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## The taxonomic circumscription of *Aconitum* subgenus *Aconitum* (Ranunculaceae) in Europe

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**Abstract.** In this article, we present a revised taxonomic circumscription of *Aconitum* subg. *Aconitum* (Ranunculaceae) in Europe. In total, the subgenus contains some 250 species with the major center of diversity in Eastern Asia. Altogether 94 taxa (species and infraspecific taxa, including hybrids) occur in Europe. Among them, 22 are native species, and 28 are nothospecies (including hybrid formulae). The research is based on former (since Linnaeus) and recent species diagnoses integrating herbarium and field studies carried out in the Alps, Carpathians, Balkans, Spanish Sierra Nevada, Sudetes, and Corsica. The subgenus includes three sections in Europe: the diploid sect. *Cammarum*, the tetraploid sect. *Aconitum*, and the monospecific, allopolyploid sect. *Angustifolium*. Additionally, a triploid, hybridogenous nothosection *Acomarum* (sect. *Aconitum* × sect. *Cammarum*) is presented. For each species, type citation, a concise morphological description, including infraspecific variation and hybridization, geographical distribution, and iconography sources are given. Also, a key to the determination of all taxa is presented. The proposed system scrutinizes former and recent species concepts and gives a base for further studies on the genus' phylogeny and biotechnology.

**Keywords:** *Aconitum*, geographical distribution, Europe, hybrids, Linnaean taxonomy, nomenclature, species concept.

### INTRODUCTION

The genus *Aconitum* L. (monkshood) comprises ca. 300–400 species distributed in temperate regions of the northern hemisphere, with a center of diversity in the eastern Himalaya, southwestern China, and Japan (Kadota 1987; Li and Kadota 2001; Luo et al. 2005). From a total number of ca. 250 species belonging to the subgenus *Aconitum*, 22 species may be found in Europe, with eight species occurring exclusively in the Carpathian and Balkans Mts (Boroń et al. 2020). The subgenus includes both the “temperate” forest (diploid) and “cold” high-mountain (tetraploid) species, which are differentiated both morphologically (Starmühler 1998; Mitka 2003; Novikoff

and Mitka 2011) and cytogenetically (Ilnicki and Mitka 2009, 2011).

Genera *Aconitum* L., *Delphinium* L., *Consolida* (DC.) S.F. Gray, *Aconitella* Spach, and *Staphisagria* J. Hill form the monophyletic tribe Delphinieae Schröd., subtribe Delphiniinae Benth. & Hook. f. (Tamura 1993; Keener et al. 1999; Turland and Barrie 2001; Jabbour and Renner 2011a, b). Zygomorphic flowers and the presence of diterpene alkaloids turned out to be the synapomorphies to this taxonomic group (Johansson 1995; Jabbour et al. 2009, 2014). Genus *Aconitum* consists of the following monophyletic subgenera: subg. *Aconitum*, subg. *Fletcherum* (Tamura) Y.Hong & Q.E.Yang, subg. *Galeata* (Rapaics) Y.Hong & Q.E.Yang, and subg. *Lycoctonum* (DC.) Peterm. (Kita et al. 2000; Utelli and Ito 2000; Luo et al. 2005; Jabbour and Renner 2011b; Hong et al. 2017). The monophyly and taxonomic rank of subg. *Anthora* (Rapaics) Peterm. is unclear and deserves further studies (Novikoff and Mitka 2015). The endemic of the Qinghai-Tibetan Plateau *A. gymnandrum* Maximowicz has been recently transferred from the monotypic *Aconitum* subg. *Gymnaconitum* (Stapf) Rapaics to an independent genus *Gymnaconitum* (Stapf) Wei Wang & Z.D.Chen based on molecular data (Wang et al. 2013).

*Aconitum* subg. *Aconitum* is known for its remarkable morphological plasticity and notorious hybridization, leading to difficulties in the circumscription of taxa (Kadota 1981; Tutin et al. 1993; Sutkowska et al. 2013, 2017a, b). To clarify the sectional treatment of the subgenus, we used both cytogenetic and morphological criteria (Starmühler 1996b, 2000; Ilnicki and Mitka 2009, 2011; Joachimiak et al. 1999; Mitka and Starmühler 2000; Novikoff and Mitka 2011).

The subgenus *Aconitum* in Europe has basic (monoploid, i.e., in a single complete set of chromosomes) number  $x = 8$  and ploidy levels  $2x$ ,  $3x$ ,  $4x$ , and  $6x$ . It consists of the diploid sect. *Cammarum* DC. ( $2n (2x) = 16$ ), the triploid nothosection *Acomarum* Starm. ( $2n (3x) = 24$ ), the tetraploid sect. *Aconitum* ( $2n (4x) = 32$ ), and the monospecific hexaploid sect. *Angustifolium* (Seitz) Rottensteiner, represented by the allopolyploid *A. angustifolium* Rchb. ( $2n (6x) = 48$ ) (Seitz 1969; Zieliński 1982a, b; Simon et al. 2001; Ilnicki and Mitka 2009, 2011).

Section *Aconitum* includes high-mountain species that inhabit open sites in the subalpine and alpine zones. Section *Cammarum* is represented by forest species, which usually are distributed in montane (up to ca. 1150–1200 m above sea level), foreland and lowland/upland areas (Mitka 2000, 2002; Novikoff and Mitka 2011). Intersectional hybrids (*Aconitum* sect. *Aconitum* × *Aconitum* sect. *Cammarum*) are circumscribed within

nothosect. *Acomarum* Starm. (Wacławska-Ćwiertnia and Mitka 2016; Starmühler 2001).

We also include to the list *A. carmichaelii* from the section *Euchylodea* with  $2n (4x) = 32$ ,  $2n (6x) = 48$  or, often,  $2n (8x) = 64$  (Yang 1996; Li and Kadota 2001). In Europe, *A. carmichaelii* is used as an ornamental plant, while in China (native area) it is mostly cultivated for medicinal purposes (Yu et al. 2016; Zhao et al. 2017).

In the present article, we propose an annotated Linnaean taxonomic system of *Aconitum* subg. *Aconitum* in Europe. It is based on the classical works by Reichenbach (1819, 1821, 1827, 1840), Gayer (1906, 1909, 1911, 1912), Götz (1967), Seitz (1969), Skalický (1982), and Flora Europaea (Tutin et al. 1993), supplemented by our recent systematic studies carried out in the Alps, Carpathians, Sudetes, and Balkans.

We adopt the following taxonomic treatment of *Aconitum* subgenus *Aconitum* in Europe (see also Appendix):

#### *Aconitum* L. subg. *Aconitum*

1. Sect. *Aconitum*
  - 1A. Subsect. *Aconitum* [syn. sect. *Napellus* Wolf (DC.) subsect. *Napellus* (Wolf) Rapaics]
    - 1a. Ser. *Aconitum*
    - 1b. Ser. *Castellana* Rottensteiner, **ser. nov.**
    - 1c. Ser. *Taurica* Mucher ex Starm.
    - 1d. Nothoser. *Acorica* Mucher ex Starm. (ser. *Aconitum* × ser. *Taurica*)
  - 1B. Subsect. *Burnatii* Rottensteiner
2. Sect. *Cammarum* DC.
  - 2A. Subsect. *Cammarum* (DC.) Rapaics
    - 2a. Ser. *Variegata* Steinberg ex Starm.
    - 2b. Ser. *Toxica* (Rchb.) Mucher
    - 2c. Nothoser. *Toxigata* Starm. (ser. *Toxica* × ser. *Variegata*)
3. Nothosect. *Acomarum* Starm. (sect. *Aconitum* × sect. *Cammarum*)
4. Sect. *Angustifolium* (Seitz) Rottensteiner, **stat. nov.**
5. Sect. *Euchylodea* Rchb.
  - 5a. Ser. *Japonica* (Nakai) Kadota

## MATERIAL AND METHODS

We have evaluated all recognized taxa from the *Aconitum* subg. *Aconitum* distributed in Europe based on our experience of many years of field investigations, morphological and biogeographical studies, as well as analysis of herbarium material. For each taxon, we provided comprehensive data on its distribution and morphological characteristics. We reviewed all available

sources for taxon synonymy and type citations. Basing on morphological data, a binary key for the identification of the representatives of the subgenus *Aconitum* has been developed.

The chromosome numbers were investigated in the Carpathians and Sudetes Mts (Joachimciak et al. 1999; Ilnicki and Mitka 2009, 2011; Mitka et al. 2007) or taken from the on-line DCDB database (<http://hdl.handle.net/2445/95875>; Bosch et al. 2016).

## RESULTS

### Key to the taxa of *Aconitum* subgenus *Aconitum* in Europe

1. Root napiform; stem ± stiff upright, rarely ± flexuous (*A. sect. Burnatii*); cauline leaves usually without reticulate venation; seeds smooth to transverse wrinkled or with transverse lamellae on one side, the uppermost segment of the leaf lobe with two, rarely with 4–6 teeth ..... 2
- 1.\* Root globose; stem upright to bent to overhanging or spreading-climbing, flexuous; cauline leaves with reticulate venation; seeds always with transverse lamellae on one side, the uppermost segment of the leaf lobe, located in its middle, with 4–12 teeth.....sect. *Cammarum* ....35
2. Carpels sterile.....nothosect. *Aconitum* (*A. sect. Aconitum* × *A. sect. Cammarum*)..... 3
- 2.\* Carpels fertile ..... 14
3. Hood outside glabrous (or with just some single hairs) ..... 4
- 3.\* Hood outside hairy ..... 11
4. Cauline leaves net-veined..... *A. superbum* × *A. variegatum*
- 4.\* Cauline leaves not net-veined..... 5
5. Pedicel glabrous or with just some single hairs at the top; filaments glabrous or just sparsely pilose..... 6
- 5.\* Pedicel hairy at least above the bracteoles; filaments ± densely pilose..... 7
6. Carpels mostly completely glabrous ..... *A. ×acutum* (*A. tauricum* × *A. variegatum*)
- 6.\* Carpels pilose on the suture.....*A. ×berdaui* nothosubsp. *berdaui* (*A. firmum* subsp. *firmum* × *A. variegatum* subsp. *variegatum*)
7. Pedicels with glandular hairs ..... 8
- 7.\* Pedicels without glandular hairs ..... 9
8. Pedicel pilose with strict glandular hairs ..... *A. ×mielichhoferi* (*A. degenii* × *A. tauricum*)
- 8.\* Pedicel pilose with curved and s-formed glandular hairs.....*A. pilipes* × *A. tauricum*
9. Pedicels above the bracteoles with curved, crisped and strict hairs ... *A. ×cammarum* (*A. napellus* × *A. variegatum*)
  - a. Tepals with monotonic deep blue color .... fo. *cammarum*
  - a.\* Tepals white and blue strips..... fo. *bicolor*
- 9.\* Pedicels above the bracteoles only with curved and crisped hairs ..... 10
10. Bracteoles triangular to linear, 2–5 mm long.....*A. ×exaltatum* (*A. plicatum* × *A. variegatum* subsp. *variegatum*)
- 10.\* Bracteoles lanceolate to spatulate, 5–7 mm long.....*A. ×schneebergense* (*A. napellus* × *A. variegatum*)
11. Cauline leaves net-veined.....*A. superbum* × *A. vitosanum*
- 11.\* Cauline leaves not net-veined ..... 12
12. Tepals outside with only eglandular hairs.....*A. ×berdaui* nothosubsp. *walasii* (*A. firmum* subsp. *moravicum* × *A. variegatum* subsp. *variegatum*)
- 12.\* Tepals outside with eglandular and glandular hairs..... 13
13. Tepals outside with curved eglandular hairs and s-formed glandular hairs.....*A. napellus* × *A. pilipes*
- 13.\* Tepals outside with curved eglandular hairs and strict glandular hairs. *A. ×acuminatum* (*A. degenii* × *A. napellus*)
14. Cauline leaves with uppermost leaf segments only 1–3 (–4) mm broad; tepals light blue to whitish; hood ± triangular; seeds with transverse lamellae..... sect. *Angustifolium*...*A. angustifolium*
  - a. Pedicels and tepals outside glabrous.....fo. *angustifolium*
  - a.\* Pedicels and tepals outside ± pubescent..fo. *carniolicum*
- 14.\* Cauline leaves mostly with broader leaf segments; tepals mostly blue to violet; hood ± hemispherical; seeds smooth to transverse wrinkled .....sect. *Aconitum*...15
15. Stem at least in the inflorescence region flexuous (zigzag); inflorescence axis, pedicels and tepals outside glandular pilose.....subsect. *Burnatii*...16
- 15.\* Stem stiff, upright; inflorescence axis, pedicels and tepals outside with a different pubescence .....subsect. *Aconitum*...19
16. Hood about as broad as high.....*A. maninense*
- 16.\* Hood distinctly broader than high..... 17
17. Stem in the lower third glabrous; cauline leaves almost glabrous; nectary spur globose.....*A. pentheri*

- 17.\* Stem in the lower third pubescent or pilose; cauline leaves densely pilose; nectary spur hooky..... 18
18. Stem in the lower third pubescent; cauline leaves with narrow segments; pedicels straight; filaments glabrous or pilose..... *A. burnatii*
- 18.\* Stem in the lower third pilose; cauline leaves with broad segments; pedicels bent; filaments always pilose .....  
.....*A. nevadense*
19. Nectary spur elongated and bent backward.....  
.....ser. *Castellana* ... *A. castellanum*
- 19.\* Nectary spur not elongated and not bent backward ..... 20
20. Nectary spur distinctly globose; tepals outside glabrous to densely pubescent..... ser. *Aconitum*... 21
- 20.\* Nectary acephalous; tepals outside glabrous or only sparsely pubescent.....ser. *Taurica*... 32
21. Nectary claw erect or only slightly curved at the top.....  
.....*A. corsicum*
- 21.\* Nectary claw distinctly curved..... 22
22. Cauline leaves net-veined..... 23
- 22.\* Cauline leaves not net-veined ..... 30
23. Tepals outside densely curved and crisped eglandular pubescent, plant above 2 m high..... *A. superbum*
- 23.\* Tepals outside with a different pubescence or glabrous..  
..... 24
24. Tepals outside densely curved and crisped eglandular pubescent and glandular pilose, bracteoles divided.....  
.....*A. firmum* subsp. *skerisorae*
- 24.\* Tepals outside glabrous or hairy ..... 25
25. Tepals outside and pedicels glabrous..... *A. firmum*
- a. Bracteoles all similar, undivided, lanceolate....subsp. *fissurae*
- a.\* Bracteoles of lower flowers bigger and divided ..... b
- b. Bracteoles of lower flowers in  $\pm$  deeply divided .....  
.....subsp. *firmum*
- b.\* Bracteoles of lower flowers only bigger or just little divided.....  
.....nothosubsp. *fussianum* (subsp. *firmum*  $\times$  subsp. *fissurae*)
- 25.\* Tepals outside and pedicels eglandular pubescent hairy .....  
a. Pedicels eglandular pubescent .....  
.....*A. firmum* subsp. *moravicum*
- a.\* Pedicels below the bracteoles glabrous .....  
.....*A. firmum* subsp. *moravicum*  $\times$  *A. variegatum* subsp. *variegatum*
- 25.\*\* Tepals outside glabrous or hairy, pedicels glandular or glandular/eglandular pubescent ..... 26
26. Pedicels glandular pilose only above bracteoles.....  
.....*A.  $\times$ mariae* nothosubsp. *mariae* (*A. firmum* subsp. *firmum*  $\times$  *A. maninense*)
- 26.\* Pedicel with a different pubescence..... 27
27. Pedicels curved and crisped eglandular and glandular pubescent, mainly above the bracteoles, tepals outside glabrous ..... *A.  $\times$ nanum* (*A. bucovinense*  $\times$  *A. firmum*)
- 27.\* Pedicels with a different pubescence..... 28
28. Pedicels sparsely glandular pubescent only above the bracteoles ..... *A.  $\times$ czarnohorensis* (*A. firmum*  $\times$  *A.  $\times$ nanum*)
- 28.\* Pedicels with a different pubescence..... 29
29. Pedicels and tepals outside curved and crisped eglandular pubescent and glandular pilose .....*A.  $\times$ mariae* nothosubsp. *paxii* (*A. firmum* subsp. *moravicum*  $\times$  *A. maninense*)
- 29.\* Pedicels only sparsely curved and crisped eglandular pubescent and glandular pilose, mainly just above the bracteoles, tepals outside glabrous..... *A.  $\times$ zapalowiczii* (*A. firmum*  $\times$  *A.  $\times$ mariae* nothosubsp. *paxii*)
30. Pedicels densely curved and crisped eglandular and glandular pubescent .....*A. bucovinense*
- a. Carpels glabrous or rarely pilose on the ventral side .....  
.....fo. *bucovinense*
- a.\* Carpels pubescent .....fo. *orthotricha*
- 30.\* Pedicels eglandular hairy ..... 31
31. Cauline leaves with linear to narrow lanceolate segments, the uppermost 2–4 mm broad, longly acuminate; flowers mauve to mauvish-blue; hood 18–20 mm high from base ...  
.....*A. anglicum*
- 31.\* Cauline leaves with mostly broader segments, which are shortly acuminate; flowers dark blue to violet; hood 13–18 (–20) mm high from the base..... *A. napellus*
- a. Carpels densely pubescent; often with bulbils in the lower leaves ..... subsp. *lobelii*
- a.\* Carpels glabrous or just sparsely pubescent on the backside; never with bulbils..... b
- b. Carpels sparsely pubescent on the backside..... c
- b.\* Carpels glabrous ..... d
- c. Bracteoles 2–3 (–4) mm long ..... nothosubsp. *polatschekii* (subsp. *formosum*  $\times$  subsp. *lobelii*)
- c.\* Bracteoles (3–) 5–8 (–20) mm long ...nothosubsp. *seitzii* (subsp. *lobelii*  $\times$  subsp. *napellus*)

- d. Filaments of stamens toothed ..... subsp. *lusitanicum*
- d.\* Filaments of stamens not toothed..... e
- e. Bracteoles (3-) 5-8 (-20) mm long; carpels 3 (-4).....  
..... subsp. *napellus*
- e.\* Bracteoles shorter; carpels 2-3 ..... f
- f. Bracteoles 1-2 (-3) mm long; carpels 2-3 .....  
..... subsp. *formosum*
- f.\* Bracteoles (2-) 3 (-4) mm long; carpels (2-) 3 ..... notho-  
subsp. *hinterhuberi* (subsp. *formosum* × subsp. *napellus*)
32. Tepals outside always glabrous ..... ser. *Taurica*
- A. Stem rigid, bracteoles linear to lanceolate 2-5 (-7) mm,  
carpels 3; tepals outside always glabrous .. *A. tauricum*
- a. Pedicels with strict and crisped, glandular or eglandu-  
lar hairs above the bracteoles; carpels often sparsely  
pubescent on the suture ..... subsp. *latemarensis*
- a.\* Pedicels with only few hairs on the top or glabrous;  
carpels mostly glabrous ..... b
- b. Pedicels with solitary hairs at the top; carpels mostly  
glabrous ..... nothosubsp. *hayekianum* (subsp.  
*latemarensis* × subsp. *tauricum*)
- b.\* Pedicels glabrous; carpels glabrous....subsp. *tauricum*
- I. Inflorescence with many, ± long side racemes .....  
..... var. *eustachyum*
- I.\* Inflorescence without or only with few short  
side racemes ..... var. *tauricum*
- i. Nectaries and filaments glabrous....fo. *tauricum*
- i.\* Nectaries and filaments ± densely pilose .....  
..... fo. *taurericum*
- A.\* Stem weakly ramified, bracteoles triangular to lin-  
ear, 1-2 (-3) mm long; carpels 2 (-3) ..... *A. clusianum*
- 32.\* Tepals outside sparsely hairy ..... 33
33. Bracteoles triangular to linear, 1-2 (-3) mm long; carpels  
2 (-3) ..... *A. plicatum*
- a. Pedicels eglandular pubescent, carpels glabrous.....  
..... subsp. *plicatum*
- a.\* Pedicels eglandular and/or glandular pilose; carpels pubes-  
cent..... subsp. *sudeticum*
- 33.\* Bracteoles linear, lanceolate or spatulate, 3-5 (-8) mm  
long; carpels 2-3..... 34
34. Bracteoles situated always shortly below the flower at the  
top of the pedicel; carpels (2-) 3.....  
..... *A. ×teppneri* (*A. napellus* × *A. tauricum*)
- a. Carpels glabrous..... b
- a.\* Carpels sparsely pubescent on the backside ..... c
- b. Pedicels sparsely curved and crisped eglandular pubes-  
cent..... nothosubsp. *teppneri* (*A.*  
*napellus* subsp. *napellus* × *A. tauricum* subsp. *tauricum*)
- b.\* Pedicels glandular and eglandular curved and crisped  
pubescent and pilose..... nothosubsp. *kernerii* (*A.*  
*napellus* subsp. *napellus* × *A. tauricum* subsp. *latemarensis*)
- c. Pedicels sparsely curved and crisped eglandular pubes-  
cent..... nothosubsp. *goetzii* (*A.*  
*napellus* subsp. *lobelii* × *A. tauricum* subsp. *tauricum*)
- c.\* Pedicels glandular and eglandular curved and crisped  
pubescent and pilose..... nothosubsp. *haderlappii* (*A.*  
*napellus* subsp. *lobelii* × *A. tauricum* subsp. *latemarensis*)
- 34.\* Bracteoles situated distant from the flower, below to or in  
the middle of the pedicel; carpels 2-3.....  
..... *A. ×bavaricum* (*A. napellus* × *A. plicatum*)
- a. Carpels glabrous..... nothosubsp. *bavaricum* (*A. napellus*  
subsp. *napellus* × *A. plicatum*)
- a.\* Carpels sparsely pubescent on the backside .....  
..... nothosubsp. *lusenense* (*A. napellus* subsp. *lobelii* × *A.*  
*plicatum*)
35. Pedicels and tepals outside glabrous or eglandular pubes-  
cent..... ser. *Variiegata*... 36
- 35.\* Pedicels and tepals outside glandular pilose or very rarely  
glabrous (*A. degenii* subsp. *rhaeticum*, *A. toxicum* subsp.  
*bucegiense*)..... 39
36. Pedicels eglandular curved pubescent; carpels glabrous or  
pubescent on the backside
- a. bracteoles at the middle of pedicel or below .....  
..... sect. *Euchylodea*... *A. carmichaelli*
- a.\* bracteoles in the upper part below flower..... 37
- 36.\* Pedicels mostly glabrous; tepals outside always glabrous;  
carpels glabrous or pilose on the suture..... 38
37. Pedicels and tepals outside eglandular curved pubescent;  
carpels mostly pubescent on the backside ..... *A. vitosanum*
- 37.\* Pedicels sparsely eglandular curved pubescent; tepals out-  
side glabrous; carpels mostly glabrous .....  
..... *A. ×aquilonare* (*A. variegatum* × *A. vitosanum*)
38. Hood not much higher than broad; claws of the nectaries  
strongly curved; spurs of the nectaries mostly reaching the  
top of the hood; carpels 3, glabrous ..... *A. vivanti*
- 38.\* Hood distinctly higher than broad; claws of the nectaries  
upright; spurs of the nectaries not reaching the top of the  
hood; carpels 3-5, glabrous or pilose on the suture.....  
..... *A. variegatum*

- a. Carpels 3, glabrous..... subsp. *nasutum*
- a.\* Carpels 3–5, pilose at least on the suture..... b
- b. Carpels 3, only sparsely pilose on the top of the suture ..  
.....nothosubsp. *podobnikianum* (subsp.  
*nasutum* × subsp. *variegatum*)
- b.\* Carpels 3–5, densely pilose on the suture .....  
..... subsp. *variegatum*
- c. Bracteoles 2–3 (–5) mm long, linear to narrow lanceo-  
late; carpels always 3.....var. *carniolicum*
- c.\* Bracteoles (4) 5–8 (–25) mm long, spatulate, ovate or  
leaflike; carpels (3–) 5.....d
- d. Leaf sheaths underside pubescent; pedicels sparsely  
pubescent below the bracteoles; carpels pilose on the  
suture and often also on the backside .....var. *stiriicum*
- d.\* Leaf sheaths underside glabrous; pedicels glabrous; car-  
pels only pilose on the suture.....var. *variegatum*
39. Tepals outside densely glandular pilose or very rarely gla-  
brous .....(A. *degenii* subsp.  
*rhaeticum*, A. *toxicum* subsp. *bucegiense*)...ser. *Toxica*...40
- 39.\* Tepals outside totally or almost glabrous .....  
..... nothoser. *Toxigata*...46
40. Hood distinctly higher than broad; nectary claw upright;  
nectary spur not reaching the top of the hood ..... 41
- 40.\* Hood about as high as broad or broader than high; nec-  
tary claw curved; nectary spur always reaching the top of  
the hood ..... 42
41. Pedicels and tepals outside with curved and s-formed  
glandular hairs..... A. *pilipes*
- 41.\* Pedicels and tepals outside with straight glandular hairs....  
..... A. *lasiocarpum*
- a. The whole pedicel glandular pilose.....subsp. *lasiocarpum*
- a.\* Pedicel only above the bracteoles glandular pilose,  
below the bracteoles glabrous or curved or crisped eglan-  
dular pubescent .....subsp. *kotulae*
42. Bracteoles broad ovate, with reticulate venation.... A. *toxicum*
- a. Tepals outside glabrous or almost glabrous..... b
- a.\* Tepals outside curved or straight glandular pilose ..... c
- b. Pedicels glabrous..... subsp. *bucegiense*
- b.\*Pedicels just sparsely straight glandular pilose, mainly  
above the bracteoles.....nothosubsp. *ungarianum* (subsp.  
*bucegiense* × subsp. *toxicum*)
- c. Pedicels and tepals outside only with straight glandular  
hairs .....subsp. *toxicum*
- c.\*Pedicels and tepals outside also or only with curved  
glandular hairs.....d
- d. Pedicels and tepals outside with curved and straight  
glandular hairs..... nothosubsp. *nyaradyanum* (subsp.  
*crispulum* × subsp. *toxicum*)
- d.\* Pedicels and tepals outside only with curved glandular  
hairs ..... subsp. *crispulum*
- 42.\* Bracteoles linear to narrow ovate ..... 43
43. Pedicels and tepals outside with straight, curved and  
s-formed glandular hairs .....  
.....A. ×*pilosiusculum* (A. *degenii* × A. *pilipes*)
- 43.\* Pedicels and tepals outside only with straight glandular  
hairs ..... 44
44. Bracteoles narrow ovate or spatulate, with branching  
veins..... A. ×*dragulescuanum* (A. *degenii* × A. *toxicum*)
- a. Pedicels, bracteoles and tepals outside only with straight  
glandular hairs.....nothosubsp. *dragulescuanum* (A. *degenii*  
subsp. *degenii* × A. *toxicum* subsp. *toxicum*)
- a.\* Pedicels, bracteoles and tepals outside with curved and  
straight glandular hairs.....nothosubsp. *grintescuanum* (A.  
*degenii* subsp. *degenii* × A. *toxicum* subsp. *crispulum*)
- 44.\* Bracteoles linear to lanceolate, without branching veins....  
..... 45
45. Nectary claw distinctly curved; nectary spur capitate or  
slightly recurved..... A. *degenii*
- a. Tepals outside glabrous ..... b
- a.\* Tepals outside glandular pilose..... c
- b. Pedicels glabrous..... subsp. *rhaeticum*
- b.\* Pedicels sparsely glandular pilose, mainly above the  
bracteoles.....nothosubsp. *lippertianum* (subsp.  
*paniculatum* × subsp. *rhaeticum*)
- c. Bracteoles linear, situated about in the middle of the  
pedicel.....subsp. *paniculatum*
- I. Nectaries and filaments glabrous ..... var. *laxiflorum*
- I.\* Nectaries glabrous or pilose; filaments ± densely  
pubescent ..... var. *turrachense*
- c.\* Bracteoles lanceolate to spatulate, situated at the top  
of the pedicel ..... e
- e. Carpels 5, densely pilose .....subsp. *valesiacum*
- e.\* Carpels 3–5, mostly glabrous..... f
- f. Pedicels below the bracteoles almost glabrous; carpels  
3–5, mostly glabrous..... nothosubsp. *gandogeri* (subsp.  
*paniculatum* × subsp. *valesiacum*)

- f.\* Pedicels below the bracteoles sparsely to densely glandular pilose; carpels 3, glabrous..... subsp. *degenii*
- II. Pedicels below the bracteoles only sparsely glandular pilose.....var. *intermedium*
- II.\* Pedicels below the bracteoles densely glandular pilose..  
.....var. *degenii*
- i. Hood ± hemispheric.....fo. *degenii*
- i.\* Hood cymbiform, spur of nectaries capitate.....  
..... fo. *craciunelense*
- 45.\* Nectary claw almost upright and only very slightly curved; nectary spur elongated and half or almost totally recurved.....*A. ×gayeri* (*A. degenii* × *A. lasiocarpum*)
46. Hood distinctly higher than broad; nectary claw upright; nectary spur not reaching the top of the hood.....47
- 46.\* Hood about as high as broad or slightly higher; nectary claw curved; nectary spur always reaching the top of the hood..... 48
47. Pedicels sparsely crisped and s-formed glandular pilose, mainly above the bracteoles; carpels (3–) 5 mostly ± densely pilose ..... *A. ×austriacum* (*A. pilipes* × *A. variegatum*)
- 47.\* Pedicels sparsely straight glandular pilose, mainly above the bracteoles; carpels 3–5, pilose only on the suture.....  
..... *A. ×pawlowskii* (*A. lasiocarpum* × *A. variegatum*)
48. Bracteoles narrow, without reticulate venation..... 49
- 48.\* Bracteoles broad spatulate to narrow ovate, with reticulate venation..... 50
49. Tepals outside sparsely glandular pilose; carpels 3–5.....  
..... *A. ×hebegynum* (*A. degenii* × *A. variegatum*)
- 49.\* Tepals outside glandular pilose and eglandular pubescent; carpels 3.....*A. ×tuschetium* (*A. degenii* × *A. vitosanum*)
50. Carpels glabrous or pilose on the suture.....  
.....*A. ×bartokianum* (*A. toxicum* × *A. variegatum*)
- a. Pedicels and tepals outside curved glandular pilose; carpels glabrous .....nothosubsp. *rapaicsianum* (*A. toxicum* subsp. *crispulum* × *A. variegatum* subsp. *nasutum*)
- a.\* Pedicels and tepals outside straight glandular pubescent.....b
- b. Carpels glabrous.....nothosubsp. *bartokianum* (*A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *nasutum*)
- b.\* Carpels pilose on the suture.....  
.....nothosubsp. *sooanum* (*A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *variegatum*)
- 50.\* Carpels entirely pubescent.....*A. lasiocarpum* × *A. toxicum*

## TAXONOMIC TREATMENT

*Aconitum* L. sect. *Aconitum* subsect. *Aconitum* ser. *Aconitum* in Europe is represented by six species, four nothospecies, and one hybrid formula; ser. *Castellana* Rottensteiner – by single species; ser. *Taurica* Mucher ex Starm. – by two species; nothoser. *Acorica* Starm. (ser. *Aconitum* × ser. *Taurica*) – by one species and two nothospecies (Mitka et al. 2017).

*Aconitum* sect. *Aconitum* subsect. *Burnatii* Rottensteiner consists of four endemic species distributed in the Sierra Nevada, Maritime Alps, French Massif Central, Balkans, and Western Carpathians (Rottensteiner 2018).

*Aconitum* sect. *Cammarum* DC. ser. *Variegata* Steinberg ex Starm. in Europe comprises three species and one nothospecies; ser. *Toxica* (Rchb.) Mucher is represented by four species, three nothospecies, and one hybrid formula; nser. *Toxigata* Starm. (ser. *Toxica* × ser. *Variegata*) – by five nothospecies.

*Aconitum* sect. *Angustifolium* Rottensteiner consists of one species (Seitz 1969).

*Aconitum* nothosect. *Acomarum* Starm. (*Aconitum* sect. *Aconitum* × *Aconitum* sect. *Cammarum*) consists of seven nothospecies and four hybrid formulae (Starmühler 2001; Waclawska-Ćwiertnia and Mitka 2016).

1. – Sect. *Aconitum*1A. – Subsect. *Aconitum**Description*

Hood falciform, hemispherical, i.e., above rostrum wide-convex, or rounded-conic, 1–1.5 times higher than wide; claws of the nectaries bent and reaching the top of the hood, spurs of the nectaries acephalous, capitate or slightly bent, reaching the top of hoods; carpels 2–3, inflorescence axis, pedicels and tepals outside eglandular, glandular/eglandular pubescent/pilose or glabrous; leaves divided into 3 or 5 (–7) lobes and dissected to the base, the uppermost leaf segment linear to ovate, sometimes with 1–2 teeth; nectary spur capitate; seeds without membranous lamellae or rugulose, black to black-brown, with one or three longitudinal wings, then one wing more developed than the other two; root fusiform.

1a. – Ser. *Aconitum*

Type species: *A. napellus* L.

*Diagnostic characters:* nectary spur distinctly globose; tepals outside glabrous to densely pubescent.

***Aconitum anglicum*** Stapf, Curtis's Bot. Mag. 151: tab. 9088. 1926

Iconotype: Stapf, Curtis's Bot. Mag. 151: tab. 9088, 1926.

Synonyms: *A. napellus* auct., *A. napellus* L. subsp. *napellus* (sensu Seitz 1969)

Distribution: Southwest and West England and East Wales.

**Diagnostic characters:** tubers up to 9 cm, by 3 cm at the top; stem with fine curled hairs; leaves 5- to 3-partite, deeply lacinate with lobes linear to narrowly linear-lanceolate and acuminate, the uppermost 2–4 mm wide, almost glabrous; pedicels (1–) 2 (–3) cm long, quite erect; flowers mauve to mauvish-blue, minutely downy, curved eglandular pubescent; hood 18–20 mm high from the base; lower tepals strongly deflexed; lateral tepals 12–17 mm; claws of the nectaries curved almost horizontal, with a capitate spur; filaments hairy; carpels 3, glabrous.

Iconography: Stapf (1926); Ross-Craig (1948); Clapham et al. (1957).

Literature: Seitz (1969); Starmühler (1998).

Hybrids: unknown.

***Aconitum bucovinense*** Zapał., Rozpr. Wyzd. Mat.-Przyr. Akad. Umiej., Dział B. Nauki Biol. 48: 89–90. 1908a, *pro hybr.* [reprinted in Zapałowicz 1908b].

Type citation: “In montanis et subalpinis Bucovinae australis: Jakobeny, Pojana negri prope Dorna Kandreny (*Rehman*)”.

Typus: lectotype or, perhaps, holotype: KRAM 132396! (Wacławska-Ćwiertnia and Mitka 2016).

Synonyms: *A. callibotryon* Rchb. subsp. *bucovinense* (Zapał.) Grinț., *A. callibotryon* Rchb. subsp. *rigidum* (Rchb.) Grinț., *A. firmum* Rchb. subsp. *bucovinense* (Zapał.) Aschers. & Graebn.

Distribution: Eastern Carpathians, Southern Carpathians.

**Diagnostic characters:** the uppermost leaf segment 3–5 mm wide; hood and pedicels densely curved and crisped eglandular pubescent and often glandular pilose; claws of the nectaries curved, glabrous or pilose; bracteoles linear to obovate-lanceolate; filaments and stamens pilose; carpels glabrous or, rarely, pilose on the dorsal side (fo. *bucovinense*) or pubescent (fo. *orthotricha*).

Iconography: Mitka (2003: 179, fig. 12A–C); Novikoff and Mitka (2011: 49, fig. 5F,G).

Literature: Starmühler (1998); Starmühler (2000); Mitka (2003); Starmühler (2010); Wacławska-Ćwiertnia and Mitka (2016).

Lower taxa:

a) fo. ***bucovinense***

**Diagnostic characters:** carpels glabrous or, rarely, pilose on the dorsal side.

b) fo. ***orthotricha*** Gáyer, Magyar Bot. Lap. 9: 168. 1909

Type citation: did not provided by the author.

Typus: not designated.

Synonyms: none.

**Diagnostic characters:** carpels pubescent.

Hybrids:

a) ***Aconitum* × *nanum*** (Baumg.) Simonk., Enum. Fl. Transsilv.: 64. 1887

Type citation: “In mtb. Csibesz et Arszuluj”.

Typus: lectotype, (Romania) in m. Arszuluj (1812) – CL-Baumgarten 4745!

Synonyms: *A. napellus* L. var. *nanum* Baumg., *A. tauricum* Wulfen subsp. *nanum* (Baumg.) Gáyer, *A. tauricum* Wulfen subsp. *nanum* (Baumg.) Grinț.

Hybrid origin: *A. bucovinense* × *A. firmum*.

**Diagnostic characters:** hoods glabrous, pedicels eglandular and glandular pubescent.

b) ***Aconitum* × *czarnohorensse*** (Zapał.) Mitka, The genus *Aconitum* in Poland and adjacent countries: 77. 2003

Type citation: “W Górach Pokucko-Marmaroskich, szczególnie na Czarnej Horze i w Alpach Rodneńskich w krainie kosodrzewu często, najwyżej tam 2010–2030 m; liczne okazy z Czarnej Hory i z Pietrosu w Alpach Rodneńskich”.

Typus: lectotype, Góry Pokucko-Marmaroskie, Pietrosz, 8.08.1880, leg. et det. H. Zapałowicz, KRAM 246853! (Wacławska-Ćwiertnia and Mitka 2016).

Synonyms: *A. napellus* L. em Skalický var. *czarnohorensse* Zapał. fo. *czarnohorensse*, *A. napellus* L. var. *czarnohorensse* Zapał. fo. *amoenum* Zapał., *A. napellus* L. var. *czarnohorensse* Zapał. fo. *glabratum* Zapał., *A. napellus* L. var. *czarnohorensse* Zapał. fo. *hoverlanum* Zapał., *A. napellus* L. var. *czarnohorensse* Zapał. fo. *nanum* Zapał. non Baumg., *A. napellus* L. em Skalický var. *czarnohorensse* Zapał. fo. *rodnense* Zapał., *A. napellus* L. var. *czarnohorensse* Zapał. fo. *tenuisectum* Zapał., *A. napellus* L. em Skalický var. *czarnohorensse* Zapał. fo. *turkulense* Zapał.

Hybrid origin: *A. bucovinense* × *A. nanum*.

**Diagnostic characters:** hoods glabrous, pedicels below bracteoles glandular pilose or glabrous.

Iconography: (Mitka 2003: 179, fig. 12E); Novikoff and Mitka 2011: 49, fig. 5K).

***Aconitum corsicum*** Gáyer, Magyar Bot. Lap. 8: 181. 1909

Type citation: “Corsica: M. Coscione (*Kralik* – W; *Reverchon* – D)”.

Typus: paratypus, WU 0034394.

Synonyms: *A. lobelianum* Rouy-Fouc., *A. napellus* L. var. *compactum*



*tum* Rapaics., *A. napellus* L. subsp. *corsicum* (Gáyer) W. Seitz, *A. pyramidale* Mill. var. *corsicum* (Gáyer) P.Fourn.  
Distribution: Corsica.

**Diagnostic characters:** hood and pedicels densely pubescent, inflorescence rigid, in lower part ramified; claws of the nectaries erected, at their top slightly bent, spur of the nectaries capitate or acephalous, reaching the top of the hoods; filaments pilose; bracteoles linear to linear-lanceolate 3–5 mm; carpels glabrous; the uppermost leaf segment 2–4 mm wide.

Iconography: Jeanmonod and Gamisans (2007).  
Literature: Gáyer (1909); Starmühler (1998).  
Hybrids: unknown.

### *Aconitum firmum* Rchb., Uebers. *Aconitum*: 20. 1819

Type citation: “in Carpathorum tractu Townson!, Genersich!, Kitaibel!, Wahlenberg!, Sadler! in Transylvania Baumgarten! in Carinth. Alp. Fladnitz. v. Vest!”

Typus: iconotype, “Rchb., Mon. Acon.: 85, Tab. XIV, fig. 1, 1821” (Skalický 1990).

Synonyms: *A. flerovii* Steinb. in Komarov, *A. palmatifidum* Rchb., p.p., *A. romanicum* Wołoszczak, *A. tatrae* Borb., *A. koelleianum* Rchb. var. *firmum* (Rchb.) Rchb., *A. napellus* L. var. *firmum* (Rchb.) Pawł., *A. napellus* L. var. *babiogorensis* Zapał. fo. *babiogorensis*, *A. napellus* L. var. *babiogorensis* Zapał. fo. *subfissum* Zapał., *A. napellus* L. var. *carpaticum* Zapał. fo. *carpaticum*, *A. napellus* L. var. *subtatrense* Zapał. fo. *subtatrense*, *A. napellus* L. var. *subtatrense* Zapał. fo. *abnorme* Zapał., *A. napellus* L. var. *subtatrense* Zapał. fo. *latisectum* Zapał., *A. napellus* L. var. *tatrense* Zapał., *A. skerisorae* auct., non Gáyer, *A. tauricum* auct. Fl. Carpathorum, non Wulfen.

Distribution: Carpathian Mts, Apuseni Mts, Balkans, Central Russian Highlands.

**Diagnostic characters:** bracteoles (2.5–) 3–17 mm long, at least those of the lowest flowers in terminal raceme divided or at least toothed; pedicels and tepals outside glabrous (subsp. *firmum*, subsp. *fissurae*, and nothosubsp. *fussianum*), curved and crisped eglandular pubescent and glandular pilose (subsp. *skerisorae*), or eglandular pubescent (subsp. *moravicum*); bracteoles 2–5 (–7) mm long, whether toothed nor divided; stamens glabrous (subsp. *firmum*) or villose (subsp. *fissurae* and nothosubsp. *fussianum*).

Iconography: Bauhin (1671: 183); Reichenbach (1821: t. xiv, fig. 1); Mitka (2003: 178); Novikoff and Mitka (2011: 49).  
Literature: Skalický (1990); Starmühler (1998); Starmühler (2000); Starmühler and Mitka (2001); Mitka (2003); Starmühler (2010); Novikoff and Mitka (2011); Mitka et al. (2017).

Lower taxa:

a) subsp. *firmum*

**Diagnostic characters:** pedicels and tepals outside glabrous; bracteoles ± deeply divided; stamens glabrous.

b) subsp. *fissurae* Nyár., Enum. Pl. Cheia Turzii: 132. 1939

Type citation: “[Romania] Transsilvania, Cheia Turzii, Repezieul caprelor; Nr. 435214; 06.09.1936; leg. E.I. Nyárády (CL)” (Starmühler and Mitka 2001).

Typus: lectotype, CL 435214.

Synonyms: *A. romanicum* Wołoszczak, *A. flerovii* Steinberg in Komarov.

**Diagnostic characters:** pedicels and tepals outside glabrous; bracteoles entire or slightly toothed; stamens villose.

c) subsp. *skerisorae* (Gáyer) Starm., Siebenbürg. Arch. 36: 18. 2000

Type citation: “Plantae Hungariae exsiccatae, Comit. Kolozs, in lapidosis fl. Melegsamos ad pag. Melegsamos, Nr. 60705; 17.07.1904 leg. Z. Zsák (BP); *A. skerisorae* Gáy., rev. Gáyer 1910” (Starmühler 2000).

Typus: neotype, BP 60705.

Synonyms: *A. skerisorae* Gáyer, *A. tatrae* Borbás var. *skerisorae* Soó, *A. napellus* Rchb. subsp. *skerisorae* Seitz non Gáyer (Soó 1972).

**Diagnostic characters:** pedicels and tepals outside eglandular pubescent and glandular pilose; bracteoles from lanceolate to divided; stamens villose or rarely glabrous.

d) subsp. *moravicum* Skalický, Preslia 54 (2): 115 1982

Type citation: “[Czech Republic] Beskydy, u cesty na západ, sva-hu Smrku, 1025 m, Nr. 322; 27.07.1943; leg. R. Kurka (PCR)” (Starmühler and Mitka 2001)

Typus: holotype, PCR 322.

Synonyms: *A. napellus* L. subsp. *firmum* (Rchb.) Gáyer var. *carpaticum* Maloch.

**Diagnostic characters:** pedicels and tepals outside eglandular pubescent; bracteoles at least those of the lowest flowers divided or at least toothed, rarely undivided; stamens mostly pilose.

e) nothosubsp. *fussianum* Starm. (*A. firmum* subsp. *firmum* × *A. firmum* subsp. *fissurae*) – see hybrids of *A. firmum*.

Hybrids:

a) *Aconitum firmum* nothosubsp. *fussianum* Starm., Siebenbürg. Arch. 36: 17. 2000

Type citation: “Transilvania (Siebenbürgen, Erdély), Muntii Apuseni (Siebenbürgisches Westgebirge, Nyugati-havasok), Muntii Vladeasa (Vlegyásza-hegyseg), W Huedin (Bánffyhunjad), im Valea Draganului (Nagysobos) beim Dorf Lunca, 735 m”.

Typus: holotype, GZU 000225133.

Synonyms: none.

Hybrid origin: *A. firmum* subsp. *firmum* × *A. firmum* subsp. *fissurae*.

*Diagnostic characters*: tepals outside glabrous; bracteoles toothed or lobed; stamens villose.

b) *Aconitum* × *nanum* (Baumg.) Simonk. (*A. bucovinense* × *A. firmum*) – see *A. bucovinense*.

c) *Aconitum* × *czarnohorensis* (Zapał.) Mitka (*A. firmum* × *A. nanum*) – see *A. bucovinense*.

d) *Aconitum* × *mariae* Rottensteiner, Mitka & Novikov, **nothospec. (hybr.). nov.**

Typus: [Slovakia] Hungaria, comitatus Szepes, Montes Bélaenses, in valle Drechslerhäuschen sub monte Stirnberg, alt. cca. 1400–1500 m, solo calc.; 01.09.1907; leg. E.G. Nyárády (holotype, SIB).

#### Diagnosis

*A. mariae* differs from *A. firmum* by glandular pilose pedicels and differs from *A. maninense* by glabrous tepals.

#### Description

Inflorescence axis glabrous, pedicels glandular pubescent and pilose, often only above the bracteoles, bracteoles linear, lanceolate, spathulate or even divided, situated in the upper half of the pedicel, tepals outside glabrous, filaments of the stamens glabrous or sparsely pilose, carpels glabrous or sparsely pilose on the backside.

Hybrid origin: *A. firmum* s.str. × *A. maninense*.

#### Eponymy

This new *Aconitum* hybrid is named after a distinguished botanist, our friend and colleague from the Institute of Botany of the Jagiellonian University in Kraków, Professor Maria Zając (1955–2018).

e) *Aconitum* × *mariae* Rottensteiner, Mitka & Novikov nothosubsp. **paxii** (Starm.) Mitka, **comb. nov.**

Basionym: *A. firmum* Rchb. nothosubsp. *paxii* Starm. in Starmühler & Mitka, Thaiszia 10 (2): 127, 2001.

Type citation: “Polen, Galizien, Nord-Karpaten, Hohe Tatra (Tatry Wysokie), S-Ufer vom Großen Fischsee (Morskie Oko), N 49°11.64', E 20°04.12', 1395 m alt.; Hochstaudenflur; 13.08.1997;

leg. U. et W. Starmühler” (Starmühler and Mitka 2001).

Typus: holotype, GZU 000232750.

Synonyms: *A. palmatifidum* Rchb. fo. *piliferum* Gáyer.

Hybrid origin: *A. firmum* subsp. *moravicum* × *A. maninense*.

*Diagnostic characters*: pedicels curved and crisped eglandular pubescent and glandular pilose.

Iconography: Mitka (2003: 178, fig. 11E).

f) *Aconitum* × *zawalowiczii* (Starm.) Mitka, Studia Universitatis Babeş-Bolyai, Biologia, 62: 166. 2017

Basionym: *A. firmum* Rchb. nothosubsp. *zawalowiczii* Starm. in Starmühler & Mitka, Thaiszia 10 (2): 128, 2001.

Type citation: “Polen, Galizien, Nord-Karpaten, Hohe Tatra (Tatry Wysokie), S-Ufer vom Großen Fischsee (Morskie Oko), N 49°11.64', E 20°04.12', 1395 m alt.; Hochstaudenflur; 13.08.1997; leg. U. et W. Starmühler” (Starmühler and Mitka 2001).

Typus: holotype, GZU 000232751.

Synonyms: none.

Hybrid origin: *A. firmum* × *A. mariae* nothosubsp. *paxii*.

*Diagnostic characters*: pedicels only sparsely curved and crisped eglandular pubescent and glandular pilose, mainly just above the bracteoles.

Iconography: Mitka (2003: 178, fig. 11F).

*Aconitum napellus* L., Sp. Pl. ed. 1, 1: 352. 1753

Type citation: “in Helvetia, Bavaria, Gallia”.

Typus: lectotype in Herb. Clifford: 214, A. 3, sheet A, BM 000628795 (Seitz 1969).

Synonyms: *A. autumnale* Clus. ex Rchb., *A. bernhardianum* Rchb., *p.p.*, *A. compactum* Rchb., *A. eminens* Koch. ex Rchb., *A. laxum* Rchb., *A. linnaeanum* Gáyer, *A. lobelianum* Rchb., *A. meyeri* Rchb., *A. neomontanum* Wulfen, *A. neubergense* Clus. ex Rchb., *A. pyramidale* Mill. ex Rchb., *A. strictum* Bernh., *A. vulgare* DC., *Delphinium napellus* (L.) Baill.

Distribution: Alps, Pyrenees, Iberian Peninsula, Bohemian Massif.

*Diagnostic characters*: inflorescence axis, pedicels and hoods outside pubescent; filaments not toothed; nectaries bent horizontal, spur of nectaries capitate; inflorescence rigid or loose/ramified; bracteoles (3–) 5–8 (–20) mm long and carpels (2–) 3, densely pubescent (subsp. *lobelii*) or carpels sparsely pubescent on the backside only (nothosubsp. *seitzii*); carpels glabrous, bracteoles linear to lanceolate, rarely spathulate (4–) 5–8 (–15) mm (subsp. *napellus*), 1–2 (–3) mm long (subsp. *formosum*); or nectaries hardly bent; filaments ± toothed, carpels 2–3 (subsp. *lusitanicum*); bracteoles (2–) 3 (–4) mm long and carpels (2–) 3 glabrous (nothosubsp. *hinterhuberi*) or carpels sparsely pubescent on the backside (nothosubsp. *polatschekii*).

Iconography: Matt., New Kreuterb.: 472, fig. D, 1563; Clus. Rar. Pl. Hist. 2: 96 *pro Aconit. Lycoc. vi. Napellus vulgar.*, 1601; Jacq. Fl. Austr. v. 4, t. 381, 1776.

Literature: Cappelletti and Poldini (1984); Molero and Blanché (1986); Mucher (1991a); Starmühler (1999); Starmühler (2001); Starmühler (2002).

Lower taxa:

a) subsp. ***napellus***

*Diagnostic characters*: carpels 3 (–4), glabrous; bracteoles linear to lanceolate, rarely spatulate (4–) 5–8 (–15) mm; filaments not toothed.

b) subsp. ***lobelii*** Mucher, Phytion (Horn) 31(1): 130. 1991

Type citation: “Ostalpen, Steiermark, Salzkammergut, Totes Gebirge, Loser, Panoramastraße, Hochstaudenflur, 1020 m, 9.8.1989, leg. W. Mucher, GZU” (Mucher 1991c).

Typus: holotype, GZU 000274111. Isotypes, GJO, GZU 000274112 – GZU 000274117, W, WU.

Synonyms: *A. lobelianum* Host, *p.p.*, non Rchb., *A. lobelianum* (Rchb.) Host. in Gayer, *p.p.*

*Diagnostic characters*: carpels (2–) 3, densely pubescent; bracteoles linear to lanceolate, (3–) 5–8 (–20) mm; filaments not toothed, pilose.

c) subsp. ***formosum*** (Rchb.) Gayer in Hegi, Fl. Mitteleur. 3: 498. 1912

Type citation: “Salzburger Alpen (Untersberg, Schafberg)” (Gayer 1912: 498)

Typus: iconotype, “Reichenbach 1825, Ill. Spec. Acon. Gen., icon. 65” (Starmühler 1997b).

Synonyms: *A. formosum* Rchb., *A. napellus* L. [var.] *formosum* (Rchb.) Koch, *A. napellus* [var.]  $\beta$  *hemisphaericum* fo. *formosum* (Rchb.) Beck.

Iconography: Gayer (1912: 499, fig. 655 a–c).

*Diagnostic characters*: carpels 2–3, glabrous; bracteoles linear to lanceolate, only 1–2 (–3) mm long; filaments not toothed.

d) subsp. ***lusitanicum*** Rouy, Le Naturaliste 6: 405. 1884

Type citation: “Prov. de *Tras-os-montes*: environ de Bracança, à San Martin ho d’Augueira. – Sept. 1854. – leg. E. Schmitz” (Rouy 1884).

Typus: not designated.

Synonyms: none.

*Diagnostic characters*: carpels 2–3, glabrous; filaments toothed.

e) nothosubsp. ***hinterhuberi*** (*A. napellus* subsp. *formosum* × *A. napellus* subsp. *napellus*) – see hybrids of *A. napellus*.

*sum* × *A. napellus* subsp. *napellus*) – see hybrids of *A. napellus*.

f) nothosubsp. ***polatschekii*** (*A. napellus* subsp. *formosum* × *A. napellus* subsp. *lobelii*) – see hybrids of *A. napellus*.

Hybrids:

a) ***Aconitum napellus*** L. nothosubsp. ***hinterhuberi*** Starm., Fritschiana 18: 12. 1999

Type citation: “*Aconitum brauneanum*, Untersberg, 1825, leg. *Hinterhuber* (WU-Keck). Dieser Beleg wurde bereits von Seitz 1966 als “*A. napellus* ssp. *hians* gegen ssp. *neomontanum*” revidiert” (Starmühler 1999).

Typus: holotype, WU-Keck.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *formosum* × *A. napellus* subsp. *napellus*.

*Diagnostic characters*: carpels (2–) 3, glabrous; bracteoles (2–) 3 (–4) mm long; filaments of stamens not toothed.

b) ***Aconitum napellus*** L. nothosubsp. ***polatschekii*** Mucher ex Starm., Fritschiana 18: 13. 1999

Type citation: “Ostalpen, Steiermark, Mariazellerland, Südufer des Hubertussees an der niederösterreichischen Grenze, feuchte Wiese, 840 m; 04.08. 1989; leg. W. Mucher” (Starmühler 1999).

Typus: holotype, GZU 000274119. Isotype, W.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *formosum* × *A. napellus* subsp. *lobelii*.

*Diagnostic characters*: carpels (2–) 3 sparsely pubescent on the backside; bracteoles (2–) 3 (–4) mm long.

c) ***Aconitum napellus*** L. nothosubsp. ***seitzii*** Mucher ex Starm., Fritschiana 18: 14. 1999

Type citation: “Ostalpen, Steiermark, Mariazellerland, in der Walster, Bachufer beim Kaiser Franz Josef Denkmal 810 m; 04.08.1989; leg. W. Mucher” (Starmühler 1999).

Typus: holotype, GZU 000274118. Isotype, W.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *lobelii* × *A. napellus* subsp. *napellus*.

*Diagnostic characters*: carpels (2–) 3 sparsely pubescent on the backside; bracteoles (3–) 5–8 (–20) mm long.

***Aconitum superbum*** Fritsch, Verh. K.K. Zool.-Bot. Ges. Wien 45: 370. 1895

Type citation: “Mala Vrata unweit vom Berge Koprivnica zwis-

chen Bugojno und Kupres/Bosnien (Sostarič, Aug. 1895)".

Typus: holotype, WU 2540.

Synonyms: *A. adriaticum* Gayer, *A. sostaricianum* Fritsch, *A. napellus* L. subsp. *superbum* (Fritsch) W. Seitz

Distribution: Western and Central Balkans.

**Diagnostic characters:** plant 200–300 cm high; inflorescence axis, pedicels and hoods outside eglandular pubescent; leaves on the lower side with distinct reticulate venation, the uppermost leaf segment ovate; filaments pilose; carpels 2 (–3) glabrous.

Iconography: Seitz (1969: 16).

Literature: Fritsch (1895); Gayer (1909).

Hybrids:

a) *A. superbum* × *A. variegatum* – more studies required.

b) *A. superbum* × *A. vitosanum* – more studies required.

#### 1b. – Ser. *Castellana* Rottensteiner, **series nova**

Type species: *A. castellanum* (Molero & Blanché) Rottensteiner.

#### *Diagnosis*

Spurs of nectaries are elongated and backward bent.

#### *Description*

Monotypical series with only one species, separated from the other series of subsection *Aconitum* by the unique character of the elongated and backward bent spur of the nectaries.

***Aconitum castellanum*** (Molero & Blanché) Rottensteiner, **stat. nov.**

Basionym: *A. napellus* L. subsp. *castellanum* Molero and Blanché, Anal. Jardín Bot. Madrid 41: 213. 1984.

Type citation: "Laguna del Marquesado, 30S XK1349, loco humido umbraoque – in populeto – ad 1400 m, *J. Molero et A. Rovira* die 20-VIII-1983 legerunt".

Typus: holotype, BCF 71554.

Distribution: Iberian Peninsula.

**Diagnostic characters:** stem and leaves glabrous or glabrescent; inflorescence ramified, curved eglandular pubescent; hood hemispheric-falciform; nectaries hardly curved, spur of the nectaries elongated and bent backward; filaments not dentate, pilose; carpels 3–5, glabrous.

Iconography: Molero and Blanché (1986: 238).

Literature: Molero and Blanché (1984), Molero and Puig (1990).

Hybrids: unknown.

1c. – Ser. *Taurica* Mucher ex Starm.

Type species: *A. tauricum* Wulfen

**Diagnostic characters:** inflorescence simple or shortly ramose; bracteoles triangle to linear, glabrous or at margins ciliate; hood and pedicels glabrous; nectary spur acephalous or hardly capitate.

***Aconitum clusianum*** Rchb., Mon. Aconit.: 91. 1821

Type citation: "Bohemian Sudetes: Aupagrund".

Typus: iconotype: Reichenbach, Mon. Aconit. Tab. III, 1. 1821

Distribution: Sudetes, Bohemian Massif.

**Diagnostic characters:** plant 30–150 cm high, inflorescence weakly ramified, hood falciform or rounded-conic, pedicels glabrous; carpels 2 (–3) glabrous; spur of nectaries acephalous or capitate; bracteoles triangle to linear 1–2 (–3) mm long; filaments pilose; the uppermost leaf segment ovate or lanceolate-ovate 3–5 mm wide.

Iconography: Reichenbach (1821: tab. XIII, fig. 1); Mitka (2003, 177: fig. 10D).

Literature: Mitka (2003).

Hybrids: unknown.

***Aconitum tauricum*** Wulfen in Koelle, Spicil. Observ. Acon.: 15. 1788

Type citation: "Frequentissimum in apricis Taureri Malnizesis, Radstadienis, etc."

Typus: iconotype, "Typus gesehen von Gayer, Magyar Bot. Lap. P. 146 (1909): (W) – ist vernichtet; Abbildung bei Reichenbach, illustr. Aconit. T. 63 (1827)" (Seitz 1969).

Synonyms: *A. dolomiticum* A.Kern.; *A. hayekianum* Gayer; *A. koelleanum* Rchb., *p.p.*; *A. napellus* L. subsp. *koelleanum* (Rchb.) Mucher; *A. parviflorum* Host.; *A. taurericum* Rchb.; *A. trichocarpum* Rchb., *A. napellus* L. subsp. *tauricum* (Wulfen) Gayer in Hegi, *A. napellus* L. var. *tauricum* (Wulfen) Sér., *A. napellus* fo. *koelleanum* (Rchb.) Gürke in Richter-Gürke.

Distribution: Alps.

**Diagnostic characters:** plant 60–80 cm high; inflorescence rigid; hoods falciform or hemispherical; inflorescence axis and tepals outside glabrous, pedicels glabrous (subsp. *tauricum*), with solitary hairs at the top (nothosubsp. *hayekianum*) or pilose above bracteoles (subsp. *latemarense*); inflorescence with a lot of long side racemes (var. *eustachyum*) or without or only a few short side racemes (var. *tauricum*), filaments glabrous (fo. *tauricum*) or pilose (fo. *taurericum*); spur of nectaries acephalous or hardly capitate; the uppermost leaf segments 1–3 mm wide.

Iconography: Clusii Histor. Rarior. Plant p. XCV, n. IV, 1601; Reichenbach (1827: t. 63).  
Literature: Mucher (1993a); Starmühler (2001).

Lower taxa:

a) subsp. *tauricum* var. *tauricum* fo. *tauricum*

*Diagnostic characters*: inflorescence compact, without or with only a few short side racemes; pedicels, carpels, nectaries and filaments glabrous.

b) subsp. *tauricum* var. *tauricum* fo. *taurericum* (Rchb.) Gáyer, Magyar Bot. Lap. 8: 145. 1909

Type citation: none.

Typus: not designated, probably iconotype is Rchb., Monogr. Acon.: 87, tab. 12, figs. 2, 3, 1820.  
Synonyms: *A. taurericum* Rchb., *A. tauricum* Wulfen in Koelle subsp. *taurericum* (Rchb.) Grinț.

*Diagnostic characters*: inflorescence compact, without or with only a few short side racemes; pedicels, carpels, nectaries and filaments pilose.

c) subsp. *tauricum* var. *eustachyum* (Rchb.) Starm., Hladnikia 6: 42. 1996

Type citation: none.

Typus: not designated, probably iconotype is Monogr. Aconit.: 96, tab. 15, fig. 3, 1820.  
Synonyms: *A. eustachyum* Rchb., *A. napellus* L. subsp. *eustachyum* (Rchb.) Gáyer in Hegi, *A. napellus* L. [var.]  $\gamma$  *eustachyum* (Rchb.) Fiori.

*Diagnostic characters*: inflorescence ramified; pedicels with solitary hairs or glabrous; carpels mostly glabrous.

d) subsp. *latemarensis* (Degen & Gáyer) Starm. in W.Maurer, Fl. Steiermark 1: 84. 1996

Type citation: "Tirol: in lapidosis subalpinis ad pedem montis Latemar prope Karersee, alt. ca.1600–1800 m, 30.VIII.1906, Degen".

Typus: not designated.

Synonyms: *A. latemarensis* Degen & Gáyer, *A. tauricum* Wulfen in Koelle var. *latemarensis* (Degen & Gáyer) Mucher.

*Diagnostic characters*: pedicels with mixed glandular and eglandular pubescence; carpels often sparsely pubescent on the suture.

e) nothosubsp. *hayekianum* (*A. tauricum* subsp. *latemarensis*  $\times$  *A. tauricum* subsp. *tauricum*) – see hybrids of *A. tauricum*.

Hybrids:

a) *Aconitum*  $\times$  *acutum* Rchb. (*A. tauricum*  $\times$  *A. variegatum*) – see nsect. *Acomarum*.

b) *Aconitum*  $\times$  *mielichhoferi* Rchb. (*A. degenii*  $\times$  *A. tauricum*) – see nsect. *Acomarum*.

c) *Aconitum tauricum* Wulfen in Koelle nothosubsp. *hayekianum* (Gáyer) Grinț. in Savulescu, Flora Reipublicii Populare Române, 2: 475. 1953

Type citation: "Sanntaler Alpen" (Gáyer 1911)

Type specimens: not designated.

Synonyms: *A. dolomiticum* Hayek, *p.p.*, *A. ranunculifolium* Rchb. var. *dolomiticum* Evers, *p.p.*

Hybrid origin: *A. tauricum* subsp. *latemarensis*  $\times$  *A. tauricum* subsp. *tauricum*.

*Diagnostic characters*: pedicels with solitary hairs at the top; carpels mostly glabrous.

d) *Aconitum pilipes*  $\times$  *A. tauricum* – see nothosect. *Acomarum*.

**Id.** – Nothoser. *Acorica* Mucher ex Starm. (*Aconitum* ser. *Aconitum*  $\times$  *Aconitum* ser. *Taurica*)

Type species: *A. plicatum* Rchb., designated here.

*Diagnostic characters*: spur of nectaries acephalous or hardly capitate, hoods pilose.

*Aconitum plicatum* Köhler ex Rchb., Uebers. Aconitum: 29. 1819

Type citation: "In Sudetis Koehler!".

Typus: iconotype in Reichenbach, Icon. Fl. Germ. Helv., Vol. 4: Icon. T. 98, Nr. 4708d. 1840 (Starmühler 1997a).

Synonyms: *A. amoenum* Rchb., *A. bernhardianum* Rchb., *p.p.*, *A. callibotryon* Rchb., *A. hians* Rchb., *A. koehleri* Rchb., *A. laetum* Rchb., *A. multifidum* Koch ex Rchb., *A. rigidum* Rchb.

Distribution: Sudetes, Bohemian Massif, Bavarian Alps.

*Diagnostic characters*: plant 30–150 cm high, inflorescence weakly ramified, hood falciform or rounded-conic, carpels glabrous, pedicels eglandular pubescent (subsp. *plicatum*) or glandular/eglandular pilose (subsp. *sudeticum*); carpels 2 (–3) glabrous; spur of nectaries acephalous or capitate; bracteoles triangle to linear 1–2 (–3) mm long; filaments pilose; uppermost leaf segment ovate or lanceolate-ovate 3–5 mm wide.

Iconography: Mattioli (1563: 472, fig. D); Clusius (1601: 96, *pro Aconit. Lycot. vi. Napellus vulgar.*); Jacquin (1776: t. 381); Reichenbach (1840: 48, fig. 4708 d); Mitka (2003: 177).

Literature: Cappelletti and Poldini (1984); Molero and Blanché

(1986); Mucher (1991a); Starmühler (1999); Starmühler (2001); Starmühler (2002); Mitka (2003).

Lower taxa:

a) subsp. *plicatum*

*Diagnostic characters*: pedicels eglandular pubescent; carpels glabrous.

b) subsp. *sudeticum* Mitka, The genus *Aconitum* in Poland and adjacent countries: 76. 2003.

Type citation: "Sudety Wschodnie, Masyw Śnieżnika, nad potokiem Czarna, 960 m, pod Dzikim Stokiem, 10.8.1988, leg. Z. Szeląg" (Mitka 2003).

Typus: holotype, KRAM. Isotypes, KRAM. Paratypus, KRA.

Synonyms: none.

*Diagnostic characters*: pedicels eglandular and/or glandular pilose; carpels pubescent.

Hybrids:

a) *Aconitum* × *bavaricum* Starm., Ber. Bayer. Bot. Ges. 71: 105. 2001, nothosubsp. *bavaricum*

Type citation: "Aconita rarissima selecta (2001), Deutschland, Bayern, Bayerischer Wald, NNE Bodenmais, Großer Arber, E-Hang unter dem Gipfel, über der Bodenmais-Mulde, N 49°06.66', E 13°08.08', 1435 m alt.; 31.08.2000; leg. W. Starmühler (GZU)" (Starmühler 2001).

Typus: holotype, GZU 000232791. Isotype, M, Herb. STARMÜHLER.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *napellus* × *A. plicatum*.

*Diagnostic characters*: bracteoles situated distant from the flower, carpels glabrous.

b) *Aconitum* × *bavaricum* Starm. nothosubsp. *lusenense* Starm., Ber. Bayer. Bot. Ges. 71: 105. 2001

Type citation: "Ranunculaceae subtrib. Delphiniinae exsiccatae, Fasc. 5 (2001), Deutschland, Bayern, Bayerischer Wald, NE Grafenau, Lusen, am Weg vom Teufelsjoch zur Böhm-Hütte, 1045 m alt.; Quellufer; 29.08.2000; leg. W. Starmühler (GZU)" (Starmühler 2001).

Typus: holotype, GZU 000232817. Isotype, GJO, JACA, KRA, LE, LG, LI, M, MEL, NY, PE, Herb. STARMÜHLER, TBL, TNS, W, Z.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *lobelii* × *A. plicatum*.

*Diagnostic characters*: carpels sparsely pubescent on the backside.

c) *Aconitum* × *teppneri* Mucher ex Starm., Ber. Bayer. Bot. Ges. 71: 107. 2001, nothosubsp. *teppneri*

Type citation: "Ostalpen, Steiermark, Hochschwab, Schönleiten, Latschengebüsch, 1680 m, 22.8.1989, leg. W. Mucher (GZU) (Starmühler 2001).

Typus: holotype, GZU 000274190. Isotypes, GZU 000274195, GZU 000274196, W, WU.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *napellus* × *A. tauricum* subsp. *tauricum*.

*Diagnostic characters*: pedicels sparsely curved and crisped eglandular pubescent, carpels glabrous.

d) *Aconitum* × *teppneri* Mucher ex Starm. nothosubsp. *goetzii* Mucher ex Starm., Ber. Bayer. Bot. Ges. 71: 108. 2001

Type citation: "Österreich, Steiermark, Totes Gebirge, Pühringer Hütte – Salzofen, 21.8.1934, leg. W. Möschl (GZU)" (Starmühler 2001).

Typus: holotype, GZU 000274189.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *lobelii* × *A. tauricum* subsp. *tauricum*.

*Diagnostic characters*: pedicels sparsely curved and crisped eglandular pubescent; carpels sparsely pubescent on the backside.

e) *Aconitum* × *teppneri* Mucher ex Starm. nothosubsp. *haderlappii* Starm., Fritschiana 30: 14. 2002

Type citation: "Slowenien, Kranjska (Krain), Kamniške Alpe (Steiner Alpen), N Kamnik (Stein), bei der Cojzova koča (Zois-Hütte) auf dem Kokrsko sedlo (Kanker-Sattel), 1790 m alt.; Hochstaudenflur; 20.08.1991; leg. W. Mucher (GZU)" (Starmühler 2002).

Typus: holotype, GZU 000232745.

Synonyms: none.

Hybrid origin: *A. napellus* subsp. *lobelii* × *A. tauricum* subsp. *latemarense*.

*Diagnostic characters*: pedicels glandular and eglandular curved and crisped pubescent and pilose, carpels sparsely pubescent on the backside.

f) *Aconitum* × *teppneri* Mucher ex Starm. nothosubsp. *kernerii* Starm., Fritschiana 30: 15. 2002

Type citation: "*Aconitum dolomiticum* A. Kerner ex Hayek, Flora stiriaca exsiccata Nr. 845, Stiria inferior [Slovenija, Štajerska], in uliginosis prope refugium Kocbekhütte in monte Molička planina in Alpius Lithopolitanis (Sanntaler-sive Steiner Alpen), solo calcareo, 1760–1800 m s.m.; 08.1905 et 1907; leg. A. Hayek et L. Der-ganc (GZU)" (Starmühler 2002).

Typus: holotype, GZU. Isotypes, GZU 000274195, GZU 000274196, LJU, WU.

Synonyms: *A. dolomiticum* Hayek, *p.p.*, *A. ranunculifolium* Rchb. var. *dolomiticum* Evers, *p.p.*

Hybrid origin: *A. napellus* subsp. *napellus* × *A. tauricum* subsp. *latemarense*.

**Diagnostic characters:** pedicels glandular and eglandular curved and crisped pubescent and pilose, carpels glabrous.

### 1B. – Subsect. *Burnatii* Rottensteiner

Type species: *A. burnatii* Gáyer.

#### Description

Differs from subsection *Aconitum* (series *Aconitum*) by the flexuous zigzag stem (at least in the region of the inflorescence) and by glandular pilose inflorescence.

***Aconitum burnatii*** Gáyer, Magyar Bot. Lap. 8: 141. 1909

Type citation: “Alpes Maritimae. Italia, au Col de la Madonna d. Fenestre (*Bourgeau* pl. alp. mar. n. 13 – W)”.

Typus: not designated.

Synonyms: *A. divergens* Pančić subsp. *burnatii* (Gáyer) W. Seitz, *A. delphinense* Gáyer, *A. napellus* L. subsp. *burnatii* (Gáyer) J.-M. Tison.

Distribution: Maritime Alps, France (Massif Central).

**Diagnostic characters:** stem in the lower third pubescent; leaves densely pubescent; the uppermost leaf segment (2–) 3–4 mm; pedicels straight; bracteoles linear 2–3 mm long; hood broader than high, falciform; spur of nectaries elongate capitate, filaments sparsely pilose or glabrous; carpels glabrous or pubescent.

Iconography: Molero and Blanché (1986: 238).

Literature: Seitz (1969); Seitz (1970); Rottensteiner (2018).

Hybrids: unknown.

***Aconitum maninense*** (Skalický) Mitka, Studia Universitatis Babeş-Bolyai, Biologia, 62, Sp. Iss. 2017

Basionym: *A. firmum* Rchb. subsp. *moravicum* Skalický var. *maninense* Skalický, Preslia 57: 136, 1985.

Type citation: “Proles localis (natio) angustiarum Maninska úžina et Kostelecká úžina inter Považská Bystrica et Súl'ov.”

Typus: holotype, PRC 725!

Distribution: Western Carpathians.

**Diagnostic characters:** stem in the lower third glabrous; leaves sparsely pubescent, the uppermost leaf segment 4–6 mm wide; pedicels straight to bent; bracteoles linear to obovate-lanceolate and then divided; hood as broad

as high, rounded-conic or hemispherical; spur of nectaries hooked; filaments glabrous or sparsely pilose; carpels glabrous or pubescent.

Iconography: Mitka (2003: 178).

Literature: Starmühler and Mitka (2001); Mitka (2003); Mitka et al. (2017).

Hybrids:

a) ***Aconitum* × *mariae*** Rottensteiner, Mitka & Novikov (**nothospec. nov.**) nothosubsp. *mariae* (*A. firmum* subsp. *firmum* × *A. maninense*) – see *A. firmum*.

b) ***Aconitum* × *mariae*** Rottensteiner, Mitka & Novikov nothosubsp. *paxii* (Starm.) Mitka **comb. nov.** (*A. firmum* subsp. *moravicum* × *A. maninense*) – see *A. firmum*.

***Aconitum nevadense*** Uechtr. ex Gáyer, Magyar Bot. Lap. 8: 180. 1909

Type citation: “Sierra Nevada. (*Willkomm* n. 321 – W), Aleazaba (*M. Jimenes* – K)”.

Typus: not designated.

Distribution: Sierra Nevada, Pyrenees.

Synonym: *A. occidentale* Timb. Lagr. f. ex Gáyer

**Diagnostic characters:** stem in the lower third pilose; leaves densely pubescent, uppermost leaf segment (2–) 3–4 mm wide; pedicels bent; bracteoles triangle or linear 1–3 (–4) mm long; hood broader than high, falciform to hemispherical; spur of nectaries capitate; filaments pilose; carpels glabrous or pilose.

Iconography: Molero and Blanché (1986: 236).

Literature: Gáyer (1909); Rottensteiner (2018).

Hybrids: unknown.

***Aconitum pentheri*** Hayek, Ann. Nat. Hofmus. 31: 68. 1917

Type citation: “In monte Žlep prope Ipek, 1800 m.s.m., leg. *A. Penther*”.

Typus: iconotype in Hayek, Ann. Nat. Hofmus. 31: Taf. 1, 1917.

Synonym: *A. divergens* Pančić *nom. illeg. p.p.*, *A. burnatii* Gáyer subsp. *pentheri* (Hayek) Jalas.

Distribution: Balkans.

**Diagnostic characters:** stem in the lower third glabrous; leaves ± glabrous, the uppermost leaf segment 3–5 mm wide; pedicels bent; bracteoles linear-lanceolate 1–3 mm long; hood broader than high, falciform; spur of nectaries globose; filaments pilose; carpels glabrous.

Iconography: Hayek (1917).

Literature: Seitz (1969).

Hybrids: unknown.

## 2. – Sect. *Cammarum* DC.

### 2A. – Subsect. *Cammarum* (DC.) Rapaics

#### *Description*

Leaves divided into 3 or 5 lobes and dissected to the base, uppermost leaf segment ovate or linear with more than two teeth; hoods conical, i.e., above rostrum distinctly elongated, 1.6–2.5 times higher than wider, rarely hemispherical, i.e., above rostrum wide-convex; claws of the nectaries erect or slightly bent, mostly not reaching the top of the hood; spurs of nectaries backward bent or semi-spiral coiled, do not reach the top of hoods; carpels 3 or 5; seeds with membranous 4–6 lamellae and with one conspicuously winged edge, goldish to light brown; root globose.

#### 2a. – Ser. *Variiegata* Steinberg ex Starm.

Type species: *A. variegatum* L.

*Diagnostic characters*: indumentum glabrous or eglandular pubescent.

#### *Aconitum variegatum* L., Sp. Pl. ed. 1: 532. 1753

Type citation: “In Italiae, Bohemiae montibus”.

Typus: lectotype, Herb. Linn. No. 695.8, LINN (Götz 1967).

Synonyms: *A. cammarum* Jacq., *A. bernhardianum* Wallr., *A. dominii* Sill., *A. gracile* Rchb., *p.p.*, *A. judenbergense* Rchb. (Gáyer), *A. macranthum* Rchb., *A. rostratum* Bernh.

Distribution: Montane and submontane areas of Europe (Alps, Balkans, Sudetes, Transilvania), descending to the lowlands. In Central Europe, it attains the eastern limit of the geographical distribution in the West Carpathians.

*Diagnostic characters*: inflorescence axis and tepals outside glabrous; hoods conical; filaments glabrous or sparsely pilose; stalks of nectaries erect, glabrous or sparsely pilose; carpels glabrous (subsp. *nasutum*), pilose on the suture (subsp. *variegatum*) or only sparsely pilose on the top of the suture (nothosubsp. *podobnikianum*), pedicel glabrous and bracteoles spatulate to incised (var. *variegatum*) or bracteoles filiform to narrow lanceolate (var. *carniolicum*), or pedicel at least under the bracteoles sparsely pubescent (var. *stiriicum*).

Iconography: Clusius (1601: 98, *pro Aconit. Lycocot. × Thora Italica*); Reichenbach (1827: t. 34; 1840: t. 82 fig. 4682); Novikoff and Mitka (2011: 44).

Literature: Cappelletti and Poldini (1984); Mucher (1991b, 1992); Starmühler (1997a); Mitka and Starmühler (2000); Mitka (2003); Novikoff and Mitka (2011).

Lower taxa:

#### a) subsp. *variegatum* var. *variegatum*

*Diagnostic characters*: bracteoles (4) 5–8 (25) mm long, spatulate, ovate or leaflike; carpels 3–5, densely pilose only along the suture; pedicels glabrous.

#### b) subsp. *variegatum* var. *carniolicum* Starm., Fritschiana 10: 1. 1997

Type citation: “Slowenien, Krain, ENE Laibach (Ljubljana), etwa 3 km NW Sagor (Zagorje), im Tal vom Kotredesch-Bach (Kotredeščica) E der Ruine Gallenberg (Gamberk), 460 m alt., GF 9855/2; Gebüsch; 31.08.1996; leg. A. Podobnik; det. W. Starmühler (LJU)” (Starmühler 1997a).

Typus: holotype, LJU. Isotypes, CL, GJO, GZU, IBF, JACA, KL, KRA, LE, LI, LG, LJM, M, MEL, NY, OSC, PE, Herb. PODOBNIK, SIB, Herb. STARMÜHLER, TBI, TNS, TK, W, WU, Z.

Synonyms: none.

*Diagnostic characters*: bracteoles short, only 2–3 (5) mm long, linear to narrow lanceolate; carpels always only 3, densely pilose along the suture.

#### c) subsp. *variegatum* var. *stiriicum* Mucher, Verh. Zool.-Bot. Ges. Österreich 129: 144. 1992

Type citation: “Österreich, Steiermark, Korallepe, Seekar, Hochstauden-flur, 1915 m, 11.9.1991, leg. W. Mucher, GZU” (Mucher 1992)

Typus: holotype, GZU 000206408. Isotypes, GZU 000206409 – GZU 000206420, KL, KRA, W, WU, Herb. MUCHER.

Synonyms: none.

*Diagnostic characters*: bracteoles (4) 5–8 (25) mm long, spatulate, ovate or leaflike; pedicels sparsely pubescent below the bracteoles; carpels (3–) 5, pilose on the suture and often also on the backside.

Iconography: Mucher (1992: 145, fig. 1).

#### d) subsp. *nasutum* (Fischer ex Rchb. em. Rupr.) Götz, Feddes Repert. 76 (1–2): 36. 1967

Type citation: “Saxonia metalifera” (Reichenbach 1823: tab. IX, fig. 2).

Typus: not designated, probably iconotype is Rchb. Illustr. Spec. Aconit., tab. IX, fig. 2, and tab. X, 1823.

Synonyms: *A. nasutum* Fischer ex Rchb., *p.p.*

*Diagnostic characters*: carpels 3, glabrous.



e) nothosubsp. ***podobnikianum*** – see hybrids of *A. variegatum*.

Hybrids:

a) *Aconitum* × *austriacum* Mucher. (*A. pilipes* × *A. variegatum*) – see nothoser. *Toxigata*.

b) *Aconitum* × *aquilonare* A. Kerner ex Gáyer, Magyar Bot. Lapok 10: 201. 1911

Type citation: “Croatia – Fužine. Borbás – HUW” (Gáyer, 1911).

Typus: lectotype, WU-Kerner 0034380.

Synonym: *A. variegatum* L. fo. *aquilonare* (Gáyer) M. Niketić.

Hybrid origin: *A. variegatum* × *A. vitanum*.

*Diagnostic characters*: pedicels sparsely eglandular curved pubescent; tepals outside glabrous; carpels mostly glabrous.

c) *Aconitum* × *hebegynum* DC. (*A. degenii* × *A. variegatum*) – see nothoser. *Toxigata*.

d) *Aconitum* × *pawlowskii* Mitka & Starm. (*A. lasiocarpum* × *A. variegatum*) – see nothoser. *Toxigata*.

e) *Aconitum variegatum* L. nothosubsp. ***podobnikianum*** Mucher, Carinthia II 183/103 (2): 522. 1993

Type citation: “*Aconitum variegatum* L. subsp. *variegatum*, Slovenija, Nanos, ad orientem a refugio alpino Vojkova koca dicto, ad margines silvarum, 1240 m s.m., 0250/1, Nr. 117683(1), 4. 10. 1987, leg. A. Podobnik, LJU. Isotypes: GZU, LJU” (Mucher 1993).

Typus: holotype, LJU 117683(1). Isotypes, GZU 000274191, LJU.

Synonyms: none.

Hybrid origin: *A. variegatum* subsp. *nasutum* × *A. variegatum* subsp. *variegatum*.

*Diagnostic characters*: pedicels glabrous or sparsely pubescent only below bracteoles; stamens glabrous; carpels 3, only sparsely pilose on the top of the suture.

*Aconitum vitanum* Gáyer, Magyar Bot. Lap. 8: 203. 1909

Type citation: “Bulgaria: Vitoša, inter saxa i. monte medio, Keck et Pichler Pl. Bulg. 1890”.

Typus: holotype, W (?). Isotypes, WU-Halácsy-Europ. 0034442, WU 0034443, WU 0034444.

Synonyms: *A. variegatum* L. var. *diffusum* (Rchb.) Penev & Simeon. (*nom. nud.*).

Distribution: Balkans, Northern Italy.

*Diagnostic characters*: Inflorescence axis and pedicels pubescent; petals outside curved eglandular pubescent;

hoods hemispherical or rounded-conic; filaments glabrous; stalks of nectaries glabrous; carpels glabrous or pubescent on the backside.

Iconography: Penev and Simeonovski (1970: 63).

Literature: Starmühler (1996c).

Hybrids: *A. ×aquilonare* A.Kern. ex Gáyer (*A. variegatum* × *A. vitanum*) – see *A. variegatum*.

***Aconitum vivanii*** Rottensteiner, *nom. nov.*

Basionym: *A. variegatum* subsp. *pyrenaicum* Vivant & Delay, Bull. Soc. Bot. France, Lettres Bot. 127: 501, 1981. There is a new name necessary in the rank of a species because the name *A. pyrenaicum* is already occupied by a taxon from the subgenus *Lycoctonum*.

Type citation: “haute vallée d’Aspe (Pyr.-Atl.) en amont du hameau des Forges d’Abel. ... vers 1700 m d’altitude au-dessus de la tertiaire-sapinière d’Esplungère ...”.

Typus: not designated.

Synonyms: none.

Distribution: Pyrenees: Navarra, Guipúzcoa (Spain).

*Diagnostic characters*: inflorescence axis and tepals outside glabrous; pedicels almost always glabrous or very rarely sparsely pubescent just below flowers; hoods hemispherical or rounded-conic; filaments glabrous; nectaries strongly bent, mostly reaching the top of the hood, glabrous; carpels 3, glabrous.

Iconography: Molero and Blanche (1986: 240).

Hybrids: most probably with *A. napellus*.

**2b. – Ser. *Toxica*** (Rchb.) Mucher

Type species: *A. toxicum* Rchb.

*Diagnostic characters*: indumentum glandular pilose.

*Aconitum degenii* Gáyer, Magyar Bot. Lap. 5: 123. 1906

Type citation: “Comit. Besztercze-Naszód: in lapidosis, umbrosis ad cacumen montis calcarei Craciunel prope Rodnam; in lapidosis graminosis montis calc. Galarin; secus rivulos montanos ad Rodna-Borberek; Comit. Csik: in montibus calcareis Ócsém et Nagy-Hagymás; Comit. Máramaros: Oberhalb der Luhyer Klause Hoverla im Fichtenwalde; Comit. Torda-Aranyos: in valle Csepilor sub alpe Nagy-Bihar; Comit. Kolozs: ad margines silvarum prope Rogozsely sub tractu Vlegyászae”.

Typus: lectotype, CL-Soó!

Synonyms: *A. hebegynum* auct. Fl. Carpathorum non DC., *A. molle* Rchb., *A. paniculatum* Lam., *p.p.* (*nom. inval.*).

Distribution: Alps, Carpathians, Balkans.

*Diagnostic characters*: hood rounded-conic; carpels (3–) 5 pubescent (subsp. *valesiacum*) or glabrous, pedicels

and petals glandular pilose, bracteoles in the middle of pedicels (subsp. *paniculatum*), filaments glabrous (var. *laxiflorum*) or pubescent (var. *turrachense*), pedicels and petals glabrous (subsp. *rhaeticum*); bracteoles in the upper part of the pedicels or just below flower (subsp. *degenii*), spur of nectaries semi-spiral coiled (fo. *degenii*) or capitate (fo. *craciunelense*); pedicels below bracteoles and hood  $\pm$  glabrous (var. *intermedium*).

Iconography: Mucher (1993a: 55); Novikoff and Mitka (2011: 46).  
Literature: Mucher (1993a); Starmühler (1996d, 1996e); Ilnicki and Mitka (2011); Novikoff and Mitka (2011); Ziman et al. (2015).

Lower taxa:

a) subsp. *degenii* var. *degenii* fo. *degenii*

*Diagnostic characters*: bracteoles lanceolate to spatulate, in the upper part of pedicel; pedicels below the bracteoles densely glandular pilose; tepals outside glandular pilose; hood  $\pm$  hemispheric; carpels 3, glabrous.

b) subsp. *degenii* var. *degenii* fo. *craciunelense* Gáyer, Magyar Bot. Lap. 5: 126. 1906

Type citation: "Comit. Besztercze-Naszód: ad cacumen montis Craciunel. (*Degen*, H.D.)".  
Type specimens: not designated.  
Synonyms: none.

*Diagnostic characters*: bracteoles lanceolate to spatulate, in the upper part of pedicel; pedicels below the bracteoles densely glandular pilose; tepals outside glandular pilose; hood cymbiform; carpels 3, glabrous.

c) subsp. *degenii* var. *intermedium* (Zapał.) Mitka, Carologia 64(4): 449. 2011

Type citation: "Płaj między Mołodą a Jajcem nad Łomnicą, Tomnatek w Polenicy Popowiczowskiej, Jabłonica na Przesmyku Tatarskim (*Wołoszczak*), Jawornik koło Mikuliczyna (*Rehman*), Bystrzec pod Czarną Horą (*Śleńdziński*)" (Zapałowicz 1908b: 221).  
Typus: lectotype, KRAM 132196 (Mitka 2003).  
Synonyms: *A. hebegynum* auct. Fl. Carpathorum, non DC., *A. paniculatum* Lam. var. *prutense* Zapał., *A. paniculatum* fo. *latiusculum* Zapał.

*Diagnostic characters*: bracteoles lanceolate to spatulate, in the upper part of pedicel; pedicels below the bracteoles only sparsely glandular pilose; tepals outside glandular pilose; carpels 3, glabrous.

d) subsp. *paniculatum* (Arcang.) Mucher var. *turrachense* (Mucher) Mucher, Phytion (Horn) 33 (1): 63. 1993

Type citation: "Ostalpen, Steiermark, Gurktaler Alpen, 2 km südlich von Predlitz, Gebüschaum, 1020 m, 26.8.1989, leg. W. Mucher (GZU)" (Mucher 1993a).

Typus: holotype, GZU 000274182. Isotypes, GJO, GZU 000274183, GZU 000274185 – GZU 000274188, W. Paratype, GZU 000274184.  
Synonyms: *A. paniculatum* Lam. subsp. *paniculatum* var. *turrachense* Mucher.

*Diagnostic characters*: bracteoles linear, in the middle of the pedicel; tepals outside glandular pilose; nectaries glabrous or pilose; filaments  $\pm$  densely pubescent.

Iconography: Mucher (1990).

e) subsp. *paniculatum* (Arcang.) Mucher var. *laxiflorum* (Rchb.) Mucher, Phytion (Horn) 33 (1): 60. 1993

Typus: lectotype, see Mucher (1993a) for details.

Synonyms: *A. cernuum* Rchb. non Wulfen [var.] a *laxiflorum* Rchb., *A. paniculatum* subsp. *paniculatum* var. *paniculatum* (nom. inval.).

*Diagnostic characters*: bracteoles linear, in the middle of the pedicel; tepals outside glandular pilose; nectaries and filaments glabrous.

Iconography: Mucher (1993a).

f) subsp. *rhaeticum* Starm., Fritschiana 7: 2. 1996

Type citation: "Schweiz, Graubünden, Oberhalbstein S Tiefencastel, Abhang zum rechten Ufer des Adont N Präsenz (Personz), 1360–1375 m alt., GF 9423/2; *Alnus incana*–*Prunus padus*-Wald; 14.08.1995; leg./det. W. Starmühler (GZU)" (Starmühler 1996d).  
Typus: holotype, GZU 000212973. Isotypes: LE, M, NY, PE, TI, W, Z, Herb. STARMÜHLER.  
Synonyms: none.

*Diagnostic characters*: tepals outside, pedicels and nectaries glabrous.

Iconography: Starmühler (1996d).

g) subsp. *valesiacum* (Gáyer) Mucher, Phytion (Horn) 33(1): 64. 1993

Type citation: "Mauvoisin, vallee de Bagnes [Suisse, Valais] (BP, Götz 1967)" (Mucher 1993a).

Typus: holotype, BP.

Synonyms: *A. valesiacum* Gáyer, *A. variegatum* L. subsp. *valesiacum* (Gáyer) Greuter & Burdet.

*Diagnostic characters*: bracteoles lanceolate to spatulate, situated at the pedicel's top; pedicels above the bracteoles densely glandular pilose, below the bracteoles – sparsely pilose or glabrous; tepals outside glandular pilose; carpels 5, densely pilose; nectaries and filaments glabrous.

Iconography: Götz (1967), Mucher (1993a).

h) nothosubsp. ***gandogeri*** Mucher (*A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *valesiacum*) – see hybrids of *A. degenii*.

i) nothosubsp. ***lippertianum*** Starm. (*A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *rhaeticum*) – see hybrids of *A. degenii*.

Hybrids:

a) ***Aconitum degenii*** Gáyér nothosubsp. ***gandogeri*** Mucher, Phytion (Horn) 33 (1): 65, 1993

Type citation: “Suisse, Vaud, Pays d’Enhaut, Vallee de Gerignoz, LaMontagnette, alt. 1445 m, cs. 579/143; 17.8.1952; leg. A. Maillefer, LAU (as *A. paniculatum* Lam.)” (Mucher 1993).

Typus: holotype, LAU.

Synonyms: none.

Hybrid origin: *A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *valesiacum*.

*Diagnostic characters:* the filaments of the hybrid are in most cases pilose, although both parents have glabrous filaments; pedicels below the bracteoles almost glabrous; carpels mostly glabrous; tepals outside glandular pilose.

b) ***Aconitum degenii*** Gáyér nothosubsp. ***lippertianum*** Starm., Fritschiana 7: 11. 1996

Type citation: “Schweiz, Kt. Graubünden, Oberhalbstein S Tiefencastel, Abhang zum rechten Ufer des Adont N Präsenz (Personz), 1325 m alt., GF 9423/2; *Alnus incana*-Wald mit *Corylus avellana*, *Sorbus aucuparia*, *Berberis vulgaris* etc.; 14.08.1995; leg./det. W. Starmühler (GZU)” (Starmühler 1996e).

Typus: holotype, GZU 000212947. Isotypes, LE, M, PE, Herb. STARMÜHLER, Z.

Synonyms: none.

Hybrid origin: *A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *rhaeticum*.

*Diagnostic characters:* pedicels sparsely glandular pilose above the bracteoles; tepals glabrous.

c) ***Aconitum* × *dragulescuanum*** Mucher (*A. degenii* subsp. *degenii* × *A. toxicum* subsp. *toxicum*) – see *A. toxicum*.

d) ***Aconitum* × *gayeri*** Starm., Stapfia 45: 41. 1996

Type citation: “Tanssilvania, Rodna – Borberek [= Valea Vinului], Nr. 135419; 28.8.1897; L. Walz (CL)” (Starmühler, 1996b).

Typus: holotype, CL 135419! Isotype, Detto, Nr. 135418 (CL).

Synonyms: none.

Hybrid origin: *A. degenii* × *A. lasiocarpum*.

*Diagnostic characters:* hood rounded-conic or conic, petals outside pilose, carpels pilose, spur of nectaries reaching the top of the hood, pedicels above bracteoles densely glandular pilose, below bracteoles sparsely pilose, bracteoles linear to lanceolate.

e) ***Aconitum* × *hebegynum*** DC. (*A. degenii* × *A. variegatum*) – see nothoser. *Toxigata*

f) ***Aconitum* × *mielichhoferi*** Rchb. (*A. degenii* × *A. tauricum*) – see nsect. *Acomarum*

g) ***Aconitum* × *pilosiusculum*** (Ser.) Gáyér, Magyar Bot. Lapok 10: 200. 1911

Type citation: “Neotype: Patura-ge de Lavaraz, Alpes de Bex, 26.9.1879, Jaccard (ZT)” (Starmühler 1996a).

Typus: neotype, ZT.

Synonyms: *A. variegatum* L. var. *pilosiusculum* Ser., *A. rostratum* Bernh. ex DC. var. *pilosiusculum* Ser.

Hybrid origin: *A. degenii* × *A. pilipes*.

*Diagnostic characters:* hood rounded-conic, bracteoles lanceolate to spatulate, tepals outside pilose, carpels pilose, pedicels glandular pilose and eglandular pubescent.

***Aconitum lasiocarpum*** Rchb., Uebers. Aconitum: 55. 1819

Type citation: “in Hungar Comit. Marmarosch. Sadler!”.

Typus: neotype, “An schattigen Stellen in der Voralpenregion auf dem Gebirge Craciunel bei Alt Rodna, 1.8.1882, leg. Porcius” – WU-Kerner” (Mitka 2003).

Synonyms: *A. cammarum* L. var. *beskidene* Zapał., *A. dasycarpum* Schur.

Distribution: Western and Eastern Carpathians, Podilya (Ukraine).

*Diagnostic characters:* inflorescence axis and tepals outside glandular pilose, hood conical; pedicels glandular pilose (subsp. *lasiocarpum*) or below bracteoles glabrous or sparsely eglandular pilose and curved and crisped eglandular pubescent (subsp. *kotulae*); bracteoles linear or lanceolate, rarely spatulate, (2.5–) 3–6 (–12) mm; carpels glandular pilose.

Iconography: Reichenbach (1827: t. 9); Mitka (2003: 175); Novikoff and Mitka (2011: 44).

Literature: Gáyér (1911); Starmühler (1993, 1996a); Joachimiak et al. (1999); Mitka and Starmühler (2000); Mitka (2003).

Lower taxa:

a) subsp. *lasiocarpum*

*Diagnostic characters*: pedicels entirely glandular pilose.

b) subsp. *kotulae* (Pawł.) Starm. & Mitka, Acta Soc. Bot. Polon. 69 (2): 150. 2000

Type citation: "Tatry Wysokie [High Tatras]: dol. Koprowa – skraj lasu. ok. 1300 m: 19.8.1925; leg. B. Pawłowski (KRAM-Pawłowski 320228 – Neotype)" (Mitka and Starmühler 2000).

Typus: neotype, KRAM-Pawłowski 320228. Paratype, KRAM 132168.

Synonyms: *A. variegatum* L. subsp. *kotulae* Pawł., *A. variegatum* fo. *kotulae* (Pawł.) Skalický, *A. paniculatum* Lam. var. *podolicum* Zapał. fo. *podolicum*, *A. paniculatum* Lam. var. *podolicum* Zapał. fo. *latilobum* Zapał., *A. podolicum* (Zapał.) Voroshylov, *A. hebegynum* auct., p.p., *A. beskidense* (Zapał.) Gáyer, *A. cammarum* Jacq. var. *koscieliskanum* Zapał., p.p., *A. cammarum* Jacq. var. *beskidense* Zapał., *A. gracile* Rchb. subsp. *grosserratum* (Gáyer) Grinț. fo. *beskidense* Zapał.

*Diagnostic characters*: pedicels below bracteoles glabrous or sparsely eglandular pilose and curved and crisped eglandular pubescent.

Hybrids:

a) *Aconitum* × *gayeri* Starm. (*A. degenii* × *A. lasiocarpum*) – see *A. degenii*.

b) *Aconitum lasiocarpum* × *A. toxicum* – hood rounded-conic, bracteoles linear-ovate with reticulate venation, pedicels glandular pilose, carpels pilose.

c) *Aconitum* × *pawłowskii* Mitka & Starm. (*A. lasiocarpum* × *A. variegatum*) – see nothoser. *Toxigata*.

*Aconitum pilipes* (Rchb.) Gáyer, Magyar Bot. Lap. 10: 200. 1911

Basionym: *A. cammarum* L. var. *pilipes* Rchb., Fl. Germ. Exurs. 738, 1832.

Type citation: "Salvesental bei Imst".

Typus: neotype, WU-Kerner.

Distribution: Western and Eastern Alps.

*Diagnostic characters*: hood conical, outside glandular pilose; pedicels curved and s-formed glandular pilose and eglandular pubescent; bracteoles spatulate 3–6 mm, situated just below the flower; filaments pilose; carpels 5, entirely pubescent.

Iconography: Starmühler (1996b: 171).

Literature: Starmühler (1996b, 2001).

Hybrids:

a) *Aconitum* × *austriacum* Mucher, Carinthia II 183/103(2): 524. 1993

Type citation: "Österreich, Salzburg, Hohe Tauern, Habachtal, Weg von der Moar-Alm zum Noitroi-Steig, Hochstaudenflur, 1540 m, 30. 8. 1991, leg. W. Mucher, GZU" (Mucher 1993b).

Typus: holotype, GZU 000206194. Isotypes: GJO, GZU 000206195, KL, KRA,W, WU 0034381, Herb. MUCHER.

Synonyms: none.

Hybrid origin: *A. pilipes* × *A. variegatum*.

*Diagnostic characters*: carpels sparsely pubescent or pubescent at the suture.

b) *Aconitum* × *pilosiusculum* (Ser.) Gáyer (*A. degenii* × *A. pilipes*) – see *A. degenii*.

c) *Aconitum napellus* × *A. pilipes* – see nothosect. *Acomarum*

d) *Aconitum pilipes* × *A. tauricum* – see nothosect. *Acomarum*

*Aconitum toxicum* Rchb., Uebers. Aconitum: 43. 1819

Type citation: "Hab. in Transylvaniae alpebus. Baumgarten!".

Typus: lectotype, "Transsylv., in graminosis alpestris, [I]827, leg. Baumgarten (as *A. neomontanum*, rev. E. Götz 1966 as *A. toxicum* Rchb.)", W (Mucher 1993).

Synonyms: *A. bosniacum* Beck, *A. diabolicum* Gáyer, *A. neomontanum* auct. non Koelle, *A. schurii* Beck., *A. schurii* fo. *retezatense* Gáyer, *A. toxicum* Rchb. *bosniacum* (Beck) Hayek, *A. toxicum* Rchb. fo. *diabolicum* (Gáyer) Grinț., *A. toxicum* [var.] β *schurii* Beck.

Distribution: Transylvania, Eastern Carpathians (Ceahlau Mts), Southern Carpathians, Balkans.

*Diagnostic characters*: pedicels glandular pilose (subsp. *toxicum*), glandular/eglandular pubescent (subsp. *crispulum* and nothosubsp. *nyaradyanum*), sparsely straight glandular pilose (nothosubsp. *ungarianum*), or glabrous (subsp. *bucegiense*); hood outside glandular pilose (subsp. *toxicum*), glandular/eglandular pubescent (subsp. *crispulum* and nothosubsp. *nyaradyanum*), or glabrous (subsp. *bucegiense* and nothosubsp. *ungarianum*); filaments in the upper part, pilose; hood rounded-conic or conical; carpels glabrous; bracteoles ovate, sometimes divided, with reticulate venation.

Iconography: Reichenbach (1827: t. 37).

Literature: Mucher (1993a, 1993b); Mitka (2000); Starmühler (2000).

Lower taxa:

a) subsp. ***toxicum***

*Diagnostic characters:* pedicels and tepals outside with straight glandular trichomes.

b) subsp. ***crispulum*** (Nyár.) Mucher, *Phyton* (Horn) 33(1): 70. 1993

Type citation: “Transsilvania, distr. Brasov, ad rivum Gr. Weidenbachsub mtbus Bucegi prope pagum Rasnov, alt. cca. 720 m s.m., 12.8.1929, leg. E.I. Nyárády (SIB-Nyárády)” (Mucher 1993a).  
Typus: lectotype, SIB-Nyárády. Paratype, SIB-Nyárády.  
Synonyms: *A. toxicum* Rchb. var. *crispulum* Nyárády in Borza.

*Diagnostic characters:* pedicels and tepals outside with curved glandular trichomes.

Iconography: Mucher (1993a).

c) subsp. ***bucegiense*** (Nyár.) Mucher, *Phyton* (Horn) 33(1): 68. 1993

Type citation: “Transsilvania, distr. Brasov, ad pedem montium Bucegi, prope Valea Toplitei, versus pagum Rasnov, in quercetis, una cum typo, alt. cca 700 m s.m., Nr. 601109, 22.9.1940, leg. P. Cretzoiu, det. E.I. Nyárády (CL)” (Mucher 1993a).  
Typus: holotype, CL. Isotypes, CL, SIB.  
Synonyms: *A. toxicum* Rchb. var. *bucegiense* Nyár.

*Diagnostic characters:* pedicels glabrous.

Iconography: Mucher (1993a).

d) nothosubsp. ***nyaradyanum*** Mucher – see hybrids of *A. toxicum*.

e) nothosubsp. ***ungarianum*** Starm. – see hybrids of *A. toxicum*.

Hybrids:

a) ***Aconitum* × *dragulescuanum*** Mucher, *Phyton* (Horn) 33(1): 72. 1993 nothosubsp. ***dragulescuanum***

Type citation: “Transsilvania, in praeruptis et graminosis rupium calc. Mt. Hagimasul Mare, supra rivum Nagyág, alt. 1500–1740 m s.m., distr. Ciuc; 19.8.1948; J.E. Nyárády (SIB-Nyárády)” (Mucher 1993).  
Typus: holotype, SIB-Nyárády.  
Synonyms: none.  
Hybrid origin: *A. degenii* subsp. *degenii* × *A. toxicum* subsp. *toxicum*.

*Diagnostic characters:* pedicels, bracteoles and tepals outside with straight glandular trichomes only.

b) ***Aconitum* × *dragulescuanum*** Mucher nothosubsp. ***grintescuanum*** Starm., *Siebenbürg. Arch.* 36: 16. 2000

Type citation: “Rumänien, Siebenbürgen (Transilvania, Erdély), Süd-Karpaten (Carpatii Meridionali, Déli Kárpátok), Retezat-Gebirge (Muntii Retezatului, Retyezát-havasok) S Hotzing (Hateg, Hátszeg), Nationalpark Retezat, am Weg von der Gura Zlata-Hütte zum Retezat, am Bach Dobrun, 1470 m”  
Typus: holotype, GZU 000232748.  
Synonyms: none.  
Hybrid origin: *A. degenii* subsp. *degenii* × *A. toxicum* subsp. *crispulum*.

*Diagnostic characters:* pedicels, bracteoles and tepals outside with curved and straight glandular trichomes.

c) ***Aconitum lasiocarpum* × *A. toxicum*** – bracteoles spatulate or linear-ovate with reticulate venation, hood slightly conical or round-conic, carpels pilose.

d) ***Aconitum toxicum*** Rchb. nothosubsp. ***nyaradyanum*** Mucher, *Phyton* (Horn) 33(1): 71. 1993

Type citation: “Transsilvania, distr. Brasov, ad rivum Gr. Weidenbach sub mtibus Bucegi prope pagum Rasnov, alt. cca. 720 m s.m., Nr. 195107; 12.8.1929; leg. E.I. Nyárády (CL)” (Mucher 1993a).  
Typus: holotype, CL 195107.  
Synonyms: none.  
Hybrid origin: *A. toxicum* subsp. *crispulum* × *A. toxicum* subsp. *toxicum*.

*Diagnostic characters:* pedicels and tepals outside glandular/eglandular pubescent.

e) ***Aconitum toxicum*** Rchb. nothosubsp. ***ungarianum*** Starm., *Siebenbürg. Arch.* 36: 21. 2000

Type citation: “Siebenbürgen (Transilvania, Erdély), Burzenländer Senke (Depresiunea Birsei, Barcasági-medence) SW Kronstadt (Brasov, Brassó), S Rosenau (Risnov, Barcarozsnyó), am rechten Ufer vom Grossen Weidenbach (Ghimbasel), 720 m.”  
Typus: holotype, GZU 000232749.  
Synonyms: none.  
Hybrid origin: *A. toxicum* subsp. *bucegiense* × *A. toxicum* subsp. *toxicum*.

*Diagnostic characters:* tepals outside glabrous or almost glabrous; pedicels sparsely glandular pilose, mainly above the bracteoles.

2c. – Nothoser. *Toxigata* Starm. (ser. *Variegata* × ser. *Toxica*)

Type species: *A. ×hebegynum* DC., designated here.

*Diagnostic characters*: indumentum glandular and eglandular pubescent.

*Aconitum* × *austriacum* Mucher, Carinthia II 183/103(2): 524. 1993

Type citation: “Österreich, Salzburg, Hohe Tauern, Habachtal, Weg von der Moar-Alm zum Noitroi-Steig, Hochstaudenflur, 1540 m, 30. 8. 1991, leg. W. Mucher” (Mucher, 1993b).

Typus: holotype, GZU 000206194. Isotypes, GZU 000206195, WU 0034381, GJO, KL, KRA, W, Herb. MUCHER.

Synonyms: none.

Hybrid origin: *A. pilipes* × *A. variegatum*.

*Diagnostic characters*: Pedicels sparsely crisped to s-formed glandular pilose, mainly above the bracteoles; tepals outside glabrous; hood higher than broad; nectaries claw upright; nectaries spur curved backward, not reaching the top of the hood; carpels (3) 5, mostly +/- densely pilose.

Iconography: Mucher (1993b).

Literature: Starmühler (1996a).

*Aconitum* × *bartokianum* Starm., Siebenbürg. Arch. 36: 10. 2000

Type citation: “Aconita rarissima selecta (1999), Rumänien, Transilvania (Siebenburgen, Erdély), Süd Karpaten, Munții Retezatului [...]”; 14.08.1992; leg. W. Mucher et U. Starmühler (GZU)”.

Typus: holotype, GZU 000225135. Isotypes, CL, GJO, Herb. STARMÜHLER, TNS.

Synonyms: none.

Hybrid origin: *A. toxicum* × *A. variegatum*.

Distribution: Transilvania, Southern Carpathians.

*Diagnostic characters*: hood conical; bracteoles spatulate or linear-ovate with reticulate venation; nectaries reaching the top of the hood; filaments glabrous or sparsely pilose. Pedicel and tepals outside straight glandular pilose; carpels glabrous – nothosubsp. *bartokianum*. Pedicel and tepals outside curved glandular pilose; carpels glabrous – nothosubsp. *rapaicsianum*. Pedicel and tepals outside straight glandular pilose; carpels pilose on the suture – nothosubsp. *sooanum*.

Iconography: Starmühler (2000: 11).

Literature: Starmühler (2000).

Lower taxa/hybrids:

a) nothosubsp. *bartokianum*

Hybrid origin: *A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *nasutum*.

*Diagnostic characters*: pedicel and tepals outside straight glandular pilose; carpels glabrous.

b) nothosubsp. *rapaicsianum* Starm., Siebenbürg. Arch. 36: 14. 2000

Type citation: “Aconita rarissima selecta (1999), Rumänien, Transilvania (Siebenbürgen, Erdely), Süd-Karpaten, Muntii Retezatului (Retezat-Gebirge, Retyezát-havasok), Nationalpark Retezat, S-Hang des Retezat, 1980 m alt.; Hochstaudenflur mit *Achillea distans*, *Adenostyles alliariae*, *Angelica sylvestris*, *Carduus personata*, *Deschampsia cespitosa*, *Rumex alpinus*, *Sericio ovatus*, *Senecio cacaliaster* etc.; 14.08.1992; leg. W. Mucher et U. Starmühler (GZU)” (Starmühler 2000).

Typus: holotype, GZU 000225136. Isotypes, CL, GJO, Herb. STARMÜHLER, TNS.

Synonyms: none.

Hybrid origin: *A. toxicum* subsp. *crispulum* × *A. variegatum* subsp. *nasutum*.

*Diagnostic characters*: pedicel and tepals outside curved glandular pilose; carpels glabrous.

Iconography: Starmühler (2000: 11).

c) nothosubsp. *sooanum* Starm., Siebenbürg. Arch. 36: 15. 2000

Type citation: “Hungaria media, Alpes Biharienses, ad balnea “Biharfüred”; 13.07.1914; leg. L.T. Haisz (CL-Soó)” (Starmühler 2000).

Typus: holotype, CL-Soó.

Synonyms: none.

Hybrid origin: *A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *variegatum*.

*Diagnostic characters*: pedicel and tepals outside straight glandular pilose; carpels pilose along the suture.

Iconography: Starmühler (2000: 11).

*Aconitum* × *hebegynum* DC., Regn. Veg. Syst. Nat.: 376. 1817, **pro spec.**

Type citation: “Hab. in dumetis Alpium Vallesiae, Austriae (Jacq.) et in Carpathorum convallibus (Wahlenb.)”.

Typus: neotype, “(Schweiz) cultivé, provenant d’un pied vivant récolté à la Gemmi – G-DC” (Starmühler 1997b).

Synonyms: none.

Hybrid origin: *A. degenii* × *A. variegatum*.

Distribution: Alps, Balkans.

**Diagnostic characters:** Hood about as high as broad or slightly higher; nectary claw curved; nectary spur backward bent always reaching the top of the hood; bracteoles linear-lanceolate, rarely spatulate 4–6 (–8) mm long, mostly glandular pilose. Pedicels and tepals outside sparsely glandular pilose; carpels 3–5 glabrous or sparsely glandular pubescent.

Iconography: Mucher (1993b: 519–527).

Literature: Gáyer (1906).

***Aconitum* × *pawlowskii*** Mitka & Starm., Acta Soc. Bot. Pol. 69: 151. 2000

Type citation: “(Tatra Mts.) Tatry, pod Raptawickimi Turniami (dol. Kościeliska) od półn., ok. 1300 m, piargi wapienne, 3.9.1932, leg. B. Pawłowski”.

Typus: holotype, KRAM-Pawłowski 320221.

Synonyms: none.

Hybrid origin: *A. lasiocarpum* × *A. variegatum*.

Distribution: West Carpathians.

**Diagnostic characters:** Hood conical; nectary claw curved; nectary spur backward bent not reaching the top of the hood; bracteoles linear-lanceolate, lanceolate, glabrous or ciliate 2.5–6 (–12) mm long. Pedicels above bracteoles straight glandular pilose, below bracteoles sparsely straight glandular pilose or appressed curved pubescent; carpels 3–5 on the suture pilose.

Iconography: Mitka and Starmühler (2000: 151); Mitka (2003: 173).

Literature: Mitka and Starmühler (2000); Mitka (2003).

***Aconitum* × *tuscheticum*** (N.Busch) N.Busch, Opred. Rast. Kryma i Kavkaza 30. 1919

Basionym: *A. caucasicum* N.Busch subsp. *pubiceps* (Rupr.) N.Busch var. *tuscheticum* N.Busch, Tr. Jur’jev. Bot. Sada 1: 3, 1900. Type citation: “Dzhvari-Vozeli. 13.VII.[18]76. Radde” (LE).

Typus: holotype, LE (?).

Synonyms: *A. caucasicum* N.Busch subsp. *pubiceps* (Rupr.) N. Busch var. *tuscheticum* N.Busch, *A. nasutum* Rchb. subsp. *tuscheticum* (N.Busch) A.N.Luferov, *A. pubiceps* Rupr. var. *tuscheticum* (N.Busch) Grossh.

Hybrid origin: *A. degenii* × *A. vitosanum*.

Distribution: Caucasus, Slovenia.

**Diagnostic characters:** plant 50–100 cm high; inflorescence axis, pedicels and tepals outside glandular and eglandular pubescent.

Iconography: none.

Literature: Luferov (2000); Starmühler (1996c).

3. – Nothosect. ***Acomarum*** Starm. (= nothosect. ***Acopellus*** Starm.)

Type species: *A. ×cammarum* L. em. Fries, designated here.

**Diagnosis**

Carpels totally or partially sterile.

**Description**

Leaves divided into 3 or 5 lobes and dissected to the base; hoods hemispherical or conical, 1.2–2.0 (–2.5) times higher than wider; claws of the nectaries erect or slightly bent, reaching or not the top of the hood; spurs of nectaries backward bent or semi-spiral coiled; carpels 3 or 5; seeds with membranous 4–6 lamellae and with one conspicuously winged edge; inflorescence ramose or rarely dense ramified; root elongated.

***Aconitum* × *acuminatum*** Rchb., Uebers. Aconitum 46. 1819

Type citation: “Hab. in monte Baldo Heineken! Hb. Mertens”.

Typus: not designated.

Synonym: *A. lobelianum* Host. in Gáyer fo. *brachytrichum* Gáyer.

Hybrid origin: *A. degenii* × *A. napellus*.

Distribution: Alps.

**Diagnostic characters:** hood glandular pilose and eglandular pubescent, pedicels above bracteoles glandular pilose and below eglandular pubescent, carpels 3, glabrous or overall pubescent.

Iconography: Reichenbach (1827: t. 68).

Literature: Starmühler (2001).

***Aconitum* × *acutum*** Rchb., Uebers. Acon. 21. 1819

Type citation: “Hab. in valle Kalstahl Tyrol. Sieber! in Alp. Seethal supra Judenburg v. Vest!”.

Typus: not designated.

Synonym: *A. ×zahlbruckneri* Gáyer.

Hybrid origin: *A. tauricum* × *A. variegatum*.

Distribution: Eastern and Southeastern Alps.

**Diagnostic characters:** hood glabrous, hemispherical; pedicels glabrous or eglandular pubescent; filaments glabrous or sparsely pilose, stalks of nectaries glabrous or pubescent; carpels mostly glabrous.

Iconography: Reichenbach (1821: Tab. 12, 2 *pro species*).

Literature: Starmühler (2001).

*Aconitum* × *berdaui* Zapał., Rozpr. Wydz. Mat.-Przyr. Akad. Umiej., Dział B. Nauki Biol. 48: 88. 1908a, pro hybr. [reprinted in Zapałowicz, 1908b].

Type citation: “In regione subalpina Tatorum: in valle Kościeliska et altero loco non indicato (*Berdau*), Podspady ad Jaworzynka”.

Typus: lectotype, “Dol. Kościeliska, ?08.1855, leg. *Berdau*, det. *Zapałowicz* (16.02.1908), KRAM 133482!” (Wacławski-Ćwiertnia and Mitka 2016).

Synonyms: *A. lengyeli* Gáyer, *A. odotandrum* Wissjul.

Hybrid origin: *A. firmum* × *A. variegatum*.

Distribution: Europe: Sudetes, Transilvania and the Balkans.

*Diagnostic characters*: inflorescence axis, pedicels and tepals outside pilose (nothosubsp. *walasii*) or glabrous (nothosubsp. *berdaui*); hoods conical; filaments glabrous or sparsely pilose, spur of the nectaries semi-spiral coiled; carpels pilose on the suture.

Iconography: Mitka (2003: 173); Novikoff and Mitka (2011: 44).

Literature: Wissjulina (1939); Starmühler and Mitka (2001); Mitka (2003), Novikoff and Mitka (2011), Wacławski-Ćwiertnia and Mitka (2016).

Lower taxa/hybrids:

a) nothosubsp. *berdaui*

Hybrid origin: *A. firmum* subsp. *firmum* × *A. variegatum* subsp. *variegatum*.

*Diagnostic characters*: inflorescence axis, pedicels and tepals outside glabrous.

Iconography: (Mitka 2003: 173, fig. 6D).

b) nothosubsp. *walasii* (Mitka) Mitka, The genus *Aconitum* in Poland and adjacent countries: 56. 2003

Type citation: “Poland, Western Carpathians, Pogórze Spisko-Gubałowskie Foothills), Podhale, Wzn. Gubałowskie, Rostoki, żwirowiska nad Czarnym Dunajcem, 22.8.1957, leg. *E. Pancer*” (Mitka 2003).

Typus: holotype, KRA 003852.

Synonyms: *A. ×lengyeli* Gáyer nothosubsp. *walasii* Mitka.

Hybrid origin: *A. firmum* subsp. *moravicum* × *A. variegatum* subsp. *variegatum*.

*Diagnostic characters*: inflorescence axis, pedicels and tepals outside pilose.

Iconography: Mitka (2003: 176, fig. 9E).

*Aconitum* × *cammarum* L. em. Fries, Sp. Pl. 1 (ed. 2): 751. 1762 em. Nov. Flor. Suec. (ed. 2): 171. 1828

Type citation: “Austria, Styria”.

Typus: not designated. Conflict of original material has been revealed (The Linnaean Plant Name Typification Project, 2006).

Synonyms: *A. intermedium* DC., *A. stoerkianum* Rchb.

Hybrid origin: *A. sect. A. (A. napellus ?) × A. variegatum*.

Distribution: Europe (garden plant, sometimes naturalized).

*Diagnostic characters*: hood glabrous; tepals deep blue (fo. *cammarum*) or with white strips (fo. *bicolor*); pedicels above bracteoles sparsely curved pubescent, below bracteoles glabrescent; carpels glabrous; filaments pilose.

Iconography: Reichenbach (1827: t. 71, *A. stoerkianum*); Mitka (2003: 173, fig. 6F), Novikoff and Mitka (2011: 44).

Literature: Mitka (2003).

Lower taxa:

a) var. *cammarum* fo. *cammarum*

*Diagnostic characters*: tepals with monotonic, usually deep blue, color.

b) var. *cammarum* fo. *bicolor* (Schult) DC., Syst. Nat. [Candolle] 1: 372. 1817

Type citation: none.

Typus: not designated.

Synonyms: none.

*Diagnostic characters*: tepals variegate, with white and blue stripes.

*Aconitum* × *exaltatum* Bernh. ex Rchb., Ill. Spec. Acon.: Tab. LXXII. 1827

Type citation: “In montium Sudetorum Aupagrund, *Funk!*”.

Type specimens: not designated, probably BM 000613639.

Synonyms: *A. exaltatum* var. *hamatum* Rchb. [= *A. hamatum* (Rchb.) Gáyer], *A. speciosum* Otto ex Rchb.

Hybrid origin: *A. plicatum* × *A. variegatum*.

Distribution: Sudetes, Bohemian Massif, Bavarian Alps.

*Diagnostic characters*: inflorescence axis and hoods outside glabrous; hoods rounded-conic or slightly elongated; pedicels glabrous or eglandular curved and crisped pubescent, stamens pilose, spur of nectaries backward bent or capitate; carpels mostly entirely sterile.

Iconography: Mitka (2003: 177, fig. 10F).

Literature: Mitka (2003).

*Aconitum* × *mielichhoferi* Rchb., Uebers. Acon.: 29. 1819

Type citation: “Hab. in Alp. Carinth. Salisb. (in quodam certi harum regionum loco) *Mielichhofer!*”.



Typus: not designated.

Synonym: *A. ×ronnigeri* Gáyér.

Hybrid origin: *A. degenii* × *A. tauricum*.

Distribution: Eastern and Southeastern Alps.

**Diagnostic characters:** pedicels at least above the bracteoles densely glandular pilose; bracteoles filiform to spatulate; tepals outside sparsely to densely glandular pilose; hood about as broad as high; nectaries always pilose, their stalks distinctly bent, their spur capitate, always reaching the top of the hood; carpels 3, glabrous to densely hairy.

Literature: Starmühler (2001).

***Aconitum ×schneebergense*** Gáyér, Magyar Bot. Lapok 8: 189. 1909

Type citation: “Hab. in Schneeberg Austriae Inf. (*Portenschlag* – W, duo exempla: unum cum nota: *A. neomontanum*, Schneeberg, alterum: Austria Inf.)”.

Typus: not designated.

Synonyms: *A. ×algotiense* Gáyér, *A. laxum* Gáyér, *A. ×virgatum* Rchb. ex Gáyér.

Hybrid origin: *A. napellus* × *A. variegatum*.

Distribution: Alps.

**Diagnostic characters:** pedicels above the bracteoles ± densely crisped eglandular pubescent, below the bracteoles ± glabrescent; tepals outside glabrous; hood about as high as broad; nectaries mostly glabrous, hardly curved, with a capitate to hooked spur, always reaching the top of the hood; filaments always hairy; carpels 3–4, glabrous or pilose on the suture.

Literature: Starmühler (2001).

Hybrid formulae:

***Aconitum napellus* × *A. pilipes*** – hood rounded, pedicels above bracteoles glandular pubescent and below bracteoles eglandular pubescent; spur of nectaries backward bent or capitate, carpels glabrous or entirely pubescent, sterile.

***Aconitum pilipes* × *A. tauricum*** – hood rounded; pedicels glandular pubescent, spur of nectaries capitates; carpels glabrous or slightly pubescent.

***Aconitum superbum* × *A. variegatum*** – more studies are required.

***Aconitum superbum* × *A. vitosanum*** – more studies are required.

#### 4. – Sect. ***Angustifolium*** (Seitz) Rottensteiner, **stat. nov.**

Basionym: *A.* subsect. *Angustifolium* Seitz, Feddes Repert. 80 (1): 60. 1969

Type species: *A. angustifolium* Bernh. ex Rchb.

**Diagnosis characters:** seeds tricorn, pyramidal, membranous 6–8 lamellae, root napiform.

**Description:** stem up to 60 cm, glabrous; leaves with 5–7 lobes, narrowly dissected; leaf segments linear to lanceolate, up to 4 (–6) mm wide; inflorescence compact, pyramidal or slightly ramified; pedicels firm, with tri-lobed or entire linear bracteoles; flowers violet; hood from crescent-shape to hemispherical, glabrous or sparsely pubescent; nectaries hardly bent with ± capitate spurs, always reaching the top of the hood; filaments glabrous; carpels 2–3, glabrous or pilose on the dorsal or ventral side.

***Aconitum angustifolium*** Bernh. ex Rchb., Mon. Aconit.: 95, t. 15, fig. 2. 1821

Type citation: “In Styriae valle Wochinensi: *Bernhardi!* (ibid.) circa lacum, in altitude circiter 2000 pendum: *de Vest!* In Sibiria: *Pallas!*”.

Typus: iconotype: Reichenbach (1820): Monogr. Aconit.: 24 (Seitz 1969).

Synonyms: *A. albicans* Host, *A. napellus* subsp. *angustifolium* (Bernh. ex Rchb.) Gáyér, *A. tenuifolium* Host.

Distribution: Julian Alps and Prealps in Italy and Slovenia.

**Diagnostic characters:** uppermost leaf segment 1–3 (–4) mm wide; flowers light blue to whitish; hood often ± triangular, about as high as broad; inflorescence axis, pedicels and tepals outside glabrous (fo. *angustifolium*) or ± pubescent (fo. *carniolicum*); nectaries hardly bent, their spur ± capitate, always reaching the top of the hood; filaments glabrous; carpels 2–3, glabrous or pilose on the dorsal or ventral side.

Iconography: Reichenbach (1821: t. 15, fig. 2).

Literature: Gáyér (1909); Seitz (1969); Nikolić (1994); Martinčić (1999); Aeschimann et al. (2004).

Hybrids: unknown.

Lower taxa:

##### a) fo. ***angustifolium***

**Diagnostic characters:** inflorescence axis, pedicels and tepals outside glabrous.

b) fo. ***carniolicum*** Gáyér, Magyar. Bot. Lap. 8: 184. 1909

Type citation: “Krain, Küstenland, Steiermark. Auf der Zhaun u. Krushza (*Fleischmann* – W); Stiria, Auen a. d. Mur (*Maly* – W. loco ergo incerto)” (Gayer 1909).

Typus: not designated.

Synonyms: none.

*Diagnostic characters*: inflorescence axis, pedicels and tepals outside  $\pm$  pubescent.

5. – Sect. *Euchyloidea* Rchb.

Type species: *A. kusnezoffii* Rchb.

*Diagnostic characters*: nectary lobes inflated; spurs thick, long and hamate curved or short saccate; stipes slightly incurved or nearly erect.

*Description*: root obconical or elongated, 2–5 cm; stem up to 200–300 cm long, usually intensively branched on the level of inflorescence; cauline leaves with 5 lobes with narrow lanceolate segments; pedicel densely pubescent; bracteoles acute ovate; tepals lilac-blue, outside pubescent; hood hemispherical to slightly elongated; carpels 5, mostly glabrous.

5A. – Ser. *Japonica* (Nakai) Kadota

Type species: *A. japonicum* Thunb.

*Diagnostic characters*: leaf blades pentagonal to roundish pentagonal, sometimes roundish reniform; lateral lobes shallowly to medially 2-parted or sometimes deeply incised.

*Aconitum carmichaelii* Debeaux, Actes Soc. linn. Bordeaux 33: 87. 1879

Type citation: “La region montagneuse du Tché-foù, près de Bamboù Temple (très-probablement la Pagode neuve) ou il a été découvert par le Dr. *Carmichael* en 1875”.

Typus: not designated.

Synonyms: *A. bodinieri* H. Lév. & Vaniot, *A. chinense* Paxton, *A. fischeri* auct., *A. lushanense* Migo, *A. wilsonii* Stapf ex Veitch.

Distribution: China, Vietnam; neophyte in Europe: Scotland, France, Germany, Austria.

*Diagnostic characters*: Root obconical, 2–4 cm long, 1–1.6 cm broad; stem rigid, upright, 200–300 cm; cauline leaves pentagonal,  $\pm$  pubescent on the lower surface; inflorescence with many side inflorescences; pedicel densely pubescent; bracteoles acute ovate; tepals lilac-blue, outside pubescent; hood about as high as broad; nectaries glabrous, with an upright claw and a recurved spur; filaments dentate, glabrous; carpels 5, mostly glabrous.

Iconography: Wang et al. (2003).

Literature: Li and Kadota (2001); Lin et al. (2017).

Hybrids: unknown.

#### ACKNOWLEDGMENTS

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## APPENDIX

CHECKLIST OF ACONITUM SUBG. ACONITUM  
IN EUROPE

- A. ×acuminatum** Rchb. [*A. degenii* × *A. napellus*]  
**A. ×acutum** Rchb. [*A. tauricum* × *A. variegatum*]  
*A. adriaticum* Gayer = **A. superbum** Fritsch  
*A. albicans* Host = **A. angustifolium** Bernh. ex Rchb.  
*A. ×algoviense* Gayer = **A. ×schneebergense** Gayer [*A. napellus* × *A. variegatum*]  
*A. amoenum* Rchb. = **A. plicatum** Köhler ex Rchb.  
**A. anglicum** Stapf  
**A. angustifolium** Bernh. ex Rchb.  
    fo. **angustifolium**  
    fo. **carniolicum** Gayer  
**A. ×aquilonare** A.Kern. ex Gayer [*A. variegatum* × *A. vitosanum*]  
**A. ×austriacum** Starm. [*A. pilipes* × *A. variegatum*]  
*A. autumnale* Clus. ex Rchb. = **A. napellus** L.  
*A. adriaticum* Gayer = **A. superbum** Fritsch  
**A. ×bartokianum** Starm. [*A. toxicum* × *A. variegatum*]  
    nothosubsp. **bartokianum** Starm. [*A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *nasutum*]  
    nothosubsp. **rapaicsianum** Starm. [*A. toxicum* subsp. *crispulum* × *A. variegatum* subsp. *nasutum*]  
    nothosubsp. **sooanum** Starm. [*A. toxicum* subsp. *toxicum* × *A. variegatum* subsp. *variegatum*]  
**A. ×bavaricum** Starm. [*A. napellus* × *A. plicatum*]  
    nothosubsp. **bavaricum** [*A. napellus* subsp. *napellus* × *A. plicatum*]  
    nothosubsp. **lusenense** Starm. [*A. napellus* subsp. *lobelii* × *A. plicatum*]  
**A. ×berdaui** Zapał. [*A. firmum* × *A. variegatum*]  
    nothosubsp. **berdaui** [*A. firmum* subsp. *firmum* × *A. variegatum* subsp. *variegatum*]  
    nothosubsp. **walasii** (Mitka) Mitka [*A. firmum* subsp. *moravicum* × *A. variegatum* subsp. *variegatum*]  
*A. bernhardianum* Rchb., *p.p.* = **A. napellus** L.  
*A. bernhardianum* Rchb., *p.p.* = **A. plicatum** Köhler ex Rchb.  
*A. beskidense* (Zapał.) Gayer = **A. lasiocarpum** Rchb. subsp. **kotulae** (Pawł.) Starm. & Mitka  
*A. bodinieri* H.Lév. & Vaniot = **A. carmichaelii** Debeaux  
*A. bosniacum* Beck = **A. toxicum** Rchb.  
**A. bucovinense** Zapał.

- fo. **bucovinense**  
fo. **orthotricha** Gáyér
- A. burnatii** Gáyér  
subsp. *pentheri* (Hayek) Jalas = **A. pentheri** Hayek  
*A. callibotryon* Rchb. = **A. plicatum** Köhler ex Rchb.  
**A. ×cammarum** L. em. Fries [*A. napellus* × *A. variegatum*]  
var. *beskidene* Zapał. = **A. lasiocarpum** Rchb.  
var. **cammarum**  
fo. **cammarum**  
fo. **bicolor** (Schult) DC.  
var. *pilipes* Rchb. = **A. pilipes** (Rchb.) Gáyér
- A. cammarum* Jacq.  
var. *beskidense* Zapał. = **A. lasiocarpum** Rchb.  
subsp. **kotulae** (Pawł.) Starm. & Mitka  
var. *koscieliskanum* Zapał., *p.p.* = **A. lasiocarpum** Rchb. subsp. **kotulae** (Pawł.) Starm. & Mitka
- A. carmichaelii** Debeaux  
**A. castellanum** (Molero & Blanché) Rottensteiner  
*A. caucasicum* N.Busch  
subsp. *pubiceps* (Rupr.) N.Busch  
var. *tuscheticum* N.Busch = **A. ×tuscheticum** (N.Busch) N.Busch [*A. degenii* × *A. vitosanum*]
- A. cernuum* Rchb., non Wulfen  
[var.] *α laxiflorum* Rchb. = **A. degenii** Gáyér subsp. **paniculatum** (Arcang.) Mucher var. **laxiflorum** (Rchb.) Mucher  
*A. chinense* Paxton = **A. carmichaelii** Debeaux  
*A. compactum* Rchb. = **A. napellus** L.  
**A. clusianum** Rchb.  
**A. corsicum** Gáyér  
**A. ×czarnohorensis** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]  
*A. dasycarpum* Schur = **A. lasiocarpum** Rchb.
- A. degenii** Gáyér  
subsp. **degenii**  
var. **degenii**  
fo. **degenii**  
fo. **craciunelense** Gáyér  
var. **intermedium** (Zapał.) Mitka  
nothosubsp. **gandogeri** Mucher [*A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *valesiacum*]  
nothosubsp. **lippertianum** Starm. [*A. degenii* subsp. *paniculatum* × *A. degenii* subsp. *rhaeticum*]  
subsp. **paniculatum** (Arcang.) Mucher  
var. **laxiflorum** (Rchb.) Mucher  
var. **turrachense** (Mucher) Mucher  
subsp. **rhaeticum** Starm.  
subsp. **valesiacum** (Gáyér) Mucher
- A. delphinense* Gáyér = **A. burnatii** Gáyér  
*A. diabolicum* Gáyér = **A. toxicum** Rchb.  
*A. divergens* Pančić *nom. illeg., p.p.* = **A. pentheri** Hayek  
subsp. *burnatii* (Gáyér) W.Seitz = **A. burnatii** Gáyér  
*A. dolomiticum* A.Kern. = **A. tauricum** Wulfen in Koelle  
*A. dolomiticum* Hayek, *p.p.* = **A. tauricum** Wulfen in Koelle nothosubsp. **hayekianum** (Gáyér) Grinț. in Savulescu [*A. tauricum* subsp. *latemarensis* × *A. tauricum* subsp. *tauricum*]  
*A. dolomiticum* Hayek, *p.p.* = **A. ×teppneri** Mucher ex Starm. nothosubsp. **kernerii** Starm. [*A. napellus* subsp. *napellus* × *A. tauricum* subsp. *latemarensis*]  
**A. ×dragulescuanum** Mucher [*A. degenii* × *A. toxicum*]  
nothosubsp. **dragulescuanum** [*A. degenii* subsp. *degenii* × *A. toxicum* subsp. *toxicum*]  
nothosubsp. **grintescuanum** Starm. [*A. degenii* subsp. *degenii* × *A. toxicum* subsp. *crispulum*]  
*A. eminens* Koch ex Rchb. = **A. napellus** L.  
**A. ×exaltatum** Bernh. ex Rchb. [*A. plicatum* × *A. variegatum*]  
var. *hamatum* Rchb. = **A. ×exaltatum** Bernh. ex Rchb. [*A. plicatum* × *A. variegatum*]  
*A. eustachyum* Rchb. = **A. tauricum** Wulfen subsp. **tauricum** var. **eustachyum** (Rchb.) Starm.
- A. firmum** Rchb.  
subsp. **firmum**  
subsp. **fissuræ** Nyár.  
nothosubsp. **fussianum** Starm. [*A. firmum* subsp. *firmum* × *A. firmum* subsp. *fissuræ*]  
subsp. **maninense** (Skalický) Starm. = **A. maninense** (Skalický) Mitka  
subsp. **moravicum** Skalický  
var. *maninense* Skalický = **A. maninense** (Skalický) Mitka  
nothosubsp. *paxii* Starm. in Starmühler & Mitka = **A. ×mariae** Rottensteiner, Mitka & Novikov nothosubsp. **paxii** (Starm.) Mitka, **comb. nov.** [*A. firmum* subsp. *moravicum* × *A. maninense*]  
subsp. **skerisorae** (Gáyér) Starm.  
nothosubsp. *zapalowiczii* Starm. = **A. ×zapalowiczii** (Starm.) Mitka [*A. firmum* × *A. ×mariae* nothosubsp. *paxii*]
- A. firmum** Rchb. subsp. **firmum** × **A. firmum** Rchb. subsp. **moravicum** Skalický  
*A. firmum* Rchb. subsp. *firmum* × *A. maninense* (Skalický) Mitka = **A. ×mariae** Rottensteiner, Mitka & Novikov nothospec. (hybr.) nov. [*A. firmum* s.str. × *A. maninense*]  
*A. fischeri* Auct. = **A. carmichaelii** Debeaux  
*A. flerovii* Steinberg in Komarov = **A. firmum** Rchb. subsp. **fissuræ** Nyár.  
*A. formosum* Rchb. = **A. napellus** L. subsp. **formosum** (Rchb.) Gáyér in Hegi  
**A. ×gayeri** Starm. [*A. degenii* × *A. lasiocarpum*]  
*A. gracile* Rchb., *p.p.* = **A. variegatum** L. subsp. **variegatum**

- subsp. *grosserratum* (Gáyer) Grinț.  
fo. *beskidense* Zapał. = **A. lasiocarpum** Rchb.  
subsp. **kotulae** (Pawł.) Starm. & Mitka
- A. hamatum* (Rchb.) Gáyer = **A. ×exaltatum** Bernh. ex Rchb. [*A. plicatum* × *A. variegatum*]
- A. hayekianum* Gáyer = **A. tauricum** Wulfen in Koelle
- A. ×hebegynum** DC. [*A. degenii* × *A. variegatum*]
- A. ×hebegynum* Auct. Fl. Carpathorum, non DC. = **A. degenii** Gáyer subsp. **degenii** var. **intermedium** (Zapał.) Mitka
- A. hebegynum* Auct., *p.p.* = **A. lasiocarpum** Rchb. subsp. **kotulae** (Pawł.) Starm. & Mitka
- A. hians* Rchb. = **A. plicatum** Köhler ex Rchb.
- A. intermedium* DC. = **A. ×cammarum** L. em. Fries [*A. napellus* × *A. variegatum*]
- A. koehleri* Rchb. = **A. plicatum** Köhler ex Rchb.
- A. koelleanum* Rchb., *p.p.* = **A. tauricum** Wulfen in Koelle  
var. *firmum* (Rchb.) Rchb. = **A. firmum** Rchb.
- A. laetum* Rchb. = **A. plicatum** Köhler ex Rchb.
- A. lasiocarpum** (Rchb.) Gáyer  
subsp. **kotulae** (Pawł.) Starm. & Mitka  
subsp. **lasiocarpum**
- A. lasiocarpum** (Rchb.) Gáyer × **A. toxicum** Rchb.
- A. latemarense* Degen & Gáyer = **A. tauricum** Wulfen  
subsp. **latemarense** (Degen & Gáyer) Starm. in W.Maurer
- A. laxum* Gáyer = **A. ×schneebergense** Gáyer [*A. napellus* × *A. variegatum*]
- A. laxum* Rchb. = **A. napellus** L.
- A. ×lengyelii* Gáyer = **A. ×berdau** Zapał. [*A. firmum* × *A. variegatum*]  
nothosubsp. *walasii* Mitka. = **A. ×berdau** Zapał.  
nothosubsp. **walasii** (Mitka) Mitka [*A. firmum* subsp. *moravicum* × *A. variegatum*]
- A. linnaeanum* Gáyer = **A. napellus** L.
- A. lobelianum* Host., non Rchb., *p.p.* = **A. napellus** L.  
subsp. **lobelii** Mucher  
fo. *brachytrichum* Gáyer. = **A. ×acuminatum** Rchb. [*A. degenii* × *A. napellus*]
- A. lobelianum* Rchb. = **A. napellus** L.
- A. lobelianum* (Rchb.) Host. in Gáyer, *p.p.* = **A. napellus** L. subsp. **lobelii** Mucher  
fo. *brachytrichum* Gáyer. = **A. ×acuminatum** Rchb. [*A. degenii* × *A. napellus*]
- A. lobelianum* Rouy-Fouc. = **A. corsicum** Gáyer
- A. lushanense* Migo = **A. carmichaelii** Debeaux
- A. maninense** (Skalický) Mitka
- A. ×mariae** Rottensteiner, Mitka & Novikov [*A. firmum* s.str. × *A. maninense*]  
nothosubsp. **mariae** [*A. firmum* subsp. *firmum* × *A. maninense*]
- nothosubsp. **paxii** (Starm.) Mitka, **comb. nov.** [*A. firmum* subsp. *moravicum* × *A. maninense*]
- A. meyeri* Rchb. = **A. napellus** L.
- A. ×mielichhoferi** Rchb. [*A. degenii* × *A. tauricum*]
- A. molle* Rchb. = **A. degenii** Gáyer
- A. multifidum* Koch ex Rchb. = **A. plicatum** Köhler ex Rchb, *A. multifidum* Auct. Fl. Carpathorum, non Koch = **A. bucovinense** Zapał.
- A. ×nanum** (Baumg.) Simonk. [*A. bucovinense* × *A. firmum*]
- A. napellus** L.  
subsp. *angustifolium* (Bernh. ex Rchb.) Gáyer = **A. angustifolium** Bernh. ex Rchb.  
subsp. *burnatii* (Gáyer) J.-M. Tison. = **A. burnatii** Gáyer  
subsp. *castellanum* Molero and Blanché = **A. castellanum** (Molero & Blanché) Rottenst.  
subsp. *corsicum* (Gáyer) W. Seitz = **A. corsicum** Gáyer  
subsp. *eustachyum* (Rchb.) Gayer in Hegi = **A. tauricum** Wulfen subsp. **tauricum** var. **eustachyum** (Rchb.) Starm.  
subsp. *firmum* (Rchb.) Gáyer, *p.p.* = **A. firmum** Rchb.  
subsp. **firmum**  
var. *carpaticum* Maloch = **A. firmum** Rchb. subsp. **moravicum** Skalický  
subsp. **formosum** (Rchb.) Gáyer  
subsp. *hians* (Rchb.) Gáyer = **A. plicatum** Köhler ex Rchb.  
nothosubsp. **hinterhuberi** Starm. [*A. napellus* subsp. *formosum* × *A. napellus* subsp. *napellus*]  
subsp. *koelleanum* (Rchb.) Mucher = **A. tauricum** Wulfen in Koelle  
subsp. **lobelii** Mucher  
subsp. **lusitanicum** Rouy  
subsp. **napellus**  
var. *babigorense* Zapał.  
fo. *babigorense* = **A. firmum** Rchb.  
fo. *subfissum* Zapał. = **A. firmum** Rchb.  
var. *carpaticum* Zapał.  
fo. *carpaticum* = **A. firmum** Rchb.  
var. *compactum* Rapaics. = **A. corsicum** Gáyer  
var. *czarnohorense* Zapał. = **A. ×czarnohorense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]  
fo. *amoenum* Zapał. = **A. ×czarnohorense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]  
fo. *czarnohorense* Zapał. = **A. ×czarnohorense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]  
fo. *glabratum* Zapał. = **A. ×czarnohorense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]  
fo. *hoverlanum* Zapał. = **A. ×czarnohorense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]



- fo. *nanum* Zapał., non Baumg. = **A. ×czarnohoreense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]
- fo. *rodnense* Zapał. = **A. ×czarnohoreense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]
- fo. *tenuisectum* Zapał. = **A. ×czarnohoreense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]
- fo. *turkulense* Zapał. = **A. ×czarnohoreense** (Zapał.) Mitka [*A. bucovinense* × *A. ×nanum*]
- [var.] *γ eustachyum* (Rchb.) Fiori = **A. tauricum** Wulfen subsp. **tauricum** var. **eustachyum** (Rchb.) Starm.
- var. *firmum* (Rchb.) Pawł. = **A. firmum** Rchb.
- [var.] *formosum* (Rchb.) Koch. = **A. napellus** L. subsp. **formosum** (Rchb.) Gáyer in Hegi
- [var.] *β hemisphaericum* Form
- fo. *formosum* (Rchb.) Beck. = **A. napellus** L. subsp. **formosum** (Rchb.) Gáyer in Hegi
- var. *nanum* Baumg. = **A. ×nanum** (Baumg.) Simonk. [*A. bucovinense* × *A. firmum*]
- var. *napellus*
- fo. *koelleanum* (Rchb.) Gürke in Richter-Gürke = **A. tauricum** Wulfen in Koelle
- var. *subtatrense* Zapał.
- fo. *abnorme* Zapał. = **A. firmum** Rchb.
- fo. *latisectum* Zapał. = **A. firmum** Rchb.
- fo. *subtatrense* = **A. firmum** Rchb.
- var. *tatrense* Zapał. = **A. firmum** Rchb.
- var. *tauricum* (Wulfen) Sér. = **A. tauricum** Wulfen in Koelle
- subsp. *napellus* sensu Seitz, 1969 = **A. anglicum** Stapf nothosubsp. **polatschekii** Mucher ex Starm. [*A. napellus* subsp. *formosum* × *A. napellus* subsp. *lobelii*] nothosubsp. **seitzii** Mucher ex Starm. [*A. napellus* subsp. *lobelii* × *A. napellus* subsp. *napellus*]
- subsp. *skerisorae* Seitz, non Gáyer = **A. firmum** Rchb. subsp. **skerisorae** (Gáyer) Starm.
- subsp. *superbum* (Fritsch) W.Seitz = **A. superbum** Fritsch
- subsp. *tauricum* (Wulfen) Gáyer in Hegi = **A. tauricum** Wulfen in Koelle
- A. napellus** L. × **A. pilipes** (Rchb.) Gáyer
- A. nasutum* Fischer ex Rchb., *p.p.* = **A. variegatum** L. subsp. **nasutum** (Fischer ex Rchb. em. Rupr.) Götz
- subsp. *tuscheticum* (N.Busch) A.N.Luferov = **A. ×tuschetium** (N.Busch) N.Busch [*A. degenii* × *A. vitosatum*]
- A. neomontanum* Wulfen = **A. napellus** L.
- A. neomontanum* Auct., non Koelle = **A. toxicum** Rchb.
- A. neubergense* Clus. ex Rchb. = **A. napellus** L.
- A. nevadense** Uechtr. ex Gáyer
- A. occidentale* Timb. Lagr. f. ex Gáyer = **A. nevadense** Uechtr. ex Gáyer
- A. odotandrum* Wissjul. = **A. ×berdaui** Zapał. [*A. firmum* × *A. variegatum*]
- A. palmatifidum* Rchb., *p.p.* = **A. firmum** Rchb.
- fo. *piliferum* Gáyer = **Aconitum ×mariae** Rottensteiner, Mitka & Novikov nothosubsp. **paxii** (Starm.) Mitka, **comb. nov.** [*A. firmum* subsp. *moravicum* × *A. maninense*]
- A. paniculatum* Lam., *p.p.* (*nom. inval.*) = **A. degenii** Gáyer subsp. **degenii**
- subsp. *lasiocarpum* (Rchb.) Soó = **A. lasiocarpum** (Rchb.) Gáyer
- subsp. *paniculatum*
- var. *paniculatum* (*nom. inval.*) = **A. degenii** Gáyer subsp. **paniculatum** (Arcang.) Mucher var. **laxiflorum** (Rchb.) Mucher
- var. *podolicum* Zapał.
- fo. *latilobum* Zapał. = **A. lasiocarpum** (Rchb.) Gáyer subsp. **kotulae** (Pawł.) Starm. & Mitka
- fo. *latiusculum* Zapał. = **A. degenii** var. **intermedium** (Zapał.) Mitka
- var. *prutense* Zapał. = **A. degenii** var. **intermedium** (Zapał.) Mitka
- var. *turrachense* Mucher = **A. degenii** Gáyer subsp. **paniculatum** (Arcang.) Mucher var. **turrachense** (Mucher) Mucher
- A. parviflorum* Host. = **A. tauricum** Wulfen in Koelle
- A. ×pawlowskii** Mitka & Starm. [*A. lasiocarpum* × *A. variegatum*]
- A. ×paxii* (Starm.) Mitka = **A. ×mariae** Rottensteiner, Mitka & Novikov nothosubsp. **paxii** (Starm.) Mitka, **comb. nov.** [*A. firmum* subsp. *moravicum* × *A. maninense*]
- A. pentheri** Hayek
- A. pilipes** (Rchb.) Gáyer
- A. pilipes** (Rchb.) Gáyer × **A. tauricum** Wulfen
- A. ×pilosusculum** (Seringe) Gáyer [*A. degenii* × *A. pilipes*]
- A. plicatum** Köhler ex Rchb.
- subsp. **plicatum**
- var. *clusianum* (Rchb.) Mitka & Starm. = **A. clusianum** Rchb.
- subsp. **sudeticum** Mitka
- A. podolicum* (Zapał.) Voroshylov = **A. lasiocarpum** (Rchb.) Gáyer subsp. **kotulae** (Pawł.) Starm. & Mitka
- A. pubiceps* Rupr.
- var. *tuscheticum* (N.Busch) Grossh. = **A. ×tuschetium** (N.Busch) N.Busch [*A. degenii* × *A. vitosatum*]
- A. pyramidale* Mill. ex Rchb. = **A. napellus** L.
- A. ranunculifolium* Rchb.
- var. *dolomiticum* Evers, *p.p.* = **A. tauricum** Wulfen in Koelle nothosubsp. **hayekianum**

- (Gáyer) Grinț. in Savulescu [*A. tauricum* subsp. *latemarensis* × *A. tauricum* subsp. *tauricum*]  
 var. *dolomiticum* Evers, p.p. = **A. ×teppneri** Mucher ex Starm. nothosubsp. **keneri** Starm. [*A. napellus* subsp. *napellus* × *A. tauricum* subsp. *latemarensis*]  
*A. rigidum* Rchb. = **A. plicatum** Köhler ex Rchb.  
*A. romanicum* Wołoszczak = **A. firmum** Rchb. subsp. **fissuræ** Nyár.  
*A. ×ronnigeri* Gáyer = **A. ×mielichhoferi** Rchb. [*A. tauricum* subsp. *latemarensis* × *A. tauricum* subsp. *tauricum*]  
**A. ×schneebergense** Gáyer [*A. napellus* × *A. variegatum*]  
*A. schurii* Beck. = **A. toxicum** Rchb.  
     fo. *retyezatense* Gáyer = **A. toxicum** Rchb.  
*A. skerisorae* Auct., non Gáyer = **A. firmum** Rchb.  
*A. skerisorae* Gáyer = **A. firmum** Rchb. subsp. **skerisorae** (Gáyer) Starm.  
*A. speciosum* Otto ex Rchb. = **A. ×exaltatum** Bernh. ex Rchb. [*A. plicatum* × *A. variegatum*]  
*A. sostaricianum* Fritsch = **A. superbum** Fritsch  
*A. stoerkianum* Rchb. = **A. ×cammarum** L. em. Fries [*A. napellus* × *A. variegatum*]  
*A. strictum* Bernh. = **A. napellus** L.  
**A. superbum** Fritsch  
**A. superbum** Fritsch × **A. variegatum** L.  
**A. superbum** Fritsch × **A. vitosanum** Gáyer  
*A. tatrae* Borb. = **A. firmum** Rchb.  
     var. *skerisorae* Soó = **A. firmum** Rchb. subsp. **skerisorae** (Gáyer) Starm.  
*A. taurericum* Rchb. = **A. tauricum** Wulfen in Koelle subsp. **tauricum** var. **tauricum** fo. **taurericum** (Rchb.) Gáyer  
*A. tauricum* Auct. = **A. firmum** Rchb.  
**A. tauricum** Wulfen in Koelle  
     nothosubsp. **hayekianum** Gáyer (Gáyer) Grinț. in Savulescu [*A. tauricum* subsp. *latemarensis* × *A. tauricum* subsp. *tauricum*]  
     subsp. **latemarensis** (Degen and Gáyer) Starm.  
     subsp. *nanum* Auct. fl. Carpat. Orient., non (Baumg.) Grinț. = **A. bucovinense** Zapał.  
     subsp. *nanum* (Baumg.) Grinț. = **A. ×nanum** (Baumg.) Simonk. [*A. bucovinense* × *A. firmum*]  
     subsp. *nanum* (Baumg.) Gáyer = **A. ×nanum** (Baumg.) Simonk. [*A. bucovinense* × *A. firmum*]  
     subsp. *taureticum* (Rchb.) Grinț. = **A. tauricum** Wulfen in Koelle subsp. **tauricum** var. **tauricum** fo. **taurericum** (Rchb.) Gáyer  
     subsp. **tauricum**  
         var. **eustachyum** (Rchb.) Starm.  
         var. *latemarensis* (Degen & Gáyer) Mucher = **A. tauricum** Wulfen in Koelle subsp. subsp. **latemarensis** (Degen & Gáyer) Starm. in W.Maurer  
     var. **tauricum**  
         fo. **tauricum**  
         fo. **taurericum** (Rchb.) Gáyer  
*A. tenuifolium* Host. = **A. angustifolium** Bernh. ex Rchb.  
**A. ×teppneri** Mucher ex Starm. [*A. napellus* × *A. tauricum*]  
     nothosubsp. **goetzii** Mucher ex Starm. [*A. napellus* subsp. *lobelii* × *A. tauricum* subsp. *tauricum*]  
     nothosubsp. **haderlappii** Starm. [*A. napellus* subsp. *lobelii* × *A. tauricum* subsp. *latemarensis*]  
     nothosubsp. **keneri** Starm. [*A. napellus* subsp. *napellus* × *A. tauricum* subsp. *latemarensis*]  
     nothosubsp. **teppneri** [*A. napellus* subsp. *napellus* × *A. tauricum* subsp. *tauricum*]  
**A. toxicum** Rchb.  
     subsp. **bucegiense** (Nyár.) Mucher  
     subsp. **crispulum** (Nyár.) Mucher  
     nothosubsp. **nyaradyanum** Mucher [*A. toxicum* subsp. *crispulum* × *A. toxicum* subsp. *toxicum*]  
     subsp. **toxicum**  
         [var.] *bosniacum* (Beck) Hayek = **A. toxicum** Rchb.  
         var. *bucegiense* Nyár. = **A. toxicum** Rchb. subsp. **bucegiense** (Nyár.) Mucher  
         var. *crispulum* Nyárády in Borza = **A. toxicum** Rchb. subsp. **crispulum** (Nyár.) Mucher  
         [var.] *β schurii* Beck = **A. toxicum** Rchb.  
         var. *toxicum*  
             fo. *diabolicum* (Gáyer) Grinț. = **A. toxicum** Rchb.  
     nothosubsp. **ungarianum** Starm. [*A. toxicum* subsp. *bucegiense* × *A. toxicum* subsp. *toxicum*]  
*A. trichocarpum* Rchb. = **A. tauricum** Wulfen in Koelle  
**A. ×tuschetium** (N.Busch) N.Busch [*A. degenii* × *A. vitosanum*]  
*A. valesiacum* Gáyer = **A. degenii** Gáyer subsp. **valesiacum** (Gáyer) Mucher  
**A. variegatum** L.  
     subsp. *kotulae* Pawł. = **A. lasiocarpum** (Rchb.) Gáyer  
     subsp. *kotulae* (Pawł.) Starm. & Mitka  
     subsp. **nasutum** (Fischer ex Rchb. em. Rupr.) Götz  
     nothosubsp. **podobnikianum** Mucher [*A. variegatum* subsp. *nasutum* × *A. variegatum* subsp. *variegatum*]  
     subsp. *pyrenaicum* Vivant & Delay = **A. vivantii** Rottensteiner.  
     subsp. *valesiacum* (Gáyer) Greuter & Burdet = **A. degenii** Gáyer subsp. **valesiacum** (Gáyer) Mucher  
     subsp. **variegatum**  
         var. **carniolicum** Starm.  
         var. *diffusum* (Rchb.) Penev & Simeon. = **A. vitosanum** Gáyer  
         var. **stiriacum** Mucher

var. **variegatum**

fo. *aquilonare* (Gáyer) M.Niketić = **A.**  
 ×*aquilonare* A.Kern. ex Gáyer [*A. variegatum*  
 × *A. vitosanum*]

fo. *kotulae* (Pawł.) Skalický = **A. lasiocarpum**  
 (Rchb.) Gáyer subsp. **kotulae** (Pawł.) Starm. &  
 Mitka

*A. ×virgatum* Rchb. ex Gáyer = **A. ×schneebergense**  
 Gáyer [*A. napellus* × *A. variegatum*]

**A. vitosanum** Gáyer

**A. vivanii** Rottensteiner, **nom. nov.**

*A. vulgare* DC. = **A. napellus** L.

*A. wilsonii* Stapf ex Veitch. = **A. carmichaelii** Debeaux

*A. ×zahlbruckneri* Gáyer = **A. ×acutum** Rchb. [*A. tauricum* × *A. variegatum*]

**A. ×zapalowiczii** (Starm.) Mitka [*A. firmum* × *A. ×mariae* nothosubsp. *paxii*]