EPPO Datasheet: *Hydrocotyle ranunculoides*

Last updated: 2026-04-07

IDENTITY

Preferred name: *Hydrocotyle ranunculoides*
Authority: L.f.
Taxonomic position: Plantae: Magnoliophyta: Angiospermae: Campanulids: Apiales: Araliaceae: Hydrocotyloideae
Other scientific names: *Hydrocotyle natans* Cirillo
Common names: floating pennywort, water pennywort
view more common names online...
EPPO Categorization: A2 list
view more categorizations online...
EU Categorization: IAS of Union concern
EPPO Code: HYDRA

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Notes on taxonomy and nomenclature

The populations of *Hydrocotyle ranunculoides* in northern Europe which have been reported as being invasive are believed to originate in North America. However, there are also records in southern Italy, Palestine, and the Caucasus, which were referred to as *H. natans* Cirillo in the late 18th and 19th century (*H. natans* has since been synonymized with *H. ranunculoides* (e.g., in Flora Europaea; Tutin et al., 1968)), or referred to its var. *natans* (Cirillo) Urban. The present status of these forms is not clear, and there is no indication that they have ever been invasive. The European Garden Flora (Cullen, 1997) synonymizes *H. ranunculoides* with *Hydrocotyle americana* Linnaeus, implying that this species is distinct from the Mediterranean *H. natans*. However, for North America *H. ranunculoides* and *H. americana* are still retained as two distinct species (Crow & Barre Hellquist, 2000; Les, 2018). Since *H. ranunculoides* also occurs in sub-Saharan Africa, more information is needed on the similarities and differences between New World and Old World populations.

GEOGRAPHICAL DISTRIBUTION

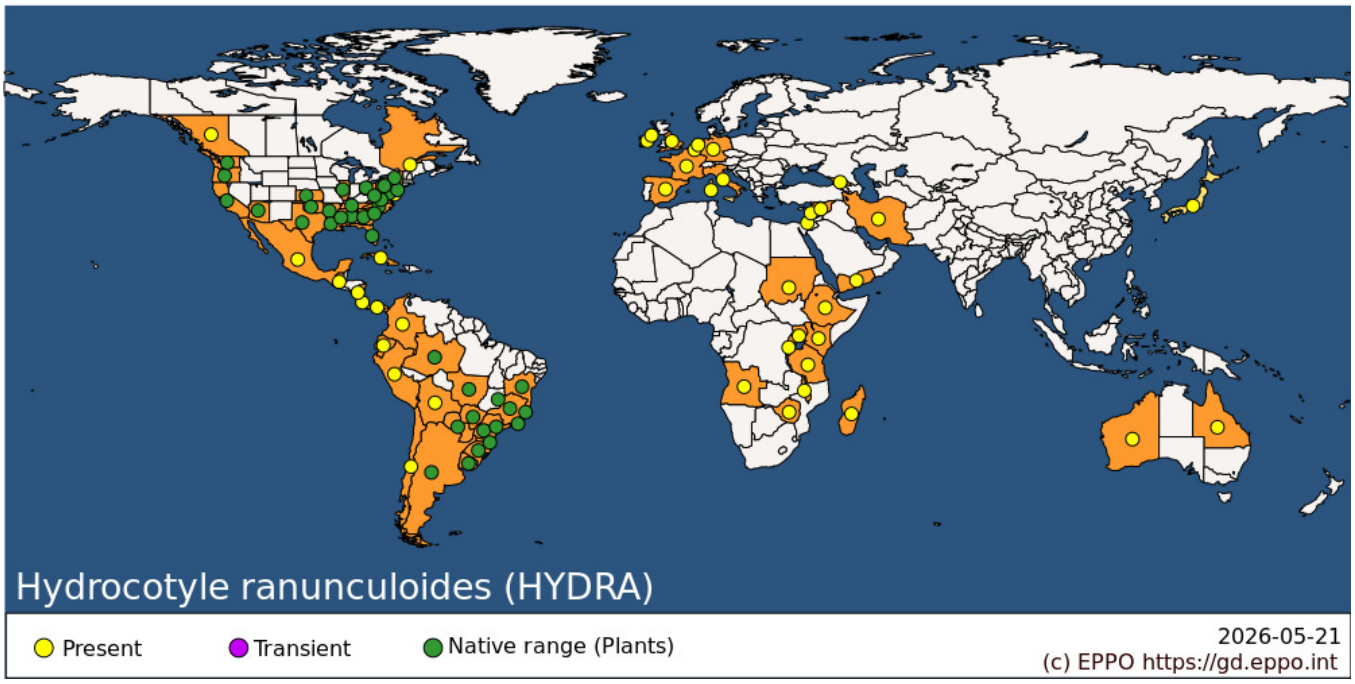
History of introduction and spread

Hydrocotyle ranunculoides is native to the Americas, including the United States of America, Argentina, Brazil, Paraguay, and Uruguay.

The main pathway of introduction is via the aquatic nursery trade. *H. ranunculoides* was first recorded in the wild in the United Kingdom in 1990. According to Newman and Dawson (1999), it was present at 29 sites in the south-east of England and in southern Wales in a wide range of water body types and had increased to 71 recorded observations by 2001–01 (Huckle, 2002). The first infestation in the Netherlands was detected and control measures were applied in 1995 (Baas & Duistermaat, 1999). In France, *H. ranunculoides* was first reported in pools in the Essonne valley south of Paris and in the Dombes area (near Lyon) in 2005; invaded pools are completely covered by the end of the growing season. It is also reported in other parts of France. The species has been present in some other southern European countries since at least the 1970s.

The infestation in the United Kingdom is assumed to have originated from a single clone which was sold by aquatic garden centres and nurseries (Newman & Dawson, 1999). In the Netherlands, the spread of this species was considered unlikely to be contained from the beginning (van der Meijden et al., 2001).

In 1983, the plant was observed for the first time in the urban drainage network in the Canning River Regional Park in Western Australia. Eight years later, it had spread throughout the drainage system into the river and nearby wetlands (Ruiz Avila & Klemm, 1996).



EPPO Region: Belgium, France (mainland), Georgia, Germany, Ireland, Israel, Italy (mainland, Sardegna), Netherlands, Spain (mainland), United Kingdom (England, Northern Ireland)
Africa: Angola, Ethiopia, Kenya, Madagascar, Malawi, Rwanda, Sudan, Tanzania, United Republic of, Uganda, Zimbabwe
Asia: Iran, Islamic Republic of, Israel, Japan, Lebanon, Syrian Arab Republic, Yemen
North America: Canada (British Columbia, Québec), Mexico, United States of America (Alabama, Arizona, Arkansas, California, Delaware, Florida, Georgia, Illinois, Kansas, Louisiana, Maryland, Mississippi, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia)
Central America and Caribbean: Costa Rica, Cuba, Guatemala, Nicaragua, Panama
South America: Argentina, Bolivia, Brazil (Amazonas, Bahia, Distrito Federal, Espirito Santo, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Parana, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, Sao Paulo), Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay
Oceania: Australia (Queensland, Western Australia)

MORPHOLOGY

Plant type

Hydrocotyle ranunculoides is a stoloniferous, perennial, aquatic plant, with floating and emergent leaves. It is both vegetatively and seed-propagated.

Description

Hydrocotyle ranunculoides is entirely glabrous, with stems floating in water or creeping onto shorelines. Stems are slender and root freely from nodes at about 4–6?cm intervals. Roots are profuse and hair-like. Leaves are alternate, emergent and held above the horizontal stem on long fleshy petioles, non-peltate, suborbicular to reniform with a cordate base, and frequently broader than long, shallowly or deeply 3–7-lobed, the lobes rounded, crenate or lobulate and subequal. They reach a diameter of 18?cm in suitable habitats in the United Kingdom. Petioles grow up to 35?cm. Flowers are hermaphrodite, white, 5–10 grouped together in a small umbel, borne on a leafless stalk, shorter than the petiole. No sepals, five unconnected petals, five stamens: ovary inferior, two-lobed, two styles. Fruits are nearly round and flat, brownish, with faint ribs and divided into two halves, each with a small persistent stalk (Huckle, 2002; Mathias & Constance, 1976; Northern Prairie Wildlife Research Center, 1999; Washington State

Department of Ecology, 2004).

Similarities to other species

In Europe, plants are sometimes falsely identified as the native *Hydrocotyle vulgaris.*

BIOLOGY AND ECOLOGY

General

H. ranunculoidesis a stoloniferous aquatic perennial plant with floating and emergent leaves. It roots in the shallow margins of slow-flowing waters. In the United Kingdom, the Netherlands and Australia, it forms dense interwoven vegetation mats, rapidly covering the water surface. It has been observed to grow 20 cm per day in the UK under appropriate conditions and it is very competitive, forming monospecific stands. Leaf matter can grow up to 40 cm above the water surface and roots and stems can sink up to 50 cm into the water (Huckle, 2002).

The plant reproduces primarily by vegetative reproduction, though spread by seed has been observed through sewage treatment works. It can regenerate even from small root fragments. It flowers in July–October in its native range.

Chromosome number: 2n = 24. There is a wide range of polyploids within the genus *Hydrocotyle*, with up to 15-ploidy (Moore, 1971, Federov, 1974). Newman (unpubl.) found four distinct groups of *H. ranunculoides* in the United Kingdom population which can be separated by AFLP analysis. There is uncertainty about the extent to which different levels of ploidy between populations influences invasiveness.

Habitats

Intended habitats in areas where the species is intentionally imported are aquaria and garden ponds. Unintended habitats are slow-flowing and eutrophic water bodies, especially ponds, ditches, and streams. *H. ranunculoides* also colonizes marshes, lake margins and other wet ground and mesotrophic water bodies, e.g. fenland pools. The species prefers high concentrations of nitrate and phosphate, and/or organic matter. The high content of fertilizers in many European waterways due to agricultural practice therefore favours the establishment of this species. It grows below 1500 m (Newman & Dawson, 1999; van der Krabben & Rotteveel, 2003; Washington State Department of Ecology, 2004).

Environmental requirements

The areas *H. ranunculoides* currently invades differ strongly in humidity and temperature, indicating that the species is very adaptable. Low frost tolerance seems to be a limiting factor for the distribution of this plant, though other plants (e.g. *Glyceria maxima*) provide shelter from frost for *H. ranunculoides* in margins and on non-mown banks.

H. ranunculoides is typically associated with climates Af, Cf and Dfa in Köppen’s classification, i.e. warm to hot summer, cool to hot winter, wet year round. It may also survive in climate Cs (hot dry summer, cool wet winter). It is hardy to zone 7 (?15°C). It is associated with the vegetation zones: temperate to tropical deciduous forests, temperate steppes, Mediterranean sclerophyllous forests.

There is no information on natural enemies in areas where *H. ranunculoides* has invaded. Information on natural enemies in the native range are included under biological control.

PATHWAYS FOR MOVEMENT

Fragments of plants are transported by flowing water to new locations. Waterfowl can spread viable fragments of the plant (Huckle, 2002), and this is also suggested as a pathway for spread in France. The main pathway of movement is, however, distribution and sale by the aquatic nursery trade. This may also involve contamination of other aquatic plants with fragments of *H. ranunculoides.* Spread from the intended to the unintended habitat then occurs primarily as a result of cleaning aquaria and garden ponds where *H. ranunculoides* has been grown.

IMPACTS

Effects on plants

The potential of *H. ranunculoides* to become a weed was first stated in a publication dating from 1936 (Huckle, 2002). Due to its vigorous growth, *H. ranunculoides* causes loss of light and reduction in dissolved oxygen content. The native aquatic flora can be outcompeted and ecosystem functions can be altered. As a consequence, keystone species, endangered species and biodiversity can be reduced. In the EPPO region, where present, *H. ranunculoides* competes with many plant species in the habitats it invades. These may include water-edge plants such as species of *Carex, Juncus, Myosotis, Rorippa* and also submerged aquatic plants shaded out due to floating mats of *H. ranunculoides*.

Environmental and social impact

H. ranunculoides is a useful plant in aquaria and garden ponds, but other species could adequately replace it. When it spreads to unintended habitats, it presents a lasting threat to the native recreational flora. Though Baas & Holverda (1996) initially stated that *H. ranunculoides* would cause no significant harm in the Netherlands, this statement had to be retracted only three years later by Baas & Duistermaat (1999), as they then expected this plant to cause major impact on plants in nature reserves and recreation areas. *H. ranunculoides* can damage waterworks and, as well as displacing native flora through competition, can affect fauna by habitat modification (van der Krabben & Rotteveel, 2003). Dense mats reduce penetration of light to the water below and oxygen shortage may induce high fish mortality. Strongly invaded waters loose their attractiveness and safety for recreation. Flooding may be caused by heavy infestations chocking drainage systems and sluices. Plants accumulate heavy metals, making disposal of plant material problematic.

CONTROL

Mechanical control

In the case of mechanical removal, the areas of concern should be fenced or netted off, to reduce the risk that water downstream is infested. Also, all cut plant material should be removed from the water, otherwise spread and impact can even be increased due to the high regeneration capability of the species. The first infestation in Dutch urban waterways in 1995 was apparently controlled successfully by mechanical removal of plant material and a severe winter. Now the situation has changed and the plant proved to be hardy to severe frosts when protected by surrounding vegetation. Baas & Duistermaat (1999) conclude that *H. ranunculoides* in the Netherlands can probably not be eradicated or contained.

Chemical control

According to Newman & Dawson (1999), *H. ranunculoides* is most susceptible to the herbicide 2,4-D amine applied at 4.23 kg/ha active substance, and is resistant to glyphosate applied at 2.16 kg/ha active substance, probably due to insufficient uptake through the leaf cuticle. The treatment with 2,4-D amine should be done at the end of the growing season when submerged apical stem tips are no longer present, as these are unaffected by the herbicide. To guarantee that all plant material is treated, a follow-up spot treatment or mechanical removal 2–4 weeks after the first treatment is very important. In some countries (e.g. Germany), treatment of water bodies with herbicides is prohibited.

Biological control

Listronotus elongatus (Curculionidae), a weevil, has been found to feed exclusively on *Hydrocotyle* species in Argentina (Cabrea Walsh *et al*., 2013; Newman, 2003). Further research on this potential biological control agent revealed its preference and successful survival on *H. ranunculoides* (Cabrera Walsh & Maestro, 2017). These results convinced the competent authorities in the United Kingdom to approve field trials in 2021. Preliminary results look promising (CABI, 2024), and further field trials have started in the Netherlands in September 2025.

Possibilities for eradication

Eradication is possible in the very early stage of invasion. Central organization and funding are crucially important, and so is legislation.

An example of control costs is the investment by the Western Australian government to control *H. ranunculoides* in the Canning River. The species became a serious problem in 1992 and after declaration as a P2 plant (a plant to be eradicated), a program costing over 200 000 AUD in the first year was implemented (AFFA, 2003). In the Netherlands, some waterboards faced a doubling of costs each year during the 1990s, and, in 2000, the total control costs were around 1 million EUR (van der Krabben & Rotteveel, 2003). Impacts have increased since, as its presence has increased tenfold. Information on actual costs are hard to obtain as management of invasive plants is often not specified at species level.

REGULATORY STATUS

In 2001–01, the Dutch Ministry van Landbouw, Natuurbeheer en Visserij prohibited the sale and possession of *H. ranunculoides.* Due to its high invasiveness, the Royal Horticultural Society in the United Kingdom prohibited this plant at its shows and gardens (Shaw, 2003). In 2005, EPPO added this plant to its A2 List of pests recommended for regulation.

In 2016, *H. ranunculoides* was included in the EU Regulation 1143/2014 and the species is now on the list of species of Union concern.

PHYTOSANITARY MEASURES

EPPO (2009) recommends phytosanitary measures for plants for planting (including seed). The measures identified includes the prohibition of import of the species into the EPPO region and a prohibition on the selling of the species in the EPPO region.

Early detection is important to identify new occurrences of the species. *H. ranunculoides* 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. *H. ranunculoides* should be banned from sale in countries within the EPPO region and action to remove it from the natural environment encouraged.

The EPPO Standard PM 9/19 *Invasive alien aquatic plants*, describes procedures for control of invasive alien plants. In addition, the EPPO Standard PM 3/97 *Inspection of consignments of plants for planting for invasive alien plants* provides guidance on how to identify *H. ranunculoides* as a contaminant of potted plants.

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Datasheet history

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EPPO (2006) Datasheets on pests recommended for regulation. *Hydrocotyle ranunculoides. EPPO Bulletin* **36**(1), 3-6. https://doi.org/10.1111/j.1365-2338.2006.00945.x

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