



## A note on some alien species of *Hydrocotyle* (Araliaceae) in Belgium

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**Illustrations:** G. Heyneman (Fig. 1) and F. Verloove (Fig. 2-3).

**ABSTRACT.** – An adventive *Hydrocotyle* (Pennywort) that has been established in lawns in the Antwerp Zoo since the 1980s appears to belong to *H. sibthorpioides*, not to *H. novae-zelandiae* as originally assumed. A second Belgian locality was recently discovered in Knokke. A few years ago, a population of *H. verticillata* has furthermore been found in Bredene. This is an aggressive, subtropical lookalike of native *H. vulgaris*. Diagnostic features of both *H. sibthorpioides* and *H. verticillata* are briefly discussed and both are depicted. A key for the identification of the species currently found in Belgium is presented.

**SAMENVATTING.** – Omtrent enkele adventieve *Hydrocotyle*-soorten (Araliaceae) in België. Een sinds de jaren 1980 in gazons in de Zoo van Antwerpen ingeburgerde adventieve waternavel blijkt *Hydrocotyle sibthorpioides* te zijn en niet *H. novae-zelandiae*, zoals aanvankelijk werd aangenomen. Recent werd van deze soort een tweede Belgische groeiplaats ontdekt in Knokke. Enkele jaren geleden is in Bredene bovendien een populatie gevonden van *H. verticillata*, een agressieve, subtropische lookalike van de inheemse soort *H. vulgaris*. Diagnostische kenmerken van zowel *H. sibthorpioides* als *H. verticillata* worden kort besproken en beide worden afgebeeld. Een determinatiesleutel voor de in België gevonden soorten van het genus is toegevoegd.

**RÉSUMÉ.** – À propos de quelques espèces adventives du genre *Hydrocotyle* (Araliaceae) en Belgique. Une espèce adventive du genre *Hydrocotyle*, établie dans les pelouses du zoo d'Anvers depuis les années 1980, appartient à *H. sibthorpioides*, et non à *H. novae-zelandiae* comme supposé à l'origine. Une deuxième station belge de cette espèce a récemment été découverte à Knokke. En outre, une population de *H. verticillata* a été trouvée, il y a quelques années, à Bredene. Il s'agit d'une espèce subtropicale et agressive, très semblable à l'espèce indigène *H. vulgaris*. Les caractéristiques diagnostiques de *H. sibthorpioides* et de *H. verticillata* sont brièvement décrites et illustrées. Une clé pour l'identification des espèces trouvées actuellement en Belgique est présentée.

### Introduction

*Hydrocotyle* L. has only one native representative in Belgium, *H. vulgaris* L. (Lambinon & Verloove 2012). However, many species of *Hydrocotyle* have a bad reputation as undesirable weeds. As such they occur in aquatic or marshy natural environments or in turf lawns (e.g. Baas & Duistermaat 1998; Verloove & Heyneman 1999; Hussner 2007; Atha 2017). Two alien species have been recorded so far in Belgium: *H. novae-zelandiae* DC. and *H. ranunculoides* L.f. (Verloove & Heyneman 1999; Billiet 2004; Verloove 2006). The identity of the former was critically reassessed lately: plant material from Belgium turned out to refer to *H. sibthorpioides* Lam. instead. In addition, a third alien species of *Hydrocotyle* has recently been re-

corded from Belgium, *H. verticillata* Thunb. Both these species are often considered undesirable weeds outside of their native distribution range.

### *Hydrocotyle sibthorpioides*

Billiet (2004) reported upon the presence of a weedy *Hydrocotyle* in a lawn in the Antwerp Zoo. It had been present there since the 1980s and was believed to have been introduced as a bonsai weed from China. It is rather competitive and apparently herbicide resistant. At present it has invaded nearly all of the lawns in the Zoo and it also frequently occurs between paving tiles and in cracks of concrete (comm. Bart Mortier on <https://waarnemingen.be>). It obviously is well-naturalized al-



**Figure 1.** *Hydrocotyle sibthorpioides* in fruit in a lawn in Knokke.

though it has not been able (yet) to spread beyond the limits of the Zoo.

This weed was initially assigned to *H. novae-zelandiae*, from New Zealand, based mostly on Clement & Foster (1994) as this was one out of two alien species of *Hydrocotyle* that occurred as weeds in lawns in the British Isles.

The plants found in Antwerp are glabrous perennial herbs, prostrate and matted; stems are slender and root at the nodes; leaves are usually two per node, unequal, the blades are basifixed, orbicular or reniform, with the margins weakly 7-lobed to merely crenate, the largest up to 14 mm broad (most are much smaller), the basal sinus narrow (< 1/4 circumference of the blade), the main veins 7; umbels are solitary, with up to 10 flowers, the peduncles are shorter than to about as long as the petioles; fruits are ca. 1.1-1.5 mm wide and 1 mm long.

These character states are more or less compatible with the very variable *H. novae-zelandiae* except that the fruits of this species are always much larger (ca. 2-3 mm across; Webb *et al.* 1988). A critical re-examination of these plants, based on flora accounts from various areas (e.g. Mathias 1936; Cannon 1968; Watson 1997; She *et al.* 2005) and herbarium specimens preserved in the herbarium of Meise Botanic Garden (BR), demonstrated that they belong to a similarly looking weed, *H. sibthorpioides*. This species is native to subtropical Asia and probably also Africa. It is a reputed weed of irrigated lawns and turf lawns and currently occurs far beyond its original distribution range, including Europe (British Isles, France, Italy; see Cattorini 1952; Viola 1954; Longevialle 1973; Reduron 2007; Banfi & Galasso 2010; Stace 2010). The much smaller fruits with very prominent lateral ribs of *H. sibthorpioides* easily separate these two species. Indumentum and shape of the leaves (incision, etc.) are variable in both species, although *H. novae-zelandiae* always has slightly larger leaves that are faintly to distinctly hairy on the upper surface (Watson 1997). Also, ribs of mericarps are very indistinct in this species (Huxley 1999).

*H. sibthorpioides* probably has been overlooked or – given the very trivial habitats in which it is found – merely neglected. A second locality of morphologically identical plants has been known to one of us (GH) since at least 2016 from a lawn in Knokke (province of West Flanders) (Fig. 1). A specimen received as ‘*H. novae-zelandiae*’ from Maarheeze (Noord-Brabant, The Netherlands), in 2012 (coll. R. Barendse; <https://waarneming.nl/observation/71094873>), was already identified by the first author as *H. sibthorpioides* in 2013. The same species was recently also recorded as a lawn weed in Germany (comm. Uwe Amarell, 2019) and it is also frequently seen as a weed in bonsai containers (comm. Rainer Otto). The latter observation corresponds well with the alleged introduction vector of the Antwerp population.

Genuine *H. novae-zelandiae* appears to be much less frequent in Europe; it has only been confirmed from the British Isles (Stace 2010).

**Herbarium:** Anvers, Jardin Zoologique, pelouse, adventice, 08.05.2003, *F. Billiet* 2802 (BR 918461); Knokke, Nachtegalenlaan, lawn, 22.07.2019, *G. Heyneman* s.n. (BR).

### ***Hydrocotyle verticillata***

*Hydrocotyle verticillata* is widespread in the Americas and Australia. It is a (sub-)tropical and much more vigorous counterpart of native *H. vulgaris* and widely cultivated as an ornamental marsh plant. Both are very similar and often hard to distinguish. *Hydrocotyle verticillata* tends to have leaves with 9-13 veins (vs. 7-9), glabrous petioles (vs. petiole with long patent hairs, at least in upper part) and inflorescences are as long as or longer than the subtending leaf (vs. shorter than subtending leaf). It is also much more vigorous (larger leaves, thicker stems, etc.). As a result of their resemblance, *H. verticillata* often passes unnoticed for quite a long time. For instance, many claims of *H. vulgaris* from the surroundings of Valencia in Spain turned out to refer to *H. verticillata* instead (Carret-



**Figure 2.** Dried-out shallow pool invaded by *Hydrocotyle verticillata* in Bredene.

ero 1997; Medina 2003). It was already well-established there before it was positively identified.

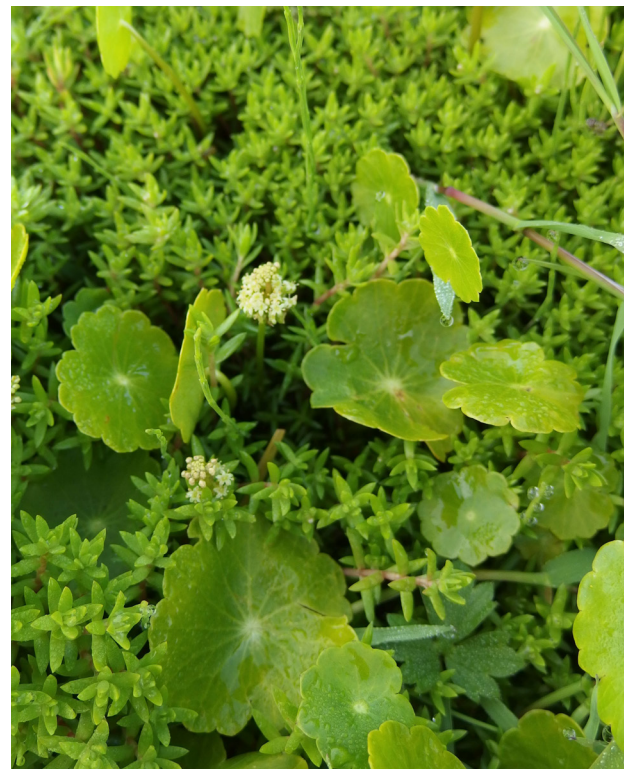
A well-established population of this species was detected in a newly created shallow pond in the nature reserve D’Heye in Bredene (province of West Flanders) by Marc Leten in 2009 and subsequently identified by the first author in 2013 (Fig. 2 and 3). It completely covered the surface of the pond and competed with other aggressive invaders of such kind of habitat [*Crassula helmsii*, *Mimulus spec.*, *Myriophyllum aquaticum* (syn.: *M. brasiliense*)]. All were without doubt inconsiderately released aquarium plants. Despite its subtropical origin, *H. verticillata* easily survived all subsequent winters. Digging up the bank of the pool in order to get rid of these exotics proved to be very beneficial for *H. verticillata*. Ultimately, the pond was filled and replaced by another pool about 20 meters away.

It is likely that *H. verticillata* has been overlooked elsewhere in Belgium (and beyond). It is sold as ‘*Hydrocotyle vulgaris*’ in plant nurseries (at least in the Netherlands; see van Valkenburg & Pot 2008) and might be more widespread as an escape or even as a deliberate introduction. Records of *H. vulgaris*-like plants in areas where it is not originally native (e.g. newly created ponds) are suspect and should be critically assessed.

According to the Euro+Med Plantbase (2019) *Hydrocotyle verticillata* is only known from Spain in Europe and the Mediterranean area, which is very unlikely. It is probably widely overlooked.

**Herbarium:** Bredene, D’Heye, recent gegraven poel, op plaats voormalige boerderij, in weiland, poel met veel exoten [recently dug pool, on site of former farm, in pasture, pool with many exotics] (*Hydrocotyle*, *Crassula helm-*

*sii*, *Myriophyllum brasiliense*,...), 12.08.2009, M. Leten 090812/H1 (BR 0000014461330); Bredene, D’Heye nature reserve (IFBL C1.26.11), pond, very invasive, with *Crassula helmsii*, known since 2009 (comm. M. Leten), 26.12.2013, F. Verloove 10617 (BR 0000024503464).



**Figure 3.** *Hydrocotyle verticillata* in flower in Bredene. Compared with native *H. vulgaris* leaf veins are more numerous.

## Identification key for *Hydrocotyle* in Belgium

The following identification key allows to identify the species of *Hydrocotyle* currently found in Belgium.

- 1 Leaves peltate ..... 2  
Leaves with a deep basal sinus, never peltate ..... 3
- 2 Leaves with 9-13 veins. Petiole glabrous. Inflorescence as long as or longer than subtending leaf .....  
..... ***Hydrocotyle verticillata***  
Leaves with 7-9 veins. Petiole with long patent hairs, at least in upper part. Inflorescence shorter than subtending leaf ..... *H. vulgaris*
- 3 Leaves fleshy, ca. 50-100 mm wide. Fruit distinctly stalked. Aquatic weed ..... *H. ranunculoides*  
Leaves not fleshy, ca. 10-15 mm wide. Fruit almost sessile. Turf weed ..... ***H. sibthorpioides***

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## References

- Atha D. (2017) – *Hydrocotyle sibthorpioides* and *H. batrachium* (Araliaceae) new for New York State. *Phytoneuron* 2017-56: 1-6.
- Baas W.J. & Duistermaat L. (1998) – De opmars van Grote waternavel (*Hydrocotyle ranunculoides* L.f.) in Nederland, 1996-1998. *Gorteria* 24: 77-82.
- Banfi E. & Galasso G. (eds.) (2010) – La flora esotica lombarda. Milano, Museo di Storia Naturale di Milano.
- Billiet F. (2004) – *Hydrocotyle novae-zelandiae* dans le jardin zoologique d'Anvers, nouveau pour la Belgique. *Dumortiera* 82: 26-27.
- Cannon J.F.M. (1968) – *Hydrocotyle*. In: Tutin T.G. et al. (eds.), *Flora Europaea*, vol. 2: 319. Cambridge, Cambridge University Press.
- Carretero J.L. (1997) – *Hydrocotyle verticillata* Thunb. (Umbelliferae) en la flora iberica. *Flora Montiberica* 5: 63.
- Cattorini P.E. (1952) – Una pianta ... fuori di posto. *Fitoterapia, rivista di studi ed applicazioni delle piante medicinali*, Milano 23(4): 339-348.
- Clement E.J. & Foster M.C. (1994) – Alien plants of the British Isles. London, BSBI.
- Euro+Med Plantbase (2019) – The information resource for Euro-Mediterranean plant diversity. [<http://www.emplantbase.org/home.html>]; accessed October 2019]
- Hussner A. (2007) – Zur Biologie des aquatischen Neophyten *Hydrocotyle ranunculoides* L. f. (Apiaceae) in Nordrhein-Westfalen. *Floristische Rundbriefe* 40: 19-24.
- Huxley A.J. (ed.) (1999) – The new Royal Horticultural Society dictionary of gardening. London, Macmillan.
- Lambinon J. & Verloove F. (2012) – Nouvelle Flore de la Belgique, du Grand-Duché de Luxembourg, du Nord de la France et des Régions voisines (Ptéridophytes et Spermatophytes). Sixième édition. Meise, Jardin botanique national de Belgique.
- Longevialle M. (1973) – Sur la présence à Paris de deux Umbellifères étrangères à la flore française: *Hydrocotyle sibthorpioides* Lam. et *Apium ammi* Urb., adventices envahissantes au Jardin des Plantes. *Bulletin de la Société Botanique de France* 118: 885-836.
- Mathias M.E. (1936) – The genus *Hydrocotyle* in northern South America. *Brittonia* 2: 201-237.
- Medina L. (2003) – *Hydrocotyle*. In: Nieto Feliner G. et al. (eds.), *Flora iberica*, vol. 10: 24-28. Madrid, Real Jardín Botánico.
- Reduron J.-P. (2007) – Umbellifères de France, vol. 3. *Bulletin de la Société Botanique du Centre-Ouest*, nouv. ser. Numéro spécial 28.
- She M., Watson M.F. & Cannon J.F.M. (2005) – *Hydrocotyle*. In: Wu Z.Y., Raven P.H. & Hong D.Y. (eds.), *Flora of China*, vol. 14: 14-17. Beijing, Science Press/St. Louis, Missouri Botanical Garden Press.
- Stace C. (2010) – New flora of the British Isles, 3th ed. Cambridge, Cambridge University Press.
- Van Valkenburg J. & Pot R. (2008) – *Landoltia punctata* (G. Mey.) D.H. Les & D.J. Crawford (Smal kroos), nieuw voor Nederland. *Gorteria* 33: 41-49.
- Verloove F. (2006) – Catalogue of neophytes in Belgium (1800-2005). Meise, National Botanic Garden. [*Scripta Botanica Belgica* 39.]
- Verloove F. & Heyneman G. (1999) – *Hydrocotyle ranunculoides* L.f. (Grote waternavel), snel uitbreidend in de omgeving van Gent (Oost-Vlaanderen, België). *Dumortiera* 74: 16-20.
- Viola S. (1954) – Presenza e distribuzione dell'*Hydrocotyle sibthorpioides* Lamk. nella città di Milano. *Nuovo Giornale Botanico Italiano, Firenze*, n.s. 60: 715-720.
- Watson M.F. (1997) – *Hydrocotyle*. In: Cullen J. et al. (eds.), *The European Garden Flora*, vol. 5: 392. Cambridge, Cambridge University Press.
- Webb C.J., Sykes W.R. & Garnock-Jones P.J. (1988) – *Flora of New Zealand*, vol. 4. Naturalised pteridophytes, gymnosperms, dicotyledons. Christchurch, DSIR.