



## On the genuine identity of *Hieracium amplexicaule* (Asteraceae) in Belgium and neighboring territories

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**Illustrations:** Lutgart Bollen (Fig. 1), Ward Vercruysse (Fig. 2) and Erik Molenaar (Fig. 3).

**ABSTRACT.** – The xenophyte *Hieracium amplexicaule* s.l. has been known since at least 1867 from the surroundings of Tongeren (Belgium) and Maastricht (the Netherlands). Its populations have been attributed to both *H. amplexicaule* s.str. and *H. speluncarum*. A critical review of the herbarium samples, including the type material of the relevant taxa, has shown that these populations belong to yet another species, *H. pulmonarioides*. Other populations, more recently discovered (e.g. in northern France), also belong to this (micro-)species. *Hieracium amplexicaule* s.str. does not exist in the territory of the *Nouvelle Flore de la Belgique*.

**SAMENVATTING.** – Omtrent de echte identiteit van *Hieracium amplexicaule* in België en aangrenzende gebieden. Minstens sinds 1867 is de neofiet *Hieracium amplexicaule* s.l. bekend uit Tongeren (België) en Maastricht (Nederland). Deze populaties werden in het verleden zowel toegeschreven aan *H. amplexicaule* s.str. als aan *H. speluncarum*. Een kritisch nazicht van het voorhanden zijnde herbariummateriaal, onder meer ook gebaseerd op een studie van typemateriaal van de relevante taxa, heeft aangetoond dat deze planten tot nog een andere soort behoren, *H. pulmonarioides*. Ook andere, recenter ontdekte populaties (onder meer in Noord-Frankrijk), behoren tot deze (micro-) soort. *Hieracium amplexicaule* s.str. komt niet voor in het gebied van de *Nouvelle Flore de la Belgique*.

**RÉSUMÉ.** – Sur l'identité réelle de *Hieracium amplexicaule* en Belgique et dans les régions limitrophes. Le xénophyte *Hieracium amplexicaule* s.l. est connu depuis au moins 1867 des environs de Tongres (Belgique) et Maastricht (Pays-Bas). Ses populations ont été attribuées à la fois à *H. amplexicaule* s.str. et à *H. speluncarum*. Une révision critique des échantillons d'herbier, y compris du matériel type des taxons pertinents, a démontré que ces populations appartiennent cependant à une autre espèce, *H. pulmonarioides*. D'autres populations, découvertes plus récemment (entre autres dans le nord de la France), appartiennent également à cette (micro-) espèce. *Hieracium amplexicaule* s.str. n'existe pas dans le territoire de la *Nouvelle Flore de la Belgique*.

### Introduction

*Hieracium* L. (excl. *Pilosella* Vaill.) (Asteraceae) is a complex genus with ca. 90 species and probably more than 1,000 microspecies (Mabberley 2008). Most species are triploid or tetraploid apomicts probably caused by massive interspecific hybridization in the past with subsequent polyploidization. A notable exception is the sexual diploid *H. umbellatum* L. As a result of apomixis the genus is notoriously complex in terms of taxonomy.

Eight (macro-) species of *Hieracium* are native in Belgium: *H. glaucinum* Jord., *H. lachenalii* C.C. Gmel., *H. laevigatum* Willd., *H. maculatum* Schrank, *H. murorum* L., *H. sabaudum* L., *H. schmidtii* Tausch and *H. umbel-*

*latum* L. (Lambinon & Verloove 2012). The genus is surprisingly poor in aliens. Only one species, *H. amplexicaule* L., the subject of this paper, is a very rare, locally naturalized xenophyte, known since the 1870s from rather few places. Two additional species, *H. pilosum* Schleich. ex Froel. and *H. speciosum* Willd. ex Hornem., were recorded as aliens in the 19<sup>th</sup> century (Verloove 2006).

*Hieracium amplexicaule* is readily distinguished from the native representatives of the genus in Belgium by its stem-clasping cauline leaves (Fig. 1) and the entire plant being sticky-glandular. However, this taxon is in fact a collective species [*H. amplexicaule* group or *H.* section *Amplexicaulia* (Griseb.) Scheele] and the designation of



**Figure 1.** *Hieracium pulmonarioides*, Tongeren, medieval rampart walls, June 2012.

our known populations to ‘micro-species’ proved to be much less straightforward. Historical records from the territory covered by the *Nouvelle Flore de la Belgique* (Lambinon & Verloove 2012), namely from Tongeren (Belgium) and Maastricht (the Netherlands), have been ascribed to both *H. amplexicaule* s.str. (e.g. Zahn 1929) and *H. speluncarum* Arv.-Touv. [syn.: *H. amplexicaule* subsp. *speluncarum* (Arv.-Touv.) Zahn] (e.g. van Soest 1934, 1937). In the present paper the exact identity of extant populations in Belgium, the southeastern part of the Netherlands and northern France is critically re-assessed. All proved to belong to yet another micro-species, *H. pulmonarioides* Vill. It is concisely described, depicted and all known localities are enumerated.

### Materials and methods

An inventory was made of all collections preserved in the main Belgian public herbaria: the herbarium of Meise Botanic Garden (BR), the herbarium of the University of Liège (LG) and the herbarium of the University of Ghent (GENT). More than 30 collections were examined but these originate from very few different localities. In the past two decades additional field work in northern France was carried out and a few randomly collected specimens from the surroundings of Tongeren, collected in 2012, were revised by the second author.

Specimens seen (exclusively from the studied area in Belgium, France and the Netherlands):

- **Belgium:** Montagne St. Pierre, s.d., *A. Hardy* s.n. (LG). – Tongres, vieux murs, 07.1885, *V. Gilson* in herb. *C. Baguet* s.n. (BR). – Tongres, vieux murs, 20.06.1887, *J. Hennen* s.n. (BR). – Tongres, vieux murs, 07.1887, *V. Gilson V.* in herb. *C. Baguet* s.n. (BR). – Tongres, vieux murs, 07.1889, *C. Baguet* s.n. (GENT). – Tongres, murs, 1894, *Vanden Borre* in herb. *C. Bamps* s.n. (BR). – Tongres, 12.08.1909, *A. Verhulst* in herb. *L. Magnel* s.n. (BR). – Tongres, 31.08.1909, *P. Errard* s.n. (BR). – Tongres, vieux murs, 06.1952, *A. Lefebvre* s.n. (BR). – Tongres, vieux murs, 06.1952, *A. Lawalrée* in herb. *G. André* s.n. (BR). – Tongres, murs, 14.06.1952, *L. Delvosalle* 2757 (BR). – Tongres, vieux murs, très abondant, 16.06.1952, *A. Lawalrée* 4193 (BR). – Tongres, sur vieux mur, 16.06.1952, *J.-M. Warlet* 952-4209 (BR). – Tongres, vieux murs, 16.06.1952, *Fr. Adam* in herb. *J. Legrain* s.n. (BR). – Tongres, vieux murs, 06.1954, *J. Pelgrims* s.n. (LG). – Tongeren (IFBL E7.41.32), stadsmuurruïne, 20.08.1957, *J.E. De Langhe* 480/1957 (BR). – Tongeren (IFBL E7.41.14), op de oude Romeinse wallen, 21.08.1957, *N. Cnops* 57.300 (BR). – Tongeren (IFBL E7.41.14), op oude Romeinse wallen, 21.08.1957, *N. Cnops* in herb. *A. Jans* 201/57 (BR). – Tongeren (IFBL E7.41.32), oude stadsmuur, 24.06.1961, *E. Van Rompaey* GIII/2133 (BR). – Tongres, murs, 06.1962, *J. Lebeau* s.n. (BR). – Tongeren, Romeinse muur, 1994, *J. Slembrouck* 95/969 (BR). – Kanne (Riemst), falaise de craie résultant du creusement du Canal Albert (côté NE), abondant, 09.09.2003, *J. Lambinon & al.* 03/B/564 (BR, LG). – Tongeren, vieux murs, 15.07.2012, *B. Berten* s.n. (BR). – Kanne, Tiendeberg, rochers calcaires, 09.2012, *B. Berten* (BR).

- **France:** Dép. Nord, Méricourt, SO de Lens, terriil, abondant sur le versant nord du terriil, 14.06.1998, *F. Verloove* 3113 (BR); ibidem, 06.2012, *J.-M. Tison* s.n. (priv. herb. J.-M. Tison). – Dép. Nord, Douai (centre-ville), Pont des Dominicains, au bord de la Scarpe, vieux murs, +/- 20 ex., 01.11.2010, *F. Verloove* (priv. herb. FV); ibidem, 06.2012, *J.-M. Tison* s.n. (priv. herb. J.-M. Tison).

- **the Netherlands:** [Maastricht], provient de graines de pieds poussant sur un mur à Maastricht, 06.1867, *Muller* s.n. (BR). – Maastricht, vieux murs, surtout en face de l’Hôpital et sur la vieille tour de St. Servais (existe aussi à Tongres), 07.1870, *A. Hardy* s.n. (BR). – Maastricht, sur les vieux murs de St. Servais (existe aussi à Tongres), 1870, *A. Hardy* s.n. (BR). – Maastricht, vieux murs et Tour St. Servais, 07.1871, *A. Hardy* s.n. (BR). – Maastricht, sur les vieux murs, abondant, 1872, *A. Hardy* s.n. (BR). – Maastricht, murs, 06.1872, *A. Hardy* in *H. Verheggen* s.n. (BR). – Maastricht, abondant sur les vieux murs, 09.06.1872, *A. Hardy* s.n. (BR). – Maastricht, murs, 07.1873, *A. Hardy* in *H. Verheggen* s.n. (BR). – Maastricht, vieux murs et églises, 1876, *C. Baguet* s.n. (BR). – Maastricht, vieux murs, assez commun, 06.1876, *T. Durand* s.n. (BR). – Maastricht, vieux murs, 24.06.1876, *H. Vandenbroeck* s.n. (BR). – Maastricht, 1877, *C. Baguet* s.n. (BR). – Maastricht, vieux murs (des touffes se sont implantées jusqu’au sommet de la tour de l’Eglise

St Servais), 07.1886, *T. Durand* s.n. (BR). – Maastricht, stadsmuur, 09.08.1952, *R. Enckels* s.n. (BR).

## Results

As a result of a revision of herbarium material, previously identified as *Hieracium amplexicaule*, we found that all specimens seen named as such from Belgium, the Netherlands (Zuid-Limburg) and northern France belong to *H. pulmonarioides*. Genuine *H. amplexicaule* apparently has never been recorded in this area.

*Hieracium pulmonarioides* Vill., Prospectus de l’Histoire des Plantes de Dauphiné 36, 1779.

≡ *H. amplexicaule* L. subsp. *pulmonarioides* (Vill.) Ces. in Cattaneo, Notizie Nat. Civ. Lombardia 1: 304. 1844.

Phyllopod, 10-50 cm; basal leaves to 20 cm long, broadly lanceolate to oblanceolate, strongly dentate to pinnatifid in the lower half, with simple and glandular hairs (glandular 20-50%) on the margins, and glandular hairs on the upper side; cauline leaves 2-7, relatively small, the lower obovate-panduriform, the upper ovate to subcordate, usually 1 or 2 somewhat clasping; synflorescence narrowly corymbiform, with 1-15 capitula, densely glandular, usually with few or no simple hairs; involucre 10-14 mm; receptacle sparsely and irregularly hairy; ligulae golden yellow, with ciliate teeth; stigmata greyish-yellow; achaenia 3-4 mm, dark brown when fertile, sometimes light brown and sterile. (See fig. 1-3.)

*Hieracium amplexicaule* s.str. and *H. pulmonarioides* aggr. are fairly different and readily distinguished. They are accommodated in two different informal groups (‘Series’), the series of *H. amplexicaule* and the series of *H. pulmonarioides* respectively (Tison & de Foucault 2014). *H. pulmonarioides* s.str. and *H. speluncarum* both belong with the latter and are less easily told apart.

- 1 Receptacle pits very densely long ciliate. Leaf margins with nearly all hairs glandular, simple eglandular hairs (nearly) absent ..... *H. amplexicaule* s.str.  
Receptacle pits almost glabrous, at most shortly and sparsely dentate-hairy at margins (Fig. 2). Leaf margins with predominantly simple, eglandular hairs (Fig. 3) ..... 2
- 2 Basal leaves more or less distinctly petiolate, (ob) ovate to (ob) lanceolate, dentate to pinnatifid. Cauline leaves several with internodes mostly less than twice leaf length ..... *H. pulmonarioides*  
Basal leaves long tapering and with indistinct petiole, subspathulate, entire or denticulate. Lower cauline leaves distinctly cordate at base, much smaller than basal leaves. Cauline leaves few (usually only two well-developed, the others bract-like), internodes mostly more than twice leaf length ... *H. speluncarum*

## Discussion

According to Zahn (1929) plants from Tongeren belong to *Hieracium amplexicaule* s.str. while those from Maastricht belong to *H. speluncarum*. Van Soest (1937)



**Figure 2.** *Hieracium pulmonarioides*, Dilsen-Stokkem, valley of river Maas, August 2015. The receptacular pits are almost glabrous, not densely long-ciliate.

subsequently ascribed both populations to the same species, *H. speluncarum*. He stated that both locations once were part of a single metapopulation. Other records in the same area, for instance from Aachen in Germany, have also been referred to *H. speluncarum* (Bomble & Wolgarten 2007). In the British Isles three species have been recorded as escapes from cultivation (*H. amplexicaule* s.str., *H. pulmonarioides* and *H. speluncarum*; Sell & Murrell 2006), the latter apparently being the most widespread (McCosh & Rich 2011). However, the illustration of *H. ‘speluncarum’* in the latter book fits with *H. pulmonarioides* and the argument of the authors (shape of the cauline leaf basis) is unsuitable since this shape is rather vari-



**Figure 3.** *Hieracium pulmonarioides*, Tongeren, medieval rampart walls, July 2014. The leaf margins almost exclusively bear simple, eglandular hairs.

able and ranges from moderately clasping to attenuate in *H. pulmonarioides*.

The alleged presence in western Europe of *Hieracium speluncarum* outside of its native distribution area is very surprising. It is a very poorly known species and most claims are definitely wrong. Arvet-Touvet (1886), although descriptor of both taxa, at first erroneously considered *H. speluncarum* and *H. spelaum* Arv.-Touv. ex Briq. to be synonyms. The type of the latter in fact belongs to *H. pulmonarioides*. Genuine *H. speluncarum* is a very rare species that is endemic to the northwestern part of the Alps. It is a highly specialized species that is confined to shady rock crevices (which is also highlighted by its specific epithet) and very unlikely to occur as an alien outside its native range. It is morphologically intermediate between *H. pseudocerinthae* (Gaudin) W.D.J. Koch and *H. pulmonarioides*. In experimental plots in the Conservatoire botanique national de Franche-Comté (France) it was shown that it is indeed a very fragile species.

*Hieracium pulmonarioides*, in turn, is by far the most widespread species of this group in Europe. It is regularly introduced inadvertently as an alien and also easily seems to escape from cultivation. It is a multiclonal and exceedingly variable species and more or less intermediate between *H. amplexicaule* s.str. and *H. humile* Jacq. (not between *H. amplexicaule* and *H. murorum* as sometimes presumed). Plants may be perfectly intermediate or approach either parent, probably more as a result of phenotypic plasticity than of genetic diversity (as seen while monitoring natural populations in the Alps; J.-M. Tison, unpubl. data). Plants from Douai, for instance, rather approach *H. humile*.

Interestingly, Bernard de Retz, the famous French hieraciologist, already identified a collection from Tongeren (*De Langhe* 480/1957; BR) as '*Hieracium amplexicaule* subsp. *pulmonarioides*' in 1960.

## Origin and distribution

### • Origin

*Hieracium pulmonarioides* is probably native to large parts of Central Europe (Austria, France, Germany, Italy, Liechtenstein, Spain and Switzerland; Greuter 2006–). The mentions westwards from the Alps, however, could result from mistaken determinations and/or introductions (J.-M. Tison, unpubl. data). It regularly occurs as an introduction beyond this area, either as a deliberate introduction (garden ornamental) or as an accidental alien. It is known as such from the British Isles (Sell & Murrell 2006) and Sweden (Greuter l.c.) but many claims of *H. amplexicaule* (and *a fortiori* of *H. speluncarum*) from other European countries possibly also belong to this species.

### • Distribution in Belgium, the Netherlands (Zuid-Limburg) and northern France

*Hieracium pulmonarioides* is by far best known from the ruins of the medieval ramparts in Tongeren (Belgium) and Maastricht (the Netherlands). In this area it is known

since 1867 (at first in Maastricht and from 1876 also from Tongeren; see Thielens 1871, van Soest 1934, 1937). At present *H. pulmonarioides* is very rare but still firmly established in this area: at least six different localities are known in Tongeren and the species was also discovered in several new localities in the surroundings, for instance in Kanne (Berten 2006). It was also noticed on several occasions alongside river Maas (Dilsen-Stokkem, Lanaken). To the south it has spread to Eben-Emael in Wallonia. Since 2006 *H. pulmonarioides* has also been recorded in relative abundance in the surroundings of the castle of Reinhardstein (Ovifat, Waimes). In Zuid-Limburg, in the Netherlands, it is still present in Maastricht and now also occurs in Valkenburg. In 1998 a large population was discovered on a coal mining spoil heap in Méricourt (Lens-Liévin) (dep. Pas-de-Calais, France) and regularly confirmed afterwards. In the same area *H. pulmonarioides* was also discovered in 2010 on the old brick quay walls of river Scarpe in the city of Douai (dep. Nord, France). Some additional records of '*H. amplexicaule*' exist from coal mining spoil heaps in Carvin, Courcelles and Vimy (dep. Nord and Pas-de-Calais, France) (Petit 1979), but these populations are probably lost; their exact identity thus could not be re-assessed.

## Means of introduction

Little is known about the vector of introduction of *Hieracium pulmonarioides* in its historical localities in Maastricht and Tongeren. Species from this complex are usually thought to be escapes from cultivation (Sell & Murrell 2006), although *H. amplexicaule*, nor segregates of it, are mentioned by for instance Huxley (1999), Sell (2000) or Jäger *et al.* (2008). Devos (1882) wrote "(...) sur les vieux murs des jardins (...)" which might indicate a possible garden origin. A recently discovered population in Waimes, at the Reinhardstein castle, most likely also refers to plants escaped from the former castle garden. However, records on coal slag heaps in northern France probably refer to accidentally introduced plants. Thus, multiple pathways apparently are involved, referring to both intentional and unintentional introductions.

## Habitat preference

All historical records of *Hieracium pulmonarioides* are from ruins of medieval walls. According to Bertin (2006) it preferably grows in sun-exposed places on dry and calcareous substrate. A recently discovered population from Douai grows in more or less similar circumstances. In Kanne *H. pulmonarioides* grows on steep cretaceous cliffs alongside the Albert canal. In Zuid-Limburg in the Netherlands it grows in quarries. In Méricourt it forms dense patches on a coal slag heap, but exclusively on the northeastern, more or less shady slope. In Waimes *H. pulmonarioides* grows on rocky slopes below the castle. Finally, in recent years it has also been observed on the gravelly, exposed banks of river Maas.

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