

AUSTRALIAN SWAMP STONECROP / NEW ZEALAND PIGMYWEED (*Crassula helmsii*)

Species Identification

Aquatic and semi-terrestrial succulent perennial plant which can be submerged, emergent and terrestrial.

Height: Up to 1.3m (when submerged) but tends to form dense, creeping mats

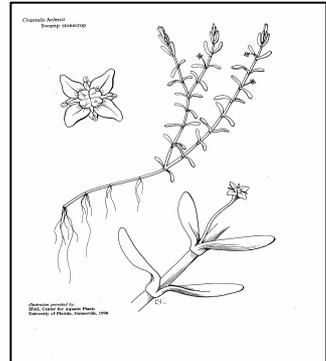
Length: Stems 10 - 130cm

Stem: 1mm thick, round green stems, creeping / erect when on land and creeping or floating when submerged in water / emerging from water.

Leaf: Basal rosette of succulent linear to narrowly oval green leaves 4 - 24mm long and 0.7-1.66mm wide grow in opposite pairs. Leaf bases join around the stem to form a collar. Leaves are fleshy when emergent or terrestrial, and flatter and sparser when they are submerged.

Flower: Small 4-petal whitish green to slightly pink flowers measuring 3-3.5mm in diameter on single stalks in the axils of the leaves.

Fruit: Contains 2-5 smooth, elliptical seeds measuring 0.5mm long.



Ecology

Habitat Description: Populations of *C. Helmsii* can grow in waters up to 3m in depth (submerged), on emergent banks in water less than 0.6m deep and on damp ground. It can be found growing in lakes, ponds, gravel pits, inland and coastal wetlands, marshes, swamps, slow moving rivers, canals and irrigation ditches. It can colonise acid to alkaline freshwater habitats as well as semi-saline water bodies and is associated with soft sediments. *C. Helmsii* is tolerant of shade and extreme cold.

Reproduction & Life Cycle: Plants can reproduce prolifically from small vegetation fragments bearing a single root node on stems as small as 5mm. Apical turions (sprouting buds) are also produced in autumn which float on the waters' surface. Sexual reproduction through seed is uncertain in Europe. *C. Helmsii* can grow throughout the year without a dormant stage. Flowers (if present) appear between July and September.

Dispersal and Spread: Natural dispersal occurs by the transportation of vegetative fragments by water currents. Fragments can also be transported by birds, other wildlife and livestock and can be unintentionally transported by humans on boots, angling nets, boats, heavy plant, vehicles and other recreational equipment.

Impact

Native Habitats: *C. Helmsii* forms dense mats of vegetation, year round, which can deplete oxygen levels in water, displace native plants which typically die back in winter, and suppress the germination of other native plant species. The plant can assimilate CO₂ for 20 hours a day when submerged. *C. Helmsii* will out-compete native flora for nutrients and can negatively affect the ecosystem in which it occurs by changing the hydrology and quality of water. Its presence has been reported to reduce the breeding success of Great crested newts.

Human Health Effects: *C. Helmsii* is not harmful to humans; but dense mats can be mistaken as dry land and therefore presents a potential hazard to people, dogs and livestock when present on public access sites.

Economic and Societal Effects: *C. Helmsii* can reduce the flow of water along irrigation channels and flood-control systems incurring large economic costs for its control and/or eradication. Its eradication on sites which have biodiversity, aesthetic, recreational and economic value is high priority, incurring costs relating to its immediate control and losses to recreational and tourism related revenue. Most major reservoirs in Sussex are now infested with *C. Helmsii*, posing major dilemmas with regards to how to treat and remove the plant without causing contamination of local drinking water sources. A large percentage of all lakes and ponds are also now infested with *C. Helmsii*, with resulting costs to economy and biodiversity associated with removal.

Legislation

Listed under Schedule 9 of the Wildlife and Countryside Act in England and Wales (2010) as an offence to plant or otherwise cause to grow in the wild. The GB Programme Board for non-native species has asked that an invasive species action plan be developed for this species.

Management Approaches

Prevention Methods - Early detection and rapid response

1. Map the distribution of all extant populations – further mapping of static waters is needed
2. Identify areas that are 'at risk' to new invasions:
 - Within downstream flood zone of invaded sites
 - Wetlands connected to infested sites by public access routes and boat launch sites
 - Sites adjacent to aquariums, garden centres, nurseries and ponds where *C. Helmsii* is grown
3. Use GIS to map 'at risk' areas utilising land use spatial layers to improve predictability
4. Implement a management plan to prevent further spread of the plant including:
 - Restrict the sale of *C. Helmsii* through garden centres, aquarists and other retail outlets
 - Avoid unintentional transportation by:
 - Increase public awareness at infested sites
 - Ensure equipment is cleaned after visits to infested water bodies
 - Prevent livestock grazing on banks of infested water bodies
 - Introduce an 'emergency response system to reports of newly infested sites
 - Monitor 'at risk' sites (particularly protected sites) to enable fast eradication if invasion occurs

Eradication, Control and monitoring effects

C. Helmsii is extremely difficult and costly to control and the recommended measures to adopt and their relative efficiency will dependent on the magnitude of the infestation and the extent of native flora remaining. **Not allowing infestation, or treatment in the early stages of infestation is highly recommended and sites should be monitored every 3-6 months for at least 5 years following apparent elimination. Grazing by Ponies in the New Forest has been shown to be effective without exacerbating the spread of the plant.**

Method	Description	Time of Year	Limitations
Shade material	Cover infested site with black plastic or carpet to starve the plant of sunlight.	Non specific but leave in place for 8 weeks to 6 months	Only suitable for small patches (1-20m ²). Difficult to install and manage and vandalism may be a problem. Plant often goes into dormancy and re-infests once plastic is removed.
Dredging / Removal	Dredging or hand removal of marginal and emergent material. Pile in heaps at least 10m away from water and cover in black polythene sheeting or at least 20cm of soil (may need consent in floodplain). Prevent access to site by livestock/people and downstream movement of material.	Throughout the year	Increased risk of spreading infestation downstream or re-infesting the treated area as small fragments are spread during the procedure. Any machinery or plant used to dredge needs meticulous cleaning following each visit to an infested site.
Liquid nitrogen	Apply freezing liquid nitrogen.	Unknown	Has been successful however limited research into its environmental impact.
Hot foam	Spray infested site with 'Waipuna' hot foam.	When water levels are lowest or plant is most vulnerable (prior to cold weather)	Can be effective in killing shallow mats of the plant, but does not affect roots. Dense infestations often only show 50% die back. May be more effective for controlling spread of existing infestations
Herbicides	Glyphosate + Topfilm on any emergent material ON or near water. Treat 70% of dense infestations at one time, repeating on remaining 30% 1 week later.	April - November February or March	Glyphosate requires a license from the Environment Agency. Creates bare ground enabling easy recolonisation by <i>Crassula</i> . Will affect non-target species. No pesticides are approved for use IN water.
Water draining and chemical application	Reduce water levels to expose submerged plants. Allow to dry out and treat with Glyphosate	Growing season	Only practical in contained water bodies where water levels are controlled. Requires removal of dead plant material and should only be carried out when rare / protected species are absent. Seriously affects non-target species.
Infilling	Cover infestation with min. 20cm of soil or rock such as chalk. In severe cases, create alternative feature adjacent to infilled feature to compensate for loss of habitat.	Early October or when least impact to existing wildlife	If serious impacts on ecology of target waterbody can be limited, then can be very successful. Fragments of plant are often transported during infilling process which reinfest afterwards.
Prolonged exposure to saltwater	Drain down wetland feature and allow incursion of saltwater into feature for prolonged period (over six months)	When least possible impact will occur to existing wildlife.	Seriously alters ecology of site. Limited to sites with access to tidal flows.

References:

CEH (2004) Information Sheet 11: Australian Swamp Stonecrop. Available online at <http://www.capm.org.uk>;

DEFRA (2011) Invasive weeds: Guidance for the control of invasive weeds in or near fresh water: Australian swamp stonecrop. Available online at: <http://adlib.eversite.co.uk/adlib/defra/content.aspx?doc=58937&id=58954>;

EPPO (2007) Datasheet on quarantine pests: *Crassula Helmsii*. Bulletin OEPP/EPPO Bulletin 37; 225-229;

NNSS (undated) New Zealand Pigmyweed. Available online from: <http://www.nonnativespecies.org>.