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Taxonomic revision of West-Alpine cushion plant species belonging to *Androsace* subsect. *Aretia*

Cédric Dentant^a , Sébastien Lavergne^b and Valéry Malécot^c 

^aParc national des Ecrins, Domaine de Charance, Gap, France; ^bLaboratoire d'Écologie Alpine (LECA), CNRS – University Grenoble Alpes – University Savoie Mont-Blanc, Grenoble, France; ^cIRHS, Agrocampus Ouest, INRA, Université d'Angers, Beaucoz, France

ABSTRACT

High-altitude rockjasmynes (genus *Androsace*) are a paramount example of evolutionary radiations in temperate mountains of the Northern Hemisphere. Yet, we show here that their taxonomy is incomplete and has been subject to many historical mistakes, probably due to the lack of exploration of mountains by the classical botanists who described these species. Here we wish to clarify the application of names with regard to four defined morphotypes, typical of high-elevation zones of the Western Alps, in order to set a definitive basis for morphological delimitation of a likely new species discovered in the Mont Blanc range (species not described in this work). To do so, we review the historical taxonomic treatments and positions, carefully reconsider types and species names for these morphotypes, and designate lectotypes and epitypes for each of them. In particular, we confirm the validity of names commonly used to refer to the taxa *Androsace alpina*, *Androsace helvetica*, and *Androsace pubescens*. We show that *Androsace vandellii* is an invalid name and that *Androsace argentea* should be used instead. Our work illustrates the utility of historical herbaria to clarify the taxonomy of complex groups of plants growing in inaccessible environments such as high-altitude regions.

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lectotype; epitype;
phylogeny; high mountain;
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Introduction

Androsace sect. *Aretia* subsect. *Aretia*, [Clade]/*Eu-Aretia* is an infrageneric group of alpine species composed of plants occurring in southwestern European mountains (Alps and Pyrenees): *Androsace alpina* (L.) Lam., *Androsace brevis* (Hegetschw.) Ces., *Androsace cylindrica* DC., *Androsace komovensis* Schönswetter & Schneeweiss, *Androsace helvetica* (L.) All., *Androsace hausmannii* Leyb., *Androsace lactea* L., *Androsace mathildae* Levier, *Androsace obtusifolia* All., *Androsace pubescens* DC., *Androsace vandellii* (Turra) Chiov., *Androsace vitaliana* (L.) Lapeyr., and *Androsace wulfeniana* (Sieber ex Koch) Rchb. (Schneeweiss et al. 2004; Schönswetter and Schneeweiss 2009).

Three of these species are strictly endemic to mountain ranges outside the Alps: *A. cylindrica* (Pyrenees), *A. komovensis* (Balkans), and *A. mathildae* (Apennines). Three of the remaining 10 species have a distribution restricted to the Central Alps: *A. hausmannii*, *A. brevis*, and *A. wulfeniana*. The species *A. pubescens* was long thought to occur in the Pyrenees, but it was recently argued that it has been mixed up with the morphologically similar, but genetically differentiated, *A. cylindrica* (Schneeweiss et al. 2017) – thus *A. pubescens* seems to be endemic to the Western Alps.

Overall, only seven species of this clade occur in Western Alps: *A. helvetica*, *A. alpina*, *A. vandellii*, *A.*

pubescens, *A. vitaliana*, *A. obtusifolia*, and *A. lactea*. Here we focus on four cushion species of this Western group which present taxonomic and nomenclatural issues for taxonomists and field botanists, namely *A. helvetica*, *A. alpina*, *A. vandellii*, and *A. pubescens*. Clarifying taxonomy is a prior requirement for on-going research on the phylogeny of this subsection (Boucher et al. 2012), and more generally for understanding the origin and structure of high-alpine plant communities (Marx et al. 2017). Recently, a field assessment of endangered plants of the Northern French Alps listed a morphologically distinct *Androsace* taxon, which could be described as a new species (Jordan 2015). As this new *Androsace* taxon shares features with both *A. pubescens* and *A. alpina*, it is of utmost importance to set a clear and definitive basis for the morphological delimitation of the four aforementioned species. Here we propose to reconsider the nomenclature and taxonomy of these species and to select proper types for each of them.

Features historically associated to species names in the genus *Androsace*

Morphological features

Considering historical species' features cited in the protologues, four morphological characters are relevant to be exposed:

- (i) leaf shape: short or long, apex pointed or round
- (ii) leaf organization: imbricated or loose
- (iii) stalk size: visible stalk or very short stalk (flowers more or less sessile)
- (iv) corolla colour: white or reddish

These features are generally not sufficient to distinguish species. However, they are good complements to the last and ultimate feature: the shape of leaf trichomes (simple, furcate, branched, or radiate). Villars (1787) was the first author to consider the shape of trichomes as a relevant character to distinguish species in the group. While merging *Aretia* in *Androsace*, he wrote: “pour distinguer les *Aretia* des *Androsace*, il falloit ou avoir recours aux tiges uniflores, ou à la forme des poils. [...] Dans le second [cas], nous n'aurions eu que l'*Androsace villosa* L. [...] car elle a des poils simples, articulés ou séparés par des diaphragmes, caractère qui nous a paru lui être particulier” [To distinguish *Aretia* from *Androsace*, it would have been necessary to refer either to single-flowered stems or to hair shape, [...]. In the second [case] we would have had only *Androsace villosa* L. [...] because it has simple hairs, articulated or separated by diaphragms, a character that seemed restricted to this species]. This key feature was usually absent from early protologues and was not necessarily cited in later ones.

Locus classicus

When the *locus classicus* of a described species is available, it may be decisive to scrutinize the plants occurring in this location.

Features of the four cushions of *Androsace*

The four aforementioned *Androsace* taxa (currently named *Androsace helvetica*, *A. alpina*, *A. vandellii*, and *A. pubescens*) correspond to four morphotypes that can be summarized as in Table 1.

History of taxa description

Since Haller (1742), at least two west-alpine cushion species of *Androsace* have been recognized by different authors. In Haller (1742), the *Helvetica* morphotype is called “*Aretia cauliculis teretibus foliis imbricatis, floribus sessilibus*”, while the *Alpina* morphotype is

called “*Aretia villosa scapis unifloris*”. Later, Linnaeus (1753) provided these two morphotypes with binomials, namely *Diapensia helvetica* L. for the *Helvetica* morphotype and *Aretia alpina* L. for the *Alpina* morphotype. However, herbarium samples used in Linnaeus' works show that under the name *Diapensia helvetica* Linnaeus merged individuals belonging to the *Helvetica* morphotype and individuals with radiate hairs assigned to the *Vandellii-Argentea* morphotype. Similarly, most available specimens collected by Allioni (herbarium of Torino – TO) under the name *Androsace helvetica* are in fact morphologically similar to what we call here the *Vandellii-Argentea* morphotype, i.e. bearing leaves with dense radiate trichomes. Furthermore, in Allioni's herbarium, a sheet with a short note written by Allioni and reproduced in his *Flora pedemontana* (1785) holds under the same name specimens of both morphotypes: *Helvetica* (simple trichomes, plant growing exclusively on limestone) and *Vandellii-Argentea* (radiate trichomes, plant growing exclusively on siliceous substratum). These observations clearly highlight the fact that two different morphotypes were actually merged under the name *Androsace helvetica* ever since its first use.

Consequently, it is not surprising that successive authors gave species descriptions mixing both morphotypes or concerning just one or the other. The first case of such mixed description is the one of Villars (1787), where he gave the following description under the name *Diapensia helvetica*: “poils ramifiés en Y & en goupillon” [ramified Y-shaped and bottlebrush-like hairs], where “ramified hairs” corresponds to the *Vandellii-Argentea* morphotype. Similarly, in the second edition of the *Flore Française* (1805), Lamarck and de Candolle described the *Vandellii-Argentea* morphotype using a name – *Androsace imbricata* Lam. – directly linked to *Diapensia helvetica* L. They even provided a precise description: “feuilles [...] tapissées d'un duvet court, blanc et serré, composé de poils rameux et rayonnants” [leaves [...] lined with a short, tied and white fluff, composed of ramified and radiant hairs], which are definitely the specific features of the *Vandellii-Argentea* morphotype. It is fundamental to note that they also gave a new name for the taxa with simple trichomes, i.e. for the *Helvetica* morphotype: *Androsace bryoides* DC. Despite a misinterpretation of the Linnaean binomial *Diapensia helvetica*, they first made a distinction

Table 1. Features of the four morphotypes corresponding to *Androsace helvetica*, *A. alpina*, *A. vandellii*, and *A. pubescens*, based on current taxonomic works and floras such as Pignatti (1982), Aeschmann and Burdet (2005), Fischer et al. (2008), Tison and Foucault (2014), Jordan (2015), Dentant (2017).

Morphotype	Leaf shape	Leaf organization	Stalk size	Corolla colour	Shape of leaf trichomes
<i>Alpina</i>	long with pointed apex	loose	visible (elongated)	reddish	radiate
<i>Helvetica</i>	short with acute apex	imbricated, forming columns	very short	white	simple
<i>Pubescens</i>	heterogeneous (short or long), with rounded apex	loose	mainly short	white	mainly simple
<i>Vandellii-Argentea</i>	short with rounded apex	imbricated, forming short columns	very short	white	radiate

between the two taxa sharing small, imbricated leaves and white flowers: the first one with simple trichomes (*Helvetica* morphotype, then named *Androsace bryoides* DC.), the second one with radiate trichomes (*Vandellii-Argentea* morphotype, then named *Androsace imbricata* Lam.). While describing the *Helvetica* morphotype, they also noted that: “*Cette plante a le port et presque tous les caractères de l’androsace embriquée* [i.e. the *Vandellii-Argentea* morphotype], *avec laquelle on l’a sans doute confondue*” [This plant shares the habitus and almost all characters of *Androsace imbricata*, with which it was probably confused]. Consequently, while recognizing that the *Vandellii-Argentea* morphotype (i.e. *Androsace imbricata*) could have been mistaken for the *Helvetica* morphotype (i.e. *Androsace bryoides*), they used wrong specific names.

Regarding the *Alpina* morphotype, Haller (1768, 274) was the first author to recognize morphological variation within it, listing three varieties, mainly on the basis of geography and colour of flowers (α white, β pink, γ red). However, it is Villars (1787) who distinguished taxa that may be related to different morphotypes. Under the name *Androsace aretia* Vill., he recognized three varieties: var. “a. *Incana*” and var. “b. *Hirsuta pilis foliorum ramosis*”, both with ramified trichomes – the first one with white flowers, the second one with red flowers – and var. “c. *Hirsuta pilis folior. simplicibus, floribus albis*” [simple leaf hairs, white flowers] for which he added “*La dernière se trouve quelquefois à feuilles rondes desséchées, très denses, et se rapproche de la Diapensia, tandis que les fleurs axillaires, et les poils simples l’en éloignent*” [The last [variety] is sometimes found with rounded, dry, very dense leaves and is close to the *Diapensia*, while it is differentiated by its axillary flowers and simple hairs]. This third mentioned variety, with simple trichomes, white flowers, and loose cushion, refers to the *Pubescens* morphotype. Later, as in the case of the confusion between the *Helvetica* and *Vandellii-Argentea* morphotypes, de Candolle (in Lamarck and de Candolle 1805) was the first to separate the *Alpina* morphotype and the *Pubescens* morphotype at the specific level. Indeed, de Candolle, in the third edition of the *Flore Française*, highlighted the specific features of this new species compared to those of *Androsace alpina*: “*elle en diffère [...] par ses poils simples et nullement rameux*” [it differs from it [...] by its simple hairs, nowhere ramified]. The difference from the *Helvetica* morphotype is a little bit more subtle: “*feuilles [...] jamais serrées ni embriquées comme dans l’androsace faux-bry; les feuilles sont oblongues planes, pubescentes*” [leaves never packed or imbricated as for the *androsace faux-bry*; the leaves are oblong flat, pubescent].

Interpretation and typification of names

In the following part, for each new legitimate name we provide information from the protologue, the indication regarding the original material, the taxonomic assignation of this material, the species typification, and the

homotypic (i.e. nomenclatural) synonyms. For each new combination we indicate the basionym. For illegitimate superfluous names, we provide nomenclatural justification of the illegitimacy, and the name whose type is included and explanations regarding the illegitimacy.

(i) ***Alpina* morphotype** (ramified trichomes; loose cushion; peduncle mainly elongated; corolla mainly pink)

i1. ***Androsace alpina* (L.) Lam.**

*Publication place

Fl. Franç. 3: 641 (1779)

*Combination based on

Aretia alpina L. (i4)

*Typification

See under the basionym *Aretia alpina* L. (i4)

i2. ***Androsace aretia* Vill. nom. illeg.**

*Publication place

Hist. Pl. Dauphiné 2: 469 (1787)

*Nomenclatural justification

In 1787, Villars created the name *Androsace aretia* as the name, in the genus *Androsace*, of *Aretia alpina* L. Considering Art. 11.4 and Art 52.1 (see Appendix 2 for the detailed cited articles) of the International Code of Nomenclature (ICN) (McNeill et al. 2012), he should have used the Linnaean epithet as it includes its type. *Androsace aretia* Vill. is therefore an illegitimate and superfluous name.

*Name whose type is included

Aretia alpina L. (i4)

i3. ***Androsace pedunculata* Clairv. nom. illeg.**

*Publication place

Man. Herbor. Suisse: 57 (1811)

*Nomenclatural justification

By citing *Aretia alpina* as a synonym of his *Androsace pedunculata*, Clairville provided a new, superfluous name for *Aretia alpina* L. Considering current nomenclatural rules, Clairville should have used Linnaeus’ epithet (i.e. *alpina*). *Androsace pedunculata* Clairv. is an illegitimate name under Art 52.1 of ICN (McNeill et al. 2012)

*Name whose type is included

Aretia alpina L. (i4)

i4. ***Aretia alpina* L.**

*Publication place

Sp. Pl. 1: 141 (1753)

*Information from the protologue

In the prologue of *Aretia alpina*, Linnaeus (1753) referred to a species described by Haller (1742) under the polynomial “*Aretia villosa scapis unifloris*”. The locality provided by Linnaeus, i.e. “*Habitat in Vallesiae monte Loch dicto*” does not correspond to the information provided by Haller (1742), but was linked with Burser’s herbarium by De Beer (1955). During our study, this link with Burser’s material was also identified. Unlike De Beer, we did not identify this link based on Savage (1937) but

on the basis of a footnote in Linnaeus (1749). In this text, which is the printed version of a thesis defended in 1745 by Rolando Martin, a note is associated to the polynomial that will be cited under *Aretia alpina* by Linnaeus (1753). This note reads “ARETIA villosa scapis unifloris Hall. Helv. 486 t.8. habetur a Bursero sub SEDI saxatilis variegato flore C.B. nomine, quae dici potest ANDROSACE caulescens, foliis alternis, pedunculis unifloris” [our translation: The ARETIA villosa scapis unifloris in Haller [Enumeratio methodica stirpium Helvetiae indigenarum 486 Tab. 8] occurs in Burser’s herbarium under the name SEDI saxatilis variegato flore C.B. [of Caspard Bauhin] which may be said ANDROSACE caulescens, foliis alternis, pedunculis unifloris]. From this note which consolidates De Beer’s arguments, we can ascertain that Linnaeus had seen Burser’s herbarium while dealing with *Aretia alpina*.

*Original material

The original material used by Linnaeus to name *Aretia alpina* consists of:

(a) herbarium material

– in Burser’s herbarium (Uppsala): UPS [UPS-BURSER 16(1)-71]!

(b) illustration

– Haller’s illustration of *Aretia villosa scapis unifloris* in Haller (1742) *Enumeratio methodica stirpium Helvetiae indigenarum*, 2: tab. VIII. (Figure 1)

*Taxonomic assignation of the original material

Both Burser’s sample and Haller’s illustration can be assigned to the *Alpina* morphotype. Additionally, Haller’s material (P [P-HALL 16-052]!, right part of the sheet (Figure 2)) also belongs to the *Alpina* morphotype.



Figure 1. Original material of *Aretia alpina* L. (Haller 1742).



Figure 2. Haller’s material of *Alpina* morphotype (P-HALL 16-052) (photo: Cécile Aupic, herbarium of Paris, P).

*Typification

In order to clarify the application of the name and considering that typification is better while based on a specimen, we chose to typify *Aretia alpina* on the basis of Burser’s material (Figures 3a and 3b).

***Aretia alpina* L. (Sp. Pl. 1: 141. 1753)**

– **LECTOTYPUS (designated here)**: Switzerland, Canton of Valais; collector: J. Burser; UPS [UPS-BURSER 16(1)-77]! (Figure 3a and 3b)

*Homotypic synonyms

Androsace alpina (L.) Lam.

Androsace aretia Vill. nom. illeg.

Androsace pedunculata Clairv. nom. illeg.

i5. ***Androsace multiflora* (Vand.) Moretti nom. illeg.**

*Publication place

Bibliot. Ital. Giorn. Lett. 28: 344 (1822)

*Nomenclatural justification

Based on *Aretia multiflora* Vand., this combination is, however, illegitimate by homonymy, because of the publication of the name *Androsace multiflora* Lam. in 1779. This earlier name, despite being also illegitimate – it is a replacement name for *Androsace septentrionalis* L. – makes Moretti’s combination illegitimate (cf. Art. 53.1 Note 1 of ICN (McNeill et al. 2012)).

*Typification

See under *Aretia multiflora* Vand. (i7)

i6. ***Androsace vandellii* Chiov.**

*Publication place

Nuovo Gior. Bot. Ital. n.s., 20: 21–29 (1919)

*Nomenclatural justification

In 1919, Chiovenda published a relevant study on taxonomic ambiguities on a taxon he finally named “*Androsace vandellii* (Turra) Chiov” (Chiovenda 1919).

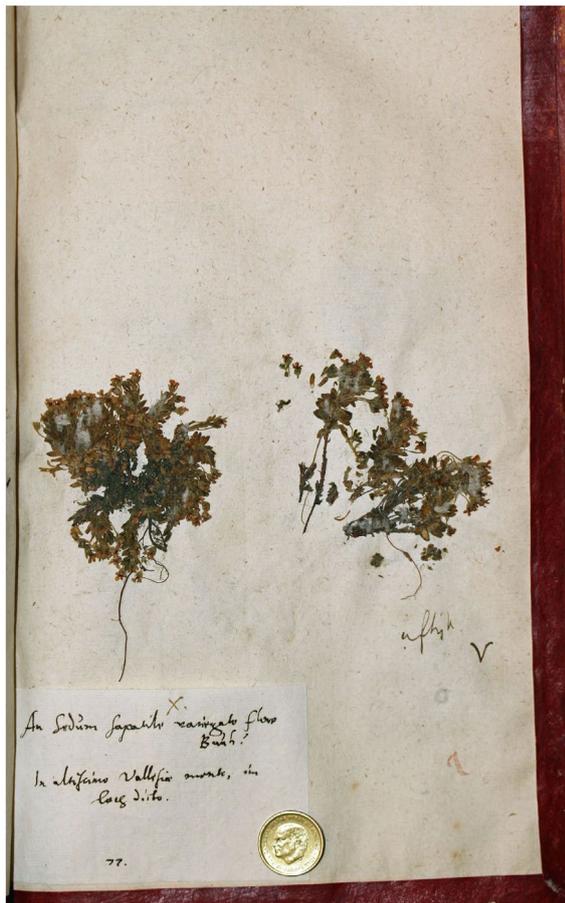


Figure 3(a). Lectotypus of *Aretia alpina* L. (UPS-BURSER 16(1)-77), allowing by extension a clear typification of *Androsace alpina* (L.) Lam. (photo: Mats Hertson, herbarium of Uppsala, UPS).

However, despite the quality of this work, the author took several erroneous positions, voluntarily or not. The presumed basionym of *Androsace vandellii* (Turra) Chiov. is *Aretia vandellii* Turra, published in Turra (1780), which is illegitimate, being superfluous to *Aretia multiflora* Vand., published in 1771.

The binomial *Androsace vandellii* given by Chioevenda is a replacement name strictly based on the same type as the one of *Aretia vandellii* Turra. As *Aretia vandellii* is illegitimate, and as the epithet *vandellii* was re-used by Chioevenda at the same rank, Chioevenda's name is then itself illegitimate, unless Vandelli's epithet (i.e. *multiflora*) is unavailable for use in the genus *Androsace* (cf. Art. 58.1 Note 1 of ICN). This is the case as the name *Androsace multiflora* was published in 1779 by Lamarck. Thus, despite being illegitimate (it was published as a replacement name for *Androsace septentrionalis* L.), Lamarck's name makes Vandelli's epithet unavailable for use in *Androsace*. Consequently, the name *Androsace vandellii* Chiov. – not “*Androsace vandellii* (Turra) Chiov.” – can be treated as a legitimate replacement name for *Aretia multiflora* Vandelli.

*Name whose type is included
Aretia multiflora Vandelli (i7)



Figure 3(b). Zoom on radiate hairs of the *Aretia alpina* L. lectotypus (UPS-BURSER 16(1)-77) (photo: Mats Hertson, herbarium of Uppsala, UPS).

i7. *Aretia multiflora* Vandelli

*Publication place

Fasc. Pl.: 8 (1771)

*Information from the protologue

Vandelli provided a relatively long description and pointed out that the plant occurs in “Mediolanensibus Montibus”, i.e. in the mountain of Milano (Italia)

*Original material

We did not find any specimen of this species (or close ones) in his herbarium (Lisboa – LISU).

*Taxonomic assignation of original material

The description of his species made by Vandelli does not provide sufficient diagnosis to interpret it but gives details that point to the *Alpina* morphotype: “*flores nutantes, rubri, folia imbricata, sessilia, lineari-cuneiformia, apice subrotundo, aut acuminato [...]*” [our translation: flowers bent, reddish, leaves imbricated, sessile, linear-cuneiform, apex subround or pointed]. He also wrote “differs from Haller’s species 468 t.8”, in which the *Helvetica* and *Vandellii-Argentea* morphotypes were merged (cf. § History of taxa description). From all this, we consider that the name *Aretia multiflora* Vandellii actually applies to the *Alpina* morphotype.

*Homotypic synonyms

Androsace multiflora (Vand.) Moretti nom. illeg.

Aretia vandellii Turra nom. illeg.

Androsace vandellii Chiov.

i8. *Aretia vandellii* Turra nom. illeg.

*Publication place

Fl. Ital. Prod.: 633 (1780)

*Nomenclatural justification

In his publication, Turra made a clear reference to a name cited in a letter from Domenico Vandelli (“*scapis multifloris. Vandell. Epist.*”). Vandelli described the same species, with the same description, in 1771 (*Fasciculus plantarum cum novis generibus et speciebus* 8) and named it *Aretia multiflora*. Therefore, in regard to the Art. 58.1

of ICN (McNeill et al. 2012), the name *Aretia vandellii* given by Turra to the species described by Vandelli is a superfluous name and turns out to be illegitimate.

*Name whose type is included

Aretia multiflora Vandelli (i7)

(ii) **Helvetica morphotype** (simple trichomes only; cushion very dense; leaves forming columns; peduncle absent; corolla white)

iii1. ***Androsace bryoides* DC.**

*Publication place

Fl. Franç. [ed. 3] 3: 440 (1805)

*Information from the protologue

De Candolle provided a name that may apply, according to him, to the use of the name *Aretia helvetica* by Hoffmann (in *Deutschlands Flora* 3: 91, 1800). He used a question mark to indicate some doubts. However, he provided a long description, specifying the presence of simple trichomes. He also gave a long list of material: “je l’ai reçue de mon frère qui la trouvée au mont Saxonet, au grand Bornand et à la Dent-d’Oche près Genève; et de M. Clarion qui la ramassée dans les montagnes de Seine en Provence. Il est probable qu’elle existe dans toutes les Alpes” [I received it from my brother who found it at the mount Saxonet, the grand Bornand, and the Dent-d’Oche near Geneva; and from Mr Clarion who collected it in the mountains of Seine in Provence. It is likely that this species exists everywhere in the Alps].

*Original material

Three herbarium specimens:

– France, dept. Haute-Savoie: Dent d’Oche (Alps); collector: J.-M.-F. de Candolle, determiner: A. P. de Candolle; G [G00139541]!

– Switzerland: Stockhorn; collector: N. C. Seringe, determiner: A. P. de Candolle; G [G00139435]!

– (Locality undefined); collector: J.-C.-L. Colaud de la Salcette, determiner: A. P. de Candolle; G [G00139544]!

*Taxonomic assignation of original material

On the basis of the precise description provided by de Candolle and on the original material, the name *Androsace bryoides* applies to the *Helvetica* morphotype.

***Typification**

In order to strengthen the link with the name *Androsace helvetica* (L.) All. and to acknowledge the clear separation of the *Helvetica* morphotype from the *Vandellii-Argentea* morphotype made by de Candolle, we selected as lectotype of the name *Androsace bryoides* Lam. the sample also selected as epitype of the name *Diapensia helvetica* L. (cf. ii7)

***Androsace bryoides* DC. (Fl. Franç. [ed. 3.] 3: 440. 1805)**

– **LECTOTYPUS (designated here)**: France, dept. Haute-Savoie: Dent d’Oche (Alps); collector: J.-M.-F. de Candolle, determiner: A. P. de Candolle; G [G00139541]! (Figure 4)

*Homotypic synonyms

Aretia bryoides (DC.) Loisel



Figure 4. Lectotypus of *Androsace bryoides* DC. and epitypus of *Diapensia helvetica* L. (G-DC, G00139541) allowing by extension a clear typification of *Androsace helvetica* (L.) All. (photo: herbarium of Geneva, G).

ii2. ***Androsace diapensia* Villars nom. illeg.**

*Publication place

Hist. Pl. Dauphiné 2: 472 (1787)

*Nomenclatural justification

Villars (1787) created the name *Androsace diapensia* while treating Linnaeus’ *Diapensia helvetica* as a member of the genus *Androsace*. As for *Androsace aretia*, Villars should have used the epithet created by Linnaeus, i.e. *helvetica*. *Androsace diapensia* Vill. is consequently a superfluous and illegitimate name (cf. Art 52.1 of ICN (McNeill et al. 2012)).

*Name whose type is included

Diapensia helvetica L. (ii7)

ii3. ***Androsace helvetica* (L.) All.**

*Publication place

Fl. Pedem. 1: 91 (1785)

*Combination based on

Diapensia helvetica L.

*Typification

See under the basionym *Diapensia helvetica* L. (ii7)

ii4. ***Androsace imbricata* Lam. nom. illeg.**

*Publication place

Fl. Franç. 3: 641 (1779)

*Nomenclatural justification

Lamarck (1779) cited *Diapensia helvetica* L. as a synonym of his *Androsace imbricata*. It is probably due to the selection of a “more appropriate” epithet while transferring the name to the *Androsace* genus. Lamarck stated that this plant was observed in Dauphiné by Villars, thus did not only occur in Helvetia. Anyhow, Lamarck should

have used Linnaeus' epithet. *Androsace imbricata* Lam. is thus a superfluous and illegitimate name under Art 52.1 of ICN (McNeill et al. 2012).

*Name whose type is included

Diapensia helvetica L. (ii7)

ii5. *Aretia bryoides* (DC.) Loisel

*Publication place

Fl. Gall. 1: 111 (1806)

*Combination based on

Androsace bryoides DC.

*Typification

See under the basionym *Androsace bryoides* DC. (ii1)

ii6. *Aretia helvetica* (L.) L.

*Publication place

Syst. Veg. ed. 13: 162 (Linnaeus 1774)

*Combination based on

Diapensia helvetica L.

*Typification

See under the basionym *Diapensia helvetica* L. (ii7)

ii7. *Diapensia helvetica* L.

*Publication place

Sp. Pl. 1: 143 (1753)

*Information from the protologue

In his famous *Species plantarum* (Linnaeus 1753), Linnaeus clearly referred to a species described by Haller (1742). Linnaeus cited Haller's polynomial "*Aretia cauliculis teretibus foliis imbricatis, floribus sessilibus*", as well as the locality: "*Habitat in Alpibus Helveticis Gemmi & Pündtnerberg*". In citing the polynomial *Androsace alpina minima* Comm. Lit. Nor. 1731 p. 380, Haller (1742) linked himself to one of his own texts from 1731 (Haller 1731), where only "*Gemmi M.*" is accounted for his finding. Additionally, in both Haller (1742) and Haller (1731), Conrad Gesner is cited as the discoverer of this species. The geographical indications provided by Haller are "*in Alpibus Abbatiscelesibus* [i.e. Appenzell]" (1731) and "*G[esner]. ex altissimis locis M. Pündtnerberg*" (1742). Linnaeus (1753) also quoted his own polynomial "*Androsace caulescens, foliis alternis, pedunculis unifloris*", from *Amoenitates Academicae* 1 (Linnaeus 1749). This dissertation, dedicated to the identification of Joachim Burser's herbarium, associates sample 179 of the 16th volume of Burser's herbarium, i.e. "*Sedum saxatile humillimum, foliis dentisissime compactis*", with Haller's polynomial.

Haller (1742) made an original and fairly complete description of the taxon, whereas Linnaeus made a much shorter one. From both authors we learn that this plant has very short, oval, hirsute, and imbricated leaves ("*folia brevissima, ovalia, imbricatim se contegunt [...] tota hirsuta*") with white flowers ("*floris [...] lactea*"). With regard to specimens of this species occurring in the *locus classicus* provided by Haller (i.e. Gemmi pass), two other relevant features are striking: the dense cushion form, with exclusively simple leaf trichomes.

*Original material

Original material used by Linnaeus to write *Species plantarum* (1753) consists in material linked to the polynomials cited in the protologue and in Linnaeus' own material. The original material for the name *Diapensia helvetica* L. is thus composed of:

(a) herbarium material

– in Burser's herbarium (Uppsala): UPS [UPS-BURSER 16(1)-71]! (Figure 5)

– in Linnaeus' herbarium at Stockholm: S-LINN [S09–35873]! (Figure 6a and 6b)

There is one sample under this name in the Linnaean herbarium at the Linnean Society of London (LINN 196.1). As it lacks a *Species Plantarum* number, it cannot be part of the original material.

(b) illustrations

– Haller's illustration of *Aretia caulibus teretibus, foliis imbricatis, floribus sessilibus* in Haller (1742) *Enumeratio methodica stirpium Helvetiae indigenarum*, 2: tab. VIII (Figure 7a).

*Taxonomic assignment of original material

Both Burser and S-LINN specimens, eligible to be designated as the lectotype of *Diapensia helvetica*, have ramified trichomes and therefore correspond to the *Vandellii-Argentea* morphotype. The sample conserved at LINN, which cannot be interpreted as original material, also belongs to the *Vandellii-Argentea* morphotype (Figure 8). Regarding Haller's illustration, despite the absence of details, the provided locality consists only of individuals belonging to the *Helvetica* morphotype. Additionally, Haller's material, conserved at P (P-HALL 16–051, middle-left material) (Figure 7b), bears the 1731 polynomial (i.e. *Androsace alpina minima*). However, this material seems heterogeneous and may belong to different morphotypes (*Helvetica* and likely *Vandellii-Argentea*).

*Typification

We decided to be conservative about the use of the name *Androsace helvetica* (L.) All., that is currently used for a species with dense and simple trichomes, exclusively growing on limestone (Pignatti 1982; Aeschmann & Burdet 1994; Fischer et al. 2008; Tison and Foucault 2014; Dentant 2017). The choice is motivated by the wish to avoid misinterpretation of this name in case of complete revision of the genus. Because of the taxonomic heterogeneity of the original material, the only option is to designate Haller's drawing cited by Linnaeus (Haller 1742) as a lectotype. However, in itself, this lectotype is not sufficient to clearly distinguish this taxon from close ones (lack of trichome feature). Therefore, with respect to the article 9.8 of the ICN, an epitype has to be designated. We decided to select a specimen from the de Candolle's herbarium, this botanist being the first one to clearly distinguish the *Helvetica* morphotype (under the name *Androsace bryoides*) from the *Vandellii-Argentea* morphotype (under the name *Androsace imbricata*).

***Diapensia helvetica* L. (Sp. Pl. 1: 141. 1753)**

– **LECTOTYPUS (designated here)**: F. Haller (1742) *Enumeratio methodica stirpium Helvetiae indigenarum*, 2: tab. VIII (drawing designated by "*ARETIA caulibus teretibus, foliis imbricatis, floribus sessilibus*"). (Figure 7a)

– **EPITYPUS (designated here)**: France, dept. Haute-Savoie: Dent d'Oche (Alps); collector: J.-M.-F. de Candolle, determiner: A. P. de Candolle; G [G00139541]! (Figure 4)



Figure 5. Zoom of Burser's specimen assigned to *Diapensia helvetica* L. (UPS-BURSER 16(1)-71). The radiate hairs show it to belong to the *Vandelli-Argentea* morphotype (photo: Mats Hertson, UPS).

*Homotypic synonyms

Androsace diapensia Vill. nom. illeg.

Androsace imbricata Lam. nom. illeg.

(iii) Pubescens morphotype (mainly simple trichomes, sometimes Y-shaped; loose cushion; leaves not forming columns; peduncle absent; white corolla)

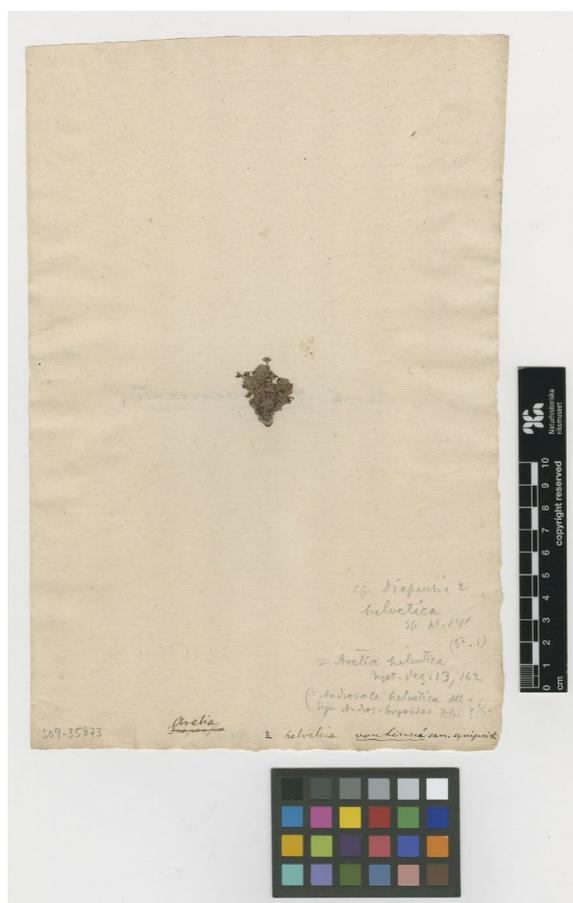


Figure 6(a). Original material of *Diapensia helvetica* L. conserved at S-LINN (S09-35873) (photo: Arne Anderberg, Stockholm, S).



Figure 6(b). Zoom of Linnaeus' specimen assigned to *Diapensia helvetica* L. (S-LINN [S09-35873]). The radiate hairs show it to belong to the *Vandelli-Argentea* morphotype (photo: Johannes Lundberg, S).

iii.1 *Androsace pubescens* DC.

*Publication place

Fl. Franç. [ed. 3] 3: 438 (1805)

*Information from the protologue

In the protologue, de Candolle cited with a question mark the Villars *Androsace alpina* var. c (1787). However, the relevant information for the identification of original material is the locality of the collection: “*Cette espèce croît parmi les rocailles dans les Alpes; elle a été trouvée par mon frère, au Mont Saxonet et au grand Bornan près Genève*” [This species grows among rocks in the Alps; it was found by my brother, at mount Saxonet and at grand Bornan near Geneva].

*Original material

Three herbarium specimens:

– France, dept. Haute-Savoie: Vallée du Reposoir (Aravis, Alps); collector: J.-M.-F. de Candolle, determiner: A. P. de Candolle; G [G00139396]!

– France, dept. Haute-Savoie: Le Buet, au-dessus du col de Salenton (Alps); collector: G. F. Reuter, determiner: A. P. de Candolle; G [G00139398]!

– Alps; collector: J. Clarion, determiner: A. P. de Candolle; G [00139513]!

*Taxonomic assignation of original material

On the basis of the precise description provided by de Candolle and on the original material, this name applies to the *Pubescens* morphotype.

*Typification

We here follow an unpublished recommendation of F. Jacquemoud and D. Jordan who let a determinavit on the following sample designate it as the type of *Androsace pubescens*.

***Androsace pubescens* DC. (Fl. Franç. [ed. 3] 3: 438. 1805)**

– **LECTOTYPUS (designated here)**: France, dept. Haute-Savoie: Vallée du Reposoir (Aravis, Alps); collector: J.-M.-F. de Candolle, determiner: A. P. de Candolle; G [G00139396]! (Figure 9)

*Homotypic synonyms

Aretia pubescens (DC.) Loisel

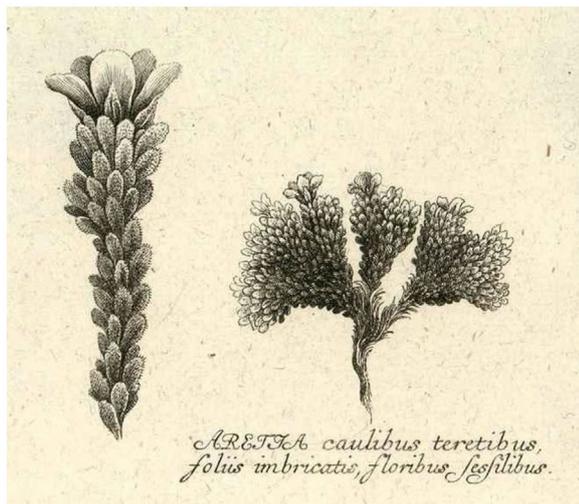


Figure 7(a). Haller (1742)'s illustration, selected as lectotype of *Diapensia helvetica* L.



Figure 7(b). Haller's material (P-HALL 16-051) linked to Haller (1742)'s illustration (photo: Cécile Aupic, P).

iii.2 *Aretia pubescens* (DC.) Loisel

*Publication place

Fl. Gall. 1: 111 (1806)

*Combination based on

Androsace pubescens DC.

*Typification

See under the basionym *Androsace pubescens* DC. (iii1)

(iv) **Vandellii-Argentea morphotype** (trichomes radiate, giving a grey aspect to the cushion; dense cushion; absent peduncle; white corolla, turning reddish once dried in herbarium specimens)



Figure 8. Zoom of Linnaeus' specimen from LINN assigned to *Diapensia helvetica* L. The radiate hairs show it to belong to the *Vandellii-Argentea* morphotype (photo: Andrea Deneau, LINN).

iv1. *Androsace argentea* (C.F.Gaertn.) Lapeyr.

Publication place

Hist. Pl. Pyrénées: 92 (1813)

Combination based on

Aretia argentea C.F.Gaertn.

Typification

See under the basionym *Aretia argentea* C.F.Gaertn. (iv4)

iv2. *Androsace tomentosa* Clairv.

*Publication place

Man. Herbor. Suisse: 57 (1811)

*Information from the protologue

The prologue of *Androsace tomentosa* Clairv. is particularly short, consisting of a four-word description: "feuil[les] oblonges imbriquées, cotoneuses" [oblong, imbricated, cottony leaves] with an approximate localization "les rochers des plus hautes alpes granitiques" [highest rocks in granitic Alps].

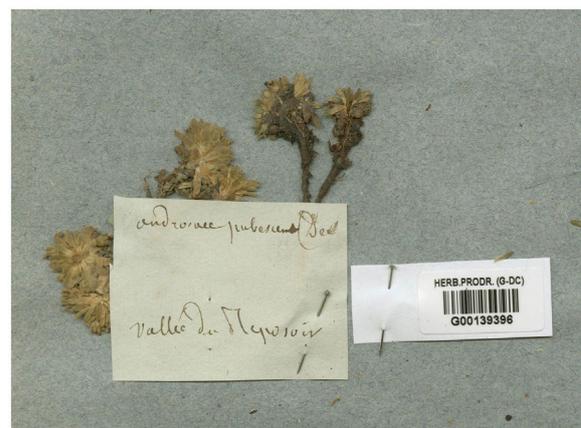


Figure 9. Zoom of the lectotypus of *Androsace pubescens* DC. (G-DC, G00139396) (photo: herbarium of Geneva, G).

*Original material

Clairville's herbarium has been deposited at Zurich. However, specimens are not available for analysis because of important ongoing construction works.

*Taxonomic assignation

Later, Swiss authors such as Gaudin (1828) linked this name to *Aretia tomentosa* Schleicher, as well as to var. γ of Haller's *Aretia foliis ovatis, repandis, scapis unifloris* (Haller 1768, 274), or to *Androsace multiflora* Vandelli. The short Clairville's protologue provides some minor clues, as it refers to a taxon with imbricated leaves occurring on granitic substrate. As Clairville also recognized *Androsace alpina* (as *A. pedunculata*) and *A. helvetica* (as *A. pubescens*), his name *Androsace tomentosa* clearly refers to the *Vandellii-Argentea* morphotype.

Considering the impossibility, during our work, of looking at a putative original material at Z (Zürich, University), instead of designating a neotype that may be superseded if original material is located at Z, we chose to indicate below a representative material of the *Vandellii-Argentea* morphotype that was assigned to that morphotype by de Candolle:

G [G00139428]!: France, dept. Ariège: Laurenti (Pyrenees); specimen named "*Diapensia helvetica* L."; collector and determiner: A. P. de Candolle; (Figure 10)

*Homotypic synonyms

Aretia tomentosa (Clairv.) Hegetschw.

iv3. *Androsace tomentosa* Clairv. var. *minor* Gaud.

Publication place

Fl. Helv. 2: 110 (1828)

Information from the protologue

Gaudin provided a short description: "*foliis ovatis obovatisque, caulibus diffusis, tortuosis, floribus saturate*



Figure 10. De Candolle's material used as representative material of *Androsace tomentosa* Clairv. (G-DC, G00139428) (photo: herbarium of Geneva, G).

purpureis vel roseis" and an additional comparison with the "var. a", but he did not provide any locality for this variety.

Original material

Gaudin's herbarium has been deposited at Lausanne, but we were unable to access it. However, a sample from Gaudin's herbarium is currently located at P (Paris) (formally in Steudel's herbarium).

Taxonomic assignation

It seems that Gaudin replicated the same mistake as Lamarck. In 1783, while trying to clarify the species he named "*Androsace imbricata*" in his *Encyclopédie* (Lamarck 1783), Lamarck showed that he made no distinction between the *Helvetica* and *Vandellii-Argentea* morphotypes: "*fleurs [...] blanches selon Haller, rougeâtres dans les individus secs que je possède*" [white flowers according to Haller, reddish in the dry specimens I hold]. Actually, Haller was referring to living plants he observed in the field, whereas Lamarck just described what he had in his herbarium. Interestingly, herbarium specimens of the *Vandellii-Argentea* morphotype clearly show that flowers, although white when alive, turn reddish once dried, and this is unique among the four considered morphotypes. Lamarck clearly referred to *Androsace argentea* (or *Androsace alpina*?), but not to *Androsace helvetica* whose flowers remain white once dried.

The linked specimen in Gaudin's herbarium shows the same features: as the specimen belongs to the *Vandellii-Argentea* morphotype, the dried flowers are reddish, but, as seen above, this is not a relevant feature to describe any infrataxon.

*Typification

In order to fix the application of the name, we chose to select a neotype based on Gaudin's material which was available to us, although this material may not be the original. If some material happens to be available at LAU, our neotypification may be superseded by a relevant lectotypification.

***Androsace tomentosa* var. *minor* Gaud. (Fl. Helv. 2: 110. 1828)**

– **NEOTYPUS (designated here):** *in iugis vallis divi Nicolai*; Legit: Schleicherey Endres (?) ex Herb. Gaudin in Herb. Steudel, determiner: Gaudin; P [P04567676]! (Figure 11)

*Homotypic synonyms

Aretia tomentosa (Clairv.) Hegetschw.

iv4. *Aretia argentea* C.F.Gaertn.

*Publication place

Suppl. Carp.: 107 (1806)

*Information from the protologue

In the protologue of *Aretia argenta*, Carl Freidrich von Gaertner provided a long description of specific

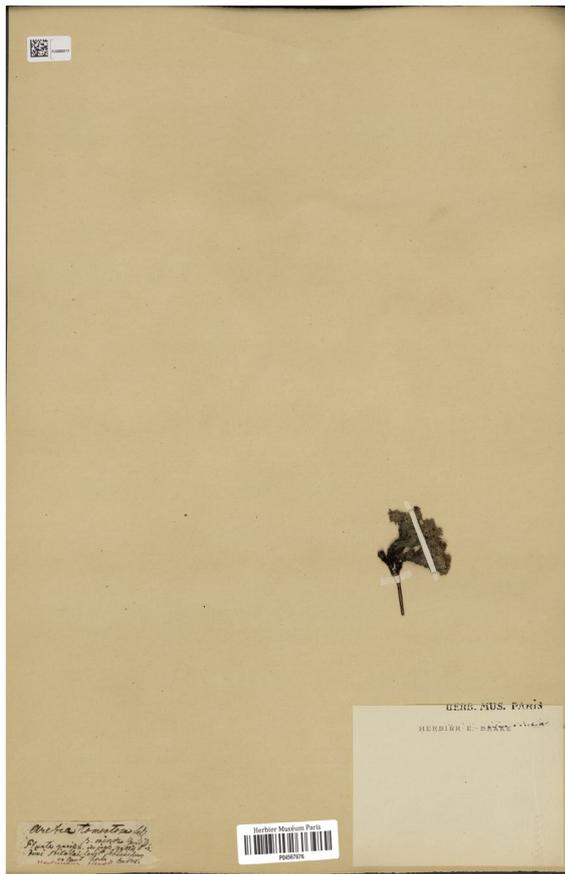


Figure 11. Neotypus of *Androsace tomentosa* var. *minor* Gaud. (P04567676) (photo: herbarium of Paris, P).

features: seeds and fruits. He completed it with the origin of his material: “*In alpinis pyrenaicis legit amicissimus Dr. Stromeyer*”. This last observer is Friedrich Stromeyer, professor in the medical faculty of Göttingen.

***Original material**

The original material used by Gaertner to name *Aretia argentea* consists in:

(a) herbarium material

– in Gaertner’s herbarium (Tübingen): TUB [TUB022354]! (Figure 12)

(b) illustration

– drawings named “*Aretia argentea*” in C. F. Gaertner (1805) *Supplementum Carpologiae*, Tab. 198, Fig. 4. (Figure 13, middle right)

***Taxonomic assignation of the original material**

Gaertner’s sample belongs to the *Vandellii-Argentea* morphotype.

***Typification**

***Aretia argentea* C.F.Gaertn. (Suppl. Carp.: 107. 1806)**

– **LECTOTYPUS (designated here)**: France, Pyrénées Orientales, Canigou; 1801; collector: Stromeyer; Determiner: C.F. Gaertner. TUB [TUB 022354]! (Figure 12)

***Homotypic synonym**

Androsace argentea (C.F.Gaertn.) Lapeyr.

iv5. *Aretia tomentosa* Schleicher nom. nud.

***Publication place**

J. Bot. (Schrader) 1801(1): 244 (1802)

***Nomenclatural note**

In 1802, in his list of Swiss plants to be distributed to colleagues, Schleicher used the name *Aretia tomentosa* without any description. *Aretia tomentosa* Schleicher is thus a *nomen nudum*. From 1802, it is certain that Schleicher distributed herbarium material carrying that name. As early as 1805, de Candolle cited “*Aretia tomentosa* Schleich. Cent. exs. n.22” under is var. β of *Androsace imbricata*.

iv6. *Aretia tomentosa* Schleicher ex Murith nom. nud.

***Publication place**

Guide Bot.: 53 (1810)

***Nomenclatural note**

In 1810, Murith used the name *Aretia tomentosa* Schl. in a list of plants of Valais (Switzerland). He provided a locality (Tsermatten) and a collector (Thomas), but no morphological description. In the other pages of his work where the name is used (pages 16, 29, 30), there is no descriptive statement either. *Aretia tomentosa* Schleicher ex Murith should be considered as a *nomen nudum*.

***Taxonomic assignation of associated material**

Material cited by Murith, collected by Thomas at Tsermatten, and carrying the name *Aretia tomentosa*, was relatively well distributed. It occurs in Reichenbach’s *Flora Germanica Exsiccata* specimens distributed after the publication of volume 2 of Reichenberg’s *Flora Germanica Excursoria*, i.e. after 1832, with the number 257 (P[P04567670] p.p., P[P04567669] p.p., P[P04567817] p.p.). Additionally, older material collected by Thomas exists in the Blendee Herbarium at P (P04567677). All these specimens are homogeneous and allowed us to assign that denomination to the *Vandellii-Argentea* morphotype.

iv7. *Aretia tomentosa* (Clairv.) Hegetschw.

***Publication place**

In Suter, Helv. Fl. [ed. 2] 2: 408 (1822)

***Combination based on**

Androsace tomentosa Clairv.

***Nomenclatural and taxonomic note**

In the second edition of Suter’s *Flora Helvetica* (Suter 1822), Joannes Hegetschweiler-Bodmer seems to be the first author providing a description for *Aretia tomentosa*. He cited both “*Androsaces imbricatae* var. *b* Dec” and “*Ar.[etia] argentea* Gaertn. et La Peyr.” as synonyms. The first refers to var β in Lamarck & de Candolle, *Flore Française* (ed. 3) where de Candolle cited a variety of *Androsace imbricata* using the following expression “ β . *Aretia tomentosa*. Schleich. Cent. exs. n.22”. The second citation links to *Aretia argentea* C.F.Gaertn. (1806) and to *Androsace argentea* (C.F.Gaertn.) Lapeyr. (1813).

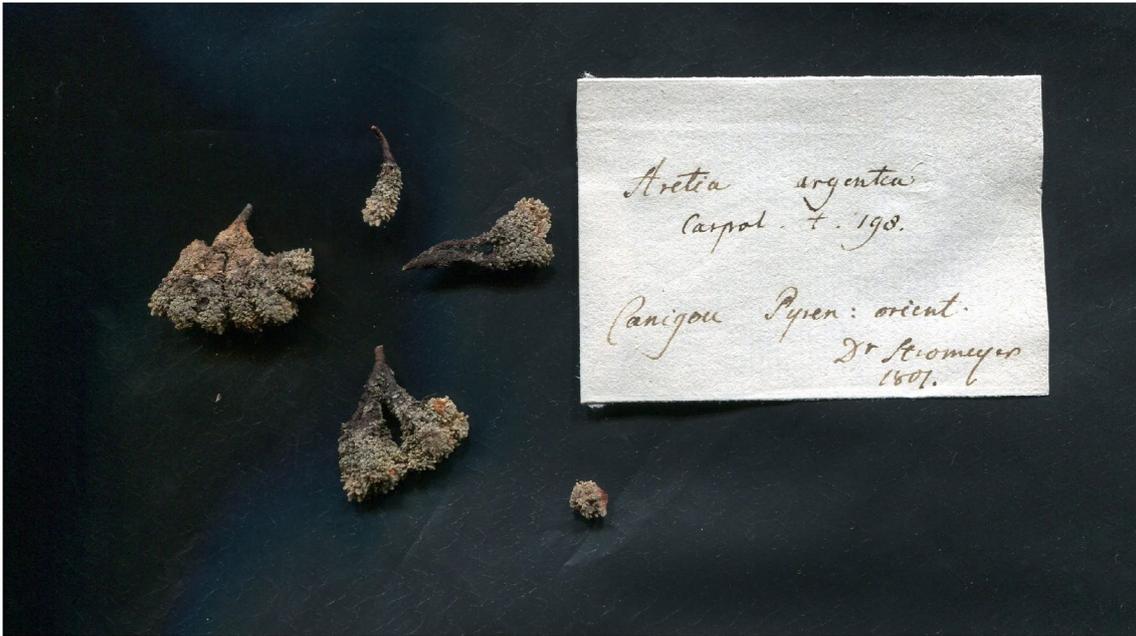


Figure 12. Lectotypus of *Aretia argentea* C.F.Gaertn. (TUB 022354), allowing by extension a clear typification of *Androsace argentea* (C.F.Gaertn.) Lapeyr. (photo: Cornelia Dilger-Endrulat, Tübingen, TUB).

Hegetschweiler-Bodmer provided a precise locality “*Ab Tsermatten in Valesia*”, and, in addition to a description, a diagnosis separating this taxa from *Aretia helvetica*. This diagnosis clearly states “*furcatis omnibus in illa*” [hairs always furcate in that one]. This binomial clearly refers to the *Vandellii-Argentea* morphotype.

Despite lacking a direct link to Clairville’s name, the ascription to Schleicher – as well as the fulfilment of conditions for valid new name publication – implies that we can treat this binomial as a new combination based on Clairville’s *Androsace tomentosa* (see Art. 41.4 of ICN (McNeill et al. 2012)), Clairville being the first one to use the epithet “*tomentosa*” in a legitimate way (i.e. with a valid description of the species).

*Typification

See under the basionym *Androsace tomentosa* Clairv. (iv2)

(v) Intermediate and undefined morphotype (furcate and simple trichomes; dense cushion; peduncle absent; white to pink corolla)

v1. *Androsace aretia* Lapeyr. nom. illeg.

*Publication place

Hist. Pl. Pyrénées: 91 (1813)

*Nomenclatural justification

In 1813, Lapeyrouse created the name *Androsace aretia* as the replacement in the genus *Androsace* of the binomial *Aretia helvetica* L. Considering Art. 11.4 of ICN (McNeill et al. 2012), he should have used the Linnaean epithet (i.e. *helvetica*) as it includes its type. Consequently, *Androsace aretia* Lapeyr. is an illegitimate name (Art 52.1 of ICN (McNeill et al. 2012)).

*Note on usage

This species, despite an illegitimate name and the citation of heterogeneous synonyms (*Androsace diapensia* Vill. and *Androsace imbricata* Lam.), holds the only description that refers to an intermediate morphotype: mixture of simple and furcate trichomes; white corolla, with reddish centre.

These features clearly match those of another taxon, sampled in the Mont Blanc massif (Jordan 2015). However, there is no herbarium specimen nor recent observation mentioning such a morphotype in the Pyrenees. Lapeyrouse considered this taxon as a homotypic synonym of *Androsace helvetica* (L.) All. As a consequence, the features it holds had been more or less forgotten. Additional samplings in the localities mentioned by Lapeyrouse (1813) may lead to clarifying this cryptic taxon and allowing comparison with the Mont Blanc one.

Synthesis of applicable names and described morphotypes

On the basis of this survey, consisting in interpretation and typification of the main names applicable to the various west-alpine cushions of *Androsace*, it is now possible to list the legitimate names suitable for the four morphotypes and to select the correct one. Such a procedure is provided here, for each morphotype.

(i) *Androsace alpina* (L.) Lam. / *Alpina* morphotype

Aretia alpina L., Sp. Pl. 1: 141 (1753)

Androsace alpina (L.) Lam., Fl. Franç. 3: 641 (1779)

Aretia multiflora Vandelli, Fasc. Pl.: 8 (1771)

Androsace vandellii Chiov., *Nuovo Gior. Bot. Ital. n.s.*, 20: 21–29. (1919)

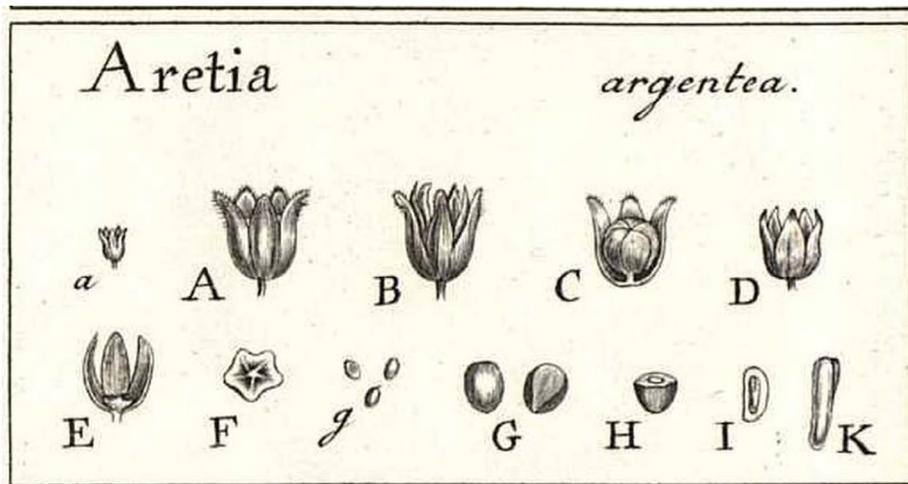


Figure 13. Original drawings associated with the first use of the name *Aretia argentea* (Gaertner 1805).

Androsace multiflora (Vand.) Moretti nom. illeg.
Androsace pedunculata Clairv. nom. illeg.
Aretia vandellii Turra nom. illeg.

The application of the priority principle points to the utilization of the epithet “*alpina*” in the name of this morphotype. Thus, its correct name when treated as a species of the genus *Androsace* is ***Androsace alpina* (L.) Lam.**

(ii) ***Androsace helvetica* (L.) All. / *Helvetica* morphotype**

Diapensia helvetica L., Sp. Pl. 1: 143 (1753)
Aretia helvetica (L.) L., Syst. Veg. ed. 13: 162 (1774)
Androsace helvetica (L.) All., Fl. Pedem. 1: 91 (1785)
Androsace bryoides DC., Fl. Franç. [ed. 3.] 3: 440 (1805)
Aretia bryoides (DC.) Loisel, Fl. Gall. 1: 111 (1806)
Androsace diapensia Vill. nom. illeg.
Androsace imbricata Lam. nom. illeg.

In application of priority, the epithet “*helvetica*” should be selected, and the correct name for this morphotype, when recognized as a species of *Androsace*, is ***Androsace helvetica* (L.) All.**

(iii) ***Androsace pubescens* DC. / *Pubescens* morphotype**

Androsace pubescens DC., Fl. Franç. [ed. 3.] 3: 438 (1805)
Aretia pubescens (DC.) Loisel, Fl. Gall. 1: 111 (1806)
 The epithet “*pubescens*” is the only one available for use and, when considered as a species of the genus *Androsace*, this morphotype should be named ***Androsace pubescens* DC.**

(iv) ***Androsace argentea* (C.F.Gaertn.) Lapeyr. / *Vandellii-Argentea* morphotype**

Aretia argentea C.F.Gaertn., *Suppl. Carp.*: 107 (1806)
Androsace argentea (C.F.Gaertn.) Lapeyr., *Hist. Pl. Pyrénées*: 92 (1813)

Androsace tomentosa Clairv., *Man. Herbor. Suisse*: 57 (1811)
Androsace tomentosa Clairv. var. *minor* Gaud., *Fl. Helv.* 2: 110 (1828)
Aretia tomentosa (Clairv.) Hegetschw., in Suter, *Helv. Fl.* [ed. 2] 2: 408 (1822)
Aretia tomentosa Schleicher nom. nud.
Aretia tomentosa Schleicher ex Murith nom. nud.
Androsace vandellii auct. plur.

At the specific rank, the epithet “*argentea*” had priority over “*tomentosa*”, and, when this morphotype is considered as a species of *Androsace*, its correct name should be ***Androsace argentea* (C.F.Gaertn.) Lapeyr.**

Conclusion

This taxonomic revision of high-alpine *Androsace* cushions occurring in Western Alps sets a clear basis for application of names and delimitation of taxa, which will ultimately serve to diagnose the new morphological variant of *Androsace* recently found in the Mont Blanc mountain range. This potentially new taxon shares common features with *Androsace alpina* and *Androsace pubescens* and resembles potential hybrids between these two species. Considering the *Androsace aretia* described from the Pyrenees by Lapeyrouse, a likely similar taxon may also occur in this mountain range. The species validity and its potential hybrid origin have yet to be fully validated based on genetic characteristics before proceeding to its description.

The taxonomic elements will also contribute to feedback to The Plant List Project (<http://www.theplantlist.org/>) (see also Appendix 1).

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Notes on contributors

Cédric Dentant is botanist at the Scientific Department of the Ecrins National Park. Specialist of the alpine flora, he is also expert for the European Commission's biogeographical process. He contributes to diverse academic research projects in several parts of the Alps, with a specific emphasis on high-mountain plant species. *Contribution*: general concept and research question, herbarium work, data analysis, interpretation of results, manuscript preparation.

Sébastien Lavergne works as an evolutionary biologist at the Alpine Ecology Lab, located in Grenoble, France. He is interested in reconstructing life history evolution (mainly of plants) in alpine environments, by the means of genomics, community ecology, and statistical modelling. His work involves field work in European Alps, the Andes, and the Arctic. He also sits on several scientific councils for National Parks and Environmental Agencies in France. *Contribution*: research question, manuscript preparation.

Valéry Malécot currently works at the Department of Ecology, Agrocampus Ouest. He is a plant systematist, with a special interest in wild or cultivated woody angiosperms, particularly in *Olacaceae* s.l., and in the genus *Viburnum*. He is also expert in phylogenetic reconstruction, evolutionary history, and history of selection. *Contribution*: herbarium work, data analysis, interpretation of results, manuscript preparation.

ORCID

Cédric Dentant  <http://orcid.org/0000-0002-4187-5642>
Valéry Malécot  <http://orcid.org/0000-0002-9350-3306>

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Appendix 1. Corrections of other synonyms of *Androsace alpina* according to ThePlantList (2017).

– ***Androsace apennina* A. Huet ex Nyman.**: this name does not exist. Indeed, Nyman, in *Consp. Fl. Eur.* (1881), only made a reference to “*Aretia apennina* A. Huet”. Whether he indeed included this taxon in “*Aretia alpina* L.,” he also included “*Aretia mathildae*” whereas this species is a distinct species. Besides, Huet described *Aretia apennina*, a mountain range where *Androsace alpina* does not exist.

Consequently, the name “*Androsace apennina* A. Huet ex Nyman” must be replaced by the name “***Aretia apennina* A. Huet ex Nyman**” and considered as a heterotypic synonym of *Androsace mathildae* Levier.

– ***Aretia hirtella* Nyman**: actually Nyman, in *Consp. Fl. Eur.* (1881), cited “*Aretia hirtella* Duf.,” that is a taxon described by Jean-Marie Léon Dufour. Besides, he included this species in *Androsace pubescens*, not in *Androsace alpina*. Dufour described his species from the Pyrenees, where, as seen before, *Androsace pubescens* has been confused with *A. cylindrica* (Schneeweiss et al. 2017).

Consequently, the name “*Aretia hirtella* Nyman” must be replaced by the name “***Aretia hirtella* Duf. ex Nyman**” and considered as a heterotypic synonym of *Androsace cylindrica* DC.

– ***Aretia ciliata* Loisel.**: this name is to be changed in “***Aretia ciliata* (DC.) Loisel.**” as Loiseleur, in his *Flora Gallica* (1806), clearly referred to *Androsace ciliata* DC., which he renamed in the *Androsace* genus.

Obviously, *Aretia ciliata* (DC.) Loisel. is therefore a homotypic synonym of *Androsace ciliata* DC.

Appendix 2. Mentioned articles of the International Code for Nomenclature for algae, fungi and plants (McNeil et al. 2012)

*article 9.8:

An epitype is a specimen or illustration selected to serve as an interpretative type when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon. Designation of an epitype is not effected unless the holotype, lectotype, or neotype that the epitype supports is explicitly cited (see Art. 9.20).

*article 11.4:

For any taxon below the rank of genus, the correct name is the combination of the final epithet of the earliest legitimate name of the taxon in the same rank, with the correct name of the genus or species to which it is assigned, except (a) in cases of limitation of priority under Art. 14, 15, 56, or 57, or (b) if the resulting combination could not be validly published under Art. 32.1(c) or would be illegitimate under Art. 53, or (c) if Art. 11.7, 22.1 or 26.1 rules that a different combination be used.

*article 38.1:

In order to be validly published, a name of a new taxon (see Art. 6.9) must (a) be accompanied by a description or diagnosis of the taxon or, if none is provided in the protologue, by a reference to a previously and effectively published description or diagnosis (except as provided in Art. 38.7, 38.8, and H.9; see also Art. 14.9 and 14.15); and (b) comply with the relevant provisions of Art. 32–45.

*article 52.1:

A name, unless conserved (Art. 14) or sanctioned (Art. 15), is illegitimate and is to be rejected if it was nomenclaturally superfluous when published, i.e. if the taxon to which it was applied, as circumscribed by its author, definitely included the type (as qualified in Art. 52.2) of a name that ought to have been adopted, or of which the epithet ought to have been adopted, under the rules (but see Art. 52.3 and Art. 59.1).