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

Fermín del Egido¹,* & Gonzalo Mateo²

¹) Departamento de Biodiversidad y Gestión Ambiental (Área de Botánica), Facultad de CC Biológicas y Ambientales, Campus de Vegazana, Universidad de León, ES-24071 León, Spain (*corresponding author's e-mail: fegim@unileon.es)
²) Jardín Botánico e Instituto Cavanilles de Biodiversidad y Biología Evolutiva, Universidad de Valencia, C/Quart 80, ES-46008 Valencia, Spain

Received 2 Feb 2012, final version received 28 Mar 2012, accepted 29 Mar. 2012


We describe three new species of *Pilosella* (Asteraceae) from the Cantabrian Mountains (N Spain): *P. adenogaliciana* Mateo & Egido, *P. orogaliciana* Mateo & Egido and *P. tardogaliciana* Mateo & Egido. 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) (Krahulec 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, Fehr 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 \((\text{galiciana} \times \text{vahlii})\). 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 Egido 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 Brättingam and Greuter (2008) except for some species that were described by Mateo and del Egido (2010).

**Pilosella adenogaliciana** Mateo & Egido, *sp. nova* (galiciana \( \times \) officinarum) (Fig. 1)

Plantae rosulatae, stolonibus brevibus vel nullis. Folia ad 1.5–3.5 \( \times \) 0.5–1.2 cm, elliptica vel ob lanceolato-elliptica, obtusa-mucronata, attenuata, supra viridia, laxe subrigida-pilosa, subtus laxe vel dense cano-floccosa, pilosa, eglandulosa. Scapi 4–10 cm \( \times \) 1–1.5 mm alta, monocephali, floccosi et glandulosi. Involucra 7–10 \( \times \) 5–8 mm. Bracteae lanceolato-lineares, 1 mm latae, acutae, dense glandulosae, modice floccosae, epiloseae.

**Type:** Spain. León, Villamanín, Casares de Arbas, near Cueto Negro, 42\(^\circ\)57'67.3"N, 5\(^\circ\)47'52.4"W, 1555 m a.s.l., wet grassland in heathland (\( V. \) myrtillus and Calluna vulgaris) clearings, 17 Aug. 2009 *F. del Egido* (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 gramnoid and dwarf-chamaephyte grassland-like community, 28 June 2009 *F. del Egido* (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 \( \times \) 0.5–1.2 cm; entire; elliptical to ob lanceolate-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 eglandular 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 glandul ar trichomes that become more abundant at apex (occasional simple eglandular trichomes can also sometimes appear). Involucre 7–10 \( \times \) 5–8 mm. Inv olucral bracts linear-lanceolate, acute, \( \pm \) 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 mon ocephalic 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 — \( P. \) lactu cella, \( P. \) vahlii, \( P. \) pseudo vahlii \((\text{lactu cella} \times \text{vahlii})\) and \( P. \) unamunoi \((\text{galiciana} \times \text{vahlii})\) — and which \( P. \) adenogaliciana has inherited: stolons absent or if present, scarce, short and stout \((P. \) lactu cella and \( P. \) pseudo vahlii have abundant, elongated and thin stolons) and leaves without glandular trichomes \((P. \) vahlii 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.
Table 1. Principal morphological differences between Pilosella galiciana, P. adenogaliciana and P. officinarum.

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

Fig. 1. Holotype of Pilosella adenogaliciana.
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 Egido 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 involucral bracts with abundant black glandular trichomes (the involucral bracts of P. pseudogaliciana have abundant simple eglandular trichomes and very scarce glandular and stellate trichomes; the involucral bracts of P. niveogaliciana have abundant stellate trichomes, few glandular trichomes and no simple eglandular trichomes; and the involucral 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 involucral 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 involucral bracts.

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

Plantae rosulatae, stolonibus brevibus vel nullis. Folia ad 2–8 × 0.5–1.5 cm, elliptica vel oblongo-lanceolata-elliptica, obtusum-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. Involucra 9–12 × 0.5–1.5 cm; entire; elliptical to oblongoceolate-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. Involucral 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 involucral bracts, as with P. officinarum, but in this case the scapes and capitula should be somewhat thicker and the involucral 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 (hypeurya × 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
Table 2. Principal morphological differences between *Pilosella galiciana*, *P. orogaliciana* and *P. hypeuria*.

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>P. galiciana</em></th>
<th><em>P. orogaliciana</em></th>
<th><em>P. hypeuria</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of capitula</td>
<td>1–4(6)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Stellate trichomes on abaxial surface of leaves</td>
<td>absent on all leaves</td>
<td>scarce or absent on some leaves</td>
<td>abundant on all leaves</td>
</tr>
<tr>
<td>Width of involucral bracts</td>
<td>1–1.5 mm</td>
<td>1.4–1.9 mm</td>
<td>1.3–2 mm</td>
</tr>
<tr>
<td>Indumentum of involucral bracts</td>
<td>not very dense, with glandular, stellate and simple eglandular trichomes in similar proportions (generally glandular trichomes most abundant)</td>
<td>very dense, with abundant black glandular trichomes, few stellate trichomes and some occasional simple eglandular trichomes</td>
<td>very dense, with abundant black glandular trichomes and scarce or absent simple eglandular trichomes and/or stellate trichomes</td>
</tr>
</tbody>
</table>
× unamunoi) <galiciana–hoppeana–officinarum–vahlii> (Mateo & del Egido 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 Egido 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 & Egido, *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 oblongolanceolata–elliptica, obtuso–obtusata, supra viridia, laxe subrigido-pilosa, adaxial surface green, 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. Bractae lanceolato-lineares, ad 1 mm latae, acutae, dense cano-floccosa et hirsuta, laxe glandulosae.*

**Type**: Spain. León: Villamanín, Millaró, Sierra de Currillos, 42°58’64.9”N, 5°37’11.4”W, 1610 m, wet grassland, 6 Aug. 2008 *F. del Egido* (holotype LEB 101502; isotype VAL 202502). — **Paratypes**: Spain. León, Cármenes, Canseco, Morala peak, 43°00’14.0”N, 5°29’21.3”W, 2100 m a.s.l., orotomertate silicicolous geliturbate graminoid and chamaephyte grassland-like community, 28 June 2009, *F. del Egido* (LEB 102324). 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 Egido* (LEB 103375).

Perennial herb. Phyllopodous. Stolons absent or if present, scarce, short (up to 3.5 cm in studied specimens) and stout, with leaves smaller than those of rosette. Rosette-leaves (1.5)3–10 × 0.5–1.5 cm; entire; elliptical to oblongolanceolate–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 stel late 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 Egido 2007). The basic difference between these two species is that *P. mampodrensis* presents some glandular trichomes on the leaves due to the
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 Egidio 2010). It differs from *P. pseudogaliciana* basically by the involucral bracts with more stellate trichomes and less simple eglandular trichomes (which are shorter) and from *P. niveogaliciana* basically by the involucral bracts with abundant simple eglandular trichomes (the involucral 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.

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

Acknowledgements

We thank an anonymous reviewer for the corrections and helpful suggestions to improve the manuscript.

References


This article is also available in pdf format at http://www.annbot.net