



Department of
Primary Industries and
Regional Development

Digital Library

Biosecurity bulletins

Biosecurity, pests, weeds and diseases
research

1-7-2023

Skeleton weed in Western Australia: Control program 2023–2024

Department of Primary Industries and Regional Development, Western Australia

Follow this and additional works at: https://library.dpir.wa.gov.au/bs_bulletins



Part of the [Agriculture Commons](#), and the [Plant Sciences Commons](#)

This report is brought to you for free and open access by the Biosecurity, pests, weeds and diseases research at Digital Library. It has been accepted for inclusion in Biosecurity bulletins by an authorized administrator of Digital Library. For more information, please contact library@dpird.wa.gov.au.



Department of
Primary Industries and
Regional Development



Grains, Seeds and Hay
Industry Funding Scheme

Skeleton weed in Western Australia

Control program 2023–2024

Early detection is the best prevention



Bulletin 4929 – July 2023

ISSN 1833-7236

ABN: 18 951 343 745

Disclaimer

The information contained in this publication is provided for general information purposes only. The information in this publication has been written for Western Australian conditions and may not be applicable or suitable for use in States other than Western Australia.

The State of Western Australia, the Minister for Agriculture and Food, the Director General of the Department of Primary Industries and Regional Development, Western Australia, and their respective officers, employees and agents shall not be liable, in negligence or otherwise, to any person for any loss, liability or damage arising out of a person applying the information in this publication to a location other than Western Australia.

Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product, and 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.

Copyright © State of Western Australia (Department of Primary Industries and Regional Development) 2023

Copies of this document are available in alternative formats upon request.

Department of Primary Industries and Regional Development

+61 1300 374 731 | enquiries@dpird.wa.gov.au | dpird.wa.gov.au

Contents

Key program changes.....	1
Winter eradication program	1
Summer search assistance scheme	1
Summer control of skeleton weed.....	4
Small infestations	4
Large infestations.....	4
Treatment of pre-flowering skeleton weed	5
Other summer control requirements	6
Helpful tips for infested broadacre landholders.....	8
Winter treatment of skeleton weed	10
Treatment of marked-out squares.....	10
Treatment of heavily infested paddocks	12
Treatment options for erosion-prone soils.....	13
Skeleton weed on organic properties	16
Skeleton weed in tree plantings/plantations	18
Eradication treatments	19
Skeleton weed in urban properties	22
Eradication treatments in urban areas	23
Appendices	24
Table 1. Trade names of products.....	24
Table 2. Conversion rates	29
Table 3. Herbicide guide – crops and pasture	30
Table 4. Herbicide guide – tree plantations.....	32
Reporting and identification	34

**This control program booklet section of the
Skeleton Weed Management Guide is reviewed annually.**



Key program changes

Winter eradication program

New herbicide recommendations for control in crops, legume based annual pastures, plantations and glyphosate tolerant canola.

- The minimum size of 'squares' (infested areas) has been reduced from 40 m x 40 m (0.16 ha) to 20 m x 20 m (0.04 ha) to help reduce the winter treatment area.
- Landholders will need to consult with DPIRD/LAG officers to assess the degree of infestation before working or cultivating through squares in Code 1 paddocks.
- Clopyralid (Lontrel™) herbicide will no longer be provided for treatment on heavily infested paddocks. Landholders will still be required to undertake chemical control on these paddocks.

Summer search assistance scheme

Code 1 paddocks are eligible for search assistance, including paddocks treated with clopyralid during the 2023 growing season.

- Code 2 paddock re-infestations, where plants are found and are therefore 're-infested paddocks' this season will still be eligible for search assistance.
- Code 3 paddock searching will still be eligible for search assistance.

Limiting paddock search areas

New paddock 'search areas' will be limited up to a maximum of 100 ha. Program staff will determine 'paddock search areas' considering:

- Paddock topography – creeklines and other natural boundaries.
- How paddock is worked and the location of the actual infested area.
- A 100 m buffer from the infested area can be applied to delimit the paddock search area in paddocks that are worked up and down using knife points, or other minimum tillage systems.

Search assistance rate

- The rates for search assistance have changed for the 2023–2024 search season. Eligibility for search assistance is outlined below.

Paddock code Status description	Search assistance	Comments
Code 1		
Currently infested paddock Plants found last search season 2022–23	Eligible to Grains IFS contributors	Search assistance is available for landholder or contract searching
Newly infested paddock Plants found this search season 2023–24		
Re-infested paddock Code 2 paddock where plants are found this search season 2023–24		
Code 2		
First clear search No plants found last search season 2022–23		Code 2 paddocks progress to Code 3 after a clear search
Code 3		
Second consecutive clear search No plants found last two search seasons 2021–22 and 2022–23	Eligible to Grains IFS contributors	Search assistance is available for landholder or contract searching
Code 4		
Third consecutive clear search Paddock can be released from Infested List		Release is pending audit of search by DPIRD or LAG staff
Code 5		
Surveillance search No plants found		Surveillance search of suspected paddocks

Winter treatment eligibility

- Eligibility for skeleton weed winter treatment is as follows:

Type	Description	Winter treatment assistance	Comments
Infested squares	Mapped (dGPS) areas within the paddock that are currently infested with skeleton weed	Eligible* chemical supply and application	Landholders wanting to undertake their own spraying application of infested squares will be provided with chemical

* Picloram based products only



Summer control of skeleton weed

There are several options to control the above-ground part of the plant to prevent viable seed set during the summer months. Trade names have been grouped (i.e. Glyphosate450, Brodal500, etc) and presented with concentrations of active constituents (Appendices Table 1).

Small infestations

- Picloram20 granules can be used for single plants and small infestations, at a rate of 20 to 45 g/m². Sprinkle granules over plants and on ground in a 1 m buffer around each plant. Then cut and remove all stems to prevent seed production while the chemical takes effect.
- Spot spray with a mixture of 1 L of Glyphosate450 plus 1 L of 2,4-D/picloram mix plus 250 mL of Pulse™ (or equivalent) in 100 L of water and spray the plants plus a 1 m buffer area until just wet. Other formulations of glyphosate are available and if used the rates should be adjusted accordingly.
- **Where small numbers of plants are seeding, cut and bag stems before spraying. Burn all cuttings.**

Large infestations

- Boom spray the whole paddock if infestations are widely scattered, to control possible missed plants.
- Treat large areas of **flowering and seeding plants** with SpraySeed250 at a rate of 1 to 2 L/ha (minimum recommendation) especially where cutting and bagging is impractical. This treatment will act quickly and prevent further flowering and seeding for several weeks. The addition of Diuron900 will improve control and lengthen the period between retreatments. Rates of 1 L/ha of SpraySeed250 + 250g/ha of Diuron900 have generally provided good control in trials when applied in summer. Cereals, grain legumes (e.g. lupins, peas, faba beans) and canola can be planted in autumn and legume-based pastures (e.g. clover, medic, serradella) will establish with rains.
- On paddocks to be planted to cereals, follow up with a spray of 1.5 to 2.25 L/ha of Glyphosate450 plus 700 mL/ha of 2,4-D/picloram mix a week before planting and then 300 mL/ha of 2,4-D/picloram mix

when the crop is between the tillering and early jointing stage (Z2.3 to Z3.1).

- **It is important to regularly monitor (at least monthly) all infested sites throughout summer and autumn, particularly after rain.**

Treatment of pre-flowering skeleton weed

- For legume-based pastures (e.g. clover, medic, serradella) and paddocks to be planted to legumes (e.g. lupins, peas, beans), apply a mixture of 1 to 2 L/ha of Glyphosate450 plus 0.5 to 1 L/ha of 2,4-D ester680.
- For paddocks to be planted to cereals, apply 2 L/ha of 2,4-D/picloram mix with 1 L/ha of Glyphosate450. **This is expensive, but provides an effective control for the entire summer.**
- SpraySeed250 treatment will give about 5 weeks suppression of viable seed formation; Glyphosate450 + 2,4-D ester680 about 8 weeks; and the 2,4-D/picloram mix + Glyphosate450 longer than 14 weeks. The cumulative viable seed production per plant is listed in the table below.

Treatment rate L/ha	Days after treatment					% Reduction
	35	56	68	83	99	
SpraySeed250 + wetting agent (0.25%) 2.0	0	76	311	330	338	69.4
Glyphosate + 2,4-D ester (80%) + DC Trate oil (2%) 1.5 + 0.5–0.7	0	0	2	33	44	96
Tordon™ 75D + glyphosate + wetting agent (0.25%) 1.5 + 0.5	0	0	0	0	0	100
Unsprayed	94	637	752	833	1108	0

Tordon 75-D is no longer available but there are many other products with a similar mix of 2,4-D + picloram.

Other summer control requirements

Ask for guidance if unsure of your obligations and always observe relevant safety precautions.

- **Pay attention and thoroughly clean vehicles when leaving infested areas. This will reduce the risk of weed spread to other paddocks and farms.**
- Search known infested areas using the **Full Search** protocol.
- Search adjoining 'suspect' areas where possible, including road verges 300 m either side of roadside infestations.
- Record GPS coordinates where possible.
- Cut and bag flowering/seeding plants where appropriate.
- Extend squares (or be prepared to) if plants emerge outside marked areas as the 10 m buffer must be maintained at all times.
- Notify DPIRD/LAG staff of any additional plants, or extended or new squares found throughout summer and autumn. This will assist with the coordination of the Winter Spray Program.
- Record all search/treatment details on the **Infested property paddock record** issued to you when you first reported skeleton weed.

Random audit inspections will be undertaken by authorised DPIRD/LAG staff.

Sample form of an Infested property and paddock record

Skeleton Weed Program Infested property and paddock records

Property number: 1161000 Owner/occupier: A Grower & Co. Season: 2023-24

Paddock number / name	Paddock area (ha)	Search date	Search method F or S	Paddock code last season	Paddock code this season	New find (Y)	Approx. number of plants	Number of infested squares	Estimated infested area (ha)	Chemical / treatments used	Comments (C) for Contractor search or (L) for Landholder search
A1	90	2/12/23	F	1	1		30	2	0.5	Glyph / ester	C
A3	100	2/12/23	F	N/A	1	Y	250	5	1.5	Glyph / ester	C - found during harvest
A2	80	5/12/23	S	N/A	5						L - paddock very bare
B1	85	5/12/23	F	3	4						L - final clear search
E1	200	6/12/23	S	N/A	3						L
Mill	100	5/1/24	F	3	1		50	1	0.7	Spray Seed	L - found while moving sheep
New Land	100	6/1/24	S	2	3						L
Ram	95	5/1/24	S	1	2						L

Search method Use (F) for Full paddock search and (S) for Surveillance search

Paddock codes 1 - Plants found 2 - First clear search 3 - Second clear search 4 - Third consecutive clear search (must be a Full Search to be released from Infested List) 5 - Surveillance search, no plants found

Comments Use (C) for Contractor search or (L) for Landholder search

Completed forms to be faxed, posted or emailed to Department of Primary Industries and Regional Development by 15 February each year

Helpful tips for infested broadacre landholders

- It is important to regularly monitor all infested sites (throughout summer and autumn) at least once a month, particularly after rain. This will allow you to observe plants that have emerged or become more evident after searching or treatment.
- Be prepared to extend squares if plants emerge outside marked areas.
- If you have an infestation on a property boundary, assist your neighbours with surveillance searching on adjacent paddocks within their boundary.
- Carry flagging tape in all vehicles, including headers, to mark plants.
- To improve residual control, add to the summer spray mix: 200 mL/ha of Picloram240 OR 700 mL/ha of Picloram/2,4-D mix OR 500 mL/ha of Picloram/triclopyr mix.

Ensure all staff and family members on your business/property know how to identify skeleton weed.

- Aim to harvest infested paddocks **before mid December** to avoid harvesting through seeding plants.
- Grain from infested paddocks harvested **after mid December** should not be sold for seed.
- Remove all produce eg. hay, as soon as practicable before searching.
- Prior to exiting a property, thoroughly clean all equipment with water or air (including seeding and harvesting machinery) that has been driven/worked through any infested paddocks.

Do not remove/dismiss plants you're unsure of – treat any spindly green plant with suspicion.

- Check paddocks for skeleton weed prior to moving in stock.
- Remove stock **4 weeks prior** to searching paddocks and re-stock post-search (to prevent missed plants seeding) preferably with non-saleable stock – sheep grazed on infested paddocks during the summer must be sold bare-shorn unless sold for slaughter.
- Kangaroos and rabbits will also graze on skeleton weed, which makes it difficult to find even if stock have been removed.



Winter treatment of skeleton weed

Treatment of marked-out squares

The Winter Spray Program aims to eradicate plants using herbicide products and mixes containing the active constituent picloram, which works best when there are high soil moisture levels. This is applied to all infested squares.

- Winter spraying of marked squares is provided by the Skeleton Weed Program at no direct cost to the landholder. This includes application by a registered contractor or DPIRD/LAG staff.
- Landholders who want to undertake their own winter spraying can be provided with chemical products. However, they must ensure the spraying is completed as per **eradication protocols for winter treatment** to be eligible for search assistance the following summer.
- You will also need to notify your local DPIRD or LAG office once spraying is completed so a winter spray audit can be carried out.

Prior to winter treatment

If more plants are found before winter spraying, notify your local DPIRD or LAG office as sites which are not officially recorded will not be eligible for winter treatment.

As a rule, marked infested areas (squares) should not be cultivated or worked through, to avoid spreading skeleton weed roots. However, as part of ongoing program adaptations to changing farming practices, infested areas (squares) can now be worked through when cropping Code 1 paddocks, under certain circumstances.

Be aware that a winter eradication treatment will still be required and infested areas (squares) which have been seeded through will need (up to) 7 L/ha of picloram based herbicide applied, in a minimum volume of 50 L water/ha, and this may damage the crop where applied.

It is important that landholders consult and seek agreement with DPIRD or LAG staff beforehand to determine whether working through infested areas is the right option for them.

Where there is only one, or a small number of ‘squares’ in the paddock, it is still preferable not to work through these.

Please note

- Landholders who undertake their own winter spraying must ensure it is completed properly to be eligible for search assistance the following summer.
- Winter spray audits will be carried out on infested properties by DPIRD or LAG staff.
- **All equipment must be thoroughly cleaned down prior to exiting any infested paddock.**

Don't forget to notify your local DPIRD or LAG office if you find more plants before winter spraying as sites that are not officially recorded will not be eligible for winter treatment.



Treatment of heavily infested paddocks

The decision to apply a whole paddock treatment (more than 10% infested area) is made by a DPIRD or LAG officer in conjunction with the landholder.

Winter spraying heavily infested paddocks continues to be the responsibility of the landholder. **The Skeleton Weed Program will no longer provide Clopyralid (Lontrel™) for winter treatments of heavily infested paddocks.**

It is strongly recommended heavily infested paddocks be both cropped and treated with a recommended chemical, as listed below:

- **Pre-planting** – for wheat, barley, oats and triticale apply Glyphosate450 at 1 to 2 L/ha + 2,4-D/picloram mix at 700 mL/ha.
- **Post-emergence** – for wheat, barley and triticale apply a follow-up spray from early tillering to flag leaf emergence (Zadok Z23-31) with a mix of Clopyralid300 at 500 mL/ha (or Clopyralid750 at 200 g/ha) + Metsulfuron600* at 3 g/ha + 2,4-D/picloram mix at 300 mL/ha.
- **Post-emergence** – for oats apply a follow-up spray from early tillering to flag leaf emergence (Zadok Z23-31) with a mix of Clopyralid300 at 500 mL/ha (or Clopyralid750 at 200 g/ha) + 2,4-D/picloram mix at 300 mL/ha.

See Herbicide guide (for other crops) in Appendices Table 3.

As a biosecurity rule, thoroughly clean your seeding equipment prior to moving onto the next paddock or paddock section. Minimise spreading skeleton weed root fragments by seeding infested paddocks last.



Treatment options for erosion-prone soils

The use of 2,4D/picloram mixes over large areas to treat skeleton weed may leave light sandy soils exposed to erosion. You must consult with DPIRD officers before following the below recommendations.

Recommendation 1: Erosion-prone soils in cropping rotation

Non-crop phase

- Treat the infested area/squares with herbicides such as clopyralid, clopyralid + MCPA or clopyralid + 2,4-D amine or ester at the maximum label rates for the situation. Using clopyralid alone will allow grasses and brassica weeds such as radish and turnips to grow and provide protection against erosion.
- For small infestations, cut and bag stems and burn all cuttings.
- Spray the plant, plus a 1 m radius buffer with 1 L/ha of 2,4-D/picloram mix plus 250 mL of Pulse™ or equivalent in 100 L water.
- OR apply 60 to 135 g of Picloram20 granules in a 1 m radius around where plants were located.

In-crop treatment

- Using clopyralid, clopyralid + MCPA or clopyralid + 2,4-D and summer spraying will reduce the risk of plants producing seed.



Recommendation 2: Preserving pasture in a non-cropping situation

- **Manage grazing to allow skeleton weed rosettes to run up prior to inspection to make them easier to detect.**
- Assess the extent of the infestation.
- In grass based pastures with low legume and capeweed cover, treat the pasture with clopyralid + MCPA or clopyralid + 2,4-D amine. This treatment will not affect the grasses, thereby reducing the potential for baring the soil and causing soil erosion.
- Avoid using products containing picloram in areas which are predominantly permanent broad-leaved based pastures or where considerable amounts of tagasaste are growing. These products will affect pasture and kill adjacent rows of tagasaste.
- On tagasaste areas, spring treatments of clopyralid + MCPA or clopyralid + 2,4-D or spring/summer treatments of glyphosate + 2,4-D ester should be applied between the rows only, while avoiding any contact with the foliage of the tagasaste. This treatment is best applied in late spring after the annual legumes have flowered and set seed.
- Treat the main area of infestation with glyphosate + clopyralid after annual pasture has seeded and dried off.
- For small infestations cut and bag stems before treating with 2,4-D/picloram mix or Picloram20 granules in a 1 m radius around plants.
- Burn all cuttings.
- Repeat annual treatment applications at or near flowering of skeleton weed, until infestation numbers are reduced sufficiently to allow all remaining plants to be treated using spot applications of the more residual products containing picloram.



Skeleton weed on organic properties

The Skeleton Weed Program recognises that the best practice chemical control recommendations to eradicate skeleton weed may lead to the cancellation of the organic and biodynamic certification for the treated area.

- The Program consulted with organic and biodynamic certification groups and prepared management protocols to assist organic landholders.
- Program staff will work with organic landholders to limit the area where chemical control can be carried out.

Organic landholders will be expected to liaise with their relevant organic certification organisation on any further requirements or considerations when the chemical control is carried out.

The National Standard for Organic and Bio-Dynamic Produce (Australian Department of Agriculture and Water Resources, 2015) provides the standards and guidance for products labelled organic or bio-dynamic.

A copy of the 'Protocols for control on organic properties' will be made available upon request.



Skeleton weed in tree plantings/ plantations

Tree plantings/plantations require considerable planning prior to trees being planted to eradicate as much skeleton weed as possible with minimum damage to plantings.

- Commence skeleton weed eradication prior to planting trees, as chemical control options may impact plantings.
- Landholders should undertake summer inspections to locate any skeleton weed present and treat to prevent seed set. These searches would include a 10 m buffer around the infested sites.
- Manage vegetation in the spring and early summer, e.g. reduce spring growth with stock, slashing or spraying; remove stock 4 weeks prior to summer searching to allow any skeleton weed plants to run up prior to inspection. This will make plants easier to detect.
- Monitor and spot treat regularly over summer and autumn as plants may emerge or become more evident post-search.
- When reviewing options for searching tree plantation areas, health, safety and fire risk concerns are important considerations:
 - Is the area physically safe to search?
 - Is the fire risk at an acceptable level?

A copy of the 'Searching Protocols for tree plantations' is available upon request.

Consult with your local DPIRD Officer or LAG Coordinator to determine the extent of the skeleton weed infested area prior to planting work; and to develop a management plan that best suits your situation.

Eradication treatments in eucalypt, pine and tagasaste plantations

Winter treatment application

- Assess the extent of the infestation
- Clopyralid is the most selective herbicide for skeleton weed control in most plantations.
- In May and November, apply 800 g/ha Clopyralid750 plus organosilicone surfactant (e.g. Pulse™) at 250 mL/100L of spray mix. Repeat each year until eradicated (refer to Appendices Table 4).
- In tagasaste, clopyralid should be applied between the rows avoiding contact with the tagasaste foliage. In eucalypt and pine plantations, directed spraying between the rows is preferred but most species will tolerate an overall spray.
- For small infestations cut, bag and burn or bury stems, then apply picloram granules in a 1 m radius around skeleton weed plants or apply Vigilant™ gel to each skeleton weed rosette.
- This may affect adjacent trees, but it provides the most reliable eradication results.

Summer treatment application

- Search the infested areas in summer; cut, bag and burn or bury stems to prevent seed set.
- Spot treatments are an option in some areas, but it is recommended landholders liaise with their local DPIRD or LAG officer for advice.



Eradication treatments in acacia and sandalwood plantations

Eradicate skeleton weed before planting acacias as there are no overall sprays that are very effective for eradicating skeleton weed in acacia and sandalwood plantations.

- On interrow areas, directed sprays with clopyralid that avoids contact with the tree leaves can provide control on established plantations greater than 3 years old. In May and November, apply 800 g/ha Clopyralid750 plus organosilicone surfactant (e.g. Pulse™) at 250 mL/100 L of spray mix. Repeat each year until eradicated.
- On younger plantations use half of these rates and only spray infested areas. Some damage may occur.
- For small areas or isolated plants use Vigilant™ gel as the preferred treatment. This will damage and may kill nearby trees.

Eradication treatments for mixed species plantations

For mixed species plantations contact DPIRD for specific advice and control options at SkeletonWeedProgram@dpird.wa.gov.au





Skeleton weed in urban properties

The Grains, Seeds and Hay Industry Funding Scheme does not provide search assistance or winter treatment to urban landholdings. As the manager/owner (person responsible for land infested with skeleton weed) you are obliged to search for, and eradicate at your own expense, all skeleton weed found on your property.

- Prevent the active movement of seed and root fragments from your property - ensure that the risk of contaminated soil, produce and equipment moving off the property is minimised.
- Prevent the setting of viable seeds in known infested locations - adjoining 'suspect' areas should be searched where possible, including road verges 300 m either side of roadside infestations.
- Treat all plants as per recommendations (see next page).
- Submit a completed **Skeleton Weed Survey Record Sheet** and **business site plan** indicating locations of infestations to DPIRD by **1 April** each year, along with your **Statutory Declaration**.
- DPIRD will conduct audits of infested properties to ensure infestations are being effectively treated.
- **DPIRD can undertake surveillance and treatment on your behalf, on a fee-for-service basis.**

All skeleton weed must be reported to DPIRD within 48 hours and treated to prevent seed set.



Eradication treatments in urban areas

Urban landholders/managers are required to meet search and treatment protocols similar to broadacre landholders. Ask for guidance if unsure of your obligations and always observe relevant safety precautions.

Summer herbicide application

- Prevents further growth of skeleton weed plants as well as seed setting, but is unlikely to kill well established, robust plants.

Winter herbicide application

- Will more likely kill mature plants, as the rain and higher levels of soil moisture allow herbicides to permeate into the root zone of the weed. The type of winter treatment used will depend on your specific circumstances.
- Infestations in or adjacent to sensitive areas like roads, public recreation spaces and market gardens are given special consideration and decisions on treatment in these instances will be made in conjunction with the landholder/manager.
- **DPIRD recommends the use of Picloram in the Perth metropolitan area.**
- All winter treatments administered by landholders/managers must be recorded on the Skeleton Weed Survey Record Sheet, and provided to DPIRD on request.
- Where there is evidence of non-compliance with the protocols, all costs associated with winter treatment will be recovered from the landholder/manager.



Infested sites must not be disturbed, cultivated, or worked through in any way until treated

Appendices

Table 1. Trade names of products used for skeleton weed control.

Trade name examples	Active ingredient
2,4-D/picloram mix <ul style="list-style-type: none"> • 4FARMERS 2,4-D PLUS PICLORAM HERBICIDE™ • CONQUEST DEPIC 75-D HERBICIDE™ • ENFORCER 75-D HERBICIDE™ • IMTRADE COMMANDER 75-D HERBICIDE™ • KENSO AGCARE BUCKO 75-D HERBICIDE™ • TROOPER 75-D HERBICIDE™ 	2,4-D (300 g/L) + picloram (75 g/L) NB. There are about 22 products registered for this category.
MCPA/picloram mix <ul style="list-style-type: none"> • 4FARMERS MCPA/PICLORAM CEREAL HERBICIDE™ • CONQUEST BUCKWHEAT CEREAL HERBICIDE™ • ENFORCER 242 CEREAL HERBICIDE™ • ENFORCER 242 HERBICIDE™ • IMTRADE COMMANDER CEREAL HERBICIDE™ • KENSO AGCARE BUCKO 242 HERBICIDE™ • TROOPER 242 HERBICIDE™ 	MCPA (420 g/L) + picloram (26 g/L) NB. There are about 28 products registered for this category.
Picloram/triclopyr mix <ul style="list-style-type: none"> • 4FARMERS TRI-PICK HERBICIDE™ • CONQUEROR HERBICIDE™ • CONQUEST HATCHET HERBICIDE™ • FIGHTBACK HERBICIDE™ • GRAZON DS HERBICIDE™ • IMTRADE PICKER HERBICIDE™ • KENSO AGCARE KEN-ZON HERBICIDE™ 	Picloram (100 g/L) + triclopyr (200 g/L) NB. There are about 34 products registered for this category
Clopyralid300 <ul style="list-style-type: none"> • 4FARMERS CLOPYRALID 300 SELECTIVE HERBICIDE™ • ARCHER HERBICIDE™ • CONQUEST CORSAIR HERBICIDE™ • IMTRADE RALLY 300 SL HERBICIDE™ • KENSO AGCARE KEN-TREL 300 HERBICIDE™ • LONTREL HERBICIDE™ • VICTORY HERBICIDE™ 	Clopyralid (300 g/L) NB. There are about 40 products registered for this category

Trade name examples	Active ingredient
Clopyralid750 <ul style="list-style-type: none"> • 4FARMERS CLOPYRALID 750 SG HERBICIDE™ • CONQUEST CORSAIR DRY 750 SG HERBICIDE™ • IMTRADE RALLY 750 SG HERBICIDE™ • KENSO AGCARE KEN-TREL 750 SG HERBICIDE™ • LONTREL 750 SG HERBICIDE™ • LONTREL FORESTRY HERBICIDE™ • NUFARM ARCHER 750 DUAL SALT LIQUID HERBICIDE™ • VICTORY 750 SG HERBICIDE™ • VICTORY IVM HERBICIDE™ 	Clopyralid (750 g/kg) NB. There are about 42 products registered for this category
Picloram240 <ul style="list-style-type: none"> • FARMALINX STUKA FLEXI HERBICIDE™ • MACSPRED PICLORAM HERBICIDE™ • PICOFLEX HERBICIDE™ 	Picloram (240 g/L) NB. There are about 3 products registered for this category
Brodal500 <ul style="list-style-type: none"> • 4FARMERS DIFLUFENICAN 500 SELECTIVE HERBICIDE™ • ADAMA BONANZA ELITE HERBICIDE™ • BONANZA ELITE HERBICIDE™ • BRODAL OPTIONS SELECTIVE HERBICIDE™ • CONQUEST DEFCON 500 SC SELECTIVE HERBICIDE™ • DIFEN OPTIONS SELECTIVE HERBICIDE™ 	Diflufenican (500 g/L) NB. There are about 41 products registered for this category
Diuron900 <ul style="list-style-type: none"> • 4FARMERS DIURON 900 DF HERBICIDE™ • ADAMA DIURON 900 WDG HERBICIDE™ • CONQUEST DIURON 900 WG HERBICIDE™ • DIUREX WG HERBICIDE™ • IMTRADE DIURON 900 WG HERBICIDE™ • KENSO AGCARE DIURON 900 WG HERBICIDE™ 	Diuron (900 g/kg) NB. There are about 40 products registered for this category

Trade name examples	Active ingredient
2,4-D ester680 <ul style="list-style-type: none"> • 4FARMERS 2,4-D LV ESTER 680 SELECTIVE HERBICIDE™ • ADAMA 2,4-D LV ESTER 680 HERBICIDE™ • CONQUEST LV ESTER 680 HERBICIDE™ • ESTERON LV HERBICIDE™ • IMTRADE LV ESTER 680 HERBICIDE™ • KENSO AGCARE KEN-ESTER LV 680 SELECTIVE HERBICIDE™ • NUFARM ESTERCIDE XTRA 680 HERBICIDE™ 	2,4-D LV ester (680 g/L) NB. There are about 44 products registered for this category
2,4-D amine625 <ul style="list-style-type: none"> • 4FARMERS 2,4-D AMINE 625 SELECTIVE HERBICIDE™ • ADAMA 2,4-D AMINE 625 HERBICIDE™ • BATON LOW HERBICIDE™ • CHEMAG SMASH 625 LOW SELECTIVE HERBICIDE™ • CONQUEST AMINE 625 SELECTIVE HERBICIDE™ • CONQUEST AMINE 700 DUAL SALT SELECTIVE™ HERBICIDE™ • IMTRADE SMASH 625 SELECTIVE HERBICIDE™ • KENSO AGCARE KEN-AMINE 625 SELECTIVE HERBICIDE™ • NUFARM AMICIDE ADVANCE 700 SELECTIVE HERBICIDE™ • NUFARM AMINE 625 SELECTIVE HERBICIDE™ • ZEPHYR 625 2,4-D LOW ODOUR HERBICIDE™ • ZULU XT HERBICIDE™ 	2,4-D amine (625-700 g/L) NB. There are about 80 products registered for this category
MCPA amine750 <ul style="list-style-type: none"> • 4FARMERS MCPA 750 SELECTIVE HERBICIDE™ • ADAMA MCPA 750 HERBICIDE™ • ADAMA MCPA 750 SL HERBICIDE™ • CANVAS 750 SELECTIVE HERBICIDE™ • CONQUEST MCPA 750 SELECTIVE HERBICIDE™ • IMTRADE MCPA 750 SELECTIVE HERBICIDE™ • KENSO AGCARE MCPA 750 SELECTIVE HERBICIDE™ • NUFARM AGRITONE 750 SELECTIVE HERBICIDE™ • THISTLE-KILLEM 750 SELECTIVE HERBICIDE™ 	MCPA amine (750 g/L) NB. There are about 60 products registered for this category

Trade name examples	Active ingredient
Diflufenican/MCPA <ul style="list-style-type: none"> • 4FARMERS LV MCPA/DIFLUFENICAN SELECTIVE HERBICIDE™ • CONQUEST RADICATE SELECTIVE HERBICIDE™ • IMTRADE LIONEX SELECTIVE HERBICIDE™ • KENSO AGCARE TEXUS SELECTIVE HERBICIDE™ • LEGACY MA HERBICIDE™ • LEGACY MA-X HERBICIDE™ • NUFARM NUGREX SELECTIVE HERBICIDE™ • TIGREX SELECTIVE HERBICIDE™ • T-REX SELECTIVE HERBICIDE™ 	Diflufenican (25 g/L) + MCPA (250 g/L) NB. There are about 39 products registered for this category
Metsulfuron600 <ul style="list-style-type: none"> • 4FARMERS METSULFURON-METHYL 600 WG SELECTIVE HERBICIDE™ • CONQUEST METSULFURON 600 WG HERBICIDE™ • IMTRADE METSULFURON 600 WG HERBICIDE™ • KENSO AGCARE KEN-MET 600 WG HERBICIDE™ • LYNX WG HERBICIDE™ • NUFARM ASSOCIATE HERBICIDE™ 	Metsulfuron (600 g/kg) NB. There are about 55 products registered for this category
SpraySeed250 <ul style="list-style-type: none"> • 4FARMERS BROWN OUT 250 HERBICIDE™ • CONQUEST SCORCHER 250 HERBICIDE™ • FARMOZ SPRAY & SOW HERBICIDE™ • IMTRADE SPRAYKILL 250 HERBICIDE™ • KENSO AGCARE SPEEDY 250 HERBICIDE™ • NUFARM REVOLVER HERBICIDE™ • SPRAY.SEED 250 HERBICIDE™ 	Diquat (115 g/L) + paraquat (135 g/L) NB. There are about 43 products registered for this category



Trade name examples	Active ingredient
Glyphosate450 <ul style="list-style-type: none"> • 4FARMERS GLYPHOSATE 450 HERBICIDE™ • 4FARMERS GLYPHOSATE 450 MEA™ • CHEMAG REBELLION 450 HERBICIDE™ • CONQUEST GLYPHOSATE 450 HERBICIDE™ • CONQUEST KNOCKOUT 450 HERBICIDE™ • GLADIATOR CT HERBICIDE™ • IMTRADE ERADICATOR 450 HERBICIDE™ • IMTRADE ERADICATOR PRO 450 HERBICIDE™ • IMTRADE ERADICATOR X 450 HERBICIDE™ • KENSO AGCARE KEN-UP 450 CT NON-SELECTIVE, TRANSLOCATED HERBICIDE™ • KENSO AGCARE KEN-UP GRAND 450 CT NON-SELECTIVE, TRANSLOCATED HERBICIDE™ • KENSO AGCARE NUGGET NON-SELECTIVE HERBICIDE™ • TOUCHDOWN 450 HERBICIDE™ • WIPE-OUT 450 HERBICIDE™ • WIPE-OUT 450 NON-RESIDUAL HERBICIDE™ • WIPE-OUT PRO HERBICIDE™ 	Glyphosate (450 g/L) NB. There are about 157 products registered for this category



Table 2. Conversion rates – for different formulations of glyphosate based on the 450 formulation.

Glyphosate formulation	Rate/ha				
360	0.25 L	0.50 L	1.00 L	1.50 L	2.00 L
450	0.20 L	0.40 L	0.80 L	1.20 L	1.60 L
490	0.18 L	0.37 L	0.73 L	1.10 L	1.47 L
500	0.18 L	0.36 L	0.72 L	1.08 L	1.44 L
540	0.17 L	0.33 L	0.66 L	1.00 L	1.33 L
680	0.13 kg	0.26 kg	0.53 kg	0.79 kg	1.07 kg
690	0.13 kg	0.26 kg	0.52 kg	0.78 kg	1.04 kg
700	0.13 kg	0.26 kg	0.51 kg	0.77 kg	1.03 kg
840	0.11 kg	0.21 kg	0.43 kg	0.64 kg	0.87 kg

**What is the difference between these two plots?
The one on the left was managed for skeleton weed.**



Table 3. Herbicide guide – best practice skeleton weed control in crops and pasture.

Crop			Preferred herbicides	Rate per hectare
Wheat & Barley	Pre-seeding		Glyphosate450 + 2,4-D/picloram mix	1 L to 2 L + 700 mL
	In crop	Post emergence (early tillering to flag leaf emergence) (Z23-31)	Clopyralid300 or Clopyralid750 + Metsulfuron600* + 2,4-D/picloram mix	500 mL or 200 g (for 300 g/L or 750 g/kg) + 3 g + 300 mL
Oats*	Pre-seeding		Glyphosate450 + 2,4-D/picloram mix	1 L to 2 L + 700 mL
	In crop	Post emergence (early tillering to flag leaf emergence) (Z23-31)	Clopyralid300 or Clopyralid750 + 2,4-D/picloram mix	500 mL or 200 g (for 300 g/L or 750 g/kg) + 300 mL
Canola	Pre-seeding		SpraySeed250	1 L to 2 L
	In crop	Early post emergence Z12-18 (2-8 leaves)	Clopyralid300 or Clopyralid750	300 mL or 120 g
Glyphosate tolerant canola	In crop	6 leaves prior to bud formation	Glyphosate690 + Clopyralid300 or Clopyralid750	900 g ** + 300 ml or 120 g

*Do not use Metsulfuron600 on oats.

** Increase the Glyphosate690 rate to 1,300 g if TruFlex canola varieties are grown.

Crop			Preferred herbicides	Rate per hectare
Lupins	Pre-seeding		Glyphosate (various formulations)	Use rate for other crop weeds or 2 L/ha Glyphosate450
			or SpraySeed250	1 L to 2 L
	In crop	Early post emergence (2-6 leaves & plants 4-10 cm tall)	Brodal500	200 mL
Pasture	Winter	Early treatment (clover at least 3 leaf stage)	Diflufenican/MCPA (MCPA 250 g/L + diflufenican 25 g/L)	1 L
			or Brodal500	200 mL
		Late treatment (clover with more than 6 leaves and skeleton weed still as rosettes) Suppression only of skeleton weed	2,4-D amine625	1 L graze heavily after spraying
			or Clopyralid300 or Clopyralid750 + MCPA amine750 Will damage clovers, medics and serradella	70 mL or 28 g + 1 L
All crops & pasture	Summer	Prevention of seed set	SpraySeed250 if seed is starting to form	1 L to 2 L
			or Glyphosate450 + 2,4-D ester680 for earlier sprays	1 L to 2 L + 700 mL

Table 4. Herbicide guide – best practice skeleton weed control in tree plantations

Crop			Preferred herbicides	Rate per hectare
Eucalypt, pine and tagasaste plantations	Apply in May and repeat in Oct–Nov	Apply as a directed spray between the rows	Lontrel750	800 g





Reporting and identification

Regular communication with your local DPIRD office, LAG and your neighbours is integral to achieving skeleton weed eradication on your property. It is essential to ensure you are aware of all your obligations, and what support the program provides.

There is a lot of information available to landholders who find skeleton weed on their land, and a lot to remember, too. If you are unsure of what to do, there are several avenues for you to follow.

- **Pest and Disease Information Service:** a DPIRD service for identification and advice. If confirmed as skeleton weed, Skeleton Weed Program staff will be notified on your behalf.
- **MyPestGuide®:** a DPIRD service for identification only. If confirmed as skeleton weed, program staff will be notified on your behalf.
- **DPIRD officer or LAG coordinator:** your local program staff in the first instance can assist. You will be issued reference material in a **Landholder Information Pack** (which includes this Management Guide) containing all the information you need to manage and eradicate skeleton weed from your property. Take the time to read it and make a note of any additional questions that come to you later. Officers will also help you map out the best way to manage skeleton weed on your property.
- **DPIRD website:** visit for more information about the Industry Funding Scheme and the Skeleton Weed Program. The Management Guide will be available on the website at agric.wa.gov.au/skeletonweed
- **Neighbours:** neighbour notification is part of your obligations should your property become infested. They may be able to assist you, and you can share knowledge with others.

Early detection is the best treatment for skeleton weed – the earlier we can start an eradication plan on your property the better the outcome.

Contact your nearest DPIRD or LAG office

DPIRD Office	
Albany	08 9892 8444
Bunbury	08 9780 6100
Esperance	08 9083 1111
Geraldton	08 9956 8555
Merredin	08 9081 3111
Moora	08 9651 0555
Narembeen	08 9064 7131
Narrogin	08 9881 0222
Northam	08 9690 2000

LAG Office	
Avon South	0436 426 836
Central Wheatbelt	0488 169 670
Lakes	0409 351 373
Lower Lockhart	0438 892 460
Mortlock	0427 291 705
Narembeen	0477 820 803
Yilgarn	0477 964 891 08 9049 2007



Report your observations

MyPestGuide® Reporter
via app or online mypestguide.agric.wa.gov.au

Pest and Disease Information Service
08 9368 3080
padis@dpird.wa.gov.au

Further information

Visit agric.wa.gov.au/skeletonweed or contact

Martin Atwell - Project Manager Skeleton Weed, Invasive Species and Environmental Biosecurity Sustainability and Biosecurity

Department of Primary Industries and Regional Development

08 9881 0242 | 0429 881 190 | SkeletonWeedProgram@dpird.wa.gov.au

Department of Primary Industries and Regional Development

+61 1300 374 731 | enquiries@dpird.wa.gov.au | dpird.wa.gov.au

ABN: 18 951 343 745