

# Weed risk assessment



## Telegraph weed

*Heterotheca grandiflora*

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Front cover: *Heterotheca grandiflora* on South Stradbroke Island prior to control.

Photo: Steve Csurhes.

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# Summary

*Heterotheca grandiflora* ('telegraph weed') is an annual or short-lived perennial plant generally growing to a height of 50–100 cm. It produces yellow, daisy-like flowers, followed by masses of seeds that can be dispersed by animals or the wind.

The native range of *H. grandiflora* extends along the west coast of North America, from California south to Mexico. Naturalised populations exist in Hawaii, Japan and a small area near Newcastle in New South Wales.

The only population of *H. grandiflora* in Queensland is scattered over 200–300 hectares at the northern end of the Gold Coast, extending to South Stradbroke Island. To prevent further spread, this population has been the target of control efforts for the past three years.

*H. grandiflora* is a quick-growing opportunistic coloniser that is well adapted to open, dry, sandy sites in sub-tropical and warm temperate areas. If allowed to spread, it has the potential to form dense stands covering bare areas of sand along south-east Queensland's coastline. Areas of naturally sparse frontal dune vegetation are considered to be at risk of invasion, including extensive areas on South and North Stradbroke Islands, Moreton Island, the Sunshine Coast and Fraser Island.

*Important note: please send any additional information, or advice on errors, to the authors.*

# Introduction

## Taxonomy

- Species:** *Heterotheca grandiflora* Nutt
- Synonyms:** *Heterotheca floribunda* Benth. (Genus reviewed by Semple, 1996)
- Common names:** Telegraph weed, stink daisy (local name on South Stradbroke Island), goldenaster (California)
- Family:** Asteraceae
- Related species:** The *Heterotheca* genus contains about 30 species (Semple, 1987).

## Description

An erect herb, generally 50–100 cm tall, but up to 2 m tall. Annual to short-lived perennial (Semple, 1993; Hickman, 1993). Generally single-stemmed, but sometimes branched from the base. Stems and leaves covered in fine, white sticky hairs, giving a slightly dull green, lustrous appearance. Leaves are alternate; ovate to elliptical, irregularly and coarsely toothed; lower leaves petioled, basal lobes ear-like, clasping; middle leaves densely appressed-hairy, lanceolate; upper leaves sessile, ascending, less hairy and more glandular upward (Semple, 1993; Hickman, 1993). Flower heads with hairy bracts, flowers yellow and arranged in terminal clusters (Auld and Medd, 1987). Inflorescence panicle-like, densely glandular; involucre 6–9 mm; phyllaries in 4–6 series. Ray flowers 25–40; ligules yellow, 5–8 mm. Disk flowers yellow, 30–75; corollas 4–6 mm; style branches finely papillate, appendage narrowly triangular; fruit 2–5 mm, outer pappus 0.2–0.7 mm, inner 3–5 mm; chromosomes  $2n = 18$  (Semple, 1993; Hickman, 1993). Leaves emit a characteristic odour when crushed (hence, the local name of ‘stink daisy’). Produces masses of seeds, each with hairy pappus.

## Phenology

After flowering in summer one year, the plant dies back to the base, re-sprouts and flowers again the following spring. In Queensland, peak seed production appears to be in late summer and autumn. In California, plants flower from summer until times of frost.

## Dispersal and seed longevity

The seeds of *H. grandiflora* are primarily dispersed by the wind. Aided by a fine pappus, each seed is readily carried 5–10 m in a light breeze and probably much further in a strong wind. Secondary dispersal vectors include animals and people, since the pappus adheres to fur and socks.

Machinery has been blamed for dispersal of seeds into Queensland from New South Wales, since some of the first plants detected on the Gold Coast appeared at a site where a new sewerage pipeline had just been laid. However, movement of seeds adhering to the clothing of tourists is equally likely and it is possible that existing *H. grandiflora* simply colonised the area of sand that had been disturbed by machinery.

This study was unable to find any information on seed longevity in the literature.

# Distribution

## Queensland

The only known infestations of *H. grandiflora* in Queensland occur at the northern end of the Gold Coast (including Wave-break Island and on the mainland at Paradise Point and Labrador) and on nearby South Stradbroke Island. The total area infested is estimated at some 200–300 ha. Prior to a successful control program over the last three years, the most extensive infestations previously existed along about 5000 m of frontal dunes running north-south along the southern end of South Stradbroke Island. Within this area, there used to be some pure stands of *H. grandiflora* (Figure 1). Other heavily infested sites on this island were near Couran Cove and near Tipplers (B. Whyte pers. comm., 2004). Currently, the species exists only as isolated specimens scattered across its former range.



Figure 1. Open frontal dune on South Stradbroke Island that had been colonised by *Heterotheca grandiflora* (all the yellow-flowered plants and the dead, brown-coloured vegetation is *H. grandiflora*). Photo taken in May 2004 just prior to successful control (Photo: Steve Csurhes). This figure can be compared with Figure 4, which shows a nearby area that had not yet been invaded.

## Other states of Australia

*H. grandiflora* is naturalised near Newcastle in New South Wales (Hnatiuk, 1990; Csurhes and Edwards, 1998). There are no other records of *H. grandiflora* elsewhere in Australia.

## Origin and worldwide distribution

*H. grandiflora* is native to an area of North America—from southern California south into north-west Mexico (Semple, 1993; Cronquist et al. 1994; GRIN, 2004; USDA, 2004) (Figures 2 and 3). It is naturalised in Arizona, Utah and Hawaii (Semple, 1993). The majority of specimens held by the Missouri Botanic Gardens are from California; however, a single specimen was collected from the Mohave Desert in Arizona (altitude 2797 feet), presumably a naturalised specimen.



Figure 2. Herbaria records of *Heterotheca grandiflora* in North America (source: Missouri Botanic Gardens w3 TROPICOS database).



Figure 3. Distribution of *Heterotheca grandiflora* in North America (source: Southwest School of Botanical Medicine. [www.swsbm.com](http://www.swsbm.com)).

# Preferred habitat and climate

In North America, *H. grandiflora* grows naturally in open, disturbed sites with dry sandy soils (Semple, 1993; Hickman, 1993). Habitats include dry streams and coastal valleys (sandy alluvial deposits), dry coastal ranges, roadsides and sand dunes of California and north-west Mexico, generally with an elevation of less than 300 m (Munz and Keck, 1959; Semple, 1993; Cronquist et al. 1994).

Semple (1993) lists the species as 'uncommon' within the following bioregions of California:

- north-western California
- Sierra Nevada foothills
- Techachapi Mountain area
- Great Central Valley
- central-western California
- desert bioregions.

The CalFlora database (CalFlora, 2004) lists the following plant communities that contain *H. grandiflora*:

- sagebrush scrub
- southern oak woodland
- foothill woodland.

Although generally described as a temperate climate, the climate within the species' native range can be seasonally very dry and hot. The fact that *H. grandiflora* has naturalised in Arizona, Nevada, Utah and old lava flows and sand dunes of Hawaii suggests that it is well adapted for survival in arid, sandy or otherwise well-drained soils in temperate and sub-tropical areas, including deserts.

In south-east Queensland, *H. grandiflora* has invaded disturbed and otherwise open coastal sand dunes where plant cover is absent or sparse (Figure 4). This habitat is typically harsh, with plants subject to wind-blown sand, salt spray and seasonally dry and hot conditions, perhaps comparable to many of its preferred habitats in California.

*H. grandiflora* is absent or rare in dune vegetation where native tree and shrub cover is taller and produces shade over the sand surface for most of the day. In May 2004, data were collected from six random transects each running for 50 m from shaded areas out onto open areas of frontal dunes at two locations on South Stradbroke Island: at Couran Cove, a cleared housing development on the western side of the island, and an area of frontal dunes near Currigee. Plant abundance and approximate percentage shade were recorded at one metre intervals along each transect. Mean abundance per square metre was plotted against percentage shade (Figure 5). At both sites, there was a clear correlation between abundance of *H. grandiflora* and percentage shade, with maximum abundance on sites with full sun (Figure 5).



Figure 4. Open frontal dune complex on South Stradbroke Island: typical habitat type at risk of invasion by *Heterotheca grandiflora* on South Stradbroke Island (Photo: Steve Csurhes).

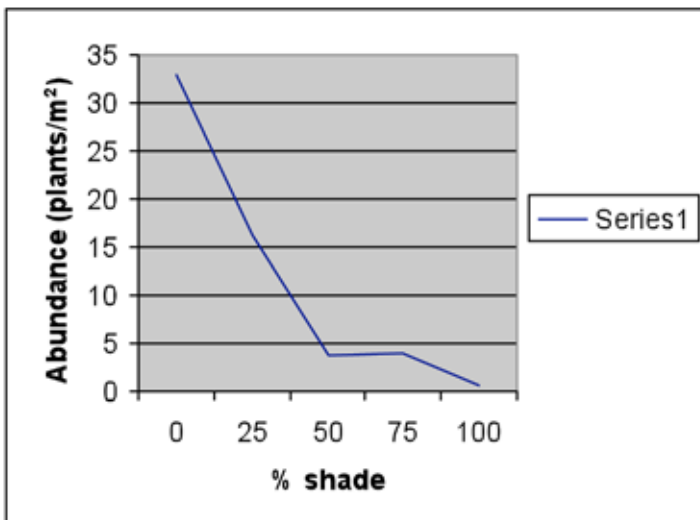


Figure 5. Relationship between percentage shade (recorded on sand surface at mid-day) and the abundance of *Heterotheca grandiflora* on South Stradbroke Island, Queensland.

# Status as a weed

## Overseas

In North America, *H. grandiflora* has spread outside its native range and become naturalised in Arizona and Utah (Semple, 1993; GRIN, 2004; USDA, 2004). It has also spread to Hawaii (Holm et al. 1979) and Japan (RIB, 2001). In Hawaii, it colonises bare areas such as old lava flows as well as sandy areas on the coast. This study was unable to find any documented evidence that *H. grandiflora* has a significant impact overseas. There is no evidence that it replaces native vegetation or impacts on agriculture.

A closely related congener, *H. subaxillaris* (Lam.) Britt and Risby (camphor weed), is listed as a weed in the USA (Holm et al. 1979; Whitson et al. 1991).

## Other states

*H. grandiflora* is a common weed of pastures, roadsides and wasteland in the lower Hunter Valley of New South Wales (Auld and Medd, 1987; Harden, 1992; Lazarides et al. 1997).

# Pest potential in Queensland

*Heterotheca grandiflora* has the potential to become a common weed of dry, open, sandy habitats throughout southern, central and western Queensland. Climatically, it is well adapted to warm temperate to sub-tropical climates. Habitats at risk of invasion include the frontal dunes of south-east Queensland's unique coastal sand islands, sandy river banks and perhaps even the sandy desert country of south-west Queensland. Climatically and edaphically, these areas are comparable to areas that support *H. grandiflora* in North America and Hawaii.

*H. grandiflora* is not predicted to replace native vegetation or to have a significant impact on agriculture. It appears to be 'ruderal weed', adapted to quickly colonise disturbed, open habitats.

Prior to a successful control campaign, *H. grandiflora* was spreading rapidly on South Stradbroke Island. From an initial population scattered over a few hectares adjacent to the Gold Coast Seaway in the 1990s, an estimated 200–300 ha became heavily infested by 2004. Recent control effort has suppressed the species' population. Without control, spread of seeds northward would be rapid, assisted by frequent strong southerly winds.

*H. grandiflora* poses a threat to open areas of coastal dunes but is unlikely to become abundant wherever trees and shrubs are dominant. Within suitable habitats, such as the open frontal dune complex and any other sandy areas where native tree and shrub cover has been removed, *H. grandiflora* has the potential to become a dominant component of existing vegetation, such as coastal pig-face (*Carpobrotus glaucescens*), coastal Spinifex (*Spinifex sericeus*) and beach bean (*Vigna marina*). Within the coastal dunes, *H. grandiflora* appears to have greater pest potential than other morphologically similar Asteracean weeds already widespread on the dunes (e.g. *Conyza albida*—tall fleabane) but is not as serious as bitou bush, since bitou bush can readily invade shaded areas as well as open areas of coastal dune ecosystems. Coastal dunes at risk of invasion by *H. grandiflora* are substantial in area since they stretch from Tweed Heads in the south, north through South and North Stradbroke Islands, Moreton Island, the Sunshine Coast, Fraser Island and may include sandy frontal dunes further north. Some of these areas have outstanding conservation and tourism values.

# Control

This species is readily controlled by herbicides.

In California, *H. grandiflora* is a host plant for Gabb's Checkerspot butterfly (Bryant, 2004), but it is difficult to predict whether this species could be a potential biocontrol agent for the plant in Australia.

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