CENTRE FOR
INVASIVE SPECIES SOLUTIONS

BEST PRACTICE MANAGEMENT FOR THE CONTROL OF mesquite (*Prosopis* spp.)

ADDENDUM TO THE WEEDS OF NATIONAL SIGNIFICANCE
BEST PRACTICE MANUAL FOR MANAGING MESQUITE

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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.

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Cover images

Front — Mesquite in Cockburn, Western Australia 2005. Image by Dennis Gannaway.

Back — Mesquite flower. Image by Dennis Gannaway.

How to use this addendum

The best practice manual for managing mesquite **(PDF, 1.7 MB) was published in 2003 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 2003 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 3: The mesquite control toolbox

Integrating control options

Page 38 – Biological control should be regarded as only part of a control program for mesquite. The available agents are unlikely to kill mesquite. However, they may improve the effectiveness of other control techniques by reducing the growth and spread rates of plants. An integrated control strategy using biological control and other control techniques and management options may be the best solution to controlling mesquite in Australia.

Physical control options

Page 42

Blade ploughing

Page 42 – Success depends on cutting the root system below the bud zone (30 cm below ground level) to reduce the likelihood of reshooting.

Stick raking

Page 48 – Stick raking will be most effective when soil is moist enough to allow minimum strain on machinery, but dry enough for the root system to desiccate.

Fire

Page 50 – Where possible, burning should be delayed until seedlings have germinated, so they can be destroyed in the fire.

Chemical control options

Page 52

Basal bark spraying

Page 52 – Recommended for plants with stems up to 5 cm in diameter. Do not treat trees with wet bark, because this will reduce the effectiveness of the herbicide.

Cut-stump technique

Page 54 – The cut-stump technique is effective regardless of stem diameter. Do not treat trees with wet bark, because this will reduce the effectiveness of the herbicide.

Foliar spraying

Page 56 – Do not spray plants bearing pods.

Herbicide labels and legislation

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 mesquite 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 62 – 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

Page 62 – 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)

Costs for mesquite herbicide control

Pages 52–56 – Note: the prices for various herbicide control options given in the 2003 manual are no longer valid.

Herbicides for use on mesquite

Pages 52–56 – Note: the herbicides listed in the 2003 manual (2003) have been superseded by Table 5 and Table 6, which were current at September 2023.

Table 5. Herbicides permitted for use on mesquite under registration

APPLICATION METHOD	ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES[1]	RATE[3]	STATE OR TERRITORY[2]	COMMENTS
Cut stump/ basal bark	picloram + triclopyr (120 + 240 g/L)	Access® (on label as Algaroba (*Prosopis* spp.))	1 L/60 L diesel or Biosafe®	All	Basal bark: Plants with stems up to 5 cm basal diameter. Cut stump: Plants up to and in excess of basal bark size. Apply immediately after cut is made.
Cut stump	picloram + aminopyralid (45 + 4.5 g/L)	Vigilant® II	Gel – 3–5 mm thick layer over cut surface. On stems of 20-mm diameter or greater, apply a 5 mm layer of gel.	All	In the case of multistem plants, treat at least 80% of stems, including all main stems. DO NOT use if rain is likely to fall within 12 hours of application.
High volume	aminopyralid + picloram + triclopyr (8 + 100 + 300 g/L)	Grazon® Xtra	350 mL/100 L	ACT, NSW, Qld, NT and WA only	Do not spray plants bearing pods. Add non-ionic surfactant (1,000 g/L) at 100 mL/100 L.
			670 mL/100 L	NT and Qld only	Only for *Prosopis velutina*
	picloram + triclopyr (100 + 300 g/L)	Nufarm Conqueror®	350 mL/100 L	NSW, Qld, NT and WA only	Do not spray plants bearing pods. Add non-ionic surfactant (1,000 g/L) at 100 mL/100 L.
			670 mL/100 L	Qld only	
	picloram (240 g/L)	Macspred picloram	145 mL plus 175 mL triclopyr (600 g/L)	NSW, Qld, NT and WA only	Do not spray plants bearing pods. Add non-ionic surfactant (1,000 g/L) at 100 mL/100 L.
			280 mL plus 340 mL triclopyr (600 g/L)	Qld only	

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

Table 6. Herbicides permitted for use on mesquite under minor use permits

APPLICATION METHOD	ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES[1]	RATE	COMMENTS
PER13333 – Control of environmental weeds in various situations. Expires 31 March 2025* WA only				
Basal bark/cut stump	triclopyr + picloram (240 + 120 g/L)	Access®	1 L/60 L diesel	Paint stump immediately after cutting. Or paint or spray basal bark.
PER91922 – Control of mesquite in rangelands. Expires 31 May 2027. WA only				
Soil application	Tebuthiuron* (200 g/kg) only	Graslan®	1–1.5 g/m2	Use the higher rate for heavy density regrowth and heavy clay soils. Refer to permit for critical use comments.

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

2 Products may be registered for use on mesquite/algaroba 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 triclopyr as the sole active are available with 600 and 750 g/kg concentrations. Check the label for application rates.

* Do not use soil-applied herbicides within a distance of 2–3 times the mature height of wanted trees. Use of soil-applied herbicides must be in accordance with state and/or local native vegetation legislation. Do not apply tebuthiuron within 100 m of a recognised watercourse or on land with a slope greater than 20% (11 degrees).

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.

Biological control

Page 57–58 – Four biological control agents have been released in Australia for the control of mesquite:

- two seed-feeding beetles, *Algarobius bottimeri* and *Algarobius prosopis* (released from 1996 to 1997)
- a sap-sucking psyllid, *Prosopidopsylla flava*
- a leaf-tying moth, *Evippe* sp.

Effectiveness of agents

All of these have been widely redistributed throughout mesquite infestations in Qld, NT, WA and NSW with varied success. However, in many areas these agents do not reach sufficiently high densities to exert control on mesquite.

Seed-feeding beetles

The seed-feeding beetles cause only limited damage, and only *A. prosopis* has been found in surveys since 2009.

Sap-sucking psyllid

Since its release, the sap-sucking psyllid has not been effective.

Leaf-tying moth

The leaf-tying moth, *Evippe* sp., has become established at all release sites but is most abundant in the hotter parts of Australia. It has maintained high rates of defoliation over a prolonged period. This has resulted in greatly reduced seed set and decreased plant growth rates, and the moth will rapidly recolonise areas cleared of mesquite to attack regrowth. In cooler areas, it has had less impact.

Redistribution of agents

Page 60 – The leaf-tying moth is well distributed throughout the range of mesquite. **Further redistribution of the moth is unlikely to yield major benefits – except in some smaller, isolated infestations of mesquite**, where it could potentially reduce the seed set of remaining trees, thus preventing new core infestations from developing. **Speak to your local weeds or biosecurity officer for advice before attempting to redistribute the leaf-tying moth**.

Australian Biocontrol Hub

Sharing information is vital to the success of biological control of weeds. Recording which weed species you are controlling and the locations of agent release sites can also assist others to obtain access to the right agents for their infestation.

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

The Australian 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
- 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: https://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

Weed control handbook for declared plants in South Australia. Department of Primary Industries and Regions, Biosecurity SA (2018). www.pir.sa.gov.au/__data/assets/pdf_file/0020/232382/WEB_8867_PIRSA_Weed_Control_Handbook_2018.pdf (PDF, 4.2 MB)

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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