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Systematics and chorology of *Aconitum* sect. *Napellus* (Ranunculaceae) and its hybrids in the Northern Carpathians and Forest Carpathians

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ABSTRACT: The genus *Aconitum* is distributed in the Northern and Forest Carpathians with 7 species, including the infraspecific taxa and hybrids with 23 taxa. A new combination is *A. firmum* subsp. *maninense*. This subspecies is also stated in Poland for the first time. New taxa described here are *A. firmum* nsubsp. *paxii*, *A. firmum* subsp. *firmum* var. *portae-ferratae*, *A. firmum* nsubsp. *zapalowiczii*, *A.* ×*lengyelii* nsubsp. *walasii*. Following names are typified in this article: *A. bucovinense*, *A. firmum*, *A. firmum* subsp. *fissurae*, *A.* ×*lengyelii*, *A.* ×*nanum*. All taxa are described, their types are stated and a key for the determination is given.

KEYWORDS: *Aconitum*, Carpathians, Ranunculaceae, Systematics, Types

Introduction

In the genus *Aconitum* the differentiation of the Carpathians is quite exact: The only species, which can be found in the whole Carpathian mountain range (exept the Western Carpathians) is *A. moldavicum*, subsp. *moldavicum* in the whole range, subsp. *simonkaianum* in the Forest and Eastern Carpathians, subsp. *hostianum* only in the Southern Carpathians. *Aconitum lycoctonum* subsp.

lycoctonum can only be found in the Western and Northern Carpathians. *Aconitum lasiostomum* is a rare plant in the Eastern Carpathians, *A. lasianthum* is endemic in the Southern Carpathians. *Aconitum variegatum* subsp. *variegatum* grows in the Northern and rarely in the Forest Carpathians, subsp. *nasutum* in the Eastern and Southern Carpathians. *Aconitum degenii* grows in the Forest Carpathians, Eastern Carpathians and Southern Carpathians, *A. lasiocarpum* subsp. *kotulae* in the Northern, Forest and Eastern Carpathians (MITKA & STARMÜHLER 2000), subsp. *lasiocarpum* only in the Forest and Eastern Carpathians. *Aconitum toxicum* with its subsp. *toxicum* and subsp. *bucegiense* you find in the Eastern and Southern Carpathians, subsp. *crispulum* only in the Southern Carpathians. *Aconitum bucovinense* is endemic in the Forest, Eastern and Southern Carpathians. *A. firmum* subsp. *firmum* var. *firmum* grows mainly in the Northern Carpathians and is just rarely scattered distributed in the Forest and Eastern Carpathians, subsp. *fissurae* mainly in the Eastern and Southern Carpathians, just rarely in the southeastern end of the Forest Carpathians too, subsp. *moravicum* in the Northern Carpathians, subsp. *maninense* and var. *portae-ferratae* are endemic to the Northern Carpathians (MITKA & STARMÜHLER 2001).

The geographical borders of subdivisions of the Carpathians as it are used in this paper (fig. 1) are partly natural borders of the Carpathian mountain ranges, some borders are artificial (STARMÜHLER & STARMÜHLER 1995). So in the classical division there is no natural boundary between the Forest Carpathians and the Eastern Carpathians, which is based on geology, orography or plantgeography (PAX & WINKLER 1924). PAX (1908, 1919) states, that the best line of demarcation are the valleys of the river Tisa in Marmaros and the river Prut in Ukraine and the Jablunycja saddle as the watershed. The separation between Forest Carpathians and Northern Carpathians goes along the rivers Dunajec, Torysa and Hornád/Hernád. In the west the Carpathians are separated from the Sudetes along the rivers Oder, Bečva and Morava. The boundary between the Northern Carpathians and Western Carpathians (Malé Karpaty Mts. + Bílé/Biele Karpaty Mts.) goes along the rivers Bečva and Váh.

This boundary is just one of several proposals. ZEMANEK (1991) gives a good survey over the most important attempts to separate the Western Carpathians (including Northern and Forest Carpathians, as it is usally treated in current Polish and Slovakian literature) from the Eastern Carpathians, but he comes to the conclusion that the problem of demarcation of a boundary has not been solved definitely until now.

Material and methods

176 herbarium specimens of the investigated area from the herbaria in Austria (GZU, LI, W, WU), Czech Republic (PR, PRC), France (LY), Germany (M), Hungary (BP), Poland (KRA, KRAM, ZTS), Romania (CL, SIB), Slovakia (KO, SAV) and Switzerland (ZT) have been revised. In several excursions to the Polish part of the Tatra Mountains and the Bieszczady Mountains populations of different *Aconitum* taxa have been studied. In excursions to the adjacent Eastern

Carpathians (1996 and 1997) it was possible to investigate the same taxa, as it occur in the Forest Carpathians. Several plants from the Northern as well as from the Forest Carpathians are in culture and observation in the Botanical Garden of the Jagiellonian University at Kraków and in the private garden of the first author at Bruck/Mur for years and have been used for morphological, morphometric and karyological investigations, artificial hybridisations and for cytogenetical analysis of chromosomal C-Giemza bands (JOACHIMIAK & al. 1999) and with the use of RAPD method, based on PCR, for nuclear DNA (JOACHIMIAK & al., in prep.).

The **concept of infraspecific differentiation** is based mainly on SKALICKÝ (1982), who was the first to try to find general directions in the genus *Aconitum*. It had been necessary to render precise it and to complete it here and now to apply it clearly.

Thus in the genus *Aconitum* a **subspecies** is a variation of a whole population within a species. It is morphologically and ecologically well characterized. It has to have a conjunct area of its own or at least a central area, where it dominates as a subspecies. Besides, there may exist disjunct areas, which are rarely far from the center. It is not necessary to distinguish subspecies by the karyotype (SEITZ & al. 1972).

A **variety** in the genus *Aconitum* is, like a subspecies, defined as a variation of a whole population with an area of its own or at least a central area, but it may occur scattered in the whole area of the subspecies (in contradiction to the subspecies, which may not occur in the whole area of the species). The dimensions of the area are not important for the decision if it is subspecies or variety. The morphological division of a variety is usually based on less marks than that of a subspecies or there are characteristics used, which stand on a lower level of the hierarchy and/or less separating marks can be stated.

A **form** in the genus *Aconitum* is just a genotypic variation of an individuum and has no area of ist own. Because almost all modificative characteristics in the genus *Aconitum* have already been used for the description of forms, it is surely an important aim, to use just such characteristics, which are used for the description of subspecies and varieties too, always convincing that only hereditary characteristics are taken into consideration. Important is also a hierarchy of the importance of morphological characteristics. In the genus *Aconitum* the most important marks are mainly situated in the flower. On principle, morphological characteristics fall in the rank, as soon as the frame conditions are not fulfilled any more (e.g. area of its own or central area). Thus marks like pilose nectaries and filaments may be used for the separation of a variety, if a central area can be stablished. If this is not the case, then there is only a separation in the rank of a form possible (Compare the discussion in *A. firmum* var. *portae-ferratae* too!).

Infraspecific hybrids often occur in overlapping areas of its parents. They are always fully fertile and in most cases they include the whole morphological range of characteristics of both parents. In mixed populations you mostly do not find it as single plants, but as hybrid swarms. A nothovarietas, a hybrid between

two varieties, may occur scattered within the whole range of both parents. On the contrary, a nothosubspecies grows only or mainly (this means near the border) within the introgression area of its parents. The deeper in the territory of one subspecies and the more to the margin of the other subspecies, the nothosubspecies may become more frequent than that the parent, which grows here at the margin of its distribution. As it could be observed in the field, there exist then also populations without both parents or almost without one parent. This may be interpreted in two ways: either both parents have fully hybridized, or the hybrid is stronger and better adopted to the ecological conditions in this area and therefore it had better chances to survive. These populations could create, after isolation and changing of conditions, a new taxon. Thus, at least in the rank of a nothosubspecies, it seems to be convenient and logical to treat those hybrids in the genus *Aconitum* with a binominal nomenclature.

Survey over the systematics of the genus *Aconitum* LINNAEUS in the Northern Carpathians and Forest Carpathians

Aconitum subgen. Aconitum

sect. *Aconitum* subsect. *Aconitum*

ser. *Aconitum*: *A. variegatum* LINNAEUS subsp. *variegatum* var. *variegatum*

ser. *Toxicum* (REICHENBACH) MUCHER: *A. degenii* GÁYER subsp. *degenii* f. *degenii*, *A.* ×*gayeri* (*A. degenii* × *A. lasiocarpum*), *A. lasiocarpum* (REICHENBACH) GÁYER subsp. *kotulae* (PAWŁOWSKI) STARMÜHLER & MITKA, *A. lasiocarpum* (REICHENBACH) GÁYER subsp. *lasiocarpum*

nser. *Acotoxicum* MUCHER: *A.* ×*hebegynum* A.P.CANDOLLE (*A. degenii* × *A. variegatum*), *A.* ×*pawlowskii* MITKA & STARMÜHLER (*A. lasiocarpum* × *A. variegatum*)

sect. *Napellus* (WOLF) A.P.CANDOLLE subsect. *Napellus* (WOLF) RAPAICS:

A. bucovinense ZAPAŁOWICZ, *A. firmum* REICHENBACH subsp. *firmum* var. *firmum* et var. *portae-ferratae* STARMÜHLER & MITKA, subsp. *firmum* × subsp. *maninense*, subsp. *fissurae* NYÁRÁDY, subsp. *maninense* (SKALICKÝ) STARMÜHLER, subsp. *moravicum* SKALICKÝ, nsubsp. *paxii* STARMÜHLER (subsp. *maninense* × subsp. *moravicum*), nsubsp. *zapalowiczii* STARMÜHLER (subsp. *firmum* × nsubsp. *paxii*), *A.* ×*nanum* (BAUMGARTEN) SIMONKAI (*A. bucovinense* × *A. firmum*)

nsect. *Acopellus* MUCHER: *A.* ×*lengyelii* GÁYER nsubsp. *lengyelii* (*A. firmum* subsp. *firmum* × *A. variegatum* subsp. *variegatum*), *A.* ×*lengyelii* GÁYER nsubsp. *walasii* MITKA (*A. firmum* subsp. *moravicum* × *A. variegatum* subsp. *variegatum*)

***Aconitum* subgen. *Lycoctonum* (A.P.CANDOLLE) PETERMANN sect. *Lycoctonum* A.P.CANDOLLE ser. *Lycoctonia* TAMURA & LAUENER:**

A. lycoctonum LINNAEUS em. KOELLE subsp. *lycoctonum*, *A. moldavicum* HACQUET subsp. *moldavicum*, nsubsp. *porcii* STARMÜHLER (subsp. *moldavicum* × subsp. *simonkaianum*), subsp. *simonkaianum* (GÁYER) STARMÜHLER

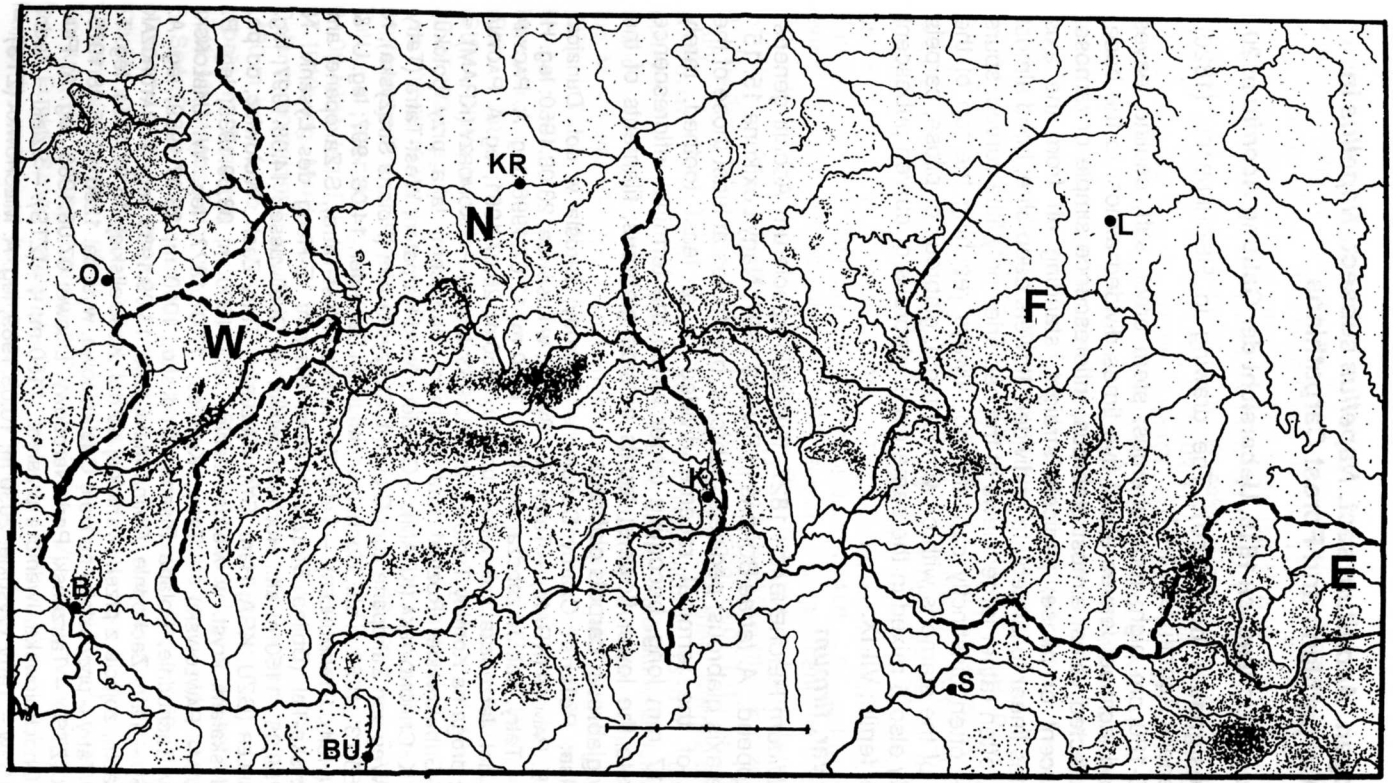

Fig. 1: The subdivisons of the Carpathians, as it are used in this paper: W = Western Carpathians; N = Northern Carpathians; F = Forest Carpathians; E = Eastern Carpathians; B = Bratislava; BU = Budapest; K = Košice; KR = Kraków; L = Ľvov; O = Olomouc; S = Satu-Mare; scale = 100 km

Aconitum subgen. *Aconitum* sect. *Napellus* subsect. *Napellus* in the Northern Carpathians and Forest Carpathians

Aconitum firmum REICHENBACH 1819, Uebersicht der Gattung *Aconitum*: 20

Lectotypus (designatus hoc loco): The drawing in REICHENBACH (1820), Monographia generis Aconiti: tab. 14/1.

Perennial; 20-180 cm high; root tuberous; stem erect, stiff; cauline leaves mostly with broad laciniae, leaves about five times divided almost to the base, mostly with connected veins, almost glabrous; inflorescence simple or ramose, glabrous, pubescent or pilose; pedicels straight, standing off from the axis upright; bracteoles linear to lanceolate or divided; flowers deep blue; hood almost as high as long, often rather large; claws of the nectaries only little curved, spurs of the nectaries often dinstinctly capitate, not always reaching the top of the hood; filaments of the stamens with or without teeth, glabrous or pilose; carpels (2-) 3 (-4), rarely also 5 mixed in the same plant, glabrous or curved pubescent on the backside, fertile; VII-IX.

subsp. *firmum* var. *firmum*

Syn.: *A. palmatifidum* REICHENBACH 1827, Illustratio specierum Aconiti generis: tab. 72, no 19 append., *A. tatrae* BORBÁS in PALLAS 1897, Nagy Lexikona 15: 15

Inflorescence axis glabrous; pedicels glabrous; bracteoles at least those of the lowest flowers of the terminal raceme divided or at least toothed, rarely undivided, 2.5-17 mm long, becoming larger within the terminal inflorescence from the upper to the lower flowers; tepals outside glabrous; filaments of the stamens mostly glabrous; carpels glabrous.

Specimina visa: Poland: Czarny Dunajec – Zagrody, zarośla w dol. Dunajca; 08.08.1955; leg. E. PANCER (KRAM). – Tatry, dol. Bystrej, w kosówce; 23.08.1960; leg. H. PIEKOŚ (KRAM). – Tatry, dol. Jarzębcza, źródlisko, 1550 m; 13.07.1996; leg. A. PACYNA (KRAM). – Tatry, dol. Jarzębcza, koło źródła potoku, 1550 m; 26.07.1961; leg. A. PACYNA (KRAM). – Tatry, droga na Kominy Tylkowe; 26.06.1953; leg. K. PODKOMORZY (KRAM). – Pogórze Spisko-Gubałowskie, Roztoki nad Czarnym Dunajcem, łąka przy potoku; 26.07.1960; leg. K. CHRONOWSKA (KRAM). – Galizien, Nord-Karpaten, West-Tatra (Tatry Zachodnie), am Weg von Zakopane zum Giewont, Strążyska-Alm (Polana Strążyska), N 49°15,76', E 19°55,73', 1050 m alt., Hochstaudenflur am Bachufer; 14.08.1997; leg. U. & W. STARMÜHLER (Herb. STARMÜHLER). – Tatry Zachodnie (West-Tatra), S Zakopane, am Weg vom Strążyska-Tal (Dolina Strążyska) zum Giewont, E-Hang des Łysanki, N 49°15,64', E 19°59,35', 1150 m alt.; Hochstaudenflur im Quellwasser; 14.08.1997; leg. U. & W. STARMÜHLER (GZU, KRA, Herb. STARMÜHLER). – Tatry Zach., Wołowiec, od pn. wsch. piarg pod skałami kryst. w wielkim żlebie, 1200-1300 m; 03.09.1935; leg. B. PAWŁOWSKI (KRAM- PAWŁOWSKI). – Tatry, Kuźnice; 17.07.18??; leg. W. JABŁOŃSKI (KRAM). – Tatry Zachodnie, Polana Pisana, Źrodlisko, 1010 m; 23.07.1989; leg. A. MIECHÓWKA (ZTS). – Tatry Zachodnie, Dolina Małej Łąki; 13.09.1985; leg. A. BATORCZAK (ZTS). – Tatry Zach., zejście z przeł. Iwanickiej do dol. Kościeliskiej; 15.07.1954; leg. T. TACIK (KRAM). – Tatry – przy szlaku na Hałę Gasienicową, wys. ca. 1290 m; 15.08.1975; leg. J. FLORCZYK (ZTS). – Tatrzański Park Narodowy, Liliowe; 07.08.1986; leg. A. FIUK (ZTS). – Dolina Chochołowska, Iwanicka przełęcz, 1150 m; -; - (ZTS). – Szlaki – Zadni Granat, Zmarzły Saw – Tatry Wysokie, 2030 m; 10.08.1989; leg. A. MIECHÓWKA (ZTS). –

Zakopane, Antałówka, ogród TSN XV-67; 17.07.1974; leg. J. FLORCZYK (ZTS). – Nord-Karpaten, Tatry Wysokie (Hohe Tatra), am Weg vom Morskie Oko (Großer Fischsee) zum Czarny Staw (Fischaug-See), N 49°11,72', E 20°04,84', 1400 m alt., Hochstaudenflur im Quellwasser; 13.08.1997; leg. U. & W. STARMÜHLER (CL, GJO, GZU, IBF, JACA, KL, LE, LG, LI, LJU, M, MEL, NY, OSC, PE, TBI, TK, TNS, W, WU, Z, Herb. STARMÜHLER). – Nord-Karpaten, Tatry Wysokie (Hohe Tatra), E-Ufer vom Morskie Oko (Großer Fischsee), N 49°11,90', E 20°04,41', 1390 m alt., Gebüschsaum am Seeufer; 13.08.1997; leg. U. & W. STARMÜHLER (CL, GJO, GZU, IBF, JACA, KL, KRA, LE, LG, LI, M, MEL, NY, OSC, PE, TBI, TK, TNS, W, WU, Z, Herb. STARMÜHLER). – Nord-Karpaten, Tatry Wysokie (Hohe Tatra), S-Ufer vom Morskie Oko (Großer Fischsee), N 49°11,64', E 20°04,12', 1395 m alt., Hochstaudenflur; 13.08.1997; leg. U. & W. STARMÜHLER (GZU, LE, LG, M, MEL, NY, PE, TBI, TNS, W, Z, Herb. STARMÜHLER). – Tatry, Liljowa, 1954 m, Tworzy małe skupienia w zagłębieniach terenu, na wapieniu, solo calcareo, aconiteta pava formans, Nr. 160110; 29.08.1929; leg. F. KRAWIEC & P. PAWŁOWSKI (CL). – Mt. Tatry, in saxosis graniticis ad lacum Morskie Oko; 23.07.1928; leg. R. SOÓ (CL). – Tatry, Dol. Kościeliska, żleb Babie Nogi, 1540 m, nad potokiem; 19.07.1961; leg. A. PACYNA (KRAM). – Babia Góra, zbocze Sokolicy, usypisko; 06.1964; leg. H. BŁASZCZYK (KRAM). – Babia Góra, Rybny Potok, 750 m; 20.08.1997; leg. B. RUSIN (KRA). – Babia Góra; 08.1876; leg. W. KULCZYŃSKI (KRAM). – Babia Góra, miejsce otwarte obok schroniska im. Zapałowicza; 17.07.1949; leg. K. KOSTRAKIEWICZ (KRAM). – Slovakia: Oberungarn, von einem Techniker mitgebracht; - ; - (WU-KERNER). – Carpat. cent., im Voelkergrund; 1847; leg. LANG (WU-KECK). – ...Trichtersee im Bez. Polane i. d. Carpath.; -; leg. LANG (WU-KECK). – Carpat., Feichtensee, M-0007110; - ; LÁNG (M). – In locis graminosis in subalp. m. Nagyrozsudec, com. Arva, c. 1400 m, Nr. 150658; 24.07.1913; leg. MARGITTAI (CL). – Tatry, Vysoké Tatry, N-Abhänge des Sattels zwischen Kežmarský štít u. Velká Svišťovka, 200 m W d. Steiges, steile Mylonitgeröllfluren, 1950 m; 10.09.1991; leg. M. MAGNES (GZU). – Tatry, Vysoké Tatry (Hohe Tatra), Malá Studená dolina von chata kpt. Nálepku zur Téryho chata, ca. 1950 m, Quellaustritte unter einer Felswand; 11.09.1991; leg. M. MAGNES (GZU). – Flora hungarica, ... in montibus ad Feketehegy, Nr. 233346; - ; - (BP). – Tatra, in valle Felkaertal, Poln. –Kamm, alt. 1900-2000 m; 16.08.1924; leg. NYÁRÁDY (SIB). – Folkaer Thal, Tatra; 03.08.1874; leg. JATIN (W). – Tatra, in valle Mengsdorf, circa lacum Popper See, alt. 1513 m, Granit; 28.07.1924; leg. E.I. NYÁRÁDY (SIB). – Tatra, circa lacum Popper Seen, alt. 1513 m, Granit; 28.07.1924; leg. NYÁRÁDY (SIB). – Tatra, in valle Mengsdorf supra lacum Frosch Seen, alt. 1900-2000 m, Granit; 29.07.1924; leg. NYÁRÁDY (SIB). – Tatra, in cacumine montis Greiner, alt. 1800-2148 m, calc.; 03.08.1924; leg. E.I. NYÁRÁDY (SIB). – Tatra Magna, in declivibus montis Durlsberg, supra lacos Weisse Seen, alt. cca. 1670 m, calc.; 03.08.1924; leg. E.I.NYÁRÁDY (SIB). – Tatra, in pascuis subalpinis „Weidau" sub monte Durlsberg, alt. cca. 1450 m; 04.08.1924; leg. E.I. NYÁRÁDY (SIB). – In subalp. m. Prassiva, com Liptó, Nr. 139745; 07.1912; leg. MARGITTAI (CL). – Liptoviae, Biela skala et Sivy vrch, alt. 1400-1800 m, Dolomit; 10.08.1924; leg. NYÁRÁDY (SIB). – Magas-Tatra, a Illinska völgy jobra, Muntegi 1400 m s.m., Liptó ..., Nr. 161998; 04.08.1916; leg. HULJÁK (CL). – In ... graminosis in subalp. m. Prassiva, com. Lipto, c. 1300 m; 07.1912; leg. A. MARGITTAI (SIB). – Com. Liptó, Mt. Magas Tátra, in dumetis ad lacum Csorbató et vallis Mlynica; 17.07.1928; leg. R. SOÓ (CL). – In locis lapidosis in alp. Prassivae, com Lipto, c. 1500 m; 07.1912; leg. A. MARGITTAI (SIB). – Hungaria, comitatus Liptó, Tatra magna, in valle Handeltal sub monte Kriváň, alt. cca. 1500 m, solo granitico; 20.08.1910; leg. E. NYÁRÁDY (SIB). – Tatra, Kriwan; 18.08.1859; - (WU). – Vysoke Tatry, Priehyba pod Kriváňom; 16.07.1968; leg. A. VOJTUŇ (KO). – Tatry, Lavínový Žľab; - ; - (KO). – Vys. Tatry, Velická dolina; 08.08.1962; leg. J. FUTÁK (SAV). – Belanské Tatry, Faixová; 22.08.1939; leg. K. PTAČOVSKÝ (SAV). – Hungaria, comitatus ad confines Liptó et Zólyom, Tatra Minor, in cacumine montis

Gyömbér (Djumbir), alt. cca. 1700 m, solo granitico; 03.08.1907; leg. E. NYÁRÁDY (SIB). – Ungarn, Liptau – Sohler Alpen, Voralpenbäche des Djumbir, Gneiss, 1600 m, M-0007109; 04.08.1870; leg. J. FREYN (M). – Magas-Tátra, a Popráditohoz vezetõ turista ut mentén a folyón át vezetõ hid körül, gránitsziklás televényes talajon, Nr. 161996; 31.08.1915; leg. HULJÁK (CL). – Ad lacum „Homulo" in valle Nagytarpatak, Magna Tátra, c. 1900 m, Nr 274834; 08.1922; leg. MARGITTAI (CL). – Hab in valle Nagytarpatak, Magna Tatra, c. 1600 m; 08.1922; leg. A. MARGITTAI (CL). – Flora Comit. Scepus, M. Tátra, ..., Nr. 13307; 16.07.1890; leg. A. RICHTER (CL). – Magas Tátra, ad „Vaskapu", Eisernes Tor, Nr. 13224; 14.08.1901; leg. A. RICHTER (CL). – detto Nr. 13225 (CL). – detto Nr. 21535 (CL). – detto Nr. 21542 (CL). – M. Tátra, Felkai völgy, „Ewige Regen", Nr. 161435; 18.08.1904; leg. GYÖRFFY (CL). – Tatra, in valle Furkota, at. 1500-1900 m, Granit; 23.08.1924; leg. E.I. NYÁRÁDY (SIB). – Hungaria comitatus Szepes, Tatra Magna, in valle Svišťovka dolina sub Lengyelnyereg, alt. cca. 1700 m, solo granito; 26.07.1908; leg. E. NYÁRÁDY (SIB). – Magas Tátra, Drechslerhäuschen, Nr. 161436; 12.08.1904; leg. GYÖRFFY (CL). – Hungaria, comitatus Szepes, montes Bélaenses, inter Faixblösse et Eisernes Tor sub monte Stirnberg, alt. cca. 1500 m; 21.07.1907; leg. E.G. NYÁRÁDY (SIB). – Hungaria, comitatus Szepes, Alpes Bélaenses, in declivibus montis Stirnberg prope „Vaskapu", alt. cca. 1600 m, solo calc.; 05.09.1911; leg. E.G. NYÁRÁDY (SIB). – Hungaria, comitatus Szepes, Alpes Bélaenses, in jugo montis Stirnberg apud portam ferream (Vaskapu) supra balneas Barlangliget, alt. cca. 1600 m, solo calcareo; 05.09.1911; leg. E.G. NYÁRÁDY (SIB). – Ungarn, Bélaer Kalkalpen, Stirnberg, Matten gegen den Gipfel, ca. 1750 m; 12.08.1909; leg. F. VIERHAPPER (WU). – Hungaria, comitatus Szepes, Tatra-Magna, in valle Nagytarpatakivölgy (Gr. Kohlbachtal) circa lacum Löffelkraut See, alt. cca. 1833 m, solo granitico; 05.08.1910; leg. E.I. NYÁRÁDY (SIB). – Großes Kohlbachtal in der Tatra, Ungarn; 07.1910; leg. J. NEVOLE (GZU). – Kohlbachtal auf der Südseite, Tatra, Ungarn; 07.1911; leg. J. NEVOLE (GZU). – Hungaria, comitatus Szepes, Tatra magna, in valle Nagytarpataki völgy, alt. cca. 1400 m, solo granitico; 16.08.1906; leg. E.G. NYÁRÁDY (SIB). – Slovakia septentrionalis, montes Tatry, distr. Poprad, vallis „Tristarská dolina", alt. 1300-1600 m s.m.; Nr. 128202; 20.08.1971; leg. M. VAŠÁK (LI). – Hungaria, comitatus Szepes, montes Bélaenses, in cacumine montis Bolandgerö = Törichter Seen supra Kopapass, alt. cca. 1900 m, solo calc.; 01.09.1907; leg. E.G. NYÁRÁDY (SIB). – 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 (SIB). – Hungaria, comitatus Szepes, montes Bélaenses, in valle Kämpental sub Breitesfeld, supra pagum Zdjar, alt. cca. 1300 m, solo calc.; 18.07.1908; leg. E.G. NYÁRADY (SIB). – Tatra, Bélaer Alpen, in cacumine montis Hintere Fleischbank, alt. 2020 m, calc.; 03.08.1924; leg. NYÁRÁDY (SIB). –Tatra Magna, sub Karfunkelthurm ad Kesm. Grüner See, alt. cca. 1600 m, Granit; 02.08.1924; leg. E.I. NYÁRÁDY (SIB). – M. Tátra, Vaskapu, Nr. 161496; 11.08.1904; leg. GYÖRFFY (CL). – Magas Tátra, Vorderes Kupferschächtenthal, Nr. 161443; 22.08.1904; leg. GYÖRFFY (CL). – Magas-Tátra, a Mengusfalvi völgyélen a. N. Hinekotö, 1965 m, Nr. 161999; 31.07.1915; leg. HULJÁK (CL). – „Királyhegy", Hnileczi, ..., Nr. 13309; 18.07.1890; leg. A. RICHTER (CL). – Hab. in valle „Kleinkohlbach", M. Tatra, c. 1700 m; 28.07.1930; leg. A. MARGITTAI (CL). – Im Kleinkohlbachtale, Hohe Tatra, M-0007111; 28.07.1930; leg. A. MARGITTAI (M). – Tatra, in valle Kl. Kohlbachtal, alt. 1300-1800 m, Granit; 13.08.1924; leg. E.I. NYÁRÁDY (SIB). – Hab. ad lacum Beikás, Magna-Tatra, c. 1800 m; 11.08.1928; leg. A. MARGITTAI (CL). – Ad Köpataki tó Tátrae; Nr. 21540; 19.08.1902; leg. BORBÁS (CL). – Vas kapu Tatra, Nr. 13300; 15.07.1884; leg. A. RICHTER (CL). – Cott. Szepes, Mt. Magas Tátra in graminosis loco Blumengarten vallis Felkai völgy, ad rivum vallis Tarpatak; 8. –9.07.1928; - (CL). – Tatra, in valle Felkaertal, Blumengarten, alt. cca. 1800-1900 m, Granit; 16.08.1924; leg. NYÁDRÁDY (SIB). – Flora der Hohen Tatra,

Blumengarten im Felker Tal, 1821 m, M-0007112; 23.07.1931; leg. O. & E. BEHR (M). – Hungaria, comitatus Szepes, Tatra-Magna, in declivibus graminosis et saxosis sub lacum Békástavak (Frosch Seen) in valle Menguszfalvivölgy, alt. cca. 1800 m, solo granitico; 18.09.1910; leg. E.G. NYÁRÁDY (SIB). – Hungaria, comitatus Szepes, montes Bélaenses, in declivibus meridionalibus montis Muran, supra pagum Javorina, alt. cca. 1500 m; 20.07.1910; leg. E.G. NYÁRÁDY (SIB). – Hungaria, comitatus Szepes, Tatra Magna, sub lacum Késmárki Zöldtó, praeter rivum Weisswasser, alt. cca. 1300 m; 26.07.1905; leg. E.G. NYÁRÁDY (SIB). – Hungaria, comitatus Szepes, Tatra Magna, in valle Menguszfalvi völgy inter lacus Poprádító et Hincóitó, alt. cca. 1600-1700 m, solo granit.; 27.08.1905; leg. E.G. NYÁRÁDY (SIB). – Hohe Tatra, Aufstieg von Štrbské Pleso nach Popradské Pleso zum Rysy bei 2000 m, zwischen Silikatblöcken, M-0006240; 16.08.1973; leg. E. ALBERTSHOFER (M). – Flora der Karpaten, Kl. Tatra, Bachufer im Demenovathale, Kalk, ca. 1000 m, Nr. 60834; 08.08.1899; leg. F. PAX (BP). – Flora Hungarica, Comit. Hont. Pukanec, Bakabánya, Brezno, Stroma; 08.1898; leg. KUPČOK (ZT). – Flora Zoliensis, Brezno, in fruticosis „Stráná"; 26.07.1898; leg. S. KUPČOK (LI). – Subalp. monti Babiagora, comit. Árva, locus fere classicus; 1883; leg. L. SIMONKAI (BP). – Comit. Árva, in pineti infra locus „Rohačsi savak" – alpinum liptoviensium, ca. 1500 m; 22.08.1911; leg. A. JAVORKA (BP). – In rupestribus „Magos Fatra" loco „Bartya"; 08.1904; leg. L. SIMONKAI (BP). – Tatra, ad lacum Buckholz, 1950 m; 04.08.1931; leg. G. LENGYEL (BP). – Comit. Liptó, Tatra Inf. in valle Lucsky ad Demenyfalven; 25.07.1928; leg. G. LENGYEL (BP).

subsp. *firmum* var. *portae-ferratae* STARMÜHLER & MITKA varietas nova

Holotypus: [Slovakia, Belianske Tatry], Magas-Tátra, ad „Vaskapu" /Eisernes Thor/[Skalné vráta], Nr. 13223; 14.08.1901; leg. A. RICHTER (CL).- **Isotypus**: detto, Nr. 21536 (CL).

Both specimens have been determined by GÁYER 11.1909 as *Aconitum firmum* REICHENBACH and have been revised by MUCHER 02.1992 as *Aconitum napellus* LINNAEUS subsp. *firmum* (REICHENBACH) GÁYER.

Diagnosis: Axis inflorescentiae glabra; pedunculi glabri; bracteolae linearis, 1-2 (-3) mm, glabrae; tepala glabra; filamenta glabra vel sparse pilosa; carpella glabra vel tergo sparse pubescentes.

Etymology: This subspecies of *Aconitum firmum* is named after its locus classicus Vaskapu/Eisernes Tor (= iron gate) in the Belianske Tatry Mountains. Today this toponym is called Skalné vráta (= rocky gate), not to confound with another locality originally called Železné vráta/Eisernes Thor (= iron gate) in the Vysoké Tatry Mountains.

Inflorescence axis sparsely glabrous; pedicels glabrous; bracteoles linear, 1-2 (-3) mm long, glabrous; tepals outside glabrous; filaments of the stamens glabrous or sparsely pilose; carpels glabrous or sparsely pubescent on the backside.

Distribution: This new variety grows mainly in a small area in the Slovakian part of the Tatry Mountains, in the Malá Fatra Mountains and in addition it was also found in the Babia Gora Mountains in Poland (MITKA & STARMÜHLER 2001), where it grows in mixed populations with var. *firmum*.

Adnotation: *Aconitum firmum* var. *portae-ferratae* has probably a parallel evolution as *A. napellus* subsp. *formosum* in the Eastern Alps. The alpidic taxon