

## Mini data sheet on *Arctotheca calendula* (Asteraceae)

**Added in 2014 - Deleted in 2014**

**Reasons for deletion:**

*Arctotheca calendula* was added to the EPPO Alert List in 2014 and according to the conclusions of the prioritization process assessment it was transferred to the EPPO List of Invasive Alien Plants in 2014.

### Why

*Arctotheca calendula* (Asteraceae) is an annual or perennial plant native to South Africa. One of its common names is 'Cape Weed'. The species has been introduced in the USA and in Australia where it is listed as invasive, as well as in Japan, and New Zealand. The species is present in seven countries in the EPPO region and due to its invasive behaviour and potential economic impact, the EPPO Panel on Invasive Alien Plants suggested its inclusion in the EPPO Alert list.

### Geographical distribution

**EPPO region:** France (including Corsica), Israel, Italy (including Sardinia and Sicily), Morocco, Portugal (including Azores), Spain (including Canarias), Tunisia.

**North America:** USA (California).

**South America:** Argentina, Chile.

**Africa (native):** Lesotho, South Africa.

**Asia:** Japan.

**Oceania:** Australia (Northern Territory, New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia), New Zealand.

*Note:* in Sardinia, *A. calendula* is recorded in a campsite in the Lipari Islands. In France, the species is recorded in campsites in the Landes and in the Pyrénées Atlantiques departments as well as in Corsica. In Belgium, the species has been observed as casual and was introduced as seeds in wool. The species is also reported as casual in the Czech Republic, Kriti (Greece), Sweden and the United Kingdom.

### Morphology

*A. calendula* is a rosette-forming annual or perennial that can grow up to 80 cm wide and 30 cm high. It has purple or yellow daisy-like composite flowers that can reach 6 cm in diameter, its petal-like ray florets are yellow above and grey-green below. The plant is characterized by its deeply lobed basal leaves that are white and downy underneath and are 5-25 cm long, 2-6 cm wide, on a stalk up to 6 cm long. The upper surface of leaves can be hairless to hairy. If any upper leaves are present, they are generally amplexicaul. The area where seeds attach to the head (receptacle) is pitted. Seeds are covered in pale brown wool and topped by 6-8 short scales.

### Biology and ecology

The biology of *A. calendula* is poorly understood. Plants develop into rosettes, then flower in late spring and early summer. The plant is pollinated primarily by butterflies. A sterile, vegetatively reproducing yellow-flowered type also exists. This is considered by some experts to be a separate species, and it is noted to spread via creeping stolons. The sexually reproducing *A. calendula* can spread rapidly by seeds (up to 4300 seeds are produced per plant), typically colonizing open or disturbed sites with exposed soil.

Plants tolerate drought but are damaged by frosts a few degrees below freezing and are killed by colder temperatures. The plant is reported to prefer sunny areas and sandy, well-drained soil. Dormancy allows seeds to escape the effects of control measures and provides a mechanism for prolonged seed survival in soil.

### In which habitats

*A. calendula* is usually found infesting disturbed, agricultural land, urban, roadsides, stream banks, heavily grazed pastures, sand dunes and coastal areas, but has also been found in Sardinia as a weed of natural grasslands and cultivated forage crops since 1998.

According to the CORINE land cover classification, the following habitats are suitable for the plant: arable land; pastures; natural grassland; deserts (sparsely vegetated areas); banks of continental water; riverbanks/canalsides (dry river beds); road and rail networks and associated land; other artificial surfaces (wastelands); green urban areas, including parks, gardens, sport and leisure facilities.

### Pathways

The plant is known to be used as groundcover and may also be used as an ornamental or medicinal plant. In Australia, the plant was introduced from South Africa, probably as a contaminant of packing material, stock fodder and sheep fleeces. *A. calendula* was introduced into Europe in the middle of the 19th century. In Europe, it is thought to have been accidentally imported as a contaminant of Leguminosae of non-European origin, in particular from Australia. Likely pathways of entry also include contaminated seed and grain. The plant is currently spreading around the Mediterranean area as a contaminant of seed, of machinery, of soil, and via movement of livestock and humans, in particular of campers. In addition, *A. calendula* is naturally spread by wind and water.

### Impacts

*A. calendula* is a weed of cereals, oil seed rape and legumes in Australia; it has been estimated to cost 9.7 million AUD per annum in yield losses in annual winter crops including wheat, oats, barley, oil seed rape, and pulses, not counting pre and post emergent control costs. The species also dominates pastures in Australia and reduces the value of stock by lowering their weight.

The plant also has impacts on animal health. Seeds of the plant may be embedded in light wool which when ingested by animal can be fatal. Grazing is thought to taint milk, and where *A. calendula* is the dominant feed, nitrate poisoning of stock is possible. *A. calendula* accumulates cadmium (which occurs as a contaminant in phosphate fertilizers), which has an adverse effect on animal production and pasture production.

Ecological impacts of *A. calendula* have been reported. In California, it is reported to be an aggressive competitor for water and space and to seriously threaten native plant communities by crowding out grasses, herbs and small shrubs, in particular in coastal grasslands and riparian zones. In such habitats, the plant has been observed to form impenetrable monospecific stands. On the other hand, in Western Australia, the plant seems to be a relatively poor competitor with native species, but if established, it can have a moderate impact on native plant communities.

Impacts on humans have been reported, as *A. calendula* can cause hay fever and dermatitis.

### Control

As *A. calendula* has been considered to be an agricultural weed for some time in Australia, agricultural methods have been developed to manage it in cultivated fields, such as using crops tolerant to herbicides (essentially triazine, imidazolinone and glyphosate), traditional weed-control techniques (inversion plowing, delayed sowing, fallow and pre-sowing cultivation) and selective herbicides (clopyralid, MCPA or 2,4-D depending on the pasture type). In Australia, *A. calendula* is reported to be resistant to diquat and paraquat.

Manual removal may be appropriate for small infestations. Application of a polyethylene film has proven to exhaust stored food reserves of the plant and to kill 99% of covered plants when applied for a minimum period of one and a half years. Mechanical methods can also be used, e.g. removal of the soil surface with a tractor, but needs to be followed by surveillance and manual removal of all regrowth.

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