

# Stinkwort

*Dittrichia graveolens*



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## Summary

Stinkwort (*Dittrichia graveolens*) is a poisonous, strongly aromatic, annual plant growing 20–50 cm tall. It is native to the Mediterranean region. Touching the plant can cause dermatitis, itching and blistering skin. If consumed by livestock, the seeds of this plant can cause enteritis, leading to pulpy kidney disease and sudden death (if untreated). Stinkwort grows rapidly from a rosette in late summer and produces about 15 000 seeds per plant. Seeds are dispersed by wind, water, agricultural produce, machinery, vehicles and wool.

Climatically, stinkwort is adapted to a temperate, 'Mediterranean-type' climate with an annual rainfall of 300–800 mm, falling predominantly in winter. While it can persist in warmer, subhumid areas, this climate zone appears very marginal. Within suitable climate zones, preferred habitats include virtually any open, disturbed sites, such as overgrazed pastures, roadsides and vacant lots, mainly on sandy or otherwise light-textured soils. It typically colonises bare sites where there is poor competition from other plants.

Stinkwort is listed as a significant weed in many temperate regions of the world. It is a pest of cereal crops in South Africa, a common weed in New Zealand and a declared (noxious) pest in California. In Australia, it is a declared (noxious) weed in Victoria. It was first imported into Australia in the 1860s and is now widespread in all southern states. In Queensland, Stinkwort is currently restricted to the Stanthorpe district. This could be a consequence of the species' preference for a cool climate, or an eradication program over the past 25 years. While isolated specimens continue to be found in the Stanthorpe district, ongoing surveillance and control could prevent this species from developing into a significant problem in upland areas around Stanthorpe, Warwick and Toowoomba.

## Identity and taxonomy

**Species:** *Dittrichia graveolens* (L.) Greuter

**Family:** Asteraceae

**Synonyms:** *Erigeron graveolens*, *Inula graveolens* (L.) Desf., *Solidago graveolens* (L.) Lam., *Paniopsis graveolens* Raf., *Cupularia graveolens* (L.), *Pulicaria graveolens* (L.)

**Common names:** Stinkwort, stinkweed, camphor inula

**Identity:** The *Asteraceae* family has about 1600 genera and 23 000 species (Royal Botanical Gardens, n.d.). The genus *Dittrichia* has five species (Brullo & de Marco 2000). They have a Mediterranean distribution, extending into the Atlantic European territories and into the Middle East. In the past, taxa belonging to the genus *Dittrichia* were also included in other genera, such as *Erigeron*, *Solidago*, *Inula* and *Pulicaria* (Brullo & de Marco 2000).

## Description

Stinkwort is an erect, annual herb, growing 20–50 cm tall (Parsons & Cuthbertson 1992). The whole plant is sticky to touch, covered in white hairs and strongly aromatic with a camphor-like smell. Young plants form a rosette.

Lower leaves are 20–75 mm × 2–13 mm, lanceolate to oblong-lanceolate, entire or remotely minute toothed; upper parts stalkless, almost clasping the stem (Herbarium RNG). Flowering heads are small, sessile or peduncles to 5 mm long; heads 5–7 mm diameter, outer bracts lanceolate, entire, 2–4 mm long, herbaceous with scarious margins, inner bracts narrow-lanceolate to linear, longer, scarious margin wider. Florets are yellow to reddish (Figure 4); ray florets 10–12, with ligule erect, 3-toothed, 4–7 mm long, disc florets 9–14 (PlantNet). Seeds are about 2 mm long and have a hairy pappus (3–4 mm long), each with about 30 bristles (Herbarium RNG).

## Reproduction and dispersal

Stinkwort reproduces from seeds. Seeds are dispersed by wind, water, agricultural produce, machinery, vehicles and wool (Parsons & Cuthbertson 1992). Wind can carry seeds over 200 m. The seed's pappus readily adheres to clothing, shoes and equipment.

The plant flowers in autumn (around March) and produces large amount of seeds (about 15 000 seeds per plant). Flowering generally follows a period of rapid growth from a rosette in late summer (Parsons & Cuthbertson 1992). Under harsh conditions, specimens are capable of flowering when only 2 cm tall.

Seeds last no more than three years and germinate in spring (Parsons & Cuthbertson 1992).

## Origin and worldwide distribution

The native range of stinkwort is:

### Africa

**Northern Africa:** Algeria; Morocco; Tunisia

### Asia—temperate

**Western Asia:** Afghanistan; Iran; Israel; Lebanon; Syria; Turkey

### Asia—tropical

**Indian subcontinent:** Pakistan

## Europe

**South-eastern Europe:** Albania; Bulgaria; Greece [incl. Crete]; Italy [incl. Sardinia, Sicily]; Yugoslavia

**South-western Europe:** France [incl. Corsica]; Portugal; Spain [incl. Balears] (GRIN 2008).

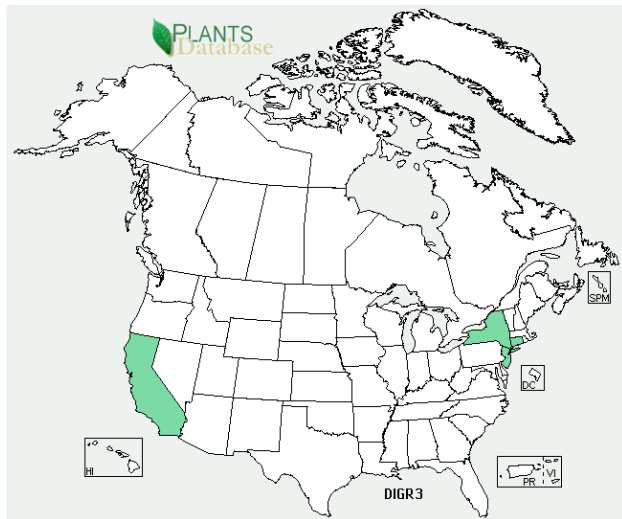
Stinkwort is widespread in the Mediterranean region, extending marginally into the western Atlantic-European coast and Middle East (Iran, Iraq, Afghanistan, north-west India) (Brullo & de Marco 2000).

It has naturalised in many temperate parts of the world, including South Africa, Australia, New Zealand and California (Parsons & Cuthbertson 1992). It is also found in disturbed sites in England, Germany, Austria and the Netherlands (Nesom 2004; Victorian DPI 2008) (Figure 1).



**Figure 1.** Countries where stinkwort has been recorded (Zipcodezoo 2008).

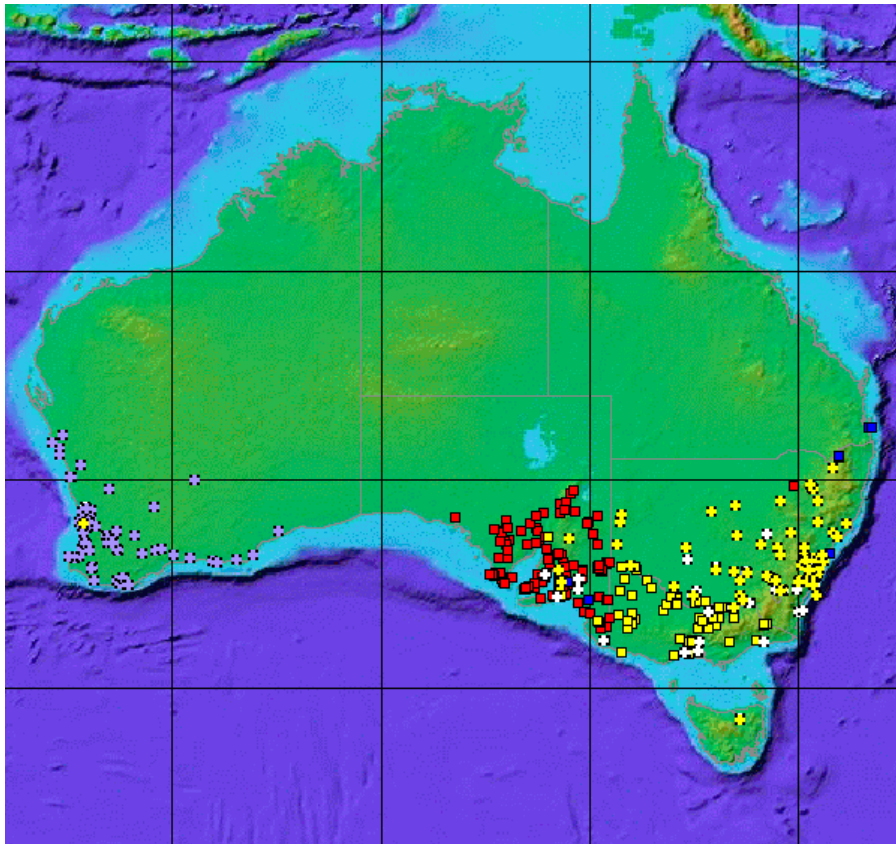
Stinkwort was first detected in California in 1984 along a levee/railroad track. Since then, it spread rapidly along roadsides, bay-land levees, manipulated riparian areas, vacant lots, overgrazed pastures, and non-native grasslands from Santa Clara, Alameda, and Contra Costa counties to surrounding counties (Hrusa *et al.* 2002). Its distribution in the United States is provided in Figure 2.



**Figure 2.** Distribution of stinkwort in the United States (USDA 2008).

In New Zealand, stinkwort was first noticed in Auckland in 1974. It became abundant at the Mt Wellington quarries, and then almost disappeared in the next year or so. Now it is common along railway lines in every suburb of Mt Wellington (Esler 1988).

Stinkwort was imported into Australia in the 1860s and is now widespread across southern Australia (all states except the Northern Territory) (Parsons & Cuthbertson 1992; Richardson *et al.* 2006) (Figure 3).



**Figure 3.** Distribution of stinkwort in Australia (AVH 2008).

There are only two herbarium records of this species in Queensland, both from south-east Queensland (AVH 2008). The first is a site near Hamilton Wharf (Brisbane) where two plants were found in 1990 and removed. No plants have been found at this site since. The second comprises very small numbers of scattered plants in the Stanthorpe district (along Wyberba Road, an old main roads campsite on a road from Stanthorpe to Wallangarra, a gravel dump near Fletcher and on a roadside 4–5 km outside the town of Wallangarra). This area is the coolest part of Queensland. This population has been subject to eradication efforts for more than 25 years.

## Preferred habitat

Stinkwort is a nitrophilous species, generally associated with disturbed, open (unshaded) habitats, such as cultivated land, abandoned fields, roadsides, ruderal places, overgrazed pastures and other open (cleared) habitats. In the United States, all collection sites for this species are considered ‘disturbed’, ‘ruderal’, rangeland, tidal or riparian (USDA 2005).

Similarly, it occurs over broad areas of grazing land and on roadsides and neglected areas across southern Australia (Parsons & Cuthbertson 1992). It can extend into open woodland and grasslands, especially areas that are grazed, as well as cereal crops. In Victoria, it has been recorded to invade dry, coastal vegetation, mallee shrubland, lowland grassland, grassy woodland and dry sclerophyll forest and woodland (Carr *et al.* 1992). In Tasmania, it is an occasional roadside weed (e.g. in the Tamar Valley). In the ACT, it has been recorded in the Tidbinbilla Nature Reserve. Some authors comment that it seems to prefer low-lying depressions and winter-flooded areas (Parsons & Cuthbertson 1992; Herbiguide n.d.).

## Preferred climate

Climatically, stinkwort is adapted to a temperate, ‘Mediterranean-type’ climate with an annual rainfall of 300–800 mm, falling predominantly in winter. While it can persist in warmer, subhumid, subtropical areas, this climate zone appears marginal.

## Preferred soil types

Preferred soil types include sandy and other light-textured soils.

Stinkwort can grow on mine-spoil contaminated with heavy metals and can bio-accumulate mercury, zinc and nickel (Danish EPA 2000; Higuera 2003).

## Use

The aerial parts (leaves, stems etc.) are used as an external application to treat lice in chickens. This species is well known for its essential oils, but its pharmacology is largely under-utilised (Pieroni *et al.* 2006).



## History as a weed elsewhere

Stinkwort is listed as a weed in many regions of the world, including South Africa, New Zealand, California and parts of its native range (Randall 2002; Parsons & Cuthbertson 1992). It is troublesome in cereal cropping areas of Cape Province, South Africa (Parsons & Cuthbertson 1992). In California, it has been declared as a statewide invasive weed (moderate—ALERT) by the California Invasive Plant Council (Cal-IPC). In Australia, it is a declared (noxious) weed in Victoria (Weeds Australia 2007). In 1890, the plant was recognised as the worst weed of cereal crops in South Australia (Parsons & Cuthbertson 1992). The plant is on a list of potential environmental weeds in Western Australia (NatureBase 2008).

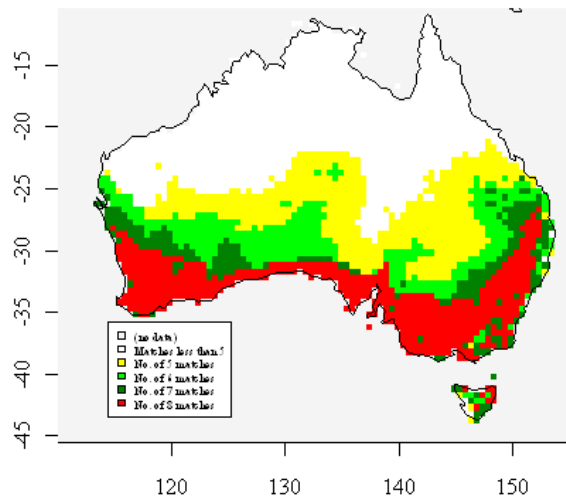
## Impact

Stinkwort can cause health problems in humans and animals (Everist 1974; Parsons & Cuthbertson 1992). Oil on its leaves and stems causes contact-dermatitis, resulting in itching and blistering skin. Stock that eat the flower-heads can develop enteritis (inflammation of the small intestine) since the seed pappus irritates and punctures the lining of the small intestine, eventually leading to pulpy kidney disease and sudden death, if untreated (Philbey & Morton 2000). If consumed, it can taint milk and meat. However, grazing animals generally avoid the plant, perhaps due to its strong smell. According to Herbiguide (n.d.), stinkwort in pastures is generally ‘associated with low phosphate status or poor pasture growth. Seedlings are very sensitive to competition and usually only establish in relatively bare areas’. Similarly, Parsons & Cuthbertson (1992) noted that ‘the presence of stinkwort in pastures often indicates overgrazing.’

## Pest potential in Queensland

Stinkwort has a well-documented history as a significant weed in many temperate areas of the world, especially South Africa, California and Victoria. As such, it is reasonable to predict that it has the potential to become a pest in comparable habitats and climate zones within Queensland.

In order to predict which areas of Queensland are at risk of invasion, this study reviewed available information on the species’ native range and the climatic parameters that appear to define its global distribution. Climatically, stinkwort is adapted to a temperate, ‘Mediterranean-type’ climate with an annual rainfall of 300–800 mm, falling predominantly in winter. While it can persist in warmer, subhumid, subtropical areas, this climate zone appears marginal. Hence, this study predicts that stinkwort is suited only to a small part of the state, namely the cooler, upland areas from around Stanthorpe/Warwick north to Toowoomba. Much of subcoastal and inland southern Queensland may be too hot and wet in summer for this species to persist. A prediction of this species’ potential distribution is provided in Figure 4.



**Figure 4.** Potential range of stinkwort in Australia, as predicted by CLIMATE modelling software (red areas indicate suitable climate, green areas are marginally suitable, yellow and white are unsuitable).

Within warm temperate areas, habitat types most at risk include virtually any open (unshaded), disturbed habitats, such as pastures (grazing land), roadsides and other cleared, neglected areas, especially where the ground is fairly bare. While this species might invade remnant native grasslands and open woodland, its impact is predicted to be minor, unless such areas have a naturally sparse ground cover, or have been subject to heavy grazing. Within such habitat types, only sandy and other light-textured soil types are considered at risk. This species is not predicted to persist in hot, tropical areas or humid subtropical areas (summer rainfall). Similarly, this species is not expected to persist wherever there is good ground cover (e.g. dense pasture).

If allowed to spread and reach its full bio-climatic range in upland south-east Queensland, stinkwort is predicted to cause injury to sheep, contact-dermatitis in susceptible people and perhaps contaminate cereal crops. While it can invade weak (sparse) pastures, it is not predicted to pose a threat to well-managed pastures.

## Related species

*D. viscosa* (false yellowhead): native to Mediterranean region; an erect, perennial shrub, 1–1.5 m tall. Young stems and leaves are covered with glandular hairs which exude sticky, foul-smelling oil. The oil can cause allergic reactions. Leaves are greyish-green and elliptical, 25–100 mm long and 8–30 mm wide, partially clasping stem. Daisy-like yellow flowers, 10–20 mm across, with radiating petal-like florets. Flowers are surrounded by narrow, triangular, sticky bracts (modified leaves) 3–9 mm long. Seeds about 2 mm long, with about 15–25 bristles at the base.

The plant produces large numbers of seeds and has spread rapidly along roadsides and walking trails in south-western Western Australia. It favours disturbed habitats, particularly following bushfires. The plant is a threat in the higher rainfall regions of southern Australia. *D. viscosa* is toxic to stock and can cause contact-dermatitis in some people. It is on the 'Alert List' of environmental weeds (Weed CRC). It grows during summer and autumn (Brullo and de Marco 2000).

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