemical compounds as plant defences against insects,' says Sands. He believes selecting for leaf toughness in certain crops has long been underrated as a mechanical deterrent to would-be pests.

Sands expects to produce enough prototype penetrometers to supply one to each of the vine-planting schools. 'These kids will evaluate the penetrometer for us,' he says.

Sands confesses to still being overwhelmed by the public's response to the Richmond birdwing's plight. 'This butterfly could come to symbolise a flagship of conservation,' he says.

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