



SOUTHERN AFRICAN PLANT INVADERS ATLAS

Newsletter of the Southern African Plant Invaders Atlas, an initiative of the Weeds Research Division, Agricultural Research Council, Plant Health and Protection (ARC-PHP)

Ox-eye daisy: another invasive threat

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Ox-eye daisy (*Leucanthemum vulgare*) is naturalized in South Africa but has the potential to become a serious invader of grasslands. This species is recognized as a threat to agriculture and biodiversity in North America and Australia where biological control is under investigation. Perhaps South Africa could benefit from these investigations and take steps to prevent wide-spread invasion.



Ox-eye daisy is an aggressive invader of sub-alpine grasslands, snow gum woodlands and wetlands in Kosiuszko National Park in New South Wales, Australia (photo: AJ McConnachie)

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Pompom weed: update on biological control

Good progress is being made with the biological control of pompom weed (*Campuloclinium macrocephalum*) using the flower- and stem-galling thrips, *Liothrips tractabilis*.

Where the thrips have established, they have been found on up to 80% of the plants, resulting in a significant reduction in height of plants, fewer flower buds and seeds. The rust fungus continues to spread throughout the range of the weed, causing dieback of stems and killing seedlings

Many private landowners have received the thrips and in future will be able to harvest the insects and redistribute to their neighbours. Read more on pages 4 and 5.



Photo: Andrew McConnachie

Ox-eye daisy (*Leucanthemum vulgare*) is a potential threat to agriculture and biodiversity

Ox-eye daisy, also known as garden chrysanthemum, marguerite/margriet, is *Leucanthemum vulgare* (= *Chrysanthemum leucanthemum*). It is native to Europe but has invaded more than 40 countries around the world. It is a perennial herb usually 30–60 cm tall, with white flowerheads borne singly on long stalks. It spreads from seeds and rhizomes. It has been cultivated for ornament in South Africa and is a seed lot contaminant.

Ox-eye daisy has been recorded from grassland regions in Mpumalanga, Free State, KwaZulu-Natal and Eastern Cape (see [map](#)) (records from BRAHMSOnlineData and SAPIA database).

Studies in other parts of the world have shown that dense stands exclude other species, reducing native species diversity, leading to soil erosion and a depletion in soil organic matter. Plants are unpalatable to cattle and reduce the carrying capacity of the land.

While mechanical and chemical control can be used to manage localized infestations, biological control could provide a more sustainable management of the weed at a landscape level, particularly in conservation areas. Biological control of ox-eye daisy in North America has been under investigation since 2008 and more recently in Australia.

How to distinguish ox-eye daisy from similar-looking plants:

Ox-eye daisy, *Leucanthemum vulgare*, has toothed to variously lobed, basal leaves, toothed mid-stem leaves, and moderately sized flowerheads 2–6 cm across (**photos 1 & 2**);

Shasta daisy, *Leucanthemum x superbum*, has toothed basal and mid-stem leaves, and large, robust flowerheads 5–12 cm across (**photos 3 & 4**);

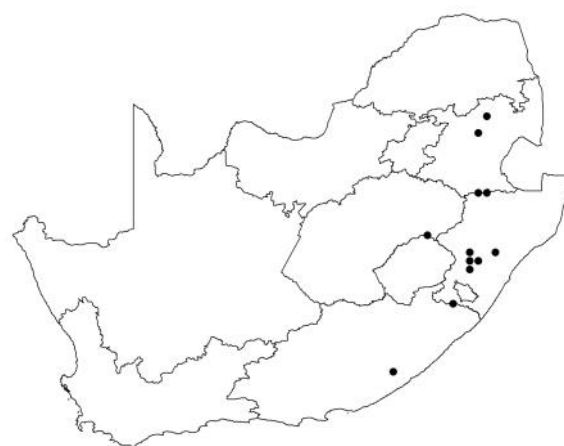
Stinking mayweed or dogfennel, *Anthemis cotula*, has very finely divided, fennel-like, leaves, and small flowerheads 1.5–3 cm across.

Key literature references:

Anonymous, 2016. *Leucanthemum vulgare*. Weeds of Australia—Biosecurity Queensland Edition Fact Sheet, Identic Pty Ltd.

Mangold, J., Sheley, R. & Brown, M. 2009. *Oxeye daisy: Identification, Biology and Integrated Management*. Montana State University, Montguide, MT200002AG, revised 8/09.

McConnachie, A.J., Peach, E., Turner, P.J., Stutz, S., Schaffner, U. & Simmons, A. 2015. The invasive weed ox-eye daisy, *Leucanthemum vulgare* Lam. (Asteraceae): Prospects for its management in New South Wales. *Plant Protection Quarterly* Vol 30(3): 103–109.



Blueberry ash (*Elaeocarpus angustifolius*) control at Westfalia Estate, Modjajiskloof, Limpopo Province

Dr H.G. Zimmermann, consultant, zimmermannhelmuth@gmail.com

When Dr. Hans Merensky purchased Westfalia farm in 1930 he noticed the meagre streamflow caused by *Eucalyptus* plantings in the catchment area. He removed the *Eucalyptus* trees and replaced them with indigenous trees and also blueberry ash and camphor, both of which have now become invasive on Westfalia. Dr Merensky was also the first person to measure streamflow increases after *Eucalyptus* removals.

Information on the blueberry ash tree and its invasive potential was published in SAPIA News (no. 46, Oct. 2017). The invasions of blueberry ash were also brought to the attention of the Early Detection and Rapid Response Programme (now Directorate Biological Invasions) of SANBI who did a weed risk assessment on blueberry ash which, surprisingly, gave a zero value of non-invasiveness. Invasiveness of blueberry ash on Westfalia Estate however, is indisputable and the managers of Westfalia decided on a control/eradication programme. The trees are cut near ground level and the stumps are treated with a picloram/triclopyr mixture which provides satisfactory control. Cleared areas are rehabilitated with the establishment of indigenous trees. Follow-up treatment of seedlings and regrowth is an important component of the control programme.

Captions to photos.

1. Large blueberry ash trees with prominent buttresses growing in the small valley alongside a small stream at Westfalia Estate.
2. Invasion of blueberry ash several hundred metres downstream from the original planting site.
3. Control of blueberry ash at the original planting site showing the large size of the trees. The wood is soft and of no commercial value. Andre Lutge of Westfalia Estate is in charge of the control programme.



Pompom weed (*Campuloclinium macrocephalum*): update on biological control

Liamé van der Westhuizen, ARC-Plant Health and Protection, Project Manager for the biological control of pompom weed

Each summer, invasion by pompom weed turns our grasslands from green to a conspicuous pink (**Photo 1**, Rietvlei Nature Reserve). Despite chemical control attempts since the late 1990s, the weed has continued to expand its range, affecting biological diversity in grasslands, savannas and wetlands.

Biocontrol research towards a more sustainable and environmentally friendly management option was made possible through generous funding from the Department of Environmental Affairs: Natural Resources Management Programmes (DEA: NRMP).

According to Dr Alana den Breeyen, a plant pathologist from ARC Vredenburg, the rust fungus, *Puccinia eupatorii* (**Photos 2 & 3**), already present in the country, was found to be host specific and the overall percentage of infected plants increase from <1% at the start of the season, to 100% at flowering time. Release strategies are currently being investigated to determine if augmentation of the rust fungus in the field would improve its impact.

In addition to the rust fungus, a flower- and stem-galling thrips (*Liothrips tractabilis*) (**Photo 4**), as well as a flower-feeding moth (*Cochylis campuloclinium*) were evaluated in quarantine and found to be host specific and cleared for release. The thrips was released in 2013 and is currently being evaluated in the field, together with the rust fungus (*Puccinia eupatorii*). Current permitting issues in the source country of the biocontrol agents have prevented the further import of the cochylis moth, so the release will be delayed until we can obtain new cultures.

From the first release of the thrips in 2013 to date, an estimated 500 000 adults and nymphs were released in the field throughout the distribution range of the weed. The majority of releases were made in Gauteng Province followed by North West, Mpumalanga and Limpopo.

The thrips is a very valuable agent. By moving underground during autumn-early winter, when pompom weed dies back, the thrips escapes frost and fires. It maintains its populations throughout winter and in early summer moves back to the soil surface to start feeding on the pompom regrowth. As the thrips prefer, and establish better on soft new growth, biocontrol efforts should be targeting infestations during the two to three month period of active growth, before plants mature.



1

Photo: Lesley Henderson



2

Photo: Stefan Nesper

The rust fungus, seen as brown spots (**Photo 2**), causes yellowing of leaves and stems, characteristically starting at ground level. Plants die back to the rootstock but this is usually followed by regrowth (**Photo 3**). Seedlings are killed by the fungus.



3

Photo: Lesley Henderson



4

Adults and nymphs of the thrips (Photo: AJ McConnachie)

Pompom weed (*Campuloclinium macrocephalum*): update on biological control

Limiting factors for the thrips

Where established, the thrips can be found on 25–80% of pompom plants, resulting in a significant reduction in plant productivity. Once established, stem and flower deformities will be noticeable, followed by a systematic reduction in plant height and the number of flowering stems until finally pompom leaves are reduced to gall-like structures with no flowers, at which point surrounding vegetation will be able to regain some of its competitive ability. This continuum is likely to occur over a number of seasons, or it may never be reached as numerous abiotic and biotic factors are at play.

Field observations made at various release sites including Rietvlei Nature Reserve, suggests that soil type (wetland areas vs. well drained sandy soils), light conditions (depending upon the density of vegetation in the area) as well as plant phenology at the time of release may be hampering the establishment of the agent. The thrips does not do well in densely vegetated wetland areas and prefers areas with less dense vegetation on well drained sandy soils. We have observed that once established in a suitable area, the thrips population then needs to reach a critical mass before dispersing over longer distances to surrounding pompom populations. This was confirmed in the field during a recent visit to Mpumalanga where thrips were found on single plants scattered along the road, 4 km away from where the initial release was made five years ago.

Private landowners can help biocontrol

Although most releases have been made in conservation areas and conservancies, numerous private landowners have received thrips consignments from ARC-PHP with many confirming establishment. Eventually these landowners will be able to harvest and redistribute the thrips on their own property, as well as to neighbouring properties.

Early detection and eradication

Buy-in from funders, local municipalities, and conservation organizations will be particularly important in provinces where pompom infestations occur in isolated pockets. Here, eradication is still possible through the deployment of early detection and rapid response teams.



5

Photo: Liamé van der Westhuizen

The thrips feed mainly on new growth (sepals and stems), causing deformed flowers (Photo 5) and stems (Photo 6).



6

Photo: Anthony King



ARC-PHP, WEEDS RESEARCH DIVISION

The Weeds Research Division of the ARC-Plant Health and Protection (PHP) is responsible for research on the ecology and control of invasive alien plants in South Africa.

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Recent articles featuring biological control in *Plant Protection News* 111 and 112:

- Den Breeyen, A. 2018. *Puccinia lantanae*, lantana blister rust fungus, arrives in South Africa. *Plant Protection News* No. 111, 6.
- Mawela, K. & Simelane, D. 2018. Prospects for the establishment of two Mexican beetle species (*Zygogramma signatipennis* and *Z. piceicollis*) deployed for the biocontrol of orange-red sunflower (*Tithonia rotundifolia*) in South Africa. *Plant Protection News* No. 111, 8–9.
- Mawela, K. & Simelane, D. 2018. First biocontrol agent against the weedy Mexican sunflower (*Tithonia diversifolia*) released in South Africa. *Plant Protection News* No. 112, 1–2.
- Simelane, D. & Mawela, K. 2018. Emerging success of a seed-attacking weevil *Cissoanthonomus tuberculipennis* in controlling balloon vine (*Cardiospermum grandiflorum*) in South Africa. *Plant Protection News* No. 111, 11–12.
- Simelane, D. & Mawela, K. 2018. Lantana root-feeding flea beetle (*Longitarsus bethae*) is steady but sure. *Plant Protection News* No. 112, 7–8.
- Wood, A. 2018. The gall rust fungus on stinkbean (*Paraserianthes lophantha*) establishes in South Africa. *Plant Protection News* No. 112, 9.