kochia (*Bassia scoparia*)

Kochia is a shrubby annual native to eastern Europe and western Asia, with some biotypes that have become major weeds in cereal crops overseas. One of these weedy forms was imported into Western Australia in the early 1990s, prompting a successful eradication program. It is not known to be present in South Australia.

**Management Plan for Kochia**

**Outcomes**
- Grazing and cropping land protected from degradation by major weeds.

**Objectives**
- To prevent the establishment of kochia in SA.

**Implementation**
- Sale, import and movement of kochia to be prevented.
- Any naturalised kochia infestation to be destroyed as found.

**Regional Implementation**

Refer to regional management plans for further details.

<table>
<thead>
<tr>
<th>NRM Region</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelaide and Mount Lofty Ranges</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>Alinytjara Wilurara</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>Eyre Peninsula</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>Kangaroo Island</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>Northern and Yorke</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>South Australian Arid Lands</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>South Australian Murray Darling Basin</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
<tr>
<td>South East</td>
<td>prevent entry or sale; destroy if detected</td>
</tr>
</tbody>
</table>

**Declaration**

To implement this policy, kochia (excluding the cultivar group 'Trichophylla') is declared under the *Natural Resources Management Act, 2004* throughout the whole of the State of South Australia. The movement or transport of the plant on a public road by itself or as a contaminant, its entry to South Australia, or the sale by itself or as a contaminant are prohibited. Land owners are required to destroy any kochia plants growing on their land. NRM
authorities are required to destroy plants on road reserves, and may recover costs from the adjoining land owners.

Kochia is declared in category 2 under the Act, for the purpose of setting maximum penalties and for other purposes. Any permit to allow its movement or sale can only be issued by the Chief Officer pursuant to section 188. Under the Natural Resources Management (General) Regulations 2005, the transport or movement of grain for milling or wool for cleaning is exempt from the operation of sections 175 and the sale of wool or grain is exempt from section 177(2) if at the time of the sale the person believes on reasonable grounds that the purchaser will remove the plant from the wool or grain before any re-sale.

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

<table>
<thead>
<tr>
<th>Sections of Act</th>
<th>Region</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>175(1) Prohibiting entry to area</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>175(2) Prohibiting movement on public roads</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>177(1) Prohibiting sale of the plant</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>177(2) Prohibiting sale of contaminated goods</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>180 Requiring notification of infestations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>182(1) Landowners to destroy the plant on their properties</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>182(2) Landowners to control the plant on their properties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>185 Recovery of control costs on adjoining road reserves</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Review

This policy is to be reviewed by 2020, or in the event of kochia becoming established as a weed in SA.

Weed Risk

Invasiveness

Kochia reproduces by seed only, with each plant producing 10,000-15,000 seeds in late summer. Seeds are dispersed in autumn when the dead plants break off at ground level and are blown large distances by the wind. This ‘tumbleweed’ mechanism can spread seeds a kilometre or more from the original site.

Most seed germinates in spring and early summer, sometimes with an autumn germination in response to late summer rains.

Impacts

Kochia significantly reduces pasture and crop production by direct competition due to its rapid growth, typically reaching 1.5 m in height and width in six months. It also produces allelopathic compounds that inhibit growth of many other plants.

In the USA, it is of some importance as a green foliage contaminant of harvested cereals.

Although palatable to stock, it may be toxic in large quantities due to its high levels of oxalates and nitrates.
Potential distribution

Kochia grows in soils from moderately alkaline to moderately acid, uses water efficiently and is adapted to warm-temperate low-rainfall habitats typical of the SA agricultural zone. Although a summer annual, in many years it may be able to get its roots down to the water table before the worst of the summer dry. It would also respond to summer rain on fallows.

Feasibility of Containment

Control costs

No selective broadacre herbicide treatments for kochia have been developed.

Seed germinates close to surface, making tillage when seedlings are seen one of the most effective control methods. They can also be killed with a nonselective herbicide such as glyphosate, paraquat or dicamba. Overseas, kochia has rapidly evolved resistance to sulfonylurea and triazine herbicides.

Mowing or slashing prior to flowering is effective in reducing seed production but the plants can regrow and flower later.

Persistence

The seeds are short lived in the soil, with most germinating in the first year and none remaining as a seedbank after 5 years.

Current distribution

Not present in South Australia.

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:

<table>
<thead>
<tr>
<th>Land use</th>
<th>Weed Risk</th>
<th>Feasibility of control</th>
<th>Response at State Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop-pasture rotation</td>
<td>medium 51</td>
<td>very high 1</td>
<td>contain spread alert</td>
</tr>
<tr>
<td>Grazing - southern</td>
<td>medium 84</td>
<td>very high 1</td>
<td>contain spread alert</td>
</tr>
<tr>
<td>Grazing - rangeland</td>
<td>medium 59</td>
<td>very high 1</td>
<td>contain spread alert</td>
</tr>
</tbody>
</table>

Considerations

Kochia is widely naturalised as a weed in the North Temperate Zone and also in New Zealand. Due to its rapid growth and hardiness, it has frequently been seen as a potential soil stabiliser or forage plant in marginal areas.

It was first imported in 1990 and planted to rehabilitate saline agricultural land at 68 sites in Western Australia. However, it rapidly spread from these sites and was declared for
eradication in 1993 when agencies realised that it was a major weed overseas. Eradication involved the use of herbicides, intensive grazing, grubbing and burning with flamethrowers.

The species *Bassia scoparia* also includes a quite different plant, the old-time garden annual known as summer cypress or burning bush. This was given the formal name of *Kochia trichophylla* Voss in a 19th century German gardening publication, but is actually a group of cultivars rather than a wild variety, and was developed as a summer-growing foliage plant that forms a compact, bright green 'shrub' and turns bright red as it senesces in autumn. Summer cypress was popular in the formal gardens of the late 19th and early 20th centuries, when there were named cultivars such as 'Childsi' within the Trichophylla group.

The seeds of *Bassia scoparia* are used in Japanese cuisine as a garnish called *tonburi*, and are also used in Chinese medicine to balance metabolism.

Risk assessment indicates containment as a management action; since kochia is absent from SA, containment is best implemented by preventing its entry to the State or establishment.

**Synonymy**


Basionym: *Chenopodium scoparia* L., Sp. Pl. 1: 221 (1753)

Nomenclatural synonyms:

- *Kochia scoparia* (L.) Schrad., Neues J. Bot. 3: 85 (1809)
- *Atriplex scoparia* (L.) Crantz, Inst. Rei Herb. 1: 208 (1766)

Taxonomic synonyms:

- *Suaeda sieversiana* Pall., Ill. Pl. Orient. 45. t. 38 (1803)

Other common names include Mexican fireweed, Mexican firebush, ragweed and belvedere.

---

Hon Ian Hunter MP  
Minister for Sustainability, Environment and Conservation  
Date: 28 July 2014