

factsheet

Alternatives to bird-dispersed weeds

north-east NSW and south-east Qld priority weeds



Background

This factsheet suggests how fleshy-fruited weeds can be replaced by fleshy-fruited native plants as a food source for birds.

This information is aimed at gardeners and land managers who have weed infestations and concerns over the fate of animals that now use the fruit resources of the weeds following weed removal.

The problem

Weeds (often also referred to as invasive or alien plants) are an important conservation and economic problem worldwide.

In Australia, it is estimated that 28 000 species of plants have been introduced from other parts of the world, and over

Project: selecting weed replacement plants for use by frugivorous birds

Location: NE New South Wales and SE Queensland

Participants: Carl Gosper, Independent researcher (ex-CRC post-doc), Gabrielle Vivian-Smith, Eve White, Tanya Grimshaw (Qld Dept of Natural Resources & Water)

2500 of these have become established in the wild (about 10% of the total Australian flora).

Weeds are a large economic cost to Australian agriculture, threaten the integrity of many of our natural places and are a threat to biodiversity.

Most of these introductions have been deliberate, with the majority having been for horticultural and ornamental purposes, particularly for use in gardens.

While weeds often have negative impacts on natural ecosystems, there are also cases where weeds appear to benefit native species, or at least provide support for them in highly disturbed landscapes.

are also cases where weeds appear to benefit native species, or at least provide support for them in highly disturbed landscapes.

Fruit of fleshy-fruited weeds can be important foods for native fruit-eating birds, and these birds then often contribute to further weed invasion by dispersing seeds.

In eastern Australia, for example, fruits of

the weed camphor laurel (*Cinnamomum camphora*, Lauraceae) are thought to be vitally important in supporting populations of several rainforest pigeons.

Stands of camphor laurel can also increase the recruitment of native fleshy-fruited plants, by attracting fruit-eating birds that then spread the seeds of native plant species.

Positive ecological contributions by weeds can be a source of conflict in conservation management.

Should the weeds be removed, or should they be retained because they support native animals?

Weeds of north-east NSW and south-east Qld

The north-east NSW and south-east Qld region contains a diversity of fleshy-fruited weed species, in addition to several Weeds of National Significance (see the Alternatives to bird-dispersed weeds: Weeds of National Significance factsheet).

Examples of particularly widespread and problematic weeds that are spread by birds are camphor laurel, ground asparagus (*Asparagus aethiopicus*), climbing asparagus (*A. africanus*) and Chinese elm (*Celtis sinensis*).



Camphor laurel (*Cinnamomum camphora*) is a particularly widespread and problematic weed that is spread by birds.
Photo: Carl Gosper

A solution

The provision of alternative (or replacement, if combined with weed control) food resources for birds is one approach to minimise the impacts of control of fleshy-fruited weeds.

Providing these alternative resources aims to:

- conserve populations of native fruit-eating birds in the event of loss of food resources following control of fleshy-fruited weeds
- favour the seed dispersal and recruitment of native plants rather than weeds
- reduce weed seed dispersal by promoting native plants that act as effective competitors for seed dispersal services (ie those provided by fruit-eating birds).

Selecting replacement plants

A variety of plant and fruit traits, such as fruit size and structure, fruit colour and fruiting season, are known to affect the food choices of birds.

Using these traits, we can identify which native plants have similar fruits to a particular weed.

These native plants should then provide alternate food to a similar suite of native fruit-eating birds, thus supporting these birds in the event of the weed's removal.

For each target weed, a number of native plant species have been identified that have very similar fruits (Table 1).

As indicated, the native species considered have been drawn from a core region of the current distribution of the weed.

Responsible use

In providing alternative food resources for birds to reduce their reliance on weed fruit, a number of important ecological issues should be considered.

The usual ecological restoration principles apply (similar principles could be followed for gardens as well, although possibly less strictly):

- use locally native species from local seed sources
- use species ecologically appropriate for the site in question.

Natural regeneration should also be harnessed wherever possible, as birds are very adept at dispersing the seeds of favoured native food plants to weedy sites.

Replacement plants should be provided over an appropriate time and spatial scale relative to the loss of resources from weed control.

For birds, incremental weed removal and replacement is the most likely to provide the continuous resources required to support resident fruit-eating birds by allowing time for new plants to mature and produce fruit, even if this is sub-optimal from a weed management perspective.

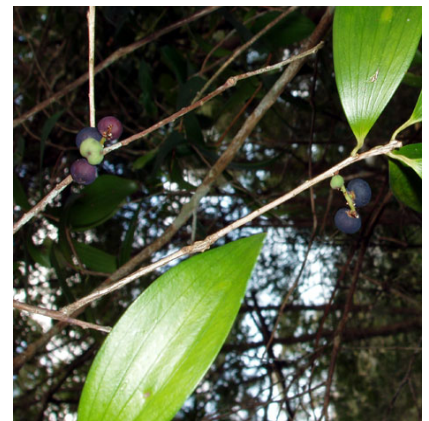
Native alternatives



Fruit of jackwood (*Cryptocarya glaucescens*).
Photo: Carl Gosper



Fruit of red-fruited palm-lily (*Cordyline rubra*).
Photo: Carl Gosper



Fruit of tree heath (*Trochocarpa laurina*).
Photo: Carl Gosper

Table 1. Native plant species with similar fruits to each of the target fleshy-fruited weeds of north-east NSW and south-east Qld. Native plants were selected from this region.

| Weed | Ground asparagus (<i>Asparagus aethiopicus</i>) | Climbing asparagus (<i>Asparagus africanus</i>) | Camphor laurel (<i>Cinnamomum camphora</i>) | Chinese elm (<i>Celtis sinensis</i>) |
|---|--|--|--|--|
| Alternative native plant species listed in order of suitability | Prickly alyxia (<i>Alyxia ruscifolia</i>) | Hairy supplejack (<i>Ripogonum elseyanum</i>) | Cabbage palm (<i>Livistona australis</i>)# | Hard quandong (<i>Elaeocarpus obovatus</i>)# |
| | Broad-leaved palm-lily (<i>Cordyline petiolaris</i>) | Sweet morinda (<i>Morinda jasminoides</i>)# | Malletwood (<i>Rhodamnia argentea</i>)# | <i>Hodgkinsonia ovatiflora</i> |
| | <i>Corokia whiteana</i> | Sarsaparilla (<i>Smilax australis</i>)# | Jackwood (<i>Cryptocarya glaucescens</i>)# | Whalebone tree (<i>Streblus brunonianus</i>)# |
| | Burny vine (<i>Trophis scandens</i> ssp. <i>scandens</i>) | Glossy acronychia (<i>Acronychia laevis</i>) | Mountain laurel (<i>Cryptocarya nova-anglica</i>) | Tall groundberry (<i>Acrotriche aggregata</i>) |
| | Lilly pilly (small-leaved race) (<i>Acmena smithii</i>)# | Whip vine (<i>Flagellaria indica</i>) | Pepperberry tree (<i>Cryptocarya obovata</i>)# | Rough-leaved elm (<i>Aphananthe philippinensis</i>)# |
| | Glossy acronychia (<i>Acronychia laevis</i>) | <i>Micromelum minutum</i> | Small-leaf cryptocarya (<i>Cryptocarya williwilliana</i>) | Three-veined cryptocarya (<i>Cryptocarya triplinervis</i> var. <i>pubens</i>)# |
| | Mountain wineberry (<i>Aristolelia australasica</i>) | Burny vine (<i>Trophis scandens</i> ssp. <i>scandens</i>) | Settler's flax (<i>Gymnostachys anceps</i>) | Rosewood (<i>Dysoxylum fraserianum</i>)# |
| | Coogera (<i>Arytera divaricata</i>) | Prickly alyxia (<i>Alyxia ruscifolia</i>) | <i>Notelaea ovata</i> | Koda (<i>Ehretia acuminata</i> var. <i>acuminata</i>)# |
| | Red-fruited palm-lily (<i>Cordyline rubra</i>) | <i>Amyema conspicuum</i> ssp. <i>conspicuum</i> | Smooth mock-olive (<i>Notelaea venosa</i>) | <i>Guioa semiglaucula</i> # |
| | Berry saltbush (<i>Einadia hastata</i>) | <i>Amyema pendulum</i> | Red ash (<i>Alphitonia excelsa</i>)# | Sweet morinda (<i>Morinda jasminoides</i>)# |
| | Amulla (<i>Eremophila debilis</i>) | Coogera (<i>Arytera divaricata</i>) | Grey walnut (<i>Beilschmiedia elliptica</i>)# | Mountain boobialla (<i>Myoporum betcheanum</i>) |
| | <i>Lysiana exocarpi</i> # | Currant bush (<i>Carissa ovata</i>) | Blush walnut (<i>Beilschmiedia obtusifolia</i>)# | Brush muttonwood (<i>Myrsine howittiana</i>)# |
| | <i>Myoporum boninense</i> ssp. <i>australe</i> | <i>Cassytha filiformis</i> | Mango bark (<i>Canarium australasicum</i>)# | Gorge mock-olive (<i>Notelaea microcarpa</i>) |
| | Water bush (<i>Myoporum montanum</i>) | Slender grape (<i>Cayratia clematidea</i>)# | Gorge laurel (<i>Cryptocarya floydii</i>) | Canary beech (<i>Polyalthia nitidissima</i>)# |
| | <i>Olax stricta</i> | Scrambling clerodendrum (<i>Clerodendrum inerme</i>) | Thick-leaved laurel (<i>Cryptocarya meissneriana</i>) | Elderberry panax (<i>Polyscias sambucifolia</i>) |
| | Hairy psychotria (<i>Psychotria loniceroides</i>) | Koda (<i>Ehretia acuminata</i> var. <i>acuminata</i>)# | Murrogun (<i>Cryptocarya microneura</i>)# | Native peach (<i>Trema tomentosa</i> var. <i>viridis</i>)# |
| | Sea-berry saltbush (<i>Rhagodia candolleana</i>) | Yellow ash (<i>Emmenosperma</i> <i>alphitonioides</i>)# | Rose maple (<i>Cryptocarya rigida</i>)# | <i>Vitex trifolia</i> var. <i>trifolia</i> |
| | Hairy supplejack (<i>Ripogonum elseyanum</i>) | <i>Jasminum suavissimum</i> | Black plum (<i>Diospyros australis</i>)# | |
| | Pearl vine (<i>Sarcopetalum harveyanum</i>) | <i>Lenwebbia prominens</i> | Stiff jasmine (<i>Jasminum volubile</i>) | |
| | Sarsaparilla (<i>Smilax australis</i>) | Water bush (<i>Myoporum montanum</i>) | Bolly gum (<i>Litsea reticulata</i>)# | |

Table 1 cont. Native plant species with similar fruits to each of the target fleshy-fruited weeds of north-east NSW and south-east Qld. Native plants were selected from this region.

| Weed | Ground asparagus (<i>Asparagus aethiopicus</i>) | Climbing asparagus (<i>Asparagus africanus</i>) | Camphor laurel (<i>Cinnamomum camphora</i>) | Chinese elm (<i>Celtis sinensis</i>) |
|---|--|--|---|---|
| Alternative native plant species listed in order of suitability | Furry nightshade (<i>Solanum densevestitum</i>) | <i>Olax stricta</i> | <i>Notelaea</i> species A | |
| | | Poison pimelea (<i>Pimelea neo-anglica</i>) | Brown beech (<i>Pennantia cunninghamii</i>)# | |
| | | Blunt-leaved condoo (<i>Planchonella</i> sp.) | Featherwood (<i>Polyosma cunninghamii</i>)# | |
| | | Hairy psychotria (<i>Psychotria loniceroides</i>) | Prickly supplejack (<i>Ripogonum discolor</i>) | |
| | | Shiny-leaved canthium (<i>Psydrax odorata</i>) | Native peach (<i>Trema tomentosa</i> var. <i>viridis</i>)# | |
| | | Zig-zag vine (<i>Rauwenhoffia leichhardtii</i>) | | |
| | | Small supplejack (<i>Ripogonum fawcettianum</i>) | | |
| | | Pearl vine (<i>Sarcopetalum harveyanum</i>) | | |
| | | Sweet sarsaparilla (<i>Smilax glycyphylla</i>) | | |
| | | Tree heath (<i>Trochocarpa laurina</i>)# | | |
| | <i>Vitex trifolia</i> var. <i>trifolia</i> | | | |

Plant whose fruit are used by bird species that also eat the weed's fruit.

Further resources

Further information about the method used to select plants and the ecological basis for the replacement plants approach can be found in the following publications:

Gosper, C.R. and Vivian-Smith, G. (2006). Selecting replacements for invasive plants to support frugivores in highly modified sites: A case study focussing on *Lantana camara*. *Ecological Management and Restoration*, **7**:197-203.

Gosper, C.R. and Vivian-Smith, G. (2007). *Replacing weeds with native plants to support fruit-eating birds: a guide to plant selection*. CRC for Australian Weed Management. On-line: www.weeds.crc.org.au

Gosper, C.R., Stansbury, C.D. and Vivian-Smith, G. (2005). Seed dispersal of fleshy-fruited invasive plants by birds: contributing factors and management options. *Diversity and Distributions*, **11**:549-558.

Additional general information on weed problems and ecological restoration can be found on the following websites:

CRC for Australian Weed Management: <http://www.weeds.crc.org.au>

Society for Ecological Restoration: <http://www.ser.org>

Society for Growing Australian Plants: <http://asgap.org.au/>

For further information visit the Weeds CRC's website: www.weeds.crc.org.au

CRC for Australian Weed Management

Waite Road, Urrbrae
PMB 1, Waite Campus
Glen Osmond, SA 5064

T 08 8303 6590

F 08 8303 7311

E crcweeds@adelaide.edu.au

Written by: Carl Gosper.

Acknowledgements: Carl Gosper, Gabrielle Vivian-Smith, Tony Grice, Dane Panetta and Rita Reitano.

Contact: Alan Fletcher Research Station

PO Box 36, Sherwood QLD 4075

Email: carl.gosper@yahoo.com.au



Established and supported under the Australian Government's Cooperative Research Centres Program

Ref: 63/2007/fs

Disclaimer:

This publication is provided for the purpose of disseminating information relating to scientific and technical matters. Participating organisations of the Weeds CRC do not accept liability for any loss and/or damage, including financial loss, resulting from the reliance upon any information, advice or recommendations contained in this publication. The contents of this publication should not necessarily be taken to represent the views of the participating organisations.