# EPPO Datasheet: *Gymnocoronis spilanthoides*

Last updated: 2020-04-23

## IDENTITY

**Preferred name:** *Gymnocoronis spilanthoides*
**Authority:** (D. Don ex Hooker) de Candolle
**Taxonomic position:** Plantae: Magnoliophyta: Angiospermae: Campanulids: Asterales: Asteraceae: Asteroideae
**Other scientific names:** *Alomia spilanthoides* D. Don ex Hooker & Arnott, *Gymnocoronis attenuata* de Candolle, *Gymnocoronis spilanthoides var. attenuata* (de Candolle) Baker, *Gymnocoronis subcordata* de Candolle, *Piqueria attenuata* (de Candolle) Gardner, *Piqueria subcordata* (de Candolle) Gardner
**Common names:** Senegal tea, giant green hygro, spade-leaf plant, temple plant, water snowball (US)
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**EPPO Categorization:** A2 list
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**EU Categorization:** IAS of Union concern
**EPPO Code:** GYNSP

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## GEOGRAPHICAL DISTRIBUTION

### History of introduction and spread

*Gymnocoronis spilanthoides* has a native range within South America (Brazil, Argentina, Paraguay, Uruguay, Bolivia and Peru), mostly centred around Uruguay and Paraguay (King & Robinson, 1987) and is becoming an invasive alien species in several regions of the world. The species is problematic in Australia, New Zealand, Japan, China and Taiwan and has recently naturalized in Italy.

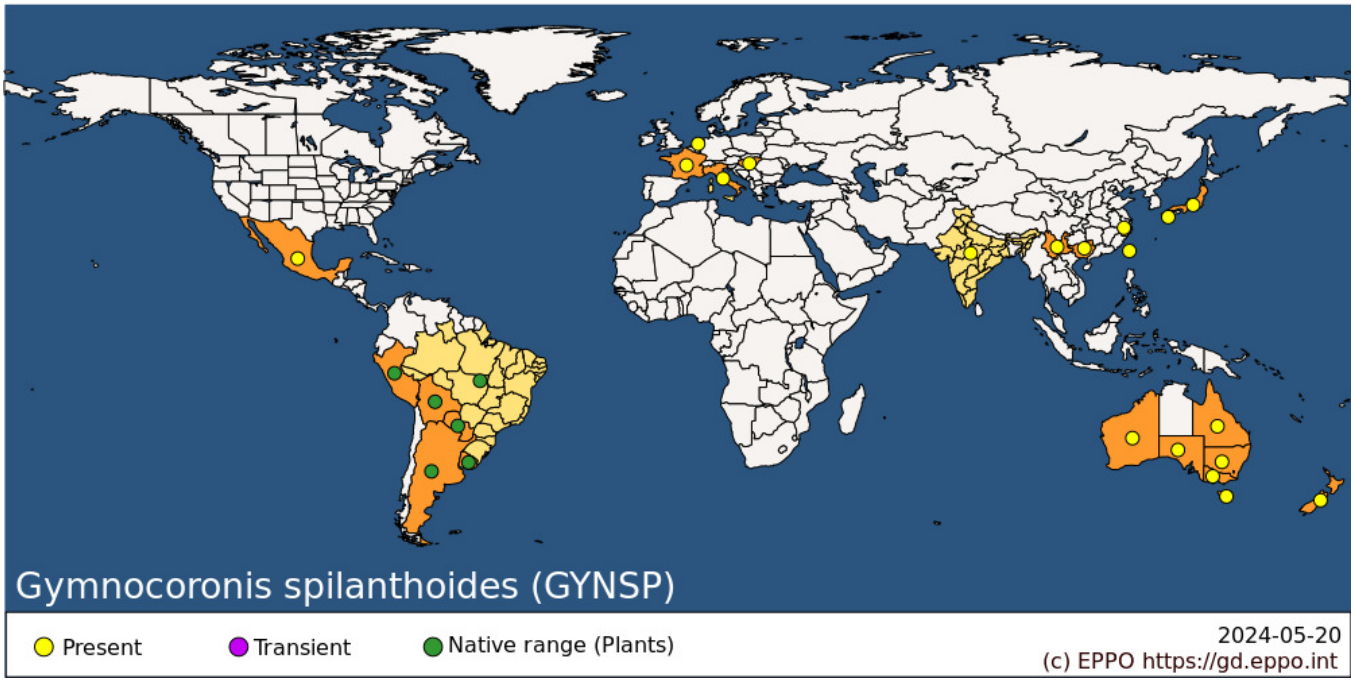
*G. spilanthoides* is cultivated in the USA but is not reported as naturalized there (Weed Science Society of America (WSSA), 2012). Records of this species from Central American countries probably refer to another species, *Gymnocoronis latifolia* (or up to four species depending on the taxonomy) (Turner, 1997).

The species was reported from India (reputedly the source of introduction to Australia through the aquarium trade) by Parsons & Cuthbertson (2001). There are relatively recent records of naturalization in Japan (in 1995), Taiwan (in 2001) and mainland China (in 2007) (Kodono, 2004; Wang *et al.*, 2010; Wu *et al.*, 2010). Kodono (2004) reports this species as rapidly naturalizing, occurring from Kyushu to central Japan.

*G. spilanthoides* was reported as casual in 1988 in Hungary, occurring in the thermal waters of Lake Héviz and ditches near Keszthely (Szabo, 2002; Lukacs *et al.*, 2016). Ardenghi *et al.* (2016) report two naturalized occurrences in north-western Italy (Lombardia region). The population in Italy stretches along the water body for 519 m, and occupies the whole canal width (1–4 m) (Ardenghi *et al.*, 2016). In the Netherlands, *G. spilanthoides* was first identified in an urban waterway in Vleuten in 2019 (EPPO Reporting Service, 2020).

*G. spilanthoides* was first reported as a naturalized species in Australia, reported from Taree in New South Wales (NSW) in 1980 (Parsons & Cuthbertson, 2001). It has since spread in NSW and also naturalized in the states of Victoria and Queensland. It has been eradicated from an ornamental pond site in Perth and Margaret River in Western Australia, the only known sites in that state (Hussey *et al.*, 2007). In New Zealand, *G. spilanthoides* was first recorded as naturalized on the Papakura Stream in South Auckland in 1990 (Timmins & Mackenzie, 1995) and has since been found through much of lowland North Island and two South Island sites, the furthest south being in Canterbury (43.4°S).

### Distribution




**EPPO Region:** France (mainland), Hungary, Italy (mainland), Netherlands
**Asia:** China (Guangxi, Yunnan, Zhejiang), India, Japan (Honshu, Kyushu), Taiwan
**North America:** Mexico
**South America:** Argentina, Bolivia, Brazil, Paraguay, Peru, Uruguay
**Oceania:** Australia (New South Wales, Queensland, South Australia, Tasmania, Victoria, Western Australia), New Zealand

## MORPHOLOGY

### Plant type

Emergent amphibious aquatic perennial herb.

### Description

*G. spilanthoides* is an emergent perennial herb, either forming upright bushes up to 1.5 m tall, tangled sprawling floating mats or occasionally fully submerged in shallow water. Plants reproduce by seed and vegetative fragmentation, with detached stems rooting at the nodes and thus forming new colonies. Stems are pale green (rarely reddish), either round or six- to eight-angled in cross section, erect or scrambling, up to 1.5 m long and 20 mm across, with hollow internodes, inflated and buoyant. Leaves lanceolate or ovate, opposite, 50–200 mm long 25–75 mm wide, serrate with wavy margins, veins pinnate. Submerged foliage usually entire but with wavy margins, petiolate, 10–70 mm long. Inflorescence glandular hairy, terminal, a cyme of capitula (flowerheads). Capitula discoid, with white (or pinkish) florets, 3.5–4 mm long, subtended by a single row of green involucral bracts, 15– 20 mm across, highly scented and very attractive to butterflies. Fruit is an achene, lacking a pappus, pale brown, slightly curved with prominent ribs, 1.2 mm long and 0.5 mm across (Parsons & Cuthbertson, 2001; New Zealand Plant Conservation Network, 2013; Ardenghi *et al.*, 2016). Seed set variable, with 6–19% of florets producing seed (Vivian-Smith *et al.*, 2005). Adventitious roots commonly developing on the nodes.

## BIOLOGY AND ECOLOGY

## General

Dense emergent beds of *G. spilanthoides* sprawling over shallow margins of water bodies limit the growth of submerged and other emergent plant species. These beds prevent wind-induced mixing of the water column, causing reductions in dissolved oxygen that may result in anoxia with serious effects on fish and invertebrate species. The plant also increases evapotranspiration, resulting in water loss. These dense plant beds can impede water flow, promoting flooding and also obstructing navigation and recreation (Parsons & Cuthbertson, 2001).

## Habitats

Within its introduced range, *G. spilanthoides* grows in wetlands, particularly degraded waterways (CRC for Australian Weed Management, 2003) forming marginal clumps on the edge of slow-flowing or still water bodies, also forming dense sprawling floating mats in rivers (including tidally influenced areas) and reservoirs, irrigation channels, ponds, lakes, canals and ditches. It also grows in marshes and swamps, especially where nutrient enriched (CRC for Australian Weed Management, 2003). *G. spilanthoides* established but did not persist in a rice field in Italy (Ardenghi *et al.*, 2016).

## Environmental requirements

In cooler parts of its introduced range, *G. spilanthoides* is a summer green, dying back to a perennial rootstock or to submerged plants, even under ice (New Zealand Plant Conservation Network, 2013, P Champion, Pers. Obs. (2016) National Institute of Water and Atmospheric Research Ltd). Burnett (2008) cultivated *G. spilanthoides* in Hamilton, New Zealand (37.8°S) with water temperature fluctuations between 7 and 23°C. The author then manipulated temperatures either 2, 4 or 6°C above or below ambient temperatures (Burnett et al. 2007) in separate tanks all otherwise experiencing outdoor ambient conditions. *Gymnocoronis spilanthoides* survived all treatments and all measured growth parameters (stem number, height, percentage cover, biomass) increased with increasing temperature. All treatments apart from +6°C died off to basal rootstocks during winter. The southernmost naturalized *G. spilanthoides* population was the Waimakariri River margin in Canterbury, New Zealand (43.4°S). Ardenghi *et al.* (2016) reported Italian sites in the north-west (45.2°N) that experienced hot summers (monthly mean summer temperature approximately 30°C) and relatively cold winters (monthly mean January ?-1°C). Seed set has been recorded at many New Zealand, Australian and Italian sites (Vivian-Smith *et al.*, 2005; Panetta, 2010; New Zealand Plant Conservation Network, 2013; Ardenghi *et al.*, 2016), with low numbers of seed set. However, germination rates were high over a range of fluctuating temperatures 5/15°C, 10/20–25/15°C or at 25°C (Vivian-Smith *et al.*, 2005; Ardenghi *et al.*, 2016). Seed bank persistence was estimated at more than 16 years until viability was reduced below 1%, but would be much shorter if exposed to daylight (Panetta, 2010). Some field sites are situated on tidally influenced rivers, but tolerance to salinity is unknown. *Gymnocoronis spilanthoides* has high growth rates under ideal conditions; a shoot growth of 150 mm per week was measured in New South Wales (Parsons & Cuthbertson, 2001).

## Natural enemies

There are no known natural enemies for *G. spilanthoides* within the EPPO region. Due to early management intervention in Australia and New Zealand, which has restricted the invasive range of the species, biological control has not been researched (Australian Government, 2016).

## Uses and benefits

*Gymnocoronis spilanthoides* is widely sold as an ornamental species within the EPPO region, including internet trade (Brunel, 2009; Ardenghi *et al.*, 2016). The species is also sold/exchanged between aquarists. The Ornamental Aquatic Trade Association (UK based) carried out a survey with its members in August 2016 requesting information on the number and value of *G. spilanthoides* stock sold at in the calendar year for 2015. Thirty-three members responded to this survey and detailed that a total of 75 700 *G. spilanthoides* plants were sold in the UK in 2015 with a value of GBP 112 955.

The species is highly regarded as an ornamental pond plant as its flowers are very attractive to some butterflies, especially monarch butterflies in Australasia and the USA (Speichert & Speichert, 2007), and Kodono (2004) reports the plant is cultivated by butterfly enthusiasts in Japan. Kodono (2004) also reports the plant being promoted in Japan for water purification.

## PATHWAYS FOR MOVEMENT

Plants for planting is considered the main pathway for entry into the EPPO region. From this pathway, individual plants can be transferred to suitable habitats through either intentional introductions into the environment or unintentionally through the disposal of aquarium material.

Consideration can be given to river systems within the EPPO region which are connected to countries outside the EPPO region. It is possible that the use of recreational equipment (e.g. fishing or canoeing gear) could spread the species, particularly as seeds or seedlings, although this is not likely to be significant pathway at present given the rarity of the plant within the EPPO region. However, there are campaigns within the European Union (EU) to raise awareness of the movement of invasive alien plants by this pathway. For example, the 'Check, Clean and Dry' campaign in Great Britain highlights the need to inspect and treat recreational material following use.

## IMPACTS

### Effects on plants

CRC for Australian Weed Management (2003) states that *G. spilanthoides* threatens biodiversity and causes other environmental damage. Although only in the early stages of establishment, this weed has the potential to seriously degrade Australia's ecosystems. Because *G. spilanthoides* grows very quickly, it can rapidly cover water bodies with a floating mat, excluding other plants and the animals that rely on them. Water quality may decline if large amounts of the plant die off and rot under water.

### Environmental and social impact

*G. spilanthoides* has been recorded as colonizing a rice field in Italy (Ardenghi *et al.*, 2016) and this could have potential economic impacts relating to crop yields unless managed. The effects of flooding will potentially be made much worse because infestations block drainage channels – although financial figures for this are lacking. Recreational activities (e.g. by preventing access to the water body), irrigation and navigation may also be affected (Parsons & Cuthbertson, 2001).

## CONTROL

Manual control has been successful in reducing small infestations of *G. spilanthoides*, either by hand removal, raking or drainage machinery (Parsons & Cuthbertson, 2001). Plants may be disposed of by drying and burning (CRC for Australian Weed Management, 2003). Care is required not to leave plant fragments that can regenerate into new plants or be spread by water movements to new locations (van Oosterhout, 2010). Re-establishment from seed germination is likely once the plant becomes established in a wetland or aquatic site, requiring follow-up control for many years (Panetta, 2010). In Lake Biwa (Japan) a concerted hand removal programme has resulted in a decrease in abundance and area occupied by *G. spilanthoides* over 3 years, with eradication anticipated in the near future (Kaneko, 2012).

Glyphosate has been found to give poor control of *G. spilanthoides* (Sainty & Jacobs, 2003), with this herbicide poorly translocating into below-ground or underwater parts and in many cases being adsorbed onto the silt coating plants (P. Champion, 2016, pers. obs.). The selective broad-leaf herbicide metsulfuron-methyl does provide good control and has been permitted for minor use on the species in aquatic situations in Australia (van Oosterhout, 2010; New South Wales Department of Primary Industries, 2014) and New Zealand where the majority of field sites of *G. spilanthoides* have been eradicated using this herbicide (Champion *et al.*, 2002; Champion & Clayton, 2003). Products should be used following the instructions on the label and in line with the relevant plant protection product

regulations

## REGULATORY STATUS

Europe (overall): *G. spilanthoides* was included on the EPPO 'Alert List' in 2009. It was removed from this list and transferred to the 'Observation List' in 2012. *G. spilanthoides* was also assessed under an alltaxa horizon scanning exercise designed to help prioritize risk assessments for the 'most threatening new and emerging invasive alien species' in Europe (Roy *et al.*, 2015); *G. spilanthoides* scored 625 representing a high probability of arrival, establishment, spread and threat to biodiversity and associated ecosystem services across the EU within the next 10 years. In 2016, *G. spilanthoides* was identified as a priority for risk assessment within the requirements of Regulation 1143/2014 (Branquart *et al.*, 2016; Tanner *et al.*, 2017). A subsequent pest risk analysis concluded that *G. spilanthoides* had a high phytosanitary risk to the endangered area (EPPO, 2017) and was added to the EPPO A2 List of pests recommended for regulation. In 2019, *G. spilanthoides* was included on the (EU) list of Union concern (EU Regulation 1143/2014)

*G. spilanthoides* is designated as an invasive alien species according to the Invasive Alien Species Act of Japan (Muranaka *et al.*, 2005).

In New Zealand, *G. spilanthoides* is listed on the National Plant Pest Accord prohibiting it from sale and commercial propagation and distribution, and it is declared an unwanted organism under the Biosecurity Act 1993 (Hicks, 2001). It is subjected to eradication programmes by regional councils throughout its New Zealand range (Champion *et al.*, 2014). It is listed as an Environmental Weed by Howell (2008).

In Australia, *G. spilanthoides* is on the Federal Alert List for Environmental Weeds, a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Although only in the early stages of establishment, these weeds have the potential to seriously degrade Australia's ecosystems. It is subject to statutory management in most Australian states including New South Wales, Queensland, South Australia, Western Australia, Tasmania and Lord Howe Island (Parsons & Cuthbertson, 2001). Csurhes & Edwards (1998) evaluated this species as a potential environmental weed, with a low probability of achieving eradication.

*G. spilanthoides* is not on the Federal or any state Noxious Weed list (USDA National Resources Conservation Service 2016).

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### Datasheet history

This datasheet was first published in the EPPO Bulletin in 2017 and is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity' and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

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