

# Primary Industries, Water, and Environment

## Service Sheet

PRODUCED BY THE DEPARTMENT OF PRIMARY INDUSTRIES, WATER, AND ENVIRONMENT

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### Boneseed

(*Chrysanthemoides* (L.) Norl. *monilifera* ssp. *monilifera*)

#### Identification and Characteristics

Boneseed is a South African plant now naturalised in all southern Australian states. It is an evergreen woody shrub, commonly growing to 2 metres or more in height and diameter.

Boneseed is capable of invading and dominating the understorey of forests and bushland areas. It is particularly invasive in coastal areas and in some instances may form dense thickets, excluding all other plant species.

Boneseed can thrive in a range of environments including coastal sands where it may grow down to the high tide mark. It also commonly inhabits rocky, infertile and inhospitable sites where few other plant species are able to establish.

Boneseed produces a relatively shallow root system. Whilst plants are young this makes manual removal quite simple, however in larger plants the root mass is quite large and physical removal is difficult.

The young leaves are covered with white, matted hairs, particularly on the underside, which disappear as the leaves mature. Adult leaves are an elongated oval or elongated diamond shape. They have blunt toothed lobes along the edges furthest from the stem and taper to a short petiole at the base. They are leathery and a dull green in colour, and approximately 40 to 70mm long and 20 to 35mm wide. The mid-rib is prominent on both the upper and lower surfaces.

Boneseed normally flowers from mid-spring to early summer. The flowers develop in clusters at the ends of the branches. The flowers are about 20

mm in diameter with 4 to 8 bright yellow petals. They resemble the flowers of a daisy.

The fruit is about 6 mm in diameter, green and fleshy at first then becoming black at maturity. The fruit eventually flakes off to leave the inner seed exposed.

There is one seed in each fruit. At maturity, seeds are very hard and bone-like in texture and colour. Seeds are shed during summer and autumn.

On some seeds, the hard seed coat splits open soon after maturation and these seeds may germinate as soon as soil moisture is adequate. For other seeds, the seed coat may remain intact for many years with such seed remaining dormant for up to 10 years.

Heat may crack the seed coat and large numbers of boneseed seedlings may be the first vegetation to reappear after fire.

Seed germination may occur at any time of the year but is usually greatest in autumn. Seed numbers of up to 2500 per square metre have been recorded beneath established boneseed infestations.

#### Distribution

In South Africa, six sub-species of *Chrysanthemoides monilifera* are recognised. Only two of these, *C. monilifera* ssp. *rotunda* (bitou bush) and *C. monilifera* ssp. *monilifera* (boneseed), are present in Australia. The former occurs predominantly in summer rainfall areas while the latter prefers winter rainfall areas. Boneseed is the only subspecies recorded in Tasmania.

Boneseed and bitou bush were imported into Australia as ornamental species in the mid 1850s. Bitou bush in particular was later planted widely on the eastern Australian coast for stabilisation of sand dunes.

Boneseed and bitou bush are now two of Australia's most widespread and damaging environmental weeds.

Boneseed was first recorded in Tasmania in 1937. It has often been planted in gardens as an ornamental species. In addition, volunteer plants appearing in gardens are often retained for their ornamental value.

Boneseed is common in several coastal areas of Tasmania, especially along the north coast from Wynyard eastwards and on parts of the east coast.

It is common in the Tamar Valley and in the cities and suburbs of both Launceston and Hobart.

Elsewhere it occurs occasionally as a weed of disturbed bushland and coastal vegetation. Once boneseed has established in an area it may spread rapidly, especially if native vegetation is disturbed mechanically or by fire.

Seedlings are commonly found beneath trees, establishing from seeds in the droppings from birds roosting in the trees.

### **Dispersal**

Boneseed is commonly spread by birds and animals which eat the fruit. They digest the fleshy fruit but the hard seed passes unharmed through the digestive system. Ants have also been observed carrying fruits to their nests where they eat the flesh and discard the seeds.

Fruits and seed may also be carried in moving water.

The inappropriate dumping of seeding plants after removal can also lead to spread of the weed. Similarly, seed can be spread in gravel or topsoil collected from areas infested with boneseed.

### **Economic Significance**

Boneseed is not significant as a weed of agriculture. It does not survive cultivation and plants are readily grazed by livestock.

It is an "environmental weed", a plant which reduces environmental values through its ability to invade bushland and compete with native flora. As

such, it restricts the growth and re-establishment of native plants and reduces biodiversity.

In such situations, native fauna may also be affected by the loss of available habitats and food sources.

The shallow root system of boneseed gives it a competitive advantage over deeper rooted species, especially in areas of low summer rainfall. Moisture from light showers is absorbed by the boneseed plants before it reaches the deeper rooting zone of associated plants.

Boneseed is surprisingly inflammable for an evergreen plant and dense infestations can be a significant fire hazard.

### **Status under the *Weed Management Act 1999***

Boneseed is a declared weed in Tasmania, largely due to its environmental impacts, especially in coastal and near coastal areas. As such, its importation, sale and distribution are prohibited. The legal responsibilities of landholders and other stakeholders for this declared weed are specified in a statutory weed management plan available from the DPIWE.

### **Control**

Well established boneseed infestations often occur in situations where control requires a high labour input with little or no immediate economic gain for the landowner. In such situations, successful control usually requires community involvement and voluntary labour.

Successful control programs have been undertaken in some localities over the last few years (e.g. Bicheno, Bridport). Several other community groups are currently initiating programs in their areas.

To be effective, boneseed control programs should give a high priority to eliminating small outlying infestations of boneseed to reduce spread of the plant. This includes plants in gardens.

In large, well-established infestations, control should be undertaken gradually, starting on the perimeter and working towards the centre, over several years if necessary. In this way, the control area remains manageable and volunteers retain their enthusiasm for the program.

The regeneration of native vegetation is strongly encouraged to provide resistance to reinvasion by boneseed or other weeds. Care must be taken during boneseed removal to avoid damage to desirable seedlings and established plants. In some

areas, native species may have to be reseeded or replanted.

Care must also be taken where boneseed removal over large areas may increase soil erosion, such as sandy or coastal areas. In these instances, an initial replanting program followed by gradual boneseed removal will cause fewer problems than complete boneseed removal, with revegetation commencing afterwards.

Several methods can be used for the management of boneseed. Generally, a combination of methods which target the initial removal, revegetation and follow up maintenance will give the greatest long term result. This is known as integrated weed management.

### ***Fire:***

Fire has been used effectively for control of boneseed in Victoria in some instances. Burning of dense infestations kills seedlings and most mature plants and stimulates the germination of the seed in the soil.

The resultant seedlings can then be controlled carefully with herbicide. Many native species are less affected by fire and regrowth or regeneration from seed may be rapid after removal of the boneseed.

This method of control must be used carefully. Unless the boneseed infestation was very dense and few native species were present, it would not be considered appropriate.

### ***Slashing:***

Slashing or mowing is generally of little benefit in controlling boneseed. Plants may regrow strongly from the cut stumps unless they are treated with herbicide.

### ***Mechanical:***

As boneseed plants have a relatively shallow root system, seedlings and young plants can usually be readily pulled by hand; larger plants require a tractor or similar equipment.

Where bushes are pulled out, the ensuing ground disturbance often stimulates seed germination. Unless follow-up action is taken to control the resulting seedlings, the boneseed problem could be exacerbated. Subsequent monitoring of the site and pulling of seedlings or herbicide treatment is necessary.

In situations of low to medium boneseed density, it is usually preferable to handpull small plants and

treat larger plants by the cut-stump method (see below). This minimises both soil disturbance and damage to desirable vegetation.

### ***Biological Control:***

Boneseed and bitou bush are the subjects of a national biological control research program.

Several insects which feed on boneseed in its native habitats in South Africa have been investigated to determine their suitability for the control of the plant in Australia.

To date, several insects have been released in Tasmania, the Black Boneseed Beetle, Painted Boneseed Beetle, Boneseed Tip Moth and most recently the Boneseed Leaf Roller Moth (see TIAR Weed Biological Control; Pamphlet). These insects were mass-reared in the laboratory and released at several locations around the State. All agents have failed to establish in Tasmania.

Several other bio-agents are currently under evaluation both in Australia and overseas. These include a leaf buckler mite and a rust fungus.

Biological control should not be considered the complete answer to specific weed problems but can be used in conjunction with other control measures in an integrated management plan.

### ***Chemical Control:***

#### ***Foliar Application***

Boneseed seedlings can be controlled by a foliar application of bromoxynil (e.g. Buctril 200<sup>®</sup>). Total coverage of the plant is important.

Avoid contact with native plants, however bromoxynil is not likely to cause more than transient damage to established native plants.

Established boneseed plants may be sprayed overall with either 2,4-D amine (e.g. Amicide 500<sup>®</sup>) or glyphosate (e.g. Roundup Biactive<sup>®</sup>).

These herbicides will cause damage to non-target plants if the spray is allowed to contact them. Glyphosate will damage both broadleaf and grass species however 2,4-D will damage broadleaf species but will not significantly affect grasses. Where populations of native grasses exist beneath boneseed, 2,4-D is the preferred herbicide for use as the unharmed grasses will provide competition to new boneseed seedlings.

Application can be made at any time of the year when the plants are actively growing. Application early in the flowering period when bushes are easy to locate is effective and will generally prevent seed production.

This technique is best used when plants are actively growing. Undiluted 2,4-D amine or glyphosate mixed 1:1 with water are the recommended herbicides for this technique.

If herbicide is to be used in, near or over waterways, the product RoundUp Biactive<sup>®</sup> is the only product permitted to be used under national registration laws (at the time of printing).



### Cut Stump

### Bee Careful !

Where large boneseed plants are growing close to desirable vegetation, the cut-stump method of treatment is more appropriate. Plants are cut off near ground level and the herbicide is painted onto the stump. Herbicide application should be carried out immediately after cutting.

Some herbicides are toxic to bees. As a general rule, avoid applying herbicides when and where bees are foraging. Always read the label.

### Note:

These herbicide recommendations are made subject to the product being registered for that purpose under relevant legislation. It is the user's responsibility to check that registration or an off-label permit covers the proposed use. If in doubt, check with the Registrar of Chemical Products, Department of Primary Industries, Water and Environment. Statewide Freecall 1300 368 550.

## HERBICIDE RECOMMENDATIONS FOR BONESEED CONTROL

Type of Application	Herbicide (Active ingredient)	Commercial product examples (Content of active ingredient)	Rate of commercial product per L	Comments
Foliar Spray	bromoxynil	Buctril 200 <sup>®</sup> (200g/L)	1.6 ml /L	For seedlings. Avoid contact to desirable plants.
	glyphosate	RoundUp Biactive <sup>®</sup> Glyphosate 360 <sup>®</sup> (360g/L)	10 ml/L	For larger plants, actively growing. Avoid contact to desirable plants.
	2,4-D	Amicide 500 <sup>®</sup> (500 g/L)	10 ml/L	For larger plants, actively growing. Avoid contact to desirable plants.
Cut Stump	glyphosate	RoundUp Biactive <sup>®</sup> Glyphosate 360 <sup>®</sup> (360g/L)	1L/L	Apply immediately after cut is made. Use when plants are actively growing.
	2,4-D	Amicide 500 <sup>®</sup> (500 g/L)	Use undiluted	Apply immediately after cut is made. Use when plants are actively growing.

Note: Addition of adjuvants to most herbicides alters their effectiveness. Carefully consult each product's label for specific directions before adding any adjuvant.



*Chrysanthemoides monilifera*