



CENTRE FOR
INVASIVE SPECIES SOLUTIONS

BEST PRACTICE MANAGEMENT FOR THE CONTROL OF boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*)

ADDENDUM TO THE WEEDS OF NATIONAL SIGNIFICANCE BONESEED MANAGEMENT MANUAL



weeds.org.au

This publication is licensed under a Creative Commons Attribution 4.0 International license, except for photographic and graphical images contained within it. Photographs and other graphical material must not be acquired, stored, copied, displayed and printed or otherwise reproduced — including by electronic means — for any purpose unless prior written permission has been obtained from the copyright owner.

Copyright of photographs and other illustrations is variously owned by Invasive Animals Ltd, individuals and corporate entities. For further details, please contact the Communications and Marketing Manager, Centre for Invasive Species Solutions.

The Creative Commons Attribution 4.0 International license allows you to copy, distribute, transmit and adapt material in this publication, subject to the exception for photographic and other graphic material set out above, and provided you attribute the work as shown below. The license does not transfer ownership of the copyright. A summary of the license terms is at: <https://creativecommons.org/licenses/by/4.0/>

© Invasive Animals Ltd

Citation: Wild Matters (2023). *Best practice management for the control of boneseed (Chrysanthemoides monilifera subsp. monilifera; Addendum to the Weeds of National Significance boneseed management manual*. A Weeds Australia publication, report to Centre for Invasive Species Solutions.

Print ISBN: 978-1-922971-41-8

Web ISBN: 978-1-922971-40-1

Published by: Centre for Invasive Species Solutions

The Centre for Invasive Species Solutions gratefully acknowledges the funding support for this publication through the Australian Government Department of Agriculture, Fisheries and Forestry.

The Centre also acknowledges Wild Matters as the primary author and thanks those who made technical contributions and reviewed the publication, including:

- Hillary Cherry, Senior Weeds Officer, Weeds Team, Feral Animal & Weeds Unit, NSW DPE
- Kay Bailey, Weeds Project Coordinator, Tamar NRM
- Andrew Storrie, Agronomo Consulting
- Royce Holtkamp, Ecological Horizons, Chair NSW Biocontrol Taskforce
- Kerinne Harvey

Disclaimer: The information contained in this publication has been prepared with care and is based on knowledge and understanding at the time of writing (2023). Some of the information in this document is provided by third parties, and all information is provided “as is”, without warranty of any kind, to the extent permitted by law. After publication, circumstances may change and before relying on this information the user needs to take care to update as necessary.

NO PRODUCT PREFERENCES: The product trade names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product name does not imply endorsement over any equivalent product from another manufacturer.

ALWAYS READ THE LABEL: Users of agricultural chemical products must always read the label and any permit, before using a product, and must strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

This publication was funded by



Australian Government

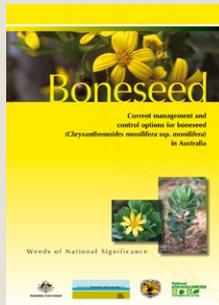
**Department of Agriculture,
Fisheries and Forestry**

Cover images

Front — Boneseed in flower. Image by Kym Smith.

Back — Releasing the leaf buckle mite. Image by Shauna Potter.

How to use this addendum



The [boneseed management manual](#) (PDF, 11.4 MB) was published in 2006 and provides information on the weed and best practice management options. The manual has since been reviewed to ensure currency of best practice management advice and information. Any updates to the information contained within the manual are included in this addendum and should be taken as the most current source of information.

Note: the addendum is not a standalone document and should be read in conjunction with the 2006 manual.

The addendum focuses on updates to control options, including mechanical, chemical and biological control methods. It also includes updates on available herbicides and where to go to find additional information on boneseed and its management.

When new or additional information is provided in the addendum, page numbers reference the related text in the original manual.

Section 1: The boneseed profile

Reproduction and spread

Seedbank longevity

Page 8 – More recent studies have shown that some seeds remain viable in the soil at some sites for up to eight years (French et al. in prep). Temperature and humidity have been shown to influence boneseed seed longevity in the soil. French et al. concluded that at sites that were either cooler or had low humidity, seed viability can extend beyond eight years.

Seed longevity and environmental factors that influence seed longevity are important when considering the duration of follow-up control.

Section 2: Managing boneseed

Managing boneseed in different situations

Page 14–18 – Use of the splatter gun method can improve management outcomes on steep slopes and areas that are hard to access.

Developing a management plan

Page 18–21 – When developing a boneseed control plan (step 4), ensure that vehicle hygiene measures are included to prevent the spread of seed to clean areas.

In areas where the spread of boneseed has resulted from the dumping of garden waste and soil, consider including in your plan a component to educate and raise the awareness of surrounding landholders. This has resource implications, but may prove beneficial in the medium to long term.

Section 3: Control methods

Key points

Follow up what you started

Page 24 – Record (map) the location of all plants. This will help you to return to their exact location the following year to control regrowth and seedlings.

Integrated methods

Page 24 – Seedlings are palatable to stock. It may be feasible to graze stock in early summer in areas with dense seedlings as part of a control plan. However, once the boneseed grows to sapling or mature stages, grazing is not effective.

Manual control

Page 25 – To minimise soil disturbance, place one foot on either side of the boneseed stem when hand pulling. This may not be possible on slopes or with larger plants.

Dispose of any fruiting plants by burning or bagging the seeds. This will prevent future germination.

Chemical control

Page 27 – When used as part of an integrated management strategy, the use of chemicals (herbicides) can be a practical and efficient way of controlling boneseed. Three herbicide application methods are currently registered for use on boneseed:

- cut-and-swab (where herbicide is applied to the stump of a felled plant)
- foliar spraying (where the leaves of the plant are sprayed with a herbicide solution)
- splatter gun application (also spraying with herbicide).

Herbicide labels and legislation

Page 27 – The Australian Pesticides and Veterinary Medicines Authority (APVMA) regulates the availability of all pesticides, which includes herbicides. Herbicides are registered with the APVMA for specific applications, as stated on the label. State governments regulate the use of pesticides after sale. A herbicide label is a legal document that defines where, when and how a herbicide can be used on which weed species and at what rate.

Note: not all registered herbicides are commercially available. Often, companies improve herbicide formulations and only market the new formulation. For example, many herbicides are being marketed in higher concentrations. This reduces transport, storage and container-disposal costs.

In addition to herbicides being registered and described 'on-label' for specific weeds and situations, herbicides can sometimes be used through permits or 'off-label' use. These situations are described below.

Minor use and emergency use permits

APVMA may issue minor use and emergency use permits for herbicide applications that are not otherwise registered for that particular use. Minor use permits are sometimes referred to as 'off-label' permits. Minor use and emergency permits are valid ('in force') for a limited time. See the [APVMA website](#) to find current permits.

Some states also have permits for the control of 'declared' weeds and may not specifically list the weed species to be controlled. These permits will often list a range of herbicides that can be used for the control of declared or environmental weeds. To find these permits for your state:

- go to the [APVMA permits database](#) search
- enter 'declared weeds' or 'environmental weeds' in the SEARCH box
- click the search term 'Pest/purpose'
- click 'Search'.

It is also recommended that if you are unsure which herbicides can legally be used on a particular weed in your state, contact the relevant biosecurity section of your state department of agriculture. When using herbicides in aquatic situations, only use those that are registered or permitted for use in and around aquatic areas.

Any minor use permits relevant to boneseed at time of publication are listed in Table 6.

Off-label use

Off-label use is the use of a registered chemical to address a specific issue that is not covered by the APVMA-approved label. Off-label use is to:

- control a different weed (or pest)
- apply at a different rate (only lower)
- apply in a different manner (not allowed in ACT, NSW and Tasmania).

Off-label use is permitted in all states and territories; however, conditions vary in each jurisdiction (Table 1).

Table 1. Where to find specific rules relating to herbicide use, including off-label use, in each state and territory

STATE/ TERRITORY	WEBSITE AND FURTHER INFORMATION
ACT	Agvet chemical use https://www.accesscanberra.act.gov.au/s/article/pest-and-weed-control-tab-Agvet-chemical-use
NSW	Pesticides https://www.epa.nsw.gov.au/your-environment/pesticides/pesticides-nsw-overview Weed control and identification https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control
NT	Chemical use https://nt.gov.au/industry/agriculture/farm-management/using-chemicals-responsibly
Qld	Chemical use https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/aquaculture/chemicals/registered
SA	Rural chemicals https://pir.sa.gov.au/biosecurity/rural_chemicals Weed control handbook https://www.pir.sa.gov.au/_data/assets/pdf_file/0020/232382/WEB_8867_PIRSA_Weed_Control_Handbook_2018.pdf (PDF, 4.2 MB)
Tas	Agricultural and veterinary chemicals https://nre.tas.gov.au/agriculture/agvet-chemicals Weeds https://nre.tas.gov.au/invasive-species/weeds
Vic	Off-label chemical use https://agriculture.vic.gov.au/farm-management/chemicals/offlabel-chemical-use
WA	Using pesticides safely https://ww2.health.wa.gov.au/Articles/U_Z/Using-pesticides-safely

Safety and training

Page 27 – Personal protective equipment (such as protective clothing, eye or face shields, and respiratory protection) must be used in accordance with the recommendations stated on the herbicide label or permit. Chemical-use training is required for people using herbicides as part of their job or business. Training is recommended for community groups and may be required if working on public land. Training courses are run by ChemCert, AusChem and TAFE in each state. Other training courses may be available through state agencies (e.g. AgTrain in Victoria, SMARTtrain in NSW), local councils or non-government organisations.

By law, you must read the label (or have it read to you) before using any herbicide product. Always follow the label or permit.

Chemical user certification

Commercial weed-control operators need to be licenced in most states (Table 2). It should also be noted that there is now shared responsibility between landholders and their contractors for any breaches of laws and regulations (such as herbicide drift).

Table 2. Chemical-user certification by state and territory

STATE/ TERRITORY	WEBSITE
ACT	www.accesscanberra.act.gov.au/s/article/pest-and-weed-control-tab-Agvet-chemical-use
NSW	www.epa.nsw.gov.au/your-environment/pesticides/licences-and-advice-for-occupational-pesticide-users
NT	nt.gov.au/industry/agriculture/farm-management/using-chemicals-responsibly/spray-applicator-licences
Qld	www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/chemical-controls/commercial-operators
SA	www.sa.gov.au/topics/business-and-trade/licensing/building-and-trades/pest-control-licence
Tas	nre.tas.gov.au/agriculture/agvet-chemicals/licences-and-certificates/ground-spraying-and-pest-management-licences
Vic	agriculture.vic.gov.au/farm-management/chemicals/licences-and-permits/commercial-operator-licence-for-contractors
WA	https://www.health.wa.gov.au/articles/n_r/pest-industry-licensing-and-registration

Effective use of herbicides

Successful herbicide control is dependent on the right herbicide for the target species, growth stage of the target species, weather conditions during and after spraying, how thoroughly the herbicide is applied, and the herbicide mix and application rate.

For spraying, wind speeds should be low (< 15 km/h) with no rain expected in the following six hours.

Do not apply herbicide to plants that are under any sort of stress, as herbicide will not be absorbed and translocated effectively, resulting in a reduced level of control. Plants may be stressed due to:

- dry soil
- low humidity
- air temperatures above 30 °C
- frost.

Effectiveness of herbicides can be maximised further by:

- mixing dye with the herbicide to help minimise missed areas and prevent overspraying (double spraying)
- using an adjuvant – an additive that improves herbicide uptake (always read the adjuvant’s product labels to ensure that they are compatible with the particular herbicide and there are no restrictions on their use; e.g. most adjuvants should not be used near waterways)
- ensuring spray equipment is correctly calibrated and maintained, including being thoroughly cleaned between uses.

Spraying in sensitive areas

Herbicide users have a legal obligation to avoid spray drift damage and to ensure that the chemicals applied stay within the target area. Target-weed infestations are often located in areas of native vegetation, so great care should be taken to avoid spraying surrounding foliage and soil. Do not use high pump/sprayer pressures that create small droplets which float in the air. Adjust the nozzle settings to produce coarser droplet sizes.

Using herbicides near water

Never spray herbicides over bodies of water or plants standing in water. Some herbicides are formulated to be a lower risk when used near water (e.g. Roundup® Biactive). NEVER add unregistered adjuvants to herbicides that will be used near water. Some states have publications explaining the safe use of herbicides near water (Table 3).

Table 3. Safe use of herbicides near water by state and territory

STATE/ TERRITORY	WEBSITE
South-eastern Australia	archive.dpi.nsw.gov.au/_data/assets/pdf_file/0011/319448/riparian-habitat-management-guide.pdf (PDF, 1.1 MB)
Qld	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/sustainable/chemical/ground-distribution-herbicide/laws
SA	https://www.epa.sa.gov.au/files/477387_pesticide_water.pdf (PDF, 1.7 MB)
Tas	https://nre.tas.gov.au/Documents/herbicide_guidelinesFINAL2012.pdf (PDF, 689 kB)
WA	https://www.water.wa.gov.au/_data/assets/pdf_file/0016/3355/12149.pdf (PDF, 113 kB)

Regulations and permits for works in riparian zones

Areas on or near the bank of a river or other body of water (riparian zones) are sensitive habitats, and in some states a licence is required to conduct weed-control works (Table 4).

Table 4. Authorities who can advise about regulations and permits for works in riparian zones

STATE/ TERRITORY	DEPARTMENT	WEBSITE
NSW	NSW Department of Planning and Environment — Water	https://water.dpie.nsw.gov.au
SA	Landscape SA, including 8 regional boards	https://www.landscape.sa.gov.au
Vic	Catchment management authorities	https://viccatchments.com.au/about-us/our-cma-regions
	Department of Energy, Environment and Climate Action — Forests and Reserves	Riparian management licences – www.forestsandreserves.vic.gov.au/_data/assets/pdf_file/0016/31426/Riparian-management-licences.pdf (PDF, 160 kB)

Herbicides for use on boneseed

Page 28 – There are many different herbicide products registered for use on boneseed (Table 5). It is important to check that each herbicide product is registered in your state or territory for the particular application method you are planning to use. There are also minor use permits available (Table 6).

Table 5. Herbicides permitted for use on boneseed under registration as at September 2023

APPLICATION METHOD	ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES ¹	STATE OR TERRITORY ²	RATE	SITUATION IN WHICH THE HERBICIDE IS REGISTERED	COMMENTS
Cut-and-swab	2,4-D amine 3 (625 g/L)	2,4-D Amine® 625	Vic, SA only	undiluted	pastures, rights of way and industrial areas	Apply to cut stump at any time of year.
	picloram + 2,4-D (75 + 300 g/L)	Tordon® 75-D	Qld, NSW, Vic, SA, WA only	1 L/10 L water	pastures, rights of way, commercial and industrial areas	Apply to cut stump at any time of year.
	aminopyralid + picloram (4.5 + 45 g/kg)	Vigilant® II	All	Undiluted (gel)	native vegetation, conservation areas, gullies, reserves and parks	Apply 3–5 mm layer of herbicide gel to cut stump from 'brush-bottle' supplied.
Foliar spray	glyphosate3 (360 g/L)	Roundup®, Roundup®, Biactive™ etc.	Qld, NSW, Vic, Tas only	5–10 mL/1 L water	all situations	Best results achieved when treated at peak flowering during winter. Use higher rate on plants over 1.5-m high.
		Weedmaster® Duo	All	5–10 mL/1 L water 75–150 mL/15 L (knapsack) 0.5–1 L/100 L high volume		
	metsulfuron-methyl 3 (600 g/kg)	Rygel Metsulfuron 600 WG	All	10 g/100 L water	native pastures, rights of way, commercial and industrial areas	Spray thoroughly to wet all foliage.
	bromoxynil 3 (400 g/L)	Bronco® 400	Vic, Tas only	80 mL/100 L water	pastures, roadsides and rights of way	High-volume spot spray for young seedlings only
	2,4-D amine 3 (700 g/L)	Amicide Advance® 700	Vic, SA only	70 mL/10 L water	pastures, rights of way and industrial areas	Spot spray when in flower Thoroughly wet all foliage.
	picloram + 2,4-D (75 + 300 g/L)	Tordon® 75-D	Qld, NSW, Vic, SA, WA only	650 mL/100 L water	pastures, rights of way, commercial and industrial areas	High-volume spot spray when flowering or fruiting
	picloram (240 g/L) + 2,4-D amine (625 g/L)	Macspreed picloram	Qld, NSW, ACT, Vic, SA, WA only	205 mL + 625 mL 2,4-D (625 g/L)/100 L water	agricultural non-crop areas, commercial and industrial areas, pastures and rights of way	High-volume handgun Flowering to fruiting
	aminopyralid + metsulfuron (375 + 300 g/kg)	Stinger®	NSW, Qld, Vic, SA only	20 g/100 L water		High-volume handgun Spray to thoroughly wet all foliage. Minimise contact with desirable species.

APPLICATION METHOD	ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES ¹	STATE OR TERRITORY ²	RATE	SITUATION IN WHICH THE HERBICIDE IS REGISTERED	COMMENTS
Splatter gun	glyphosate ³ (360 g/L)	Roundup®, Roundup® Biactive™	Qld, NSW, Vic, Tas only	1:29 or 1:19 with water	all situations	Use higher rate (1:19) on bushes over 1.5-m high. ⁴
		Weedmaster® Duo	All	1:29 or 1:19 with water		
	metsulfuron (600 g/kg)	Rygel® Metsulfuron 600 WG	All	1 g/L + organosilicone penetrant (10 mL/5 L)	native pastures, rights of way, commercial and industrial areas	
	aminopyralid + metsulfuron (375 + 300 g/kg)	Stinger®	NSW, Qld, Vic, SA only	20 g/10 L water + Pulse® Penetrant (20 mL/10 L)	agricultural non-crop areas, commercial and industrial areas, pastures and rights of way	Minimise contact with desirable species.
Stem injection	aminopyralid + metsulfuron-methyl (93.7 g/kg + 75g/kg)	Di-Bak AM	All	1 capsule every 10 cm of circumference	Forestry, Pasture, Commercial & Industrial areas; Rights of Way, Around Agricultural Buildings & Public Service areas	Use the Injecta applicator to drill a hole and deliver Di-Bak AM capsule in the sapwood layer beneath the bark. Space capsule insertions at 10 cm, centres around tree circumference below any branching, otherwise remove or treat all branches below the capsule insertion. On multiple trunk trees ensure each trunk is treated. ALL TREES: Apply the capsules to each tree at waist height or below.

Notes to this table can be found at the bottom of Table 6.

Table 6. Herbicides permitted for use on boneseed under minor use permits as at September 2023

APPLICATION METHOD	CHEMICAL	TRADE NAME ¹	RATE	COMMENTS
PER12251	Control of bitou bush and boneseed in sand dunes, bushland and grassland, NSW only Expires 31 March 2026. National Parks and Wildlife Service – Staff or contractors of NSW Parks and Wildlife Service or agencies/organisations represented on NSW LLS Regional Weed Committees			
Helicopter only	glyphosate (360 g/L) + metsulfuron (600 g/L)	Roundup® Biactive™ + Macspred Metmac® 600 Herbicide	2 L + 20-30 g/ha	Coastal sand dunes, bushland and grassland. Refer to permit critical use comments.

APPLICATION METHOD	CHEMICAL	TRADE NAME ¹	RATE	COMMENTS
	PER12363 – For control of various environmental weeds in natural Ecosystems using helicopter and unmanned aircraft vehicles (UAVS). Spot-spraying equipment. NSW only. Expires 31 March 2026. National Parks and Wildlife Service. Persons who can use the product under this permit: staff or contractors employed/contracted by the National Parks and Wildlife Service or agencies/organisations represented on NSW Local Land Services Regional Weeds Committees.			
Aerial spot spray	Metsulfuron (600 g/kg)	Macsprid Metmac™ 600	1–2 g/10 L	
	PER12363 – For control of various environmental weeds in natural Ecosystems using helicopter and unmanned aircraft vehicles (UAVS). Spot-spraying equipment. NSW only. Expires 31 March 2026. National Parks and Wildlife Service. Persons who can use the product under this permit: staff or contractors employed/contracted by the National Parks and Wildlife Service or agencies/organisations represented on NSW Local Land Services Regional Weeds Committees.			
Aerial spot spray	Metsulfuron (600 g/kg)	Macsprid Metmac™ 600	1–2 g/10 L	
	PER11916 – Control of various weeds in urban bushland, forests and coastal reserves, NSW only. Expires 31 March 2025. NSW Dept. of Primary Industries. Persons generally.			
Spray	glyphosate ³ (360 g/L)	Roundup®	1 L/100–200 L	Urban bushland, Forests, Coastal reserves
	PER13371 – Control of environmental weeds in South Australia only. Expires 30 April 2027. Department of Primary Industries and Regions South Australia – Persons generally			
Foliar – knapsack	glyphosate ³ (360 g/L)	Roundup®, Roundup® Biactive™ etc.	100 mL/10 L water	Non-crop areas, Rights of way, roadsides and easements. Forest and conservation areas
Cut stump			1:1 herbicide:water	
	PER91974 – Control of woody weeds in non-crop situations. South Australia only. Expires 31 January 2027. Primary Industries and Regions South Australia – Persons generally			
Cut stump	triclopyr ³ (600 g/L)	Garlon® 600	1 L:30 L diesel	Nature reserves and other native vegetation, roadsides, urban open spaces and forests
	PER84775 – Control of environmental weeds in non-crop and bushland situations in Tasmania, Tas only. Expires 30 September 2025. Persons generally.			
Gas gun	metsulfuron (600 g/kg)	Rygel® Metsulfuron 600 WG	As per label rate. If weed not recorded on label: 1 g/L + Pulse penetrant (2 mL/L)	Refer to permit critical use comments.

1 Commercial products listed here are examples only, and many other products containing these active ingredients are registered for use on boneseed. Search at <https://apvma.gov.au/node/10831>

2 Products may be registered for use on boneseed in all states and territories (shown as 'All') or only in the specific states and territories listed.

3 Products containing different concentrations of the active ingredients are registered for this use. For example, registered products containing the active ingredient glyphosate are available with 350, 450, 510, 540, 570 and 600 g/L and 700, 720 and 800 g/kg. Check the label for application rates.

Note: Not all currently registered herbicides are commercially available. Check the company website for a current label.

Note: herbicides are not to be used for any purpose or in any manner contrary to the label unless authorised under appropriate legislation. By law, you must read the label (or have it read to you) before using any herbicide product. The same applies for minor use permits. Always follow the label and permit directions.

Foliar spraying

Page 32 – Use of a surfactant or penetrant can greatly assist with the uptake of the active ingredient and significantly increase the effectiveness of treatment. Use of surfactants or penetrants should always be in accordance with instructions on the label and registration.

The addition of dye to the herbicide mix allows better tracking of plants and areas that have been sprayed.

Splatter gun

Page 32–33 – Splatter guns administer large droplets of herbicide solution in a stream rather than a spray, and are used with more concentrated solutions than other foliar applications.

Use of splatter guns for boneseed control has been relatively recent. Use on lantana and other environmental weeds such as blackberry and bellyache bush have shown splatter guns to be particularly effective up to 10 m from the user. Splatter guns may enable mature plants that are in hard-to-access areas (such as steep slopes and gullies) to be reached and controlled.

This technique uses a much lower volume of spray mixture than standard foliar spraying and the larger droplets are less likely to drift. The splatter gun is designed to shoot a stream of high-concentration herbicide. While splatter guns are not widely used on boneseed, they have proved effective for mature boneseed plant control. They are not recommended for use on seedlings.

Splatter guns are most effective when boneseed plants are actively growing.

Method

Splatter guns are usually used with a gas or battery-powered backpack spray unit with a specialised nozzle (such as the NJ Phillips Forestry Powermaster Splatter Gun). Manual splatter guns are also available but may become tiring to use on a large number of plants.

Check the label to ensure the herbicide is registered for application by splatter gun, and read and follow all label directions.

Videos demonstrating the use of the splatter gun technique are available. Two excellent examples are: '[How to use the Splatter Gun](#)' for lantana (YouTube video, 4 min 34 sec, produced by Chemcert Training Group, 26 June 2012); and '[The How and Why of Splatter Guns](#)' for bitou bush (YouTube video, 13 min 47 sec, produced by Pittwater Ecowarriors, 27 September 2012).

Stem injection with encapsulated herbicide

Stem injection of herbicide capsules can be used to control boneseed infestations.

Di-Bak AM is a herbicide produced in capsule form, containing a combination of aminopyralid and metsulfuron-methyl.

Capsules can be inserted into the tree using a specially designed handheld applicator. The applicator, used in conjunction with a hand held drill, first drills a hole into the tree stem and then inserts the capsule. The capsule is sealed in place with a plug.

Alternatively, drill a 25-mm-deep hole in the tree stem using an 8 mm-diameter drill bit, approximately 10–30 cm above ground level. Insert one capsule and seal with a plug immediately.

Over time, the capsule dissolves, releasing the herbicide into the plant. This process can be performed at any time of year and is a cost-effective method suitable for low-to-high-density populations.

Further information on using this technique can be found at www.bioherbicides.com.au/about/videos-resources

Biological control

Page 39–42 – Eight agents have been released in Australia on boneseed, but only one is believed to have established, the boneseed leaf buckle mite (*Aceria* sp.), at a limited number of sites.

The following text is sourced from:

Harvey KJ, McConnachie AJ, Sullivan P, Holtkamp R and Officer D (2021) *Biological control of weeds: a practitioner's guide for south-east Australia*, New South Wales Department of Primary Industries, Orange.

Approval from the New South Wales Department of Primary Industries to use this information is gratefully acknowledged.

Leaf buckle mite

The leaf buckle mite (*Aceria* sp.) induces the formation of felt-like leaf galls (or erineae). These reduce the photosynthetic efficiency of infected plants, resulting in less vigorous growth and reduced reproductive capacity.

Unfortunately, the leaf buckle mite appears to be causing only minimal damage and is currently ineffective as a biological control agent. The reasons for the failure of these agents to establish in Australia are not known, although they are thought to be related to predation by native wasps, ants, mites and spiders – and also possibly poor climate matching.

The long-term impact of the leaf buckle mite has not been determined, but redistribution programs are encouraged. In its native range, boneseed leaf buckle mite is known to heavily infest boneseed plants, commonly resulting in a lower growth rate and reproductive output.

Further information on the biological control of boneseed can be obtained from the [NSW DPI biological control practitioner's guide](#) (Harvey et al. 2021).

Biocontrol Hub

Information sharing is vital to the success of biological control of weeds. Recording what weed species you are controlling, and the locations of agent-release sites can assist others in obtaining access to the right agents for their infestation.

The Atlas of Living Australia (ALA) is a national online biodiversity database that helps information sharing. The Australian Biocontrol Hub is a portal within the ALA that acts as a one-stop shop for data and information sharing on biological control of weeds.

The Biocontrol Hub can:

- facilitate recording of biological-control-agent release and establishment data
- capture observations of biological-control-agent spread
- ensure biological-control-agent-distribution data is readily accessible and
- provide access to biological-control extension material.

For further information on how to contribute to or use information on the Australian Biocontrol Hub, visit the website: biocollect.ala.org.au/biocontrolhub

Contacts

STATE/ TERRITORY	DEPARTMENT	PHONE	EMAIL	WEBSITE
National	Australian Pesticides and Veterinary Medicines Authority	02 6770 2300	enquiries@apvma.gov.au	www.apvma.gov.au
ACT	Parks and Conservation	13 22 81	ACTBiosecurity@act.gov.au	www.environment.act.gov.au/parks-conservation/plants-and-animals/Biosecurity/invasive-plants
NSW	Department of Primary Industries	1800 680 244	weeds@dpi.nsw.gov.au	www.dpi.nsw.gov.au/biosecurity/weeds
NT	Department of Environment, Parks and Water Security	08 8999 4567	weedinfo@nt.gov.au	www.nt.gov.au/environment/weeds
Qld	Department of Agriculture and Fisheries	13 25 23	info@daf.qld.gov.au	www.daf.qld.gov.au/business-priorities/biosecurity/invasive-plants-animals/plants-weeds
SA	Department of Primary Industries and Regions	1300 374 731	invasivespecies@sa.gov.au	www.pir.sa.gov.au/biosecurity/weeds
Tas	Department of Natural Resources and Environment	1300 368 550	biosecurity.tasmania@nre.tas.gov.au	www.nre.tas.gov.au/invasive-species/weeds
Vic	Agriculture Victoria	13 61 86	Refer to www.agriculture.vic.gov.au/about/contact-us for contact options	www.agriculture.vic.gov.au/biosecurity/weeds
WA	Department of Primary Industries and Regional Development	08 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au/pests-weeds-diseases/weeds

Further information

NSW boneseed best practice management manual. Department of Environment and Conservation, NSW (2006). <https://profiles.ala.org.au/opus/b6be6ec2-37e5-43c6-a2c0-7f5427cb8d93/profile/6ec2ee7d-0369-420f-b962-e56190b63829/attachment/37b1f6eb-1e8e-4a3c-bd09-3043e3c68794/download> (PDF, 11.4 MB)

Weeds Australia boneseed profile. Weeds Australia (2019). <https://weeds.org.au/profiles/boneseed/>

NSW boneseed profile. Department of Primary Industries New South Wales (2021). <https://weeds.dpi.nsw.gov.au/Weeds/Boneseed>

Conference proceedings paper on boneseed research, management and coordinated action in Australia. New Zealand Plant Protection Society (2010). <https://caws.org.nz/old-site/awc/2010/awc201010811.pdf> (PDF, 625 kB)

Book about biological control of weeds in Australia, with information about bitou bush and boneseed on pages 170–183. CSIRO Publishing (2012). https://www.researchgate.net/publication/264703432_Biological_Control_of_Weeds_in_Australia_edited_byMic_Julien_Rachel_McFadyen_and_Jim_Cullen_CSIRO_Publishing_Melbourne_2012_pp_648_ISBN_9780643099937_Hardback_RRP_AU18000

[Reference: French K, Ashcroft MB, Flagg D, Panetta FD, Raghu S and Cherry H (in prep.) *Differences in soil seed persistence for two subspecies of the invasive weed, Chrysanthemoides monilifera*.]

**CENTRE FOR INVASIVE
SPECIES SOLUTIONS**

Building 22, University of Canberra
University Drive South, BRUCE ACT 2617
T 02 6201 2887
E communications@invasives.com.au

