

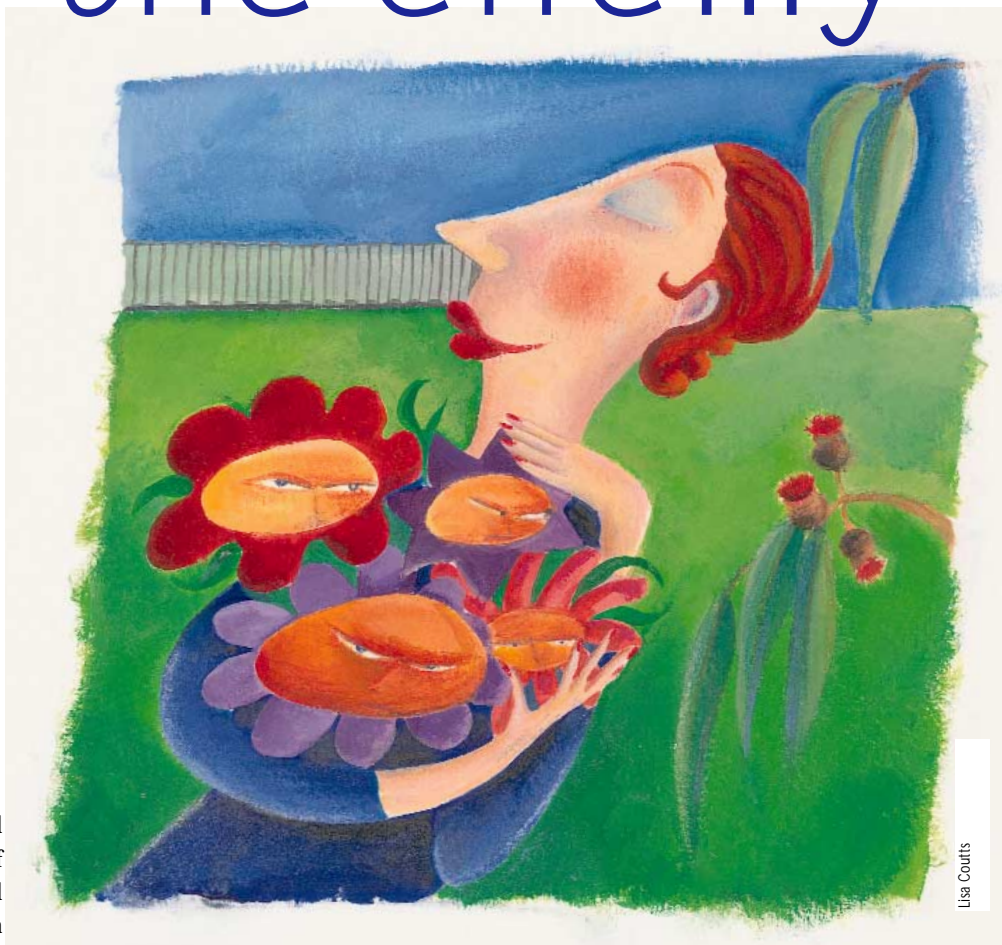


Dr Mark Lonsdale, weed management program leader at CSIRO Entomology, suggests our gardens harbour far greater dangers than the laboratories of genetic engineers.

As an ecologist who has worked for 15 years on the ecology of invasive plants, I feel bemused by the near-hysteria over the introduction of genetically engineered organisms (an expression I prefer to the euphemistic 'genetically modified organisms'), or GEOs, into agriculture. Truly we strain at a gnat, while swallowing a camel. For while the number of engineered organisms is small (only 29 species had been approved or were near-approved for trial in Europe up to 1998), thousands of exotic plant species, many of them little known to science, are moved around the globe each year as new crops, pastures and ornamentals.

A study in 1993 found that nearly half of Australia's noxious weeds had been introduced intentionally, causing great economic and environmental harm and even damage to human health (for example, parthenium weed). None of them was genetically engineered. A study I carried out in 1994 showed that introductions of tropical pasture species were three times as likely to produce a weed as a useful plant. Exotic species are regarded as second only to habitat destruction in the threat they pose to global biodiversity.

Weeding out the enemy



Lisa Coutts

I do think it is right that we should move slowly in the process of introducing GEOs into Australia, because they are so novel that we have little evidence on which to assess the risks they pose. But what of conventional plants? Even here the risks are hard to predict, because all new arrivals, while their history overseas may have been one of benign obscurity, may interact with chance and their new environment to become a monster. *Mimosa pigra*, a six metre tall, vigorous prickly shrub in northern Australia, its reproductive capacity so great that stands are capable of doubling in area each year, is a minor part of the flora in its native range in Mexico. Barely two metres tall, spindly and harassed by insects and pathogens, it is short-lived and uncompetitive. In its Australian environment, it almost looks like a different species. It is considered a serious threat to the biodiversity of Kakadu National Park, being capable of transforming species-rich tropical wetlands into monotonous shrub lands.

Meanwhile, the quest for new species continues. Ornamentals are the greatest source of introduced weed species. The problem is that people plant up their yards with pretty flowers, which find the environment to their liking and leap the fence as seeds, invading the native bush. One of the worst weeds in Australia, rubbervine, is a creeper with a delightful flower that was introduced as an ornamental. Is it possible that genetic engineering can come to the rescue?

One gene technology that has had a particularly bad press is the 'Terminator Gene'. Seed companies who produce say insect-resistant cotton by genetic engineering would like farmers to buy the seeds each year rather than save some seed from each year's crop and replant next year. It is a question of profit. The companies therefore have sought genetic technologies that prevent the crop from producing viable seed, thus forcing the farmer to buy seed from them. The implications have been generally

portrayed in the press as bad, in particular because of the serious implications for Third World farmers of having to buy their seed (see <http://www.rafi.ca>), but is it possible that Terminator technology could be introduced into ornamental species to prevent their reproducing in the wild?

There is a huge demand for novelty in ornamental species but there is a small risk of each new species going feral. It would be a great contribution to the future state of our environment if we could ensure that future ornamentals would remain in the garden where they belong, and it would indeed be ironic if genetic engineering – so widely reviled by environmentalists – were able to make such a contribution.

Ornamentals at large in the landscape. From below: large leaf privet, lupins, morning glory and forget-me-nots. Pictures by Kate Blood.



Nurseries urged to ban 'garden thugs'

A PROVISIONAL list of 100 'garden thugs' is the focus of a draft national strategy for invasive garden plants released by the CRC for Weed Management Systems and the Nursery Industry Association of Australia.

The strategy, which is open for comment by the nursery trade, heralds a joint effort by government and industry to prevent ornamental species from becoming weeds. It suggests creating a shortlist of 52 invasive ornamental species, or 'garden thugs', that would be replaced in the nursery trade by non-invasive alternatives, accompanied by a weed education program for gardeners and the horticultural industry. The provisional list includes such garden favourites as jasmine, lavender, agapanthus, holly, English ivy, freesias, arum lily, certain native wattles, English broom and buddleias.

Agricultural weeds are estimated to cost the nation \$3–4 billion dollars a year, and environmental weed and pest invasions are considered second only to habitat destruction in reducing Australia's biological diversity. According to a CRC study of weed incursions between 1971 and 1995, at least 290 plant species became naturalised in Australia during this period, and 65% of them were ornamentals. The study also warned of increased naturalisation rates between 1981 and 1995.

Environmental weed education coordinator with the CRC, Kate Blood, says garden plants are highly diverse and are spread through trade to a wide geographical range of habitats, giving them ample opportunity to become weedy somewhere. She says Paterson's curse is a notorious garden escapee. 'It was grown in Australian gardens as early as 1843 and sold by Melbourne florists under the name of Riverina bluebell,' Blood says. 'It is now one of Australia's worst weeds, costing more than \$30 million a year.'

Blood, who is based at the Keith Turnbull Research Institute at Frankston in Victoria, says efforts to manage weeds need the support of parallel efforts to address the problem's source. 'Otherwise they'll all jump back,' she says. 'You're just pouring money down the drain.'

Rules relating to the accidental or intentional introduction of weeds in Australia have been tightened in the past few years. Under recent legislation, all new, imported plants must be assessed by the Australian Quarantine and Inspection Service for their invasive potential. Only plants assessed as 'low risk' may be imported. But concerns remain that for at least the next few decades, many 'new' weeds will continue to emerge from plants already present in Australian gardens and nurseries.

'We're relying on the goodwill of nurseries,' Blood says. 'Of course the nursery industry is not the sole source of weeds, but nurseries play an important role in educating gardeners about what to plant and where to plant it.'

The aim is to tackle the problem through voluntary compliance, rather than legislation. A similar process has been tried in New Zealand, but 110 plants were formally banned when industry cooperation was not reached.

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