

Declared Plant Policy

African Rue (*Peganum harmala*)



Government
of South Australia

African rue is an unpalatable herbaceous perennial that grows as a weed in semiarid pastoral areas and marginal agricultural lands of South Australia.

Management Plan for African Rue

Outcomes

- Prevent establishment in uninfested pastoral lands

Objectives

- Prevent the spread of African rue into uninfested areas.
- Prevent small African rue infestations from affecting present and future land management options.

Implementation

- Natural Resources Management (NRM) authorities to ensure all high priority infestations, as determined by the board, on public or private land are controlled.
- NRM authorities to control high priority infestations on road reserves in marginal farming or pastoral areas, and recover costs from adjoining landowners where possible.
- NRM authorities to control all plants that grow on roadways, graded road verges and grader wind rows and recover costs from adjoining landholders where appropriate under regional plans.

Regional Implementation

Refer to regional management plans for further details.

NRM Region	Actions
Adelaide and Mount Lofty Ranges	Protect sites
Alinytjara Wilurara	Destroy infestations - Regional alert
Eyre Peninsula	Contain spread
Kangaroo Island	Monitor – not present
Northern and Yorke	Protect sites
South Australian Arid Lands	Protect sites
South Australian Murray-Darling Basin	Contain spread
South East	Destroy infestations – Regional alert

Declaration

To implement this policy, African rue 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, or the sale by itself or as a contaminant is prohibited. NRM authorities may require land owners to control African rue plants growing on their land. NRM authorities are required to control plants on road reserves and may recover costs from the adjoining land owners. In the South Australian Arid Lands and South Australian Murray-Darling Basin NRM regions, land owners are required to notify NRM authorities of African rue infestations on their land.

African rue 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 African rue 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								
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(1) Requiring notification of infestations						X	X	
182(1) Landowners to destroy the plant on their properties								
182(2) Landowners to control the plant on their properties	X	X	X	X	X	X	X	X
185 Recovery of control costs on adjoining road reserves	X	X	X	X	X	X	X	X

Review

This policy is to be reviewed by 2020, or in the event of a change in any regional management plan for African rue.

Weed Risk

Invasiveness

African rue spreads as seed, and sometimes by fragments of rootstock transported in soil. Seed dispersal is primarily by flowing water, and human-aided dispersal via vehicles and produce. Natural spread is often slow, as most seeds fall close to the parent plant. Local spread may result from water flowing over the soil surface. Spread of root fragments along roadsides by grading, and within paddocks by ploughing, may increase plant numbers.

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The seeds are not adapted to be carried in the fur or wool of animals, and as animals are most unlikely to eat the fruits of African rue, the risk of seed dispersal through stock is very low. Most primary infestations of African rue begin on roadsides that are graded.

African rue is slow growing and takes several years to form dense infestations. It is well adapted to the semi arid environment and grows best in open, disturbed areas receiving run off water. It does not establish easily in undisturbed sites, under shade or among dense vegetation.

Impacts

African rue is difficult to control or destroy. It has been present in the northeast quarter of the State for over half a century, where it is spread over an area of at least 20,000 hectares. In the western USA, it has been found to displace native chenopod shrubs and tussock grasses.

African rue is highly unpalatable to sheep and cattle, due to the presence of harmala alkaloids, which have a bitter taste. The alkaloids have a long history of use in folk medicine; they are potentially toxic if consumed in large quantities. The plant may lower pasture yields but stock poisoning is rare and is only possible when pastures are heavily grazed and there is little else left to eat. They also have an allelopathic effect, inhibiting both germination and growth of some plants.

African rue has not yet had major impacts on South Australia. It has been confined mostly to unmanaged sites and overgrazed areas and has not become a significant contaminant of livestock, hay, grain or other produce.

Potential distribution

African rue has a high potential for further spread in South Australia; it can grow in a large proportion of the State and become locally common at overgrazed sites, roadsides and disturbed but unmanaged sites. Land use, disturbance and soil movement are likely to be the major contributing factors to African rue establishment in South Australia. Favoured sites are disturbed soils with no competition.

Degraded marginal agricultural and pastoral lands are at risk from invasion by African rue, although it is unlikely to persist in areas that do not receive water run off. It can grow in regions that receive as high as 480 mm annual average rainfall but are most commonly found in arid and semi arid areas. The high temperature requirements of germinating seeds may exclude the plant from those habitats that are cooler than 20°C when moisture is available for seedling establishment. African rue grows in most soil types, excepting heavy clay.

Feasibility of Containment

Control costs

The root system of African rue is extensive, spreading both down and out, and can respond to light rains and deeply penetrating soil moisture. The taproot of African rue has been recorded to 2.5 m and lateral roots to more than three metres. When herbicides have been used as a means of control difficulties have arisen due to the plant's ability to regenerate from deep in the soil profile. There also seems to be a small level of translocation of commonly used phenoxy herbicides to the entire root system.

A knock-down herbicide, applied during early flowering, will control most growth above ground. If applied earlier than flowering, plants may be too small to absorb enough herbicide to kill the

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entire root system and many plants may still be emerging from winter senescence. If applied late in the flowering period there may not be sufficient translocation to kill the entire root system. As the herbicide has no residual properties, seedlings and roots that survived the treatment are subsequently able to emerge.

Spot spraying with nonselective soil-active herbicides provides useful control of African rue on roadsides, but damage to desirable plants will occur.

Established plants that have the surface 25 mm of soil removed by road works will re-establish from their subterranean stems. In farming areas with close crop-pasture rotations weed control during cropping years is likely to limit African rue. Control costs of the weed include the extra cost of the alternative management and lowered yield caused by alternative management.

Persistence

African rue is a prolific seed producer that releases seed over a long period each year. It is not known how long seeds will remain viable. The higher the available moisture, either through rainfall, run on or soil type, the higher the chance of plant establishment and survival. It grows densely around wells, dams and bores where soil is disturbed by the hooves of stock and competition from desirable pasture species is absent.

Current distribution

The largest infestations of African rue in South Australia occur northeast of Orroroo on floodplains at Minburra and Koonamore stations. Scattered patches occur further south and west through the South Australian Arid Lands region. It has been found in cultivated fields at Quorn, Taylorville and Parilla, and roadsides at Two Wells and Tintinara. It is also present in the riparian zone of the Broughton River gorge.

African rue is not known to be established on Kangaroo Island, in the South East, Eyre Peninsula or Alinytjara Wilurara regions.

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
Grazing – southern	Medium 39	Very high 2	Contain spread
Grazing - rangeland	Medium 59	High 25	Protect sites
Native vegetation	Negligible 10	Medium 45	No action

Considerations

In South Australia African rue was first collected in January 1943 near Tintinara. Many reports of African rue were received in the mid 1970s following the construction of a gas pipeline through the area and two consecutive years of very high rainfall that favoured germination and establishment. It is not clear whether the widely separated infestations within South Australia

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are the all result of local spread from a single introduction, or began from several independent introductions.

Heavily grazed areas are more prone to invasion than lightly grazed areas. As infestations seldom become dense in well-managed pastures, a priority for managers in areas with African rue is to ensure that pastures are not generally overgrazed.

Risk assessment at State level indicates management actions of protecting sites in rangeland areas, and containing spread in southern grazing lands. Regional management plans vary according to regional habitats and presence of the weed.

In the South Australian Arid Lands region, management approaches include monitoring for most of the region, with higher priority actions of manage sites for Flinders bioregion and protect sites for the Gawler and Broken Hill complex bioregions. In the grazing of the South Australian Murray-Darling Basin region aims to contain spread, but to also map and control all infestations in the rangelands land use where African rue is one of the highest priority weeds. African rue represents a high priority threat to the Alinytjara Wilurara region, and is therefore treated as an alert weed in this region. As it is also absent from the Eyre Peninsula, South East and Kangaroo Island regions, these regions aim to prevent its establishment. The Adelaide and Mount Lofty Ranges, and the Northern and Yorke, regions aim to protect sites as the weed is very localised there.

Synonymy

Peganum harmala L., Sp. Pl. 1: 444 (1753)

Taxonomic synonyms:

Harmala multifida All., Fl. Pedem. 2: 101 (1785)

Harmala peganum Crantz, Inst. Rei Herb. 2: 463 (1766)

Harmala syriaca Bubani, Fl. Pyren. 3: 354 (1901)

Other common names include harmal, isband, peganum, Syrian rue and yüzerlik.

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Minister for Sustainability, Environment and
Conservation

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