

***Scorzoneroideis montana* (LAM.) HOLUB s. l. (Asteraceae – Cichorieae) and its Relatives**

By

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Summary

ZIDORN C. 2008. *Scorzoneroideis montana* (LAM.) HOLUB s. l. (*Asteraceae*-*Cichorieae*) and its relatives. – *Phyton* (Horn, Austria) 48(1): 51–59.

The splitting of the genus *Leontodon* into two distinct genera – *Leontodon* s. str. and *Scorzoneroideis* – based on molecular and morphological characters is more and more accepted. In the European mountain ranges six population groups of *Scorzoneroideis montana* agg. are occurring. These groups inhabit areas geographically more or less disjunctive from each other. A new taxonomic system for these groups is proposed. Based on morphological characters and distribution areas three species are accepted: *S. montana* (L.) HOLUB s.l., *S. montaniformis* (WIDDER) GUTERMANN, and *S. pseudotaraxaci* (SCHUR) HOLUB. *S. montana* is divided into four subspecies: *S. m.* subsp. *montana*, *S. m.* subsp. *melanotricha* (VIERH.) GUTERMANN, *S. m.* subsp. *breviscapa* (DC.) GREUTER, and *S. m.* subsp. *illyrica* (K. MALÝ) ZIDORN, comb. nova.

Zusammenfassung

ZIDORN C. 2008. *Scorzoneroideis montana* (LAM.) HOLUB s. l. (*Asteraceae*-*Cichorieae*) and its relatives. [*Scorzoneroideis montana* (LAM.) HOLUB s. l. (*Asteraceae*-*Cichorieae*) und ihre Verwandten]. – *Phyton* (Horn, Austria) 48(1): 51–59.

Die Aufspaltung der Gattung *Leontodon* in zwei Genera, *Leontodon* s. str. und *Scorzoneroideis*, welche morphologisch und durch molekularbiologische Daten begründbar ist, beginnt sich durchzusetzen. Von *Scorzoneroideis montana* agg. kommen

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in den Gebirgen Europas sechs mehr oder weniger disjunkte Populationsgruppen vor. Für diese wird eine neue taxonomische Gliederung vorgeschlagen. Aufgrund morphologischer und geographischer Gegebenheiten werden drei Arten unterschieden, nämlich *S. montana* (L.) HOLUB s. l., *S. montaniformis* (WIDDER) GUTERMANN und *S. pseudotaraxaci* (SCHUR) HOLUB. *S. montana* wird in vier Unterarten gegliedert: *S. m. subsp. montana*, *S. m. subsp. melanotricha* (VIERH.) GUTERMANN, *S. m. subsp. breviscapa* (DC.) GREUTER und *S. m. subsp. illyrica* (K. MALÝ) ZIDORN, comb. nova.

1. Introduction

SAMUEL & al. 2006 proved based on molecular methods, that *Leontodon* subgenus *Oporinia*, which was defined by WIDDER 1975 on a morphological and karyological basis, is indeed better regarded as a genus separate from the remainder of *Leontodon* (ca. 25 species). Some of the necessary new combinations in *Scorzoneroides* (ca. 25 species) were already published by HOLUB 1977a,b, who proposed the split of *Scorzoneroides* s.str. (i.e. *Leontodon* sectio *Oporinia* sensu WIDDER 1975) from *Leontodon* on morphological grounds. The remaining necessary combinations in *Scorzoneroides* were provided by GUTERMANN 2006 and GREUTER & al. 2006. As the list of existing and new combinations given by GREUTER & al. 2006 is not annotated, some of the existing problems in the taxonomy and nomenclature of the genus *Scorzoneroides* are unclear. This situation is worsened in *S. montana* agg. by the fact that the group was misleadingly treated by FINCH & SELL 1976 in *Flora Europaea*. Moreover, GREUTER & al. 2006 do not cite GUTERMANN's 2006 combination *S. montana* subsp. *melanotricha* (VIERH.) GUTERMANN in their list of accepted names.

2. Characteristics of the *Scorzoneroides montana* agg.

The *Scorzoneroides montana* agg. includes a number of closely related taxa, which inhabit similar habitats – high alpine limestone scree and stony meadows on basic soils – in the Alps, the Abruzzi, the Balkans, and the Carpathians. The plants are small perennials of 1 to 20 cm height with an oblique or vertical truncate stock. Each plant has 1–2(–4) flowering stems with one capitulum each, the indumentum is solely composed of simple eglandular hairs. Stems are erect before anthesis and have 0–2 bracts; leaves are 10–90 × 3–10 mm and linear to oblanceolate, dentate to runcinate pinnatifid, narrowed at base into a winged petiole, with few to numerous long hairs. The involucre is 9–18 × 9–14 mm; bracts are linear lanceolate, obtuse with more or less dense, long simple eglandular hairs. Ligules are deep yellow (similar in colour to ligules of *Leontodon hispidus* L.) on both faces, concolorous with the yellow stigmata. Achenes are 6.5–7.5 mm long, pale brown, cylindrical or slightly fusiform, slightly narrowed at apex, weakly transversely muricate; pappus hairs are disposed in one row and plumose. $2n = 12$. In contrast to the data given in *Flora*

Europaea (FINCH & SELL 1976) the area of *S. montana* s.l. does not include the Pyrenees and no unambiguous records from Spain are known.

S. montana is often confused with high alpine populations of *Leontodon hispidus* L., high alpine populations of *Scorzoneroides autumnalis* (L.) MOENCH with solitary capitula, and taxa from the group of *Scorzoneroides pyrenaica* (GOUAN) HOLUB s.l. [i.e. *S. pyrenaica* (GOUAN) HOLUB s.str., *S. cantabrica* (WIDDER) HOLUB, and *S. helvetica* (MÉRAT emend. WIDDER) HOLUB]. *S. montana* differs from *L. hispidus* by its indumentum, which is solely composed of simple hairs (*L. hispidus* has bifid hairs, or hairs with 3, rarely up to 4 branches) and the erect buds of its capitula (buds of capitula from *L. hispidus* are nodding before anthesis (WIDDER 1931). *S. autumnalis* is readily distinguished by its discoloured stigmata and frequently also by reddish stripes on the outer ligules (*S. montana* has yellow stigmata and concolorous yellow ligules). Morphological differentiation from *S. pyrenaica* s.l. and *S. montana* is less clear cut: leaves of *S. pyrenaica* are usually less deeply dentate, stems are usually higher, the involucre tends to be smaller, and the colour of the pappus is slightly different. The best character is the indumentum of the involucre: dark simple eglandular hairs intermixed with shorter whitish hairs in *S. pyrenaica* s.l. and long simple eglandular hairs in *S. montana* s.l. (the colours of these hairs differ between the taxa of *S. montana* s.l. as outlined below). In the field *S. pyrenaica* s.l. and *S. montana* are also differentiated by their habitat preferences: acidic soils and alpine grasslands in *S. pyrenaica* s.l. versus limestone scree or alpine grasslands on alkaline soil in *S. montana*.

3. Members of the *Scorzoneroides montana* agg.

Scorzoneroides montana sensu latissimo, i.e. in the delimitation of *Leontodon montanus* LAM. as proposed by FINCH & SELL 1976 includes populations from the Alps, Abruzzi, Carpathians, and the Balkans. In total there are six morphologically and geographically distinct population groups within *S. montana* sensu latissimo:

3.1. *Group montana*: Populations from the Western Alps extending to North West Tyrol in the Northern Alps and to East Tyrol in the Southern Alps, which are morphologically characterized by a dense light grey to white indumentum of the involucre, white pappus hairs, and by stems, which are conspicuously inflated below the capitula. As the type material from *Leontodon montanus* LAM. is from the Western Alps and exhibits these characteristics, these Western alpine populations are representing *S. montana* (LAM.) HOLUB sensu stricto.

A scan of a voucher specimen of a member of this group is accessible free of charge in the digital specimen collection of the Herbarium Berlinense at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon montanus* LAM.

subsp. *montanus* and the unique barcode number of the specimen selected is B 10_021691.

3.2. Group *melanotricha*: Populations from the Eastern Alps – but excluding the outermost North Eastern Austrian Alps (WIDDER 1950) – are morphologically characterized by an indumentum with black hairs and a white pappus. This taxon was firstly described as *Leontodon montanus* forma *melanotrichus* VIERH. and later classified as *L. montanus* subsp. *melanotrichus* (VIERH.) WIDDER ex PITTONI. Like in the Western alpine *montana* group, members of this group are characterized by stems, which are conspicuously inflated below the capitula.

A scan of a voucher specimen of a member of this group is also available at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon montanus* var. *melanotricha* VIERH. and the unique barcode number of the specimen selected is B 10_021694.

3.3. Group *montaniformis*: Populations from the outermost North Eastern Alps, restricted to the Alps of Styria and Lower Austria and so far only reported from mounts Veitsch, Schneealpe, Rax, and Schneeberg. These populations are morphologically intermediate between the *melanotricha* and *pseudotaraxaci* group and have a dark-haired involucre but are additionally characterized by dingy white to cream coloured pappus hairs (WIDDER 1950). Stems of members of the *montaniformis* group are less conspicuously inflated below the capitula than those from the groups *montana* and *melanotricha* (WIDDER 1950). The *montaniformis* populations are also intermediate in size and subtle differences in leaf shape between groups 2 (*melanotricha*) and 6 (*pseudotaraxaci*). This taxon was first formally described by WIDDER as *Leontodon montaniformis* WIDDER (WIDDER 1950).

A scan of a voucher specimen of a member of this group is also available at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon montaniformis* WIDDER and the unique barcode number of the specimen selected is B 10_021695.

3.4. Group *breviscapa*: Populations from the Central Italian Abruzzi. These populations share most of the morphological characters of the *melanotricha* group but are usually smaller and have deeper yellow coloured ligules. In addition, stems seem to be less conspicuously inflated below the capitula in the *breviscapa* group than in the *melanotricha* and *montana* group. Moreover, these populations are genetically separated from all alpine populations by a 450 km geographic gap to the closest South alpine populations and by a 500 km gap to the populations in the Balkans. This taxon was originally described as *Leontodon croceus* var. *breviscapus* DC.

A scan of a voucher specimen of a member of this group is also available at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon montanus* subsp. *breviscapus* (DC.) CAVARA & GRANDE and the unique barcode number of the specimen selected is B 10_021692.

3.5. Group *illyrica*: Populations from the Balkans in the border region of Albania, Bosnia-Herzegovina, Montenegro, and Serbia. These populations resemble populations from the *melanotricha* group and also share some characteristics of the *breviscapa* group (lesser average height, stems not conspicuously inflated below the capitula). These populations, too, are geographically separated from the populations in the Abruzzi (500 km), Alps (500 km), and Carpathians (350 km) by huge geographic gaps. These populations were described as *Leontodon illyricus* K. MALÝ (MALÝ 1904). This taxon was also treated as a species by HOLUB 1977a.

A scan of a voucher specimen of a member of this group is also available at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon illyricus* MALÝ and the unique barcode number of the specimen selected is B 10_021693.

3.6. Group *pseudotaraxaci*: Populations from the Carpathians are composed of plants which are usually higher, have a dark-haired indumentum, and are moreover characterized by a pale-yellowish achene and pappus colour. Like in the alpine groups *montana* and *melanotricha*, stems are usually conspicuously inflated below the capitula (WIDDER 1950). Members of the group are traditionally known as *Leontodon pseudotaraxaci* SCHUR or *Leontodon montanus* subsp. *pseudotaraxaci* (SCHUR) FINCH & P. D. SELL.

A scan of a voucher specimen of a member of this group is also available at <http://ww2.bgbm.org/herbarium/>. The current storage name in the Berlin digital specimen images collection is *Leontodon pseudotaraxaci* SCHUR and the unique barcode number of the specimen selected is B 10_021696.

With the exception of the *illyrica* group, the author has studied members of all groups not only as voucher specimens but also in the field (Western Alps, Central Alps, North Eastern Alps, Eastern Alps, South Carpathians, and Abruzzi).

4. Proposed New System for *Scorzoneroides montana* agg.

Conclusively, all groups of *Scorzoneroides montana* s.l. have similar habitat preferences and are morphologically very similar. Differential characters between the groups are subtle [differences in indumentum density and hair colour, differences in pappus hair colour, differences in ligule colour varying from gold-yellow (like *Leontodon hispidus* L.) to saffron-yellow (like *Carthamnus tinctorius* L.), and differences in the de-

gree of inflation of the stems below the capitula]. Some of the morphological characters like the plant height are also influenced by differing growing conditions within the distribution area. Populations from the Abruzzi, the Balkans, and the Carpathians are geographically and conclusively genetically isolated from populations in the Alps and from each other; they are therefore in spite of their morphological similarity regarded as separate evolutionary entities and it is deemed desirable to have distinct scientific names for each of these entities.

In the light of these facts all taxa of the group can be regarded as members of one informal group *Scorzoneroides montana* agg. The taxa within the *Scorzoneroides montana* aggregate, which are morphologically slightly but distinctly differentiated by their pappus characteristics are regarded as species: *Scorzoneroides montana*, *Scorzoneroides montaniformis*, and *Scorzoneroides pseudotaraxaci*. Within *S. montana* there are two groups, which differ in the colour of the indumentum of the involucre: *Scorzoneroides montana* s.str. from the Western Alps with a white to light grey indumentum and the remaining members of the group from the Abruzzi, the Balkans, and the greater part of the Eastern Alps with a black to dark grey indumentum. There are populations e.g. in North Western Tyrol (e.g. in the Samnaun group SSW Zebblasjoch, CZ-98-00231) with intermediate plants and also populations with plants assignable to both morphological groups (GUTERMANN 2006). The alpine representatives of *S. montana* are therefore split into two subspecies (*montana* and *melanotricha*) based on the differing colour of their indumentum. The taxa from the Abruzzi and the Balkans are also considered as subspecies (*breviscapa* and *illyrica*, respectively), both are geographically sharply delimited from the other members of the group. Moreover, the analyzed vouchers (also compare digital specimens cited above) of both Abruzzian and Illyrian population groups differ from their alpine counterparts in their stems, which are not or only slightly inflated below the capitula (a characteristic these two population groups share with *S. montaniformis*). In contrast, stems of *S. montana* subsp. *montana* and *S. m.* subsp. *melanotricha* are distinctly inflated below the capitula. Moreover, populations from the Abruzzi (*breviscapa* group) are characterized by ligules of a darker yellow (giallo-zafferano = saffron-yellow, FIORI 1927; similar to *Carthamnus tinctorius* L.) than their alpine counterparts (giallo-dorati = golden yellow, FIORI 1927, similar to *Leontodon hispidus* L.). In the original description by MALY 1904 the ligule colour in *illyrica* is described as „dunkelgelb“ (= dark yellow); according to observations in the field by T. WRABER (Ljubljana; in litt.) the ligule colour in Komovi and Prokletije Mts. is dark yellow, approximately similar to *Leontodon hispidus*, not to *Scorzoneroides crocea*.

The *breviscapa* and the *illyrica* group differ in their leaf-shape from each other. Plants from the Abruzzi (*breviscapa* group) tend to have linear

leaves, which are more elongate than leaves from the remainder of *S. montana* agg. (GUTERMANN 2006). In contrast, *S. illyrica* is characterized by lanceolate to oblanceolate leaves like the other groups of *S. montana* agg. Conclusively, the system outlined below is proposed.

- 1 *Scorzoneroides montana* (L.) HOLUB 1977a s. l.
 - a *Scorzoneroides montana* (L.) HOLUB subsp. *montana*
 - b *Scorzoneroides montana* (L.) HOLUB subsp. *melanotricha* (VIERH.) GUTERMANN 2006
 - c *Scorzoneroides montana* (L.) HOLUB subsp. *breviscapa* (DC.) GREUTER 2006
 - d *Scorzoneroides montana* (L.) HOLUB subsp. *illyrica* (K. MALÝ) ZILDORN, **comb. nova.** – Basionym: *Leontodon illyricus* K. MALÝ [Verh. zool.-bot. Ges. Wien 54: 271, 1904].
- 2 *Scorzoneroides montaniformis* (WIDDER) GUTERMANN 2006
- 3 *Scorzoneroides pseudotaraxaci* (SCHUR) HOLUB 1977a

5. Differences of the Proposed System to Flora Europaea

In addition to the differing genus name – the currently accepted name *Scorzoneroides* instead of *Leontodon* – the following differences to the system provided by FINCH & SELL 1976 result from the system outline above.

1. In contrast to FINCH & SELL 1976 *Scorzoneroides montaniformis* and *Scorzoneroides pseudotaraxaci* are regarded as species not as subspecies.
2. In contrast to FINCH & SELL 1976, the difference between the taxon from the Eastern Alps (*melanotricha*) and the one from the North Eastern Alps (*montaniformis*) is recognized.
3. The three entities (*breviscapa*, *illyrica*, *melanotricha*) lumped by FINCH & SELL together with the narrow endemic from the North Eastern Alps (*montaniformis*) into their *Leontodon montanus* subsp. *montaniformis* are split into three subspecies. The morphologically distinct taxon from the North Eastern Alps is regarded – as indicated above – as a distinct species.

6. Differences of the Proposed Concept to Euro+Med PlantBase

GREUTER and co-workers recognize *Scorzoneroides montana*, *S. montaniformis*, and *S. pseudotaraxaci* as species. Within *Scorzoneroides montana*, *Scorzoneroides montana* subsp. *breviscapa* (DC.) GREUTER is preliminarily accepted as a subspecies.

Indirect evidence from the provided distribution maps in GREUTER 2005–2007 indicates that *Scorzoneroides montaniformis* is used in the sense of WIDDER 1950, for a narrow endemic taxon from the North Eastern

Alps. However, based on the same indirect information, the name *Scorzoneroides montana* subsp. *breviscapa* is applied not only to the taxon from the Abruzzi, to which it is based upon and traditionally used for, but obviously to all taxa with a white pappus and a black involucre [groups 2 (*melanotricha*), 4 (*breviscapa*), and 5 (*illyrica*) as defined in chapter 3)].

7. Conclusion

The new system proposed here has two major advantages: 1. Nomenclatural stability: The name *breviscapa*, which was always only used to distinguish the populations of *Scorzoneroides montana* from the Abruzzi from populations of the *Scorzoneroides montana* agg. from other regions (mainly the Alps) can continue to be used in the traditional sense. Likewise the well introduced name *melanotricha* can still be used for Eastern alpine representatives of *S. montana* agg. with a dark involucre. 2. Each of the geographically distinct groups within the aggregate gets a scientific name. This is most important for the few populations of *S. montana* s.l. in the Balkans, which are otherwise lumped with the comparatively common taxon *S. montana* subsp. *melanotricha* from the Eastern Alps.

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