

Eyre Peninsula NRM Board  
PEST SPECIES REGIONAL MANAGEMENT  
PLAN  
*Orbea variegata* Carrion flower



This plan has a five year life period and will be reviewed in 2023.



Natural Resources  
Eyre Peninsula



Government of South Australia  
Eyre Peninsula Natural Resources  
Management Board

# INTRODUCTION

## Synonyms

*Orbea variegata* (L.) Haw., Syn. Pl. Succ. 40 (1812)  
*Stapelia variegata* L., Sp. Pl. 1: 217 (1753)  
*Stisseria variegata* (L.) Kuntze, Revis. Gen. Pl. 2: 422 (1891). [4]

## Biology

Carrion flower, *Orbea variegata* (L.) Haw, is a low clump forming succulent. Individual plants can cover an area up to 5.0 m<sup>2</sup>. It is a leafless plant, the multiple four-angled, hairless stems are prominently sharp-toothed and can grow more than 25.0 cm high. The stems can range in colour from purple to green, with unhealthy plants yellowing when under stress.

In South Australia flowering occurs after significant rainfall. Carrion flower belongs to a plant group known to produce a flower that releases a scent similar to rotting organic material (sapromyophilous) to attract insect pollinators.

The attractive 5-8.0 cm yellow and purple spotted flower has five points, with a round centre and a felt finish. It is suggested that this pattern may mimic the sight of rotting organic matter [3].

The pollinators, mainly flies, get their wings or legs trapped at the centre part of the flower, and as they release themselves they remove the pollinarium – there are five pollination areas on each flower [3]. The plant can also reproduce asexually, with the stem able to propagate itself as a new plant.

The banana-shaped seed pods, tend to grow on the outer edges of the plant. Whole plants can have multiple seed pods at one time. There does not seem to be a particular season for seed pod growth, with pods produced when conditions are suitable.

The seed pods contain thousands of seeds arranged around a vertical stem. When mature, the skin of the pod peels open to release the seeds. Seeds are dispersed by wind, facilitated by fine white hairs that catch the wind. Literature on the invasiveness of the plant suggests that seed viability is low in environments where the species is an exotic [4]. Less than 10% of the seeds of the plant are viable [3].

Low-lying, flood-prone areas, where water pools, seem to be where successful outbreaks of carrion flower occur. It appears rain events are needed at most stages of the reproduction process, from flowering, seeding, through to germination and plant establishment. Most outbreaks seem to occur under an established plant – this success could be a combination of the seed being trapped by the existing vegetation, as well as the

carrion flower profiting from the shade and lower soil temperatures that the host plant provides [5].

## Origin

Worldwide there are 56 species of *Orbea*, 28 of which are found in South Africa. Carrion flower *O. variegata*, is native to the coastal belt in the Western Cape Province of South Africa [1].

## Distribution

First recorded in Australia by the Queensland Herbarium in 1969, the distribution of carrion flower appears to be isolated to particular areas of the country (Figure 1). In South Australia the largest infestation is located between Whyalla and Port Augusta, in a semi-arid landscape dominated by saltbush and bluebush. The spread of carrion flower infestations on the Eyre Peninsula appears to be progressing in a northerly direction, probably driven by the prevailing southerly winds.

Carrion flower plants were introduced to Whyalla to divert flies away from households (pers. comm. I Honan, 2015). The species is believed to have spread from these early introductions. The plant initially established itself in rocky hills within Whyalla but has since spread onto the surrounding plains [1].

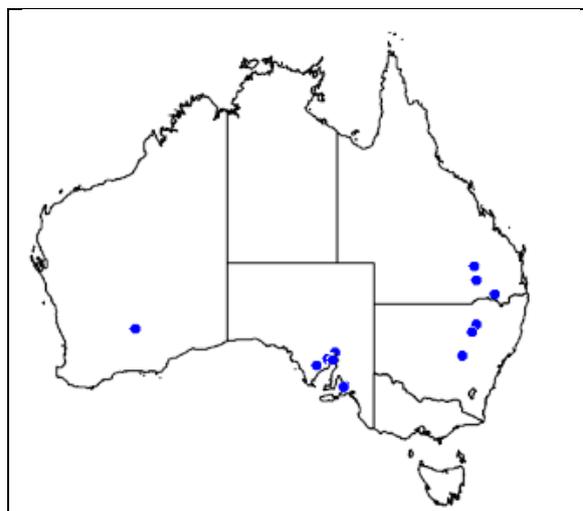


Figure 1. The current known distribution of carrion flower (*Orbea variegata*) in Australia, [5].

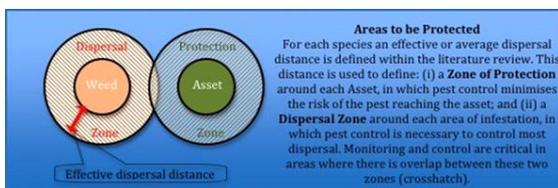
## RISK ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national framework for environmental management (including the recognition of nationally threatened species and ecological communities), thereby directing resources towards the delivery of improved environmental protection. The EPBC Act applies where declared pest species threaten any listed species or ecological

community or where its control may have adverse effects on matters of national environmental significance on Commonwealth land.



**Figure 2. Map showing local outbreaks of carrion flower (*Orbea variegata*) in the upper Spencer Gulf area.**



## South Australian weed risk assessment process

The Primary Industries and Regions SA (PIRSA) Biosecurity SA division, in cooperation with Natural Resources Management Boards developed the Biosecurity SA Weed Risk Management System [6] to rank the importance of pest plants, standardise the prioritising of these plants for control programs and to assess weed species for declaration.

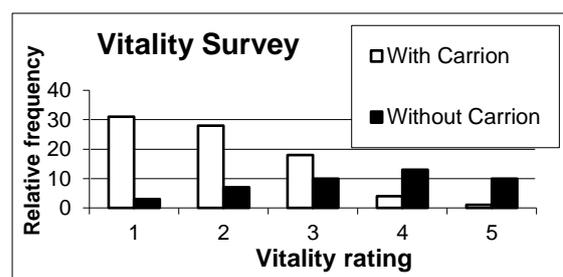
The Biosecurity SA Weed Risk Management System uses a series of questions to determine weed risk and feasibility of control for a species within a specific land use type. The result of the assessment is used to determine and prioritise weed management actions within each land use type.

Weed risk characteristics assessed include; invasiveness (i.e. its rate of spread); economic, environmental and social impacts, and potential distribution (total area) of the weed.

Appropriate management objectives are determined and can be prioritised using a risk matrix which compares weed risk scores against feasibility of control scores. Pest plants that have both high weed risk and are feasible to control have higher priority management objectives e.g. eradication. Conversely, species that are not feasible to control will not rank as a high priority, monitoring or limited management action may be the most appropriate management objective.

The risk matrix categorises each weed species into one of nine risk categories for regional management:

1. **ALERT:** to prevent species which pose a significant threat arriving and establishing in a management area.
2. **ERADICATE:** remove from a management area.
3. **DESTROY INFESTATIONS:** significantly reduce the extent in a management area.
4. **CONTAIN SPREAD:** prevent the ongoing spread in a management area.
5. **PROTECT SITES:** prevent spread to key sites/assets of high economic, environmental and/or social value.
6. **MANAGE WEED:** reduce the overall economic, environmental and/or social impacts through targeted management.
7. **MANAGE SITES:** maintain the overall economic, environmental and/or social value of key sites/assets through improved general weed management.
8. **MONITOR:** detect any significant changes in the species' weed risk.
9. **LIMITED ACTION:** species would only be targeted for coordinated control if its presence makes it likely to spread to land uses where it ranks as a higher priority.



**Figure 3. Vitality of native vegetation against the presence/absence of carrion flower [3].**

## Pest risk

Carrion flower is regarded as a serious pest plant due to its ability to damage and displace native vegetation. The plant seems to establish itself under native vegetation and puts pressure on the shelter plant by intercepting water and nutrients.

In the absence of carrion flower, chenopod shrubs have

greater vitality, higher levels of growth and higher water potential [3]. Where carrion flower is present, native vegetation is generally less healthy (Figure. 3).

Carrion flower prefers dry climates with heavy but infrequent rainfall. The species has no natural 'enemies' in Australia, allowing it to spread more readily than in Southern Africa. It is suggested that the rate of spread maybe restricted limited more so by low seed viability and climatic differences to its native environment [3]. The Western Cape Province has high winter rainfall [1] whereas north eastern Eyre Peninsula enjoys summer rains.

Seed dispersal occurs when pods mature and the seeds are released. The seeds travel with the wind, reportedly only small distances. Seed and stems are also spread by careless dumping of unwanted garden plants in areas of native vegetation.

Longevity of seeds is unknown, however, its suggested that in the Australian climate, seed viability is low (<10%) [3].

### Feasibility of control

Carrion flower has a resistant cuticle which inhibits chemical penetration requiring labour intensive control methods. Currently there are no practical control methods for situations where infestations occur over large areas.

Due to the lack of an effective control method, persistence of naturalised populations appears to be high [4].

The plant is commonly grown in pots and rockeries throughout the dry rural areas as a hardy low-care perennial. It is not available in the nursery trade but is usually obtained by gift or informal sale [4].

**Brush on chemical application** –brush-on application of a non-selective herbicide with surfactant added has provided an effective treatment, however good coverage is necessary. Brushing on the chemical appears to aggravation the plants' outer cuticle (skin) allowing a better uptake of the poison. The plants die slowly over a period of weeks. This method is labour intensive and only suitable for small infestations.

**Foliar Chemical application** – The tough cuticle has proven to limit herbicide uptake, therefor foliar sprays are not as effective as brush on, having highly variable kill rates (approximately 50-95%). Total foliar cover is essential in order to get the best results.

**Manual removal** – is only feasible for small infestations, regular monitoring and follow-up is crucial to ensure the regrowth is controlled.

**Biological control** - options may be investigated. In South Africa there has been several threats to the plant

that include a scale on the skin of the plant, mealy bugs on the roots, and the stapeliad snout beetle that is known to eat the flesh of stems [1].

### Status

In the chenopod rangelands around Whyalla, practical control methods are yet to be realised. It has a weed risk of 76 in the northern EP [4].

The Natural Resources Eyre Peninsula risk management assessment (Table 1) rates carrion flower as '**protect sites**' in native vegetation and urban land use systems on Eyre Peninsula.

**Table 1: Regional Assessment**

Land Use	Pest Risk	Feasibility of Control	Management Action
Cropping systems			N/A
Native vegetation	28 Low	7 Very High	Protect sites
Pasture grazing	28 Low	25 High	Monitor
Urban residential	28 Low	5 Very High	Protect sites

## REGIONAL RESPONSE

### Special considerations/Board position

A State level Declared Plant Policy and Management Plan [4] exists for carrion flower (*Orbea variegata*). The policy provides State level outcomes, objectives and implementation actions for regional NRM authorities.

The NREP pest management response supports the State Carrion flower policy.

The NREP seeks to encourage/facilitate research where data shortfalls and knowledge gaps are identified.

### Aim

To protect key environmental assets from the impact of carrion flower.

### Objectives

1. Identify and protect key assets under threat from carrion flower.
2. Educate community on threat of this species to encourage voluntary compliance with declaration.
3. Determine the extent of carrion flower on Eyre Peninsula.
4. Encourage investment in trials and research for alternative control options, including biological.



## Priority areas to be protected

Priority sites include Whyalla Conservation Park and the northern edge of the infestation.

## Actions

1. Develop localised annual action plans to achieve the aim and implement the objectives and actions of the Eyre Peninsula regional carrion flower management plan;
2. Control and monitor carrion flower at priority sites to protect high biodiversity values.
3. Establish buffer zones to contain existing carrion flower populations;
4. Monitor control areas to ensure control action is effective and enduring;
5. Raise community awareness to promote landholder control of carrion flower in the eastern region.
6. Encourage, facilitate or compel compliance for control, including sales and movement of the plant.

## Evaluation

Evaluation will be based on:

- Analysis of monitoring data to evaluate the outcome of control actions; and
- Annual assessment of surveillance programs at the district level, and review of the monitoring program every five years.

## Declarations

In South Australia carrion flower (*Orbea variegata*) is a declared weed under Schedule 2 (CLASS 41 – Provisions: 175 (1) (2), 177(1) (2) for the whole of the state and 182(2) for the areas of the AW and EP Natural Resources Management Regions) of the *Natural Resources Management Act 2004* (Table 2). Meaning that it must not be moved or sold throughout SA and is required to be controlled for the specific areas mentioned above [4].

**Table 2: Carrion flower – Provisions under the *Natural Resources Management Act 2004*.**

Section	Description of how the section applies
175 (1)	Cannot transport the plant or any substance carrying the plant in it within the state
175 (2)	Must not bring or cause the plant to be brought into a control area
177 (1)	Cannot sell any produce / goods carrying the plant
177 (2)	Must not sell any animal/ soil/ equipment carrying the plant
182 (2)	Land owner must keep plants controlled on their land

## References

1. Bester, S.P. 2006. Orbea. 2006.
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3. Meve, U. and S. Liede, 1993. Floral biology and pollination in stapeliads – new results and a literature review. *Plant Systematics and Evolution*, 192: p. 99-116.
4. Biosecurity SA. 2015. Declared Plant Policy Carrion Flower (*Orbea variegata*). January 2015. [http://www.pir.sa.gov.au/data/assets/pdf\\_file/0019/234550/carrion\\_flower.pdf](http://www.pir.sa.gov.au/data/assets/pdf_file/0019/234550/carrion_flower.pdf)
5. Lenz, T. and J. Facelli, 2003. Shade facilitates an invasive stem succulent in a chenopod shrubland in South Australia. *Austral Ecology*, 28: p. 480-490.
6. Virtue, J.G., 2008, SA Weed Risk Management Guide February 2008. Adelaide: Department of Water Land and Biodiversity Conservation - South Australia. 22.

