

Three new species of *Pilosella* (Asteraceae) from the Cantabrian Mountains, N Spain

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We describe three new species of *Pilosella* (Asteraceae) from the Cantabrian Mountains (N Spain): *P. adenogaliciana* Mateo & Egado, *P. orogaliciana* Mateo & Egado and *P. tardogaliciana* Mateo & Egado. All of them are intermediate species of *P. galiciana*, endemic to the NW Iberian Peninsula. For each species, we provide a detailed description, together with a discussion and a table with the diagnostic morphological characters used to separate these species from their morphologically closest species. We also provide images of type material.

Pilosella is taxonomically one of the most complicated genera of vascular plants. Its high morphological variation is caused by a combination of common hybridisation, agamospermy (aposporous type), and polyploidy ($x = 9$, diploids to octoploids have been recorded in nature) (Krahulcová *et al.* 2000).

Pilosella is often treated as a subgenus of the widely accepted genus *Hieracium*. However, the members of *Hieracium s. stricto* and *Pilosella* differ in many aspects: morphology, parthenogenetic reproduction, cytotype pattern, rate of present-day hybridisation, haploid genome size, ITS sequences and ecology (Zahn 1930, Nogler 1984, Mraz 2003, Bräutigam & Greuter 2007, Fehrer *et al.* 2007, Suda *et al.* 2007, Krahulec *et al.* 2008), and thus separation into two independent genera is currently the most widely accepted classification.

Two kinds of species in the broad sense (= species groups) are traditionally distinguished in *Hieracium* and *Pilosella*: basic species (*species principales*, *Hauptarten*) having a unique set of morphological characters, and intermediate species (*species intermediae*, *Nebenarten*, *Zwischenarten*) sharing a morphologically intermediate position between two or more basic species (von Nägeli & Peter 1885, Zahn 1921–1923). Members of the latter are considered to be of hybrid origin.

Pilosella galiciana is a basic species of the sect. *Auriculina* and it is well characterized basically by the absence of stolons (or if present, they are scarce, short and stout), by the subglabrous leaves (with only some subrigid long simple eglandular trichomes, without glandular and stellate trichomes) and by its scapes with 1–4(6) capitula. It is a very local and scarce plant

only present in mountainous areas of the NW Iberian Peninsula. Until recently, there was only one species described which was thought to have resulted from hybridisation of *P. galiciana*: *P. unamunoi* (*galiciana* × *vahliei*). Nevertheless, in recent years we have discovered and described several more species (all of them from the Cantabrian Mountains) in the genesis of which this local endemism seems to be involved (Mateo 2006, Mateo & del Egado 2007, 2010).

After the names of the new taxa, we indicate (in parentheses) the species pair that we think are most probably their progenitors. In the text, within “<” and “>” we indicate the reduction of this formula to basic species, except where both formulas are the same.

Nomenclature of taxa cited follows Bräutigam and Greuter (2008) except for some species that were described by Mateo and del Egado (2010).

***Pilosella adenogaliciana* Mateo & Egado, sp. nova (*galiciana* × *officinarum*) (Fig. 1)**

Plantae rosulatae, stolonibus brevibus vel nullis. Folia ad 1.5–3.5 × 0.5–1.2 cm, elliptica vel oblanceolato-elliptica, obtuso-mucronata, attenuata, supra viridia, laxe subrigido-pilosa, subtus laxe vel dense cano-floccosa, pilosa, eglandulosa. Scapi 4–10 cm × 1–1.5 mm alti, monocephali, floccosi et glandulosi. Involucra 7–10 × 5–8 mm. Bractee lanceolato-lineares, 1 mm latae, acutae, dense glandulosae, modice floccosae, pilosae.

TYPE: Spain. León, Villamanín, Casares de Arbás, near Cueto Negro, 42°57'67.3"N, 5°47'52.4"W, 1555 m a.s.l., wet grassland in heathland (*Vaccinium myrtillus* and *Calluna vulgaris*) clearings, 17 Aug. 2009 F. del Egado (holotype LEB 103408). — PARATYPE: Spain. León, Valdelugueros, Redilluera, Sierra de Portillas, 42°59'87.2"N, 5°27'46.0"W, 1930 m a.s.l., orotemperate silicicolous geliturbate graminoid and dwarf-chamaephyte grassland-like community, 28 June 2009 F. del Egado (LEB 103239).

Perennial herb. Phyllopodous. Stolons absent or if present, scarce, short (up to 2.5 cm in studied specimens) and stout, with leaves smaller than those of rosette. Rosette-leaves 1.5–3.5 × 0.5–1.2 cm; entire; elliptical to oblanceolate-

elliptical; rounded-obtuse and slightly mucronate at apex, gradually narrowing towards base; adaxial surface green, with some subrigid long simple eglandular trichomes; abaxial surface green to greyish-green or whitish, with few (or even absent in some leaves) to numerous (variable from one leaf to another) stellate trichomes and some long simple eglandular trichomes thinner than those of adaxial surface; without glandular trichomes. Scapes 4–10 cm tall and 1–1.5 mm in diameter, each with a single capitulum in studied specimens (it may have more), with stellate and glandular trichomes that become more abundant at apex (occasional simple eglandular trichomes can also sometimes appear). Involucre 7–10 × 5–8 mm. Involucral bracts linear-lanceolate, acute, ± 1 mm wide; with abundant black glandular trichomes and other less abundant stellate trichomes (occasional simple eglandular trichomes can also sometimes appear). Ligules yellow, outer with a dark red stripe on outer face.

It is evident that *P. adenogaliciana* has resulted from hybridisation of a species of the sect. *Pilosellina* (it has monocephalic scapes, stellate trichomes on the abaxial surface of leaves, etc.) and a species of the sect. *Auriculina* (it has some leaves with very few, or absent, stellate trichomes on the abaxial surface). The species of the sect. *Auriculina* must be *P. galiciana*, because it is the only basic species of the section present in the Cantabrian Mountains. There are also some distinctive morphological characters of *P. galiciana* which differentiate it from the other four Iberian species of the sect. *Auriculina* — *P. lactucella*, *P. vahliei*, *P. pseudovahliei* (*lactucella* × *vahliei*) and *P. unamunoi* (*galiciana* × *vahliei*) — and which *P. adenogaliciana* has inherited: stolons absent or if present, scarce, short and stout (*P. lactucella* and *P. pseudovahliei* have abundant, elongated and thin stolons) and leaves without glandular trichomes (*P. vahliei* and *P. unamunoi* have them). The species of the sect. *Pilosellina* have thin involucral bracts with abundant and dominant black glandular trichomes (also abundant at the apex of the scape); in this area it can only be *P. officinarum*. *P. adenogaliciana* occupies an intermediate morphological position between *P. galiciana* and *P. officinarum*. Its principal differences from those are presented in Table 1.

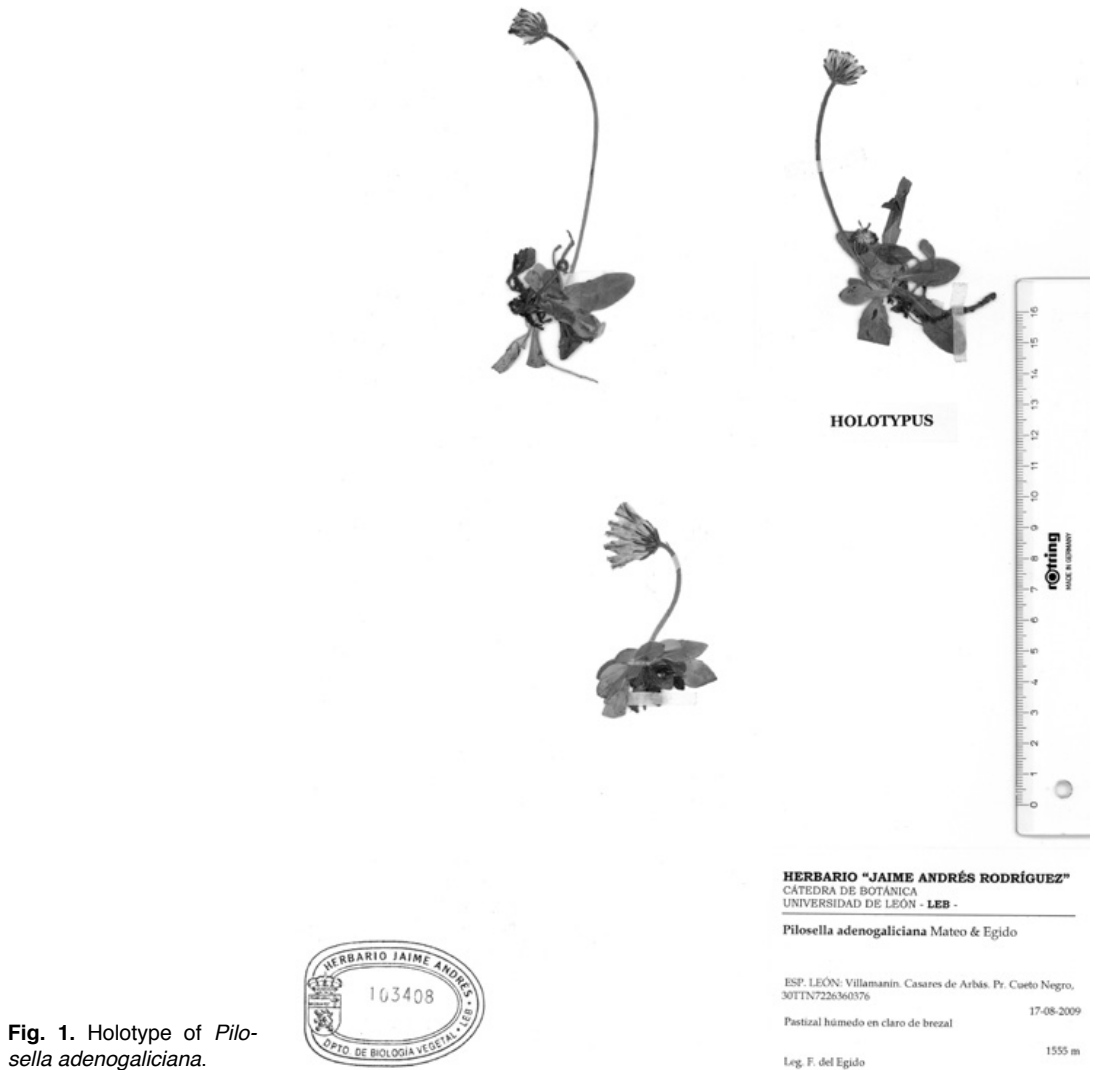


Fig. 1. Holotype of *Pilosella adenogaliciana*.

Table 1. Principal morphological differences between *Pilosella galiciana*, *P. adenogaliciana* and *P. officinarum*.

Characters	<i>P. galiciana</i>	<i>P. adenogaliciana</i>	<i>P. officinarum</i>
Stolons	absent or, if present, scarce, short and stout	absent or, if present, scarce, short and stout	abundant, elongated and thin
Number of capitula	1–4(6)	1	1
Stellate trichomes on abaxial surface of leaves	absent on all leaves	scarce or absent on some leaves	abundant on all leaves
Indumentum of involucre bracts	not very dense, with glandular, stellate and simple eglandular trichomes in similar proportions (generally glandular trichomes most abundant)	very dense, with abundant black glandular trichomes, few stellate trichomes and scarce or absent simple eglandular trichomes	very dense, with abundant black glandular trichomes and scarce or absent simple eglandular trichomes and/or stellate trichomes

Pilosella adenogaliciana is similar to the other species which are thought to have resulted from hybridisation of *P. galiciana* and other species of the sect. *Pilosellina*: the recently described *P. pseudogaliciana* (*pseudopilosella* × *galiciana*) (Mateo 2006) and *P. niveogaliciana* (*galiciana* × *saussureoides*) (Mateo & del Egado 2010); and the two species described below in this paper: *P. orogaliciana* and *P. tardogaliciana*. *Pilosella adenogaliciana* differs from *P. pseudogaliciana*, *P. niveogaliciana* and *P. tardogaliciana* basically in the involucre bracts with abundant black glandular trichomes (the involucre bracts of *P. pseudogaliciana* have abundant simple eglandular trichomes and very scarce glandular and stellate trichomes; the involucre bracts of *P. niveogaliciana* have abundant stellate trichomes, few glandular trichomes and no simple eglandular trichomes; and the involucre bracts of *P. tardogaliciana* have abundant stellate trichomes and short simple eglandular trichomes and some glandular trichomes). The abundance of black glandular trichomes at the apex of the scape and involucre bracts in *P. adenogaliciana* makes it very similar to *P. orogaliciana*. The basic difference between these two species is that *P. orogaliciana* has thicker capitula with wider involucre bracts.

***Pilosella orogaliciana* Mateo & Egado, sp. nova** (*galiciana* × *hypeurya*) (Fig. 2)

Plantae rosulatae, stolonibus brevibus vel nullis. Folia ad 2–8 × 0.5–1.5 cm, elliptica vel oblanceolato-elliptica, obtuso-mucronata, attenuata, supra viridia, laxe subrigido-pilosa, subtus laxe vel dense cano-floccosa, pilosa, eglandulosa. Scapi 4–14 cm × 1–2 mm alti, monocephali, dense floccosi et glandulosi, laxe pilosi. Involucre 9–12 × 7–10 mm. Bractee lanceolatae vel lineari-lanceolatae, 1.4–1.9 mm latae, acutae, dense nigro-glandulosae, modice floccosae, laxe pilosae.

TYPE: Spain. Asturias, Pola de Lena, Pajares, near Cueto Negro, 42°57'98.5"N, 5°47'79.7"W, 1820 m a.s.l., *Nardus stricta* grassland, 11 Aug. 2009 F. del Egado (holotype LEB 103416). — PARATYPE: Spain. León, Villamanín, Casares de Arbás, near Cueto Negro, 42°57'46.4"N, 5°47'53.5"W, 1640 m a.s.l., wet grassland in heathland (*Vaccinium myrtillus*

and *Calluna vulgaris*) clearings, 4 Aug. 2009 F. del Egado (LEB 103390).

Perennial herb. Phyllopodous. Stolons absent or if present, scarce, short (up to 5 cm in studied specimens) and stout, with leaves smaller than those of rosette. Rosette-leaves 2–8 × 0.5–1.5 cm; entire; elliptical to oblanceolate-elliptical; rounded-obtuse and slightly mucronate at apex, gradually narrowing towards base; adaxial surface green, with some subrigid long simple eglandular trichomes; abaxial surface green to greyish-green or whitish, with few (or even absent in some leaves) to numerous (variable from one leaf to another) stellate trichomes and some long simple eglandular trichomes thinner than those of adaxial surface; without glandular trichomes. Scapes 4–14 cm tall and 1–2 mm in diameter, each with a single capitulum in studied specimens (it may have more), with stellate and glandular trichomes that become more abundant at apex (occasional simple eglandular trichomes can also sometimes appear). Involucre 9–12 × 7–10 mm. Involucre bracts lanceolate to linear-lanceolate, ± acute, 1.4–1.9 mm wide; with abundant long black glandular trichomes that cover other less abundant whitish stellate trichomes and some occasional simple eglandular trichomes. Ligules yellow, outer with a dark red stripe on outer face.

As with *P. adenogaliciana*, it is evident that *P. orogaliciana* has resulted from hybridisation of a species of the sect. *Pilosellina* and a species of the sect. *Auriculina*. The species of the sect. *Auriculina* must again be *P. galiciana* for the same reasons. The species of the sect. *Pilosellina* also have abundant black glandular trichomes at the apex of the scape and on involucre bracts, as with *P. officinarum*, but in this case the scapes and capitula should be somewhat thicker and the involucre bracts somewhat wider. The species with these characters, and also the dominant species of *Pilosella* in both localities where *P. orogaliciana* has been found, is *P. hypeurya* (*hoppeana* × *officinarum*). *Pilosella orogaliciana* occupies an intermediate morphological position between *P. galiciana* and *P. hypeurya*. Its principal differences from these are presented in Table 2.

The most similar species to *P. orogaliciana* is the recently described *P. arbasiana* (*hypeurya*



HOLOTYPUS

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Pilosella orogaliciana Mateo & Egido

ESP. ASTURIAS: Pola de Lena. Pajares. Pr. Cueto Negro,
30TTN7191260966

Cervunal

11-08-2009

Leg. F. del Egido

1820 m



Fig. 2. Holotype of *Pilosella orogaliciana*.

Table 2. Principal morphological differences between *Pilosella galiciana*, *P. orogaliciana* and *P. hypeuria*.

Characters	<i>P. galiciana</i>	<i>P. orogaliciana</i>	<i>P. hypeuria</i>
Number of capitula	1–4(6)	1	1
Stellate trichomes on abaxial surface of leaves	absent on all leaves	scarce or absent on some leaves	abundant on all leaves
Width of involucre bracts	1–1.5 mm	1.4–1.9 mm	1.3–2 mm
Indumentum of involucre bracts	not very dense, with glandular, stellate and simple eglandular trichomes in similar proportions (generally glandular trichomes most abundant)	very dense, with abundant black glandular trichomes, few stellate trichomes and some occasional simple eglandular trichomes	very dense, with abundant black glandular trichomes and scarce or absent simple eglandular trichomes and/or stellate trichomes

× *unamunoi*) <*galiciana–hoppeana–officinarum–vahlii*> (Mateo & del Egado 2007). The basic difference between these two species is that *P. arbasiana* presents some glandular trichomes on the leaves due to the influence of *P. vahlii*. The differences with *P. adenogaliciana* (also very similar) have been indicated previously in this paper. The other species which are thought to have resulted from hybridisation of *P. galiciana* and other species of the sect. *Pilosellina*: the recently described *P. pseudogaliciana* (*pseudopilosella* × *galiciana*) (Mateo 2006) and *P. niveogaliciana* (*galiciana* × *saussureoides*) (Mateo & del Egado 2010), and *P. tardogaliciana* (described below in this paper) are less similar. *Pilosella orogaliciana* differs clearly from all of them because it has thicker capitula and wider involucral bracts with abundant long black glandular trichomes (these other three species have narrower bracts with dominant simple eglandular or stellate trichomes and glandular trichomes are always very scarce or absent).

***Pilosella tardogaliciana* Mateo & Egado,
sp. nova (*galiciana* × *tardans*) (Fig. 3)**

Plantae rosulatae, stolonibus brevibus vel nullis. Folia ad (1.5)3–10 × 0.5–1.5 cm, elliptica vel oblanceolato-elliptica, obtuso-mucronata, attenuata, supra viridia, laxe subrigido-pilosa, subtus laxe vel dense cano-floccosa, pilosa, eglandulosa. Scapi 3–20 cm × 1–1.5 mm alti, monocephali, dense floccosi, laxe hirsuti et glandulosi. Involucra 7–12 × 5–9 mm. Bractee lanceolato-lineares, ad 1 mm latae, acutae, dense cano-floccosae et hirsutae, laxe glandulosae.

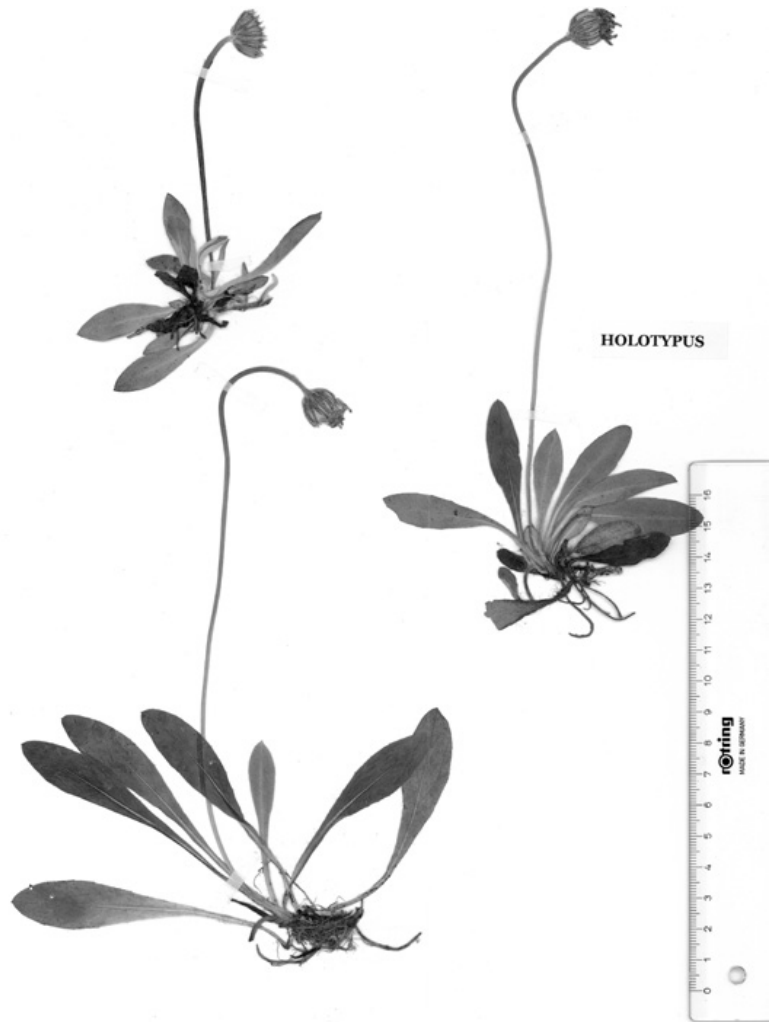
TYPE: Spain. León: Villamanín, Millaró, Sierra de Currillos, 42°58'64.9"N, 5°37'71.4"W, 1610 m, wet grassland, 6 Aug. 2008 *F. del Egado* (holotype LEB 101502; isotype VAL 202502). — PARATYPE: Spain. León, Cármenes, Canseco, Morala peak, 43°00'14.0"N, 5°29'12.3"W, 2100 m a.s.l., orotemperate silicicolous geliturbate graminoid and dwarf-chamaephyte grassland-like community, 28 June 2009, *F. del Egado* (LEB 103234). Villamanín, Busdongo, Canto la Tusa, 42°58'32.8"N, 5°43'83.1"W, 1480 m a.s.l., silicicolous pasture, 21 Aug. 2009 *F. del Egado* (LEB 103375).

Perennial herb. Phyllopodous. Stolons absent or if present, scarce, short (up to 3.5 cm in stud-

ied specimens) and stout, with leaves smaller than those of rosette. Rosette-leaves (1.5)3–10 × 0.5–1.5 cm; entire; elliptical to oblanceolate-elliptical; rounded-obtuse and slightly mucronate at apex, gradually narrowing towards base; adaxial surface green, with some subrigid long simple eglandular trichomes; abaxial surface green to greyish-green or whitish, with few (or even absent in some leaves) to numerous (variable from one leaf to another) stellate trichomes and some long simple eglandular trichomes thinner than those of adaxial surface; without glandular trichomes. Scapes 3–20 cm tall and 1–1.5 mm in diameter, each with a single capitulum in studied specimens (it may have more), with abundant stellate trichomes along whole length of stem whereas simple eglandular and glandular trichomes are generally very scarce except towards apex where they become more abundant. Involucre 7–12 × 5–9 mm. Involucral bracts linear-lanceolate, acute, ± 1 mm wide; with abundant white stellate trichomes and white or greyish (usually black at base) short (± 2 mm) simple eglandular trichomes and some glandular trichomes). Ligules yellow, outer with a dark red stripe on outer face.

As with the two species described previously in this paper, *P. tardogaliciana* has resulted from hybridisation of a species of the sect. *Pilosellina* and a species of the sect. *Auriculina*, and again, the species of the sect. *Auriculina* must be *P. galiciana* for the same reasons. In this case, the species of the sect. *Pilosellina* must be *P. tardans* (*pseudopilosella* × *saussureoides*), because it is the only species in the area from which *P. tardogaliciana* could have inherited the thin involucral bracts with abundant white stellate trichomes and short white or greyish simple eglandular trichomes. *Pilosella tardogaliciana* occupies an intermediate morphological position between *P. galiciana* and *P. tardans*. Its principal differences from these are presented in Table 3.

The most similar species to *P. tardogaliciana* is the recently described *P. mampodrensis* (*tardans* × *unamunoi*) <*galiciana–pseudopilosella–saussureoides–vahlii*> (Mateo & del Egado 2007). The basic difference between these two species is that *P. mampodrensis* presents some glandular trichomes on the leaves due to the



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Pilosella tardogaliciana Mateo & Egido

ESP. LEÓN: Villamanín. Millaró. Sierra de Curillos,
30TTN8565761752

06-08-2008

Pastizal húmedo

Leg. F. del Egido

1610 m



Fig. 3. Holotype of *Pilosella tardogaliciana*.

influence of *P. vahli*. *Pilosella tardogaliciana* is also similar to other species recently described which are thought to have resulted from hybridisation of *P. galiciana* and other species of the sect. *Pilosellina*: *P. pseudogaliciana* (*pseudopilosella* × *galiciana*) (Mateo 2006), and *P. niveogaliciana* (*galiciana* × *saussureoides*) (Mateo & del Egido 2010). It differs from *P. pseudogaliciana* basically by the involucre bracts with

more stellate trichomes and less simple eglandular trichomes (which are shorter) and from *P. niveogaliciana* basically by the involucre bracts with abundant simple eglandular trichomes (the involucre bracts of *P. niveogaliciana* have abundant stellate trichomes, few glandular trichomes and no simple eglandular trichomes). The differences with *P. adenogaliciana* and *P. orogaliciana* are indicated previously in this paper.

Table 3. Principal morphological differences between *Pilosella galiciana*, *P. tardogaliciana* and *P. tardans*.

Characters	<i>P. galiciana</i>	<i>P. tardogaliciana</i>	<i>P. tardans</i>
Stolons	absent or, if present, scarce, short and stout	absent or, if present, scarce, short and stout	abundant, elongated and thin
Number of capitula	1–4(6)	1	1
Stellate trichomes on abaxial surface of leaves	absent on all leaves	scarce or absent on some leaves	abundant on all leaves
Indumentum of involucre bracts	not very dense, with glandular, stellate and simple eglandular trichomes in similar proportions (generally glandular trichomes most abundant)	very dense, with abundant white stellate trichomes and short white or greyish simple eglandular trichomes and some glandular trichomes	very dense, with abundant white stellate trichomes and short white or greyish simple eglandular trichomes

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