EPPO Datasheet: *Crassula helmsii*

Last updated: 2026-04-20

IDENTITY

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Preferred name: *Crassula helmsii*
Authority: (Kirk) Cockayne
Taxonomic position: Plantae: Magnoliophyta: Angiospermae: Basal core eudicots: Saxifragales: Crassulaceae
Other scientific names: *Bulliardia recurva* Hook.f., *Crassula recurva* (Hook.f.) Ostenf., *Tillaea helmsii* Kirk, *Tillaea recurva* Hook.f.
Common names: Australian stonecrop, New Zealand pigmyweed, swamp stonecrop
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EPPO Categorization: A2 list
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EU Categorization: IAS of Union concern
EPPO Code: CSBHE

Notes on taxonomy and nomenclature

In trade, *Crassula helmsii* is also known under the incorrect name of *Tillaea recurva* and as *Crassula recurva.*

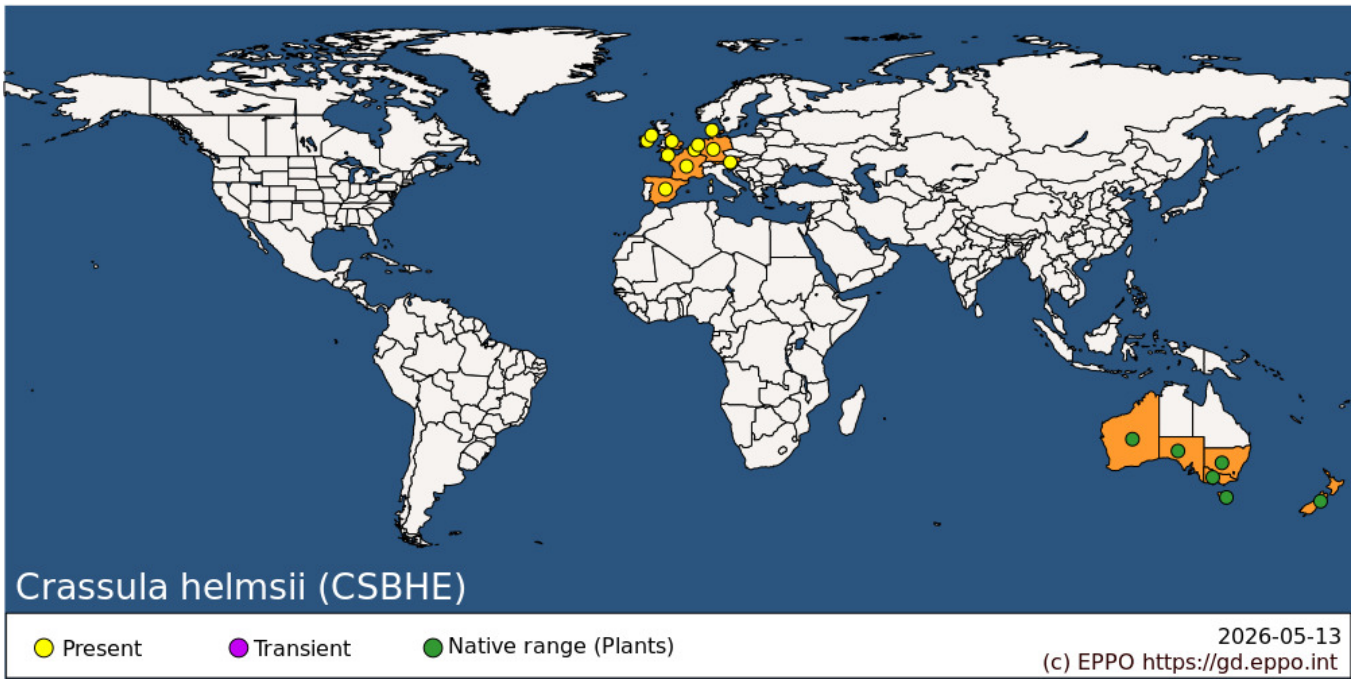
GEOGRAPHICAL DISTRIBUTION

Note on geographical distribution: information reporting the presence of *C. helmsii* in Portugal has been invalidated.

History of introduction and spread

Crassula helmsii is a native species of Australia and New Zealand and is reported to be invasive or potentially invasive in Florida and North Carolina. *C. helmsii* is locally present in Austria, Denmark (reported in Denmark in 2003; NOBANIS, 2005), France, Germany (first reported in the early 1980s, now found locally in Hessen, Mecklenburg-Vorpommern, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Schleswig-Holstein), Ireland, Spain, and widespread in Belgium (Flanders) and the Netherlands (first found in 1995 and 1996 in a nature reserve near Breda). *C. helmsii* is widespread in the British Isles where it has been the most studied (first found in the 1950s in Greensted Pond, Essex, England). This includes Alderney, Guernsey (first noted in 1986) (1989), and Northern Ireland (1984, in a pool at Gosford). In England, it was introduced from Tasmania in 1911 and was sold in the 1920s, but was only reported in the wild in 1956. Since its initial introduction into the United Kingdom, the number of sites invaded by the plant has increased year on year.

It is currently known in over 1 000 sites in the British Isles (Watson, 2001). Dawson (1994) predicted that the majority of temporary and permanent ponds and that some drainage channels and streams in the United Kingdom and northern Europe would be rapidly invaded. Studies of genetic variation of isoenzymes suggest that only one introduction was made into Britain, and that plants growing along the River Murray are the likely source of the British population (Dawson, 1994).



EPPO Region: Austria, Belgium, Denmark, France (mainland), Germany, Ireland, Netherlands, Spain (mainland), United Kingdom (Channel Islands, England, Northern Ireland)
Oceania: Australia (New South Wales, South Australia, Tasmania, Victoria, Western Australia), New Zealand

MORPHOLOGY

Plant type

C. helmsii is an aquatic and semiterrestrial plant, herbaceous and perennial.

Description

C. helmsii is an aquatic or semiterrestrial succulent perennial herb, with round stems of 10–30 cm long, floating or creeping (with roots forming at the nodes) (Figs 1 & 2). Leaves are opposite, sessile and succulent (4–20 mm long, 0.7–1.6 mm wide), linear-lanceolate to ovate-lanceolate, acute. White or pinkish flowers are borne singly in the axils of leaves (diameter 3–3.5 mm) and are numerous. Petals are slightly longer than the sepals. Fruits are follicles containing two to five elliptical and smooth seeds (0.5 mm long).

A close relative of *C. helmsii* is *Crassula aquatica*. The two species are easily distinguished by the size and position of their flowers. *C. aquatica* is the smaller of the two, rarely exceeding 6 cm in height, with leaves 4–6 mm long and flowers sessile in the leaf axils. *C. helmsii* is frequently seen at sizes of up to 40 cm in length and its flowers are produced on pedicels (Dawson & Warman, 1987).

The submerged stems of some *Callitriche* species may be mistaken for *C. helmsii* but stems of the former are often waterborne and are never emergent. Leaves of *C. helmsii* are connate at the base and acute at the tip, whereas in *Callitriche* spp. leaves are not connate, with emarginate to spanner-shaped leaf-tips (Dawson & Warman, 1987).

BIOLOGY AND ECOLOGY

General

Crassula helmsii occurs in different growth forms (Dawson & Warman, 1987). The terrestrial form has creeping or

erect stems and aerial leaves which are yellowish-green in colour and succulent in appearance. The emergent form usually grows as stands of short densely packed stems in water of 0.6 m or less in depth. The submerged form grows from a basal rosette well rooted at the base with long sparsely leaved stems which may reach the water surface. The three forms change according to prevailing conditions.

The plant assimilates CO_2 for 20 h of the day when submerged due to the possession of crassulacean acid metabolism and can therefore grow throughout the year. There is no dormant period. Such a metabolic adaptation confers an advantage for plants growing where the supply of inorganic carbon for photosynthesis is deficient or limited during the day (Dawson & Warman, 1987).

In Australia and New Zealand, *C. helmsii* flowers in November and December, while in New Zealand the flowering continues to February. In Europe, flowers appear between July and September. Seed germination in a laboratory setting, from various populations in western Europe, has been recorded , although germination percentage was generally low. The contribution of seeds to spread is considered very limited for this species which principally spreads by fragmentation (D'hondt *et al*., 2016)

Local dispersal is mainly ensured by vegetative reproduction. Small fragments (as small as a single node on 10 mm of stem) can produce new plants. These small fragments are readily transported by water, mud or wildlife to new sites (Denys *et al*., 2014). In addition, asexual reproduction is achieved via the production in autumn (in the United Kingdom) of short shoots with very short internodes called turions. The turions are produced apically, and float around the water surface. *C. helmsii* has the ability to produce roots and lateral shoots from many of its nodes, particularly when stressed. The plant forms a 100% cover and is winter green, enabling it to outpace native species which die back each winter (Huckle, 2005).

Habitats

This aquatic plant colonizes inland wetlands (marshes, peat bogs), coastal wetlands, inland water bodies and their banks, riverbanks/canal sides, dry river beds and muddy margins of ponds. Within its native range, *C. helmsii* inhabits marginal situations in many riverine habitats; however, within the United Kingdom the plant has not effectively made the transition from static or slow-flowing systems to more demanding habitats such as river margins. Studies have shown that the biomass production of *C. helmsii* in artificial stream systems is greater than for other species, including the invasive plant *Elodea canadensis* (Dawson & Warman, 1987), highlighting the potential of this plant to colonize river systems (Leach & Dawson, 1999).

The distribution of *C. helmsii* in Australia and Europe shows that the species is suited to a wide variety of freshwater habitats. It grows on damp ground from 0.5 m above water level down to depths of 3 m. *C. helmsii* has been found in ponds and lakes with natural water chemistry ranging from acid to alkaline, and the plant has also been recorded in semisaline sites (Centre for Ecology and Hydrology Dorset, 2002). In its native area, *C. helmsii* inhabits water bodies over a wide range of climates.

Environmental requirements

In its native range, *C. helmsii* seems to be confined to areas that have levels of precipitation from 100 to 550 mm in summer (November–April) and 200–3000 mm in winter (May–October). Its temperature requirements are restricted to a summer range of 20–25°C and a winter range of 0–15°C including extended periods under snow. In its native range it inhabits a wide range of climatic variation, from a mean temperature of 30°C in summer to ?6°C in winter (Huckle, 2005), and can tolerate drying for extended periods. The climate in the British Isles falls well within these limits, providing the plant with optimal growing conditions. In the United Kingdom, the plant has been found at a range of altitudes from sea level to 278 m (Leach & Dawson, 1999). In general the climatic requirements for the species match the Atlantic biogeographical region and some parts of the Continental biogeographical region.

Uses and benefits

C. helmsii is sold in garden centres and nurseries as a submerged oxygenating plant for aquaria and ponds.

PATHWAYS FOR MOVEMENT

Natural dispersal

Local dispersal is mainly ensured by vegetative reproduction. Plant parts (even single nodes on stem fragments of 10 mm in length) can generate new plants and are transported by flowing water and mud. It can also be spread by attaching to animals (cattle) or ingestion and subsequent excretion (e.g. geese).

The plant can be accidentally dispersed by human activities by escaping from garden centres, by transfer from pond to pond by anglers and their equipment (on fishing kit, waders, etc.), by boats, by children pond dipping (Leach & Dawson, 1999) and on footwear (Watson, 2001).

Movement in trade

The key pathway is its intentional introduction as an ornamental plant for aquaria and garden ponds. Plants are transferred by human activities from these intended habitats to unintended habitats. In addition, *C. helmsii* is often found as a 'contaminant' with other traded water plants (Environment Agency, 2003).

IMPACTS

Effects on plants

Crassula helsmii causes major problems in nature reserves and recreation areas by forming a 100% cover and smothering other plants.

Its impact on flora is not easily predictable. A study in north-west England suggests that there is no net reduction in the numbers of plant species, but there is a reduction in germination rates of native species, an increase in the proportion of emergent or marginal species and a reduction in aquatic species of open water. Smaller marginal plants such as some water *Callitriche* spp. seem likely to be smothered, and competition for space seems likely to cause a reduction in green algae of the class Charophyceae (Huckle, 2005). Similar observations have been made in Ireland, Belgium, the Netherlands and Germany (Van der Loop *et al.* 2022).

The starfruit *Damasonium alisma*, one of the rarest plants in the United Kingdom, is thought to be threatened by *C. helmsii* (Watson, 2001). Leach & Dawson (1999) state that in an artificially managed lake (Priors Down Lake, Stalbridge, Dorset, UK), evidence suggests that changes in floral dominance have occurred, with *C. helmsii* excluding *Ludwigia palustris* and *Galium debile* (Dawson & Warman, 1987).

A recent investigation at a well-monitored pond on Castlemorton Common Site of Special Scientific Interest, near Malvern in Worcestershire (England) found evidence that *C. helmsii* was also affecting the breeding success of the specially protected great crested newt *Triturus cristatus* (Watson, 1999).

There are other possible implications for wildlife. One study in England has shown a significant reduction in the population of the diatom *Synedra delicatissima* caused by *C. helmsii*, although the precise mechanism of this impact is unclear. As freshwater algae provide food for many invertebrates, this kind of effect may have a serious impact on freshwater invertebrate populations.

Environmental and social impact

The mats formed by the plant choke ponds and drainage ditches. Strongly invaded waters lose their attractiveness for recreation and flooding may be caused. The mats can be dangerous to pets, livestock and children who mistake them for dry land.

One recent estimate puts the cost of control of *C. helsmii* at between 1.45 and 3 million EUR based on the treatment of 500 sites over a period of 2–3 years (Leach & Dawson, 1999).). Likewise management costs to eliminate the species at two Waddenzee islands in the Netherlands amounted to over 4 million EUR (Van der Loop *et al.* , 2022).

CONTROL

Crassula helmsii is still sold even though no essential benefit to continuing the trade. Its overall value is minor, and other suitable non-invasive aquarium and pond plant species are available. Continuation of trade, introduction and movement will have negative and irreversible economic and environmental impacts.

The Ornamental Aquatic Trade Organization (OATO, 2003) recommends to its members that the plant should not be sold anymore. Control is more effective at early stage of infestation. Sites should be monitored regularly at intervals of 3–6 months for at least five years following an apparent elimination of *C. helmsii.* Treated and adjacent areas must be carefully examined for developing shoots or small buried rhizomes.

The choice of methods depends on the growth form and extent of the *C. helmsii* stand but also on the extent of native vegetation that remains within the site.

Early and effective treatment saves efforts and preserves native species. The natural seed bank of native species should be considered a resource for their re-establishment.

Mechanical control

Manual removal, up to 20 cm in depth, is chiefly effective in the context of early identification and rapid response. The effectiveness of this labour-intensive measure varies given that parts are easily missed during manual removal.

The excavation of the plants is one option for the elimination or control at dry or drained sites. It is crucial that strict hygiene practices are followed and that all fragments of *C. helmsii* are carefully removed. Excavation must be carried out up to a depth of >30 cm and preferably in three stages of approx. 10 cm. The success of the elimination can be increased by filling in the excavated profile with clean sand, thus preventing any remaining fragments from regrowing (van der Loop *et al*., 2022).

Environmental control

As *C. helmsii* is tolerant to shade over long periods, to frost and to desiccation, it cannot easily be controlled.

The burial of the plants is another option for elimination or control. Similar to excavation, the water system must be completely drained and dry. The supply of soil used for the burial is crucial for suppression and the site where the soil used originates from and is stored must be situated outside of the contamination zone. Cross-contamination between contaminated soil and the soil used for burial must be prevented. Cross-contamination of the areas can be prevented by maintaining hygiene practices and keeping transport flows separate. Once an entire affected water body has been covered, the soil must then be left untouched to prevent the regrowth of *C. helmsii*.

System-based management focuses on reducing the available nutrients, by limiting the supply of nutrients on the one hand and increasing competition for nutrients on the other hand. Limiting the supply of nutrients is essential, breaking *C. helmsii* dominance in some way is the next step to be followed by encouraging regrowth of desired species be it by active reintroduction or not. Results of field trials so far emphasize that limitation of the nutrient availability is essential, otherwise the method will not work.

Chemical control

On sites with large stands (> 1000 m²), chemical control may prove to be a practical alternative, but would need to be used with great care in the natural environmentand and strict regulations apply in many EPPO member countries.
C. helmsii is susceptible to herbicide formulations containing diquat and glyphosate.

Biological control

Recent studies on a Australian phytophagous, gall-forming mite, *Aculus crassulae,* have shown it to be highly host

specific to *C. helmsii*. Following the results of these studies approval by competent authorities was given for field trials in the United Kingdom. Infestations of *A. crassulae* were shown to cause damage to *C. helmsii* populations under field conditions in the United Kingdom. However, in certain habitats where *C. helmsii* thrives, the mite does not thrive (Varia et al., 2022: CABI 2024). Field trials have commenced in the Netherlands in September 2025.

REGULATORY STATUS

In the United States *C. helmsii* is listed as a noxious weed in Florida (prohibited aquatic plant, Class 1) and North Carolina (Noxious aquatic weed for which importation, sale, use, culture, collection, transportation, and distribution are regulated) (USDA, 2006) and is also a prohibited invasive species in Minnesota (Minnesota Department of Natural Resources, 2006) although it does not occur in these states. In the EPPO region, the species is reported to be invasive or potentially invasive in Ireland, the United Kingdom, the Netherlands, Belgium, France and Germany. In 2006, *C. helmsii* was recommended for regulation in the EPPO region as an A2 pest. Measures can include the obligation to report findings, publicity, surveillance, establishment of an action plan for eradication when the plant is found. In the United Kingdom *C. helmsii* has been banned from sale since 2014, and it is also prohibited to sell it in Spain. In Ireland, *C. helmsii* is included in S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Based on a risk assessment (Van der Loop et al., **2019**), in July 2025, the European Commission added *C. helmsii* to the List of Union (EU) concern, pursuant to Regulation (EU) no. 1143/2014.

PHYTOSANITARY MEASURES

EPPO (2014) recommends phytosanitary measures for plants for planting (including seed). The measures identified include the prohibition of import into the EPPO region.

Early detection is important to identify new occurrences of the species. *C. helmsii* should be monitored and where it occurs control measures should be implemented with the aim of eradication or containment. In addition, public awareness campaigns to prevent spread from existing populations in countries at high risk are necessary. *C. helmsii* should be banned from sale in countries within the EPPO region and action to remove it from the natural environment encouraged.

REFERENCES

CABI (2024) Progress with Weed Biocontrol Projects. March 2024. https://www.cabi.org/wp-content/uploads/CABI-weed-biocontrol-Public-Summary_March-2024.pdf

D'hondt B, Denys L, Jambon W, De Wilde, Adriaens T, Packet J, van Valkenburg J (2016) Reproduction of *Crassula helmsii* by seed in western Europe. *Aquatic Invasions* **11**, 125-130.

Dawson FH (1994) Spread of *Crassula helmsii* in Britain. In *Ecology and Management of Invasive Riverside Plants* (ed. de Waal, LC, Child, LE, Wade, PM & Brock, JH), pp. 1–13. John Wiley and Sons Ltd, Chichester (GB).

Dawson FH & Warman EA (1987) *Crassula helmsii* (T. Kirk) Cockayne: Is it an Aggressive Alien Aquatic Plant in Britain? *Biological Conservation* **42**, 247–272.

Denys L, Packet J, Jambon W, Scheers K (2014) Dispersal of the non-native invasive species *Crassula helmsii* (Crassulaceae) may involve seeds and endozoochorous transport by birds. *New Journal of Botany* **4**, 104-106.

EPPO (2014) EPPO Standard PM 9/19 (1) Invasive alien aquatic plants. *EPPO Bulletin* **44**(3), 457-471. https://doi.org/10.1111/epp.12165

Environment Agency (2003) *Guidance for the Control of Invasive Weeds in or Near Fresh Water*. https://gumstool.org.uk/wp-content/uploads/2024/08/guidance-for-the-control-of-invasive-weeds-in-or-near-fresh-water.pdf [accessed in February 2026]

Leach J & Dawson H (1999) *Crassula helmsii* in the British Isles – an unwelcome invader. *British Wildlife* **10**,

234–239.

Minnesota Department of Natural Resources (2023) *Minnesota Invasive Species Laws.* https://www.revisor.mn.gov/rules/6216.0250/

OATO (2003) Invasive Plants. http://www.ornamentalfish.org/aquanautconservation/invasiveplants.php [accessed in February 2026]

USDA (2026) Plants Profile *Crassula helmsii* A Berger. Natural Resources. Conservation Service, https://plants.usda.gov/plant-profile/CRHE5 [accessed in February 2026]

Van der Loop JMM, Beringen R, van Valkenburg RSEWJLCH, van Kleef HH, Verhofstad M, & Odé B (2019) Risk assessment of Australian swamp stonecrop (*Crassula helmsii*) in Europe. FLORON report: 2019.064

Van der Loop JMM, van Kleef HH, van Veenhuisen LS, Lamers LL, Leuven ESEW (2022) The ecosystem resilience approach to control the invasive alien species Australian swamp stonecrop (*Crassula helmsii*). *Restoration Ecology* **31**(3), E13844, https://doi.org/10.1111/rec.13844

Varia S, Wood SV, Allen RMS & Murphy ST (2022) Assessment of the host-range and impact of the mite, *Aculus crassulae*, a potential biological control agent for Australian swamp stonecrop, *Crassula helmsii*. *Biological Control* **167,** 104854. https://doi.org/10.1016/j.biocontrol.2022.104854

Watson WRC (1999) Amphibians and *Crassula helmsii*. Froglog. *Newsletter of the Declining Amphibian Task Force*, no. 31. https://www.iucn-amphibians.org/resources/froglog/froglog/archives/froglog-31/ [accessed in February 2026]

Watson WRC (2001) An unwelcome aquatic invader! *Worcestershire Record,* issue 10. http://www.wbrc.org.uk/WorcRecd/Issue10/invader.htm [accessed in February 2026]

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Datasheet history

This datasheet was first published in the EPPO Bulletin in 2007 and revised in 2025. It 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.

EPPO (2007) Datasheets on pests recommended for regulation. *Crassula helmsii*. *EPPO Bulletin* **37**, 225–229.

EPPO (2026) Datasheets on pests recommended for regulation. *Crassula helmsii*. *EPPO Bulletin* **56**(1), 120-124 . https://doi.org/10.1111/epp.70050