12-2007

Skeleton weed - best practice management guidelines for cropping programs

Department of Agriculture and Food, Western Australia

Follow this and additional works at: http://researchlibrary.agric.wa.gov.au/bulletins

Part of the Biosecurity Commons

Recommended Citation


This bulletin is brought to you for free and open access by Research Library. It has been accepted for inclusion in Bulletins by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.paponfus@agric.wa.gov.au.
IMPORTANT DISCLAIMER

This document has been obtained from DAFWA’s research library website (researchlibrary.agric.wa.gov.au) which hosts DAFWA’s archival research publications. Although reasonable care was taken to make the information in the document accurate at the time it was first published, DAFWA does not make any representations or warranties about its accuracy, reliability, currency, completeness or suitability for any particular purpose. It may be out of date, inaccurate or misleading or conflict with current laws, polices or practices. DAFWA has not reviewed or revised the information before making the document available from its research library website. Before using the information, you should carefully evaluate its accuracy, currency, completeness and relevance for your purposes. We recommend you also search for more recent information on DAFWA’s research library website, DAFWA’s main website (https://www.agric.wa.gov.au) and other appropriate websites and sources.

Information in, or referred to in, documents on DAFWA’s research library website is not tailored to the circumstances of individual farms, people or businesses, and does not constitute legal, business, scientific, agricultural or farm management advice. We recommend before making any significant decisions, you obtain advice from appropriate professionals who have taken into account your individual circumstances and objectives.

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia and their employees and agents (collectively and individually referred to below as DAFWA) accept no liability whatsoever, by reason of negligence or otherwise, arising from any use or release of information in, or referred to in, this document, or any error, inaccuracy or omission in the information.
Skeleton Weed - Best Practice Management Guidelines for cropping areas

Invasive species program, Department of Agriculture and Food, Western Australia

Taxonomy and Status
Skeleton weed (*Chondrilla juncea* L.) is the only species within the genus *Chondrilla* that is found in Australia. It belongs to the tribe Cichoriae (chicory tribe) of the family Asteraceae (the daisies). Other closely related species in this tribe include lettuce, endive, dandelion (*Taraxacum officinale*), hawkweed (*Hieracium* sp.), and sow thistle (*Sonchus* sp.).

Origin and distribution
Skeleton weed is a native of North Africa, Europe and Central Asia. It has become a pest in many countries, including Australia.

Skeleton weed is suited to semi-arid or Mediterranean climates, but will grow in other climates under suitable conditions. Skeleton weed is found throughout New South Wales, South Australia, Victoria and in the wheat belt of Western Australia.

Legislation
The Agriculture Protection Board has gazetted skeleton weed as a Declared Plant in Western Australia under the *Agriculture and Related Resources Protection Act, 1976*. It is also declared in South Australia, Tasmania and Victoria.

Description
Skeleton weed is suckering perennial non-woody plant that develops from a rosette into a sparsely leafed, erect up to one metre in height.

There are three forms of skeleton weed in Australia. the narrow leaf (form A) found mainly north of Perth and east to the Yilgarn; the intermediate (form B) not identified in Western Australia; and the broad leaf (form C) which is mainly present in Narembeen and in some Yilgarn infestations. The differences between forms are mostly visible on the rosette leaves and the appearance of the flowering stems.

Rosettes may often be found in clusters due to the suckering nature of the plant. Rosettes (Figure 2) can be identified by their hairless, toothed, deeply lobed, and often purplish leaves.

Figure 1. Skeleton weed.

Figure 2. Skeleton weed rosettes.

The teeth on skeleton weed rosette leaves are distinctive in the manner in which they point back towards the centre of the rosette.

The stems are largely hairless and may be spreading or erect. Stems have dense, downward pointing bristles at the base. The stems are wiry and exude a milky sap when cut.
Leaves on the stems are small or absent. They vary in shape and size from larger toothed leaves near the base, to small, slender, often toothless leaves on the upper stems.

The flowers are yellow with long petals around the outer rim of the head (Figure 3). The ends of the petals are slightly toothed. Flowers may be located at the ends of the stems or at branching points. Skeleton weed is similar in appearance to other yellow flowered, daisies such as flat weed, but has a different habit and different flowers. The rosettes can be distinguished from all other species except for dandelion (Taraxacum) by their backward pointing teeth.

The almost leafless stems and yellow flowers with long petals produced in summer are quite distinctive in mature plants. If in doubt, contact your local Department of Agriculture and Food.

**Life cycle**

Skeleton weed has an extensive deep tap root, which forms adventitious shoots that result in development of above ground rosettes. Because of its tap roots, skeleton weed favours deep sandy soils, though it will grow in a wide range of soil types.

Mature plants that have survived for one or more years are remarkably hardy and tolerant of drought and herbicide application.

The seeds of skeleton weed will germinate after as little as 5 mm of rain and the seedlings require three to six weeks of soil moisture to establish successfully.

The branched flowering stems can produce 20,000 to 30,000 seeds per plant in a growing season. There is little dormancy in seeds of skeleton weed so germination usually occurs soon after seed is shed, providing that there is sufficient moisture.

**Growth calendar**

Rosettes are generally formed from the roots in autumn, although they can develop at almost any time of year in response to rainfall. These grow and develop through winter and spring.

In the spring (September or October) flowering stems develop from the centre of the rosettes. As the flowering stem grows, the rosette dies off. Flowering usually starts in December and may continue until as late as May. Seeds mature approximately two weeks after the flower head opens.

Seed production and flowering are at their peak in January and February. Following this, the flowering stem slowly dies off from early autumn, around the time when new rosettes begin to appear.

Seedlings can grow from summer through to winter but most develop in autumn. The optimum temperature range for germination is between 15 and 30°C.

**Impacts**

**Crops and ecosystems invaded**

Skeleton weed is a pest of, broad area crops, pastures and occasionally roadides.

**Economic impact**

Skeleton weed reduces yields through competition for moisture, nitrogen and light, and has a high cost of control. Yield losses of up to 80% have occurred in densely infested crops.

It is poor fodder for cattle and can out compete other pasture plants. However, carrying capacity for sheep may be improved by the presence of skeleton weed presence because it provides green summer fodder. Its impact to crops far outweighs its benefit in pastures.

**Dispersal and establishment**

**Reproductive techniques**

Skeleton weed reproduces primarily by airborne seed or by regrowth from roots and root fragments. Regeneration of root fragments that are as small as one centimetre long can result in the development of new plants.

**Natural dispersal** - Seed is spread naturally by wind, with some evidence suggesting that seed may be blown as far as 50 kilometres from its origin.

The seed coat is rough and may become caught in the fur or feathers of animals, which can then act as a transport mechanism.

The plant can spread sideways up to about half a metre sideways by producing rosettes from thin horizontal roots that branch off the main tap root.

**Human dispersal** - Seed or root fragments may be spread through cultivation or on dirty equipment, vehicles, clothing or boots. Seed may also be spread in late summer in harvested fodder or grain crops.
**Persistence**

Skeleton weed seeds have little dormancy and are short lived. They will usually germinate within six months. The root system is long lived, enabling individual skeleton weed plants to survive for many years.

---

**Prevention**

The risk of skeleton weed introduction can be minimised through the practice of strict farm hygiene/biosecurity protocols. (see “Farm Biosecurity” Farmnote 27/2001)

The following tips are practical suggestions that will help minimise the introduction of any weed species.

- Use clean, certified seed.
- Allow only clean equipment or vehicles onto your property.
- Only purchase fodder and organic fertilisers from a reliable source.
- Accept new sheep in a shorn state only.
- Maintain stock in a holding paddock for at least 24 hours after arrival and monitor this area.

---

**Surveillance**

The Department of Agriculture and Food undertakes skeleton weed surveillance in locations that are suspected of infestation. Farmers are encouraged to undertake their own surveillance for skeleton weed. Protocols to observe are:

- Adhere to strict farm hygiene/biosecurity protocols.
- Attempt to undertake surveillance in paddocks that have not held stock for at least three weeks.
- If searching by vehicle, cover swaths of no more than 25 metres.
- Rest regularly to reduce strain on eyes. This will reduce the chance of plants being missed.
- Attempt to search before plants go to seed. Flowering plants are easiest to find because of their bright yellow flowers. The best time to search is in early December because by mid December mature seed can be formed.

---

**Management**

**Eradication**

The WA grains industry currently funds an eradication program for skeleton weed within Western Australia. Landholders with skeleton weed are required to report any infestations on their properties to DAFWA, conduct searches for and treat any skeleton weed found, and prevent the movement of any skeleton weed from their property.

---

**Containment**

To prevent the spread of skeleton weed, seeds and roots must not be moved from infested areas. Seeds are mainly spread in the wind so seed set should be prevented where possible. Seeds can also be spread on vehicles, machinery, clothes or animals.

When leaving an infested area, and between paddocks, check equipment, vehicles, clothes, stock and dogs for contamination by plant material or dirt.

A visual check of socks, trouser cuffs and the coats of stock/dogs for seeds should be carried out. Shoes, vehicles and equipment should be dirt free (a stiff brush should be carried for this purpose).

Check the vehicle chassis for loose plant material. This should be removed before leaving an infested area. Plant stems and seeds can accumulate with crop stubble and other material in locations such as the radiator, spare tyre, above the differential and in wheel arches.

A similar check should be carried out for harvesting equipment or other farm machinery. Seed commonly accumulates in the comb and around uncleaned grease points, as well as in crevices in the frames of harvesting equipment and areas where crushed grain usually accumulates.

Hose down the outside of the harvester or use compressed air to clean the whole unit, including the elevators, thresher and other parts. This is usually effective in removing seeds that may have become lodged. Tines of cultivation equipment should have dirt washed or knocked off as well as removing all plant material.

Do not cultivate areas of the paddock where skeleton weed is present for at least the first season after the spray treatment. The infested area may be cultivated if no plants are found during the search following the winter treatment. The exception is where there are a large number of patches of skeleton weed in a paddock. In this circumstance, it is more advisable to crop and treat the entire paddock, with one of the treatments in Table 1, to reduce the risk of missing small patches of the weed.

If you choose to cultivate an infested paddock, make sure that tines are clean before moving to another area. This can be achieved by reversing back a few paces, while tines are just touching the ground.

**Chemical control**

(See ‘Information sheet: Chemical control of Skeleton weed’)

The control strategy for skeleton weed has two focuses: to prevent seed set and to destroy the plant.

- Summer control is intended to kill the above ground part of the plant and prevent seed set.
- Winter control is aimed at destroying the entire plant, using a soil active herbicide such as picloram that works best in wet conditions.
The most critical factor required for success when using a product that contains picloram is having moist soil at time of spraying or a likelihood of rain within a few days of spraying. Strong light and high temperatures rapidly break down picloram, the active ingredient in Tordon®. Winter applications are preferred for this reason.

**Recommendations for treatment of small infestations:**
- Only mix sufficient spray for one day of spraying.
- Do not keep herbicides mixed in the tank for longer than three days.

**Cultural or physical control strategies**
- Allow sheep into the paddock from October to November before the skeleton weed flowers. Continuous grazing will not kill the plant, but it will prevent the development of flower heads and seed production.
- For small infestations, cut and bag the flowering stems and place them in a secure bag for disposal. This will not kill the plant, but will stop seed production for a short time, until a new stem is formed.
- In pastures, seeding with annual or perennial legumes can have the same effect as increased fertiliser application.
- Employ crop rotations that allow the use of a range of herbicides, to reduce or control skeleton weed, before planting a legume crop.

**Herbicide resistance**
Skeleton weed will not develop herbicide resistance under these treatment regimes, because the seeds are not formed by cross-pollination, and the daughter plants that are formed by suckering or from root fragments are genetically identical to their parent. Herbicide resistance in other weeds could, however, develop to specific herbicides used to treat skeleton weed. For example, radish and annual ryegrass have developed resistance to the Group B sulfonyl ureas, to which Logran® and diflufenican (Group F) belong. Annual ryegrass has also developed resistance to the Group B herbicides, as well as Group A. Resistance to the Group M herbicides (which include glyphosate) is also developing in ryegrass.

Consideration must, therefore, be given to the implications of using herbicides such as Logran®, metsulfuron methyl (Group B) or glyphosate if resistant weeds are present.

Follow the simple rule of not over-using herbicides (i.e. avoid multiple doses or continuous use of any one chemical) and rotate crops as well as chemicals to reduce the development of resistance.

**Crop rotation:**
Skeleton weed is easiest to kill in a wheat crop. If you are unable to sow with wheat, another cereal crop is the next best option. Barley should be your second choice and oats your last choice of cereal crops.

If you cannot plant a cereal crop, canola is the best option. Lupin crops should be avoided because they are highly susceptible to damage by the herbicides used to manage skeleton weed. Lupins should not be grown for at least 12 months after the use of a picloram herbicide such as Tordon®. This is due to the presence of herbicide residues in the soil.

**Biological control**
A range of biological control agents has been released in south-eastern Australia where they have reduced the impact of skeleton weed; however, they are of no relevance in WA, due to the current eradication program.

**Follow up**
After controlling skeleton weed, check the infested area monthly for development of new rosettes. After two years with no new rosettes, you can consider the area to be free of skeleton weed. Summer surveillance should be carried out repeatedly to verify this.

Undertake annual spring/summer surveillance for skeleton weed throughout your property because new seeds can be carried in on the wind.

**Further reading**