

Declared Plant Policy

Bifora (*Bifora testiculata*)



Government
of South Australia

Bifora is a winter-growing annual weed of broadacre crops where it is significant as a seed contaminant, and has a limited distribution in South Australia.

Management Plan for Bifora

Outcomes

- Minimise losses to cereal and field pea production from bifora.

Objectives

- Prevent further spread of bifora between properties as a seed contaminant.

Implementation

- Natural Resources Management (NRM) authorities to prevent movement of contaminated seed as detected.

Regional Implementation

Refer to regional management plans for further details.

NRM Region	Actions
Adelaide and Mount Lofty Ranges	Monitor – assess impacts
Alinytjara Wilurara	Limited action
Eyre Peninsula	Contain spread
Kangaroo Island	Monitor
Northern and Yorke	Limited action
South Australian Arid Lands	Limited action
South Australian Murray-Darling Basin	Limited action
South East	Prevent entry or sale (Regional alert)

Declaration

To implement this policy, bifora is declared under the *Natural Resources Management Act 2004* throughout the whole of the State of South Australia to prevent further spread via contaminated seed or other produce. The movement or transport of the plant on a public road, by itself or as a contaminant, or sale by itself or as a contaminant is prohibited.

In the Eyre Peninsula NRM region, NRM authorities may require land owners to control bifora plants growing on their land, and NRM authorities in this region are required to control plants on road reserves.

Bifora policy

Bifora is declared in category 3 under the Act for the purpose of setting maximum penalties under section 177. Any permit to allow its movement or sale can only be issued by the regional NRM Board. In certain circumstances, movement and sale can occur in accordance with the terms of a written approval given by an authorised officer. Under the *Natural Resources Management (General) Regulations 2005*, the sale or transport of grain or wool for milling or cleaning is exempt from the operation of sections 175 and 177.

The following sections of the Act apply to bifora throughout each of the NRM regions noted below:

Sections of Act	Region							
	AMLR	AW	EP	KI	NY	SAAL	SAMDB	SE
175(1) Prohibiting entry to area	X	X	X	X	X	X	X	X
175(2) Prohibiting movement on public roads	X	X	X	X	X	X	X	X
177(1) Prohibiting sale of the plant	X	X	X	X	X	X	X	X
177(2) Prohibiting sale of contaminated goods	X	X	X	X	X	X	X	X
180 Requiring notification of infestations								
182(1) Landowners to destroy the plant on their properties								
182(2) Landowners to control the plant on their properties			X					
185 Recovery of control costs on adjoining road reserves								

Review

This policy is to be reviewed by 2020, or in the event of a change in one or more regional management plans for bifora.

Weed Risk

Invasiveness

Bifora is an annual and is spread primarily as a contaminant in seed for sowing. It can also move in contaminated hay and on machinery or livestock. Due to its high seed production per unit area, rates of increase can be very high.

Impacts

Bifora competes with cereals, grain legumes and field peas, reducing yields. It is also a contaminant reducing value and marketability of seed and hay. It therefore increases crop input costs and can limit the options for crop rotations even precluding the use of legumes.

Potential distribution

There is little information about the ecological limits of bifora, which is native to the Mediterranean climate zone of southern Europe to about 44°N. It is most abundant on heavier soils with over 400 mm annual rainfall. Experience has shown it to be favoured by frequent cropping, implying that it takes advantage of annual soil disturbance but the seed may not persist so well in the ground under pasture.

Feasibility of Containment

Control costs

Effective herbicide treatments exist for bifora in cereals, with mixtures containing carfentrazone-ethyl giving the most reliable control. Control in pulse crops is more difficult, and there is no cost-effective control in field peas.

Persistence

Bifora forms a significant seed bank in the soil as only about 25% of seed germinates in the first year; it will remain dormant if left on the soil surface, and has staggered germination within one season. Germination is increased by cold stratification over winter, but it has a short growing season and can produce seed even when germinating late within the crop. Experience has shown it to be favoured by frequent cropping, implying that it takes advantage of annual soil disturbance, but the seed may not persist so well in the ground under pasture.

Current distribution

Bifora is scattered on Eyre Peninsula and in the Lower Flinders area, with infestations more common in the Mid North and on Yorke Peninsula.

State Level Risk Assessment

Assessment using the Biosecurity SA Weed Risk Management System gave the following comparative weed risk and feasibility of containment scores by land use:

Land use	Weed Risk	Feasibility of control	Response at State Level
Crop/pasture rotation	low 22	medium 36	limited action
Vegetables	low 22	high 23	monitor

Considerations

Bifora became a significant weed in cereal crops during the late 20th century due to changes in rotations toward more frequent cropping, and regular use of herbicides that reduced other broadleaf weeds.

Risk assessment indicates protect sites as the management action; this is implemented by containing spread through the prohibition on movement and sale. In the Eyre Peninsula NRM region, control may be enforced. Limited action is required in the South Australian Murray-Darling Basin NRM as it has widespread distribution and changes in agronomic practices provide adequate control. As bifora is not a threat to lands outside the rotational cropping zone, only limited action is needed in the Alinytjara Wilurara and South Australian Arid Lands.

Synonymy

Bifora testiculata (L.) Roth, Enum. Pl. Phan. Germ. 1: 888 (1827)

Basionym:

Coriandrum testiculatum L., Sp. Pl. 1: 256. (1753).

Nomenclatural synonyms:

Anidrum testiculatum (L.) Kuntze, Revis. Gen. Pl. 1: 264. (1891).

Atrema testiculatum (L.) Miq., Fl. Ned. Ind. 1(1): 744. (1856).

Taxonomic synonyms:

Bifora dicocca Hoffm., Gen. Pl. Umbell., ed. 2. 192 (1816)

Bifora flosculosa M.Bieb., Fl. Taur.-Caucas. 3: 234 (1820)

Coriandrum didymum Stokes, Bot. Mat. Med. 2: 121 (1812)

Other common names include carrot weed, bird's eye and European bishop.

References

Black, I. D., Mayfield, A. & Matic, R. (1994) Chemical control of bedstraw (*Galium tricornutum* Dandy) and bifora (*Bifora testiculata* L.) in wheat, barley and field peas. *Plant Protection Quarterly* 9: 24-27.

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Conservation

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