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COMPLEX OBSERVATIONS ON THE *ALCHEMILLA GLABRA* SPECIES

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Abstract: The paper presents the characterization of the species *Alchemilla glabra* Neygenf. from the taxonomic, chorologic, ecologic, coenologic and even blastogenic point of view.

Introduction

The complex study of the *Alchemilla* species in the Meridional Carpathians, with special reference to the Parâng Mountain, is part of a larger paper which will be analyzed subsequently. First, we thoroughly analyzed the species of this genus in the Parâng Mountain, which are also present in other mountains within the Carpathians, one of those species being *Alchemilla glabra*, which is the topic of the present paper.

Material and method

The research was carried out both on the field and stationary, within the conditions given by the "Al. Buia" Botanical Garden in Craiova. We followed the identification of the *Alchemilla* species in Parâng Massif and then we performed complex stational, ecologic, coenologic and chorologic observations. For identification we used the modern specialty literature and the genuine material in collections for a comparison. The authors of the species are graphed according to present standards (Brummit & Powell 1992). The material was studied alive and was preserved by pressing it, being stored in the University of Craiova Herbarium (CRAI). For writing down the cohabitants, we needed the same habitats several times. The collection of the *A. glabra* species was made in different periods of time, but autumn was the most appropriate, when the plants have fruits.

Chorology was made on an Atlas Florae Europaeae type map, using UTM indexes (Lehrer & Lehrer 1990). The counties with the respective choronyms are alphabetically ordered. We have studied the main herbarium collections in the country and, if possible, we have revised them. For the studied herbariums, we used the acronyms according to Index herbariorum (P. K. Holmgren 1990).

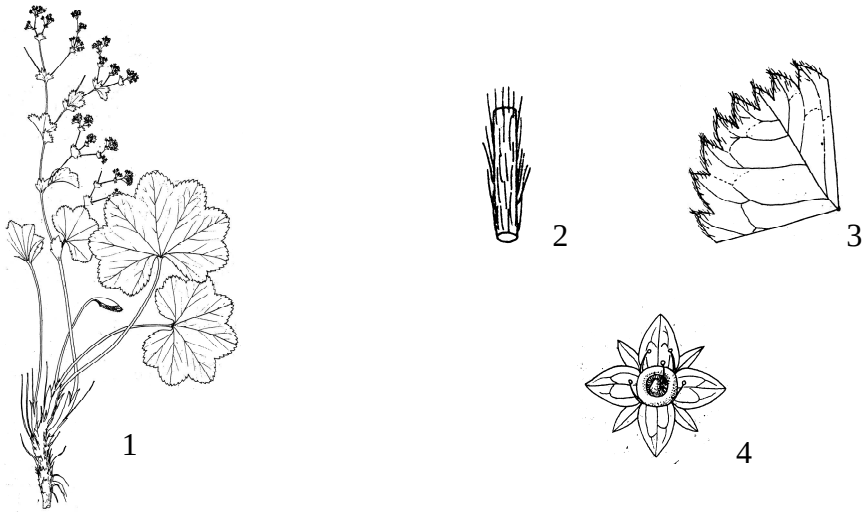
Results and discussions

Alchemilla glabra Neygenf. 1821, Enchir. Bot. Siles.: 67. Syn.: *A. vulgaris* L. var. *alpestris* F. W. Schmidt 1794, Fl. Boem. Inchoata **3**: 88; *A. truncata* Tausch ex Opiz 1838, in Opiz et Bercht., Oekon.-techn. Fl. Böhm. **2**, 1: 17; *A. alpestris* (F. W. Schmidt) Buser 1893, Scrin. Fl. Select. **12**: 15; *A. vulgaris* L. subsp. *alpestris* (F. W. Schmidt) Camus 1900, in Rouy et Camus, Fl. France **6**: 452; *A. vulgaris* L. var. *glabra* (Neygenf.) Mert. et Koch 1823,

Deutschl. Fl. **1**: 830; *A. suecica* Fröhner 1964, Bot. Not. **117**, 1: 49; *A. libericola* Fröhner 1965, Bot. Jahrb. Syst. **83**: 384 p. p.

Description: Medium to large size plant, robust, up to 60(-70) cm (fig. 1), with ascendant, erect stalks, hairy only on the lower 1-2(-3) internodes, with appressed hairs, like the petioles of the basal leaves (fig. 2) which are 1-2,5 mm thick. The petioles of the spring leaves are often glabrous. The lamina of the basal leaves is reniform to circular, at least to the insertion of the petiole, funnel-shaped; it is weak to strong and asymmetrically undulated, with an open basal sinus. Adaxially, the lamina is glabrous or with hairs only on the teeth, and abaxially on the distal half of the nervures. Lobed leaves at 1/5-1/4 (-2/5) in 7-9(-11) triangular-ovate lobes, with rounded or sharp tips, without incisions or with indistinct incisions between them. Broad teeth (fig. 3), obtuse or sharp, normally with unequal sides, with the external margin of an S shape. Glabrous inflorescence. Triangular to ovate sepals, usually their length bigger than their width (fig. 4); they are erect in postanthesis, smaller or equal in length to the hypanthium. The epi-sepals are usually narrower than the sepals, linear-lanceolate to ovate elongated, sharp, shorter or at most equal to the hypanthium and the sepals. The achene is shorter or equal to the hypanthium, sometimes disk exerted with 25-30% of its length, 1,5 times longer than wider.

The plantlet has opposed, glabrous, short petiolated cotyledons, with an elliptic lamina. The protophyle has a suborbicular-reniform lamina, with 5 lobes, being glabrous on lamina's both surfaces, excepting the teeth and the distal half of the nervures on the abaxial surface, which has some appressed hairs. Glabrous petiole. The plantlets were studied in July.



Figs. 1-4. *Alchemilla glabra*: 1- general view, 2-detail the petiole of the basal leaves, 3-detail the lobe leaves, 4- flower.

Taxonomy: *A. glabra* is a microspecies which separated from the aggregate species *A. vulgaris* L. In the Romanian specialty literature, it is mentioned either as *A. alpestris* Schmidt (D. Grecescu 1898, I. Prodan 1939), *A. vulgaris* L. subsp. *alpestris* (F. W. Schmidt) Camus (Buia 1956), or as *A. glabra* (Borza 1947, Beldie 1977, Ciocârlan 2000). Flora Europaea (Walters S. M. & Pawłowski B. 1968) mentions this species as "very variable, particularly in habit and leaf- shape, but a satisfactory taxonomic treatment is not yet possible".

According to Fröhner 1990 (in Hegi) "all the varieties known so far could have been recognized in culture as being mistaken with other species or as passing changes. The plants which grow on shadowed fields, with rivers or situated at northern latitudes are soft (flabby)

and often, of a green-yellowish colour (*A. suecica* Fröhner); the ones in the meadows are of a dark-green color and they have a solid consistency (*A. libericola* Fröhner). The strongly haired specimens were frequently determined as *A. obtusa* (even in Buser's original material), with narrow teeth (as *A. acutidens*); the narrow teeth appear when water is scarce; when sufficient water, the leaves are again normal. Hereditary, the narrow-tooth forms of the species are not known, glabrous as *A. straminea* or *A. coriacea*. Carpatica var. *pungentiflora* Plocek 1983, Folia Geobot. Phytotax. **18**: 419 is identical to *A. straminea* Buser, according to the description and illustration".

A. *glabra* can be mistaken with *A. straminea* Buser, which has glabrous petioles (few cases of the late summer leaf petioles with some appressed hairs), lobed leaves at least ¼ (-2/5), equal, sharp, narrow teeth.

Ecology: *A. glabra* is a sporadic to frequent species, in the beech forest subfloor to the alpine floor, in moist meadows, mires, weeded lands, junipers, near streams and rivulets. It vegetates on wet to moist-swampy soils, rich in limestone or bases, or without limestone and poorly acid, rich in nutritive substances. Sometimes, it also grows on moist detritus, especially at the foot of northern slopes. Mesotherm-microtherm. Oligotrophic-mesotrophic. Mesohygrophyte-hygrophyte.

Chorology: In Romania, the species is known in several locations (fig. 5):

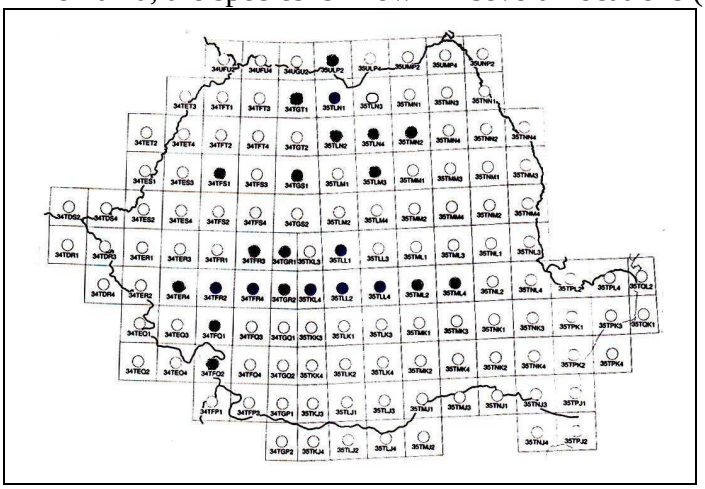


Fig. 5. Chorology of the species *A. glabra* in the Romanian Carpathians

AG: Făgăraş Mountains: Râiosu (Buia 1956) - LL22.

BH: Stâna de Vale (Buia 1956); Stâna de Vale, alt. 1,100 m, 10.VII.1970, O. Rațiu [BUCA 126089], [CL 660218], [IAGB 48578]-FS15; Distr. Bihor, in valle fluvii Sebişel supra lacum artificialem prope Poienița: in pratis mesophilis, 20.VII.1974, I. Gergely [CL 605277]; -FS16.

BN: Călimani Mountains, alt. 1,600 m, 4.VIII.1948, I. Csürös [BUCA 69526]-LN22/32/33; Rodnei Mountains on Nagy-Korongis Peak, above Rodna Baths, cca. 1,800-1,994 m, limestone soil, 9.VII.1918, E. I. Nyárádi under *A. vulgaris* L. subsp. *alpestris* (Schmidt), revised Violeta Boruz [SIB 147166]-LN35.

BV: Predeal (Grecescu 1898, Buia 1956), Mt. Postăvaru, Mt. Piatra Craiului (Buia 1956)-LL83/84; Poiana under Mt. Postăvar, in the meadows, 15.VI.1954, I. Morar under *A. glaberrima* Schm., revised M. Danciu [HUBV 001437]-LL94; Bucegi Mountains, in Mălăieşti Valley, alt. cca. 1,800 m, 10.VII.1980, D. Parascan et M. Danciu [HUBV 060994].

BZ: Mt. Siriu: Vâna Mare towards the Mălâiei sides, 13.VIII.1972, G. Dihoru [BUCA 147483], Mălâiei Side to the second sheepfold in Bocârnea, 20.VI.1957, G. Dihoru [BUCA 147632]-ML43; Penteleu Massif (Şerbănescu I. 1939)-ML53.

CJ: Feleac, in Morii Valley, near Cluj (Buia 1956)-GS07; Transylvania, Mtibus Vlădeasa, in pratis montanis vallis Zîrna, 6.VII.1968, I. Gergely under *A. vulgaris* L. subsp. *acutidens* (Buser) Gams, revised Plocek 1990 [CL 592793]-FS48; Transylvania, distr. Turda, supra pag. Segages, in sphagnetis subalpinis Muntele Mare, 29.VII.1948, alt. 1,800 m, E. Ghişa under *A. alpestris* Schm., revised A. Plocek 1990 [CL 589327]-GS15/16.

CS: Semenic Mountains (Buia 1956)- ER80/81; Ţarcu Mountains-FQ22, Godeanu and Cernei (Buia 1956, Boşcaiu 1971)-FQ19.

GJ: Craiova Region, Novaci District, between the Galben Stream and Muşătoiu, alt. 1,400 m, 10.VIII.1957, leg. A. Buia & M. Păun, det. G. Popescu [CRAI]; Groapa Dengherului, between two cliffs, near a spring, 5.VII.2004, Violeta Boruz [CRAI]-GR00/10; Mt. Dengherul, alt. 1,700 m, 8.VII.2004, Violeta Boruz [CRAI]; Păpuşa, Tidvele, Urdele (A. Buia, M. Păun, C. Maloş, M. Olaru 1963)-GR00/10.

HD: Retezat Mountains: Custura, Peleaga, Zlătuia, Zănoaga, Valereasca, V. Râul de Mori (Buia 1956: 691; E. I. Nyárádi 1958: 143); Zlătuia in piceet, Mormântul Fetei, Tău Peleaga, Peleaga Peak, Zănoguţa (E. I. Nyárádi 1958: 143)-FR34, FR61; Transilvania, in pratis subalpinis ad Piule adversus montis Retezat, 6.VIII.1949, Şt. Csürös under *A. vulgaris* L. ssp. *alpestris* (Schmidt) E. G. Camus [CL 562763]-FR43; on Mt. Oslea (Buia 1956)-FR61; Vâlcan Mountains: Straja (Buia 1956; Cristina Muică 1995)-FR72; Parâng Mountains: Jieţului Gorges, Groapa Seacă, Casa Slivei, Obârşia Jieţului, Ciobanul Sheepfold, Ciobanul, Căldarea Coasta lui Rus, Groapa Mândrei, Căldarea Roşiile (Pócs 1962)-FR83, Jieţului Gorges, alt. cca 1,000 m, 21.IX.2004, Violeta Boruz [CRAI]-FR83; Groapa Seacă, alt. 1,598 m, 21.IX.2004, Violeta Boruz [CRAI]; between Groapa Seacă Challet and Roşiile Lake, near the lake, in the junipers, alt. 1,900 m, 2.IX.2005, Violeta Boruz [CRAI]; Plaiul Caprei Sheepfold, alt. cca. 1,400 m, 29.VI.2006, Violeta Boruz [CRAI]; Zănoaga Coasta lui Rus, alt. cca. 1,900 m, 14.X.2006, Violeta Boruz [CRAI], Mt. Găuri, alt. cca. 1,800-2,000 m, 4.VIII.2006, Violeta Boruz [CRAI]; Mt. Badea, alt. cca. 1,800 m, 14.IX.2004, Violeta Boruz [CRAI]; Zănoaga Sliveiului, alt. cca 2,000 m, 8.X.2006, Violeta Boruz [CRAI]-FR83.

HR: Harghita Mountains on „Ördögtó" near Suseni (Buia 1956)-LM 86/96/97, on Mt. „Öcsém", Pâr. Ciceu (Buia 1956)-LM 86/96/97.

MH: Mehedinţi Mountains (Buia 1956)-FQ48.

MM: Rodnei Mountains (G. Coldea 1990) on Pietrosu Mare-LN 07/08, Inău-GT16, Repedea-LP00, Dragomireşti-KN98 (Buia 1956), Mt. Cearcănu (Resmeriţă I. 1985 under *A. vulgaris* subsp. *alpestris*)-LN 27/28/37, Mt. Toroioaga (Resmeriţă I. 1982)-LN 27/28/37.

NT: Mt. Ceahlău (Buia 1956)- MN 10/20/21; Neamţului Monastery (Grecescu 1898)-MN 42/52.

PH: Bucegi Mountains: V. Ialomiţei in Urşilor Gorges, Obârşia Peak, Doamnele, Omu Peak, V. Cerbului (Buia 1956: 691)-LL 82/83; Buşteni, at Urlătoarea (Grecescu 1898, Buia 1956), Azuga (Buia 1956); Mt. Ciucaş (Buia 1956), Ciucaş Mountains: Bratocea, Ciucaş Peak, Tigăile Mari, Chiruşca (Maria Ciucă 1984, Maria Ciucă, A. Beldie 1989)-ML13; Gârbova Massif (I. Todor, S. Culică 1967: 23)-LL83; Padina (Beldie 1967), Bucegi Mountains, Schill canton, 22.VII.1978, leg. A. Popescu, det. V. Sanda under *A. alpestris* Schmidt, revised Violeta Boruz [BUCA 450752]; Caraiman, VIII.1942, A. Beldie [BUCF 1680]; Bucegi, Obârşiei Waterfall, 22.VIII.1919, M. Naret [BUCF 1696]; Vf. cu Dor, VII.1927, P. Cretzoiu [BUAG 14568]-LL83/84; Bucegi, lower alpine subarea, skeletal peat soil, VII.1907, P. Enculescu under *A. vulgaris* L., revised Violeta Boruz [I 84557]-LL81/82.

SB: Bistra, Bâlea Lake, Podragu Lake, Oaşa, Oaşa Mare, Plaiu Ţării, Poiana Neamţului, Şaua Caprei, Tărtărău, V. Arpaşu Mare, V. Doamnei, Ciortea Peak (C. Drăgulescu 2003); Transilvania, Făgăraş Mountains, in Valea Doamnei, alt. cca. 1,700-2,000 m, skeletal

and limestone soil, 24.VIII.1939, E. I. Nyárádi under *A. alpestris* Schm., revised Violeta Boruz [SIB 147195]-LL16; Păltiniș, Canton Grădina, 28.VII.1967, Fr. Grundish under *A. vulgaris* L., revised Violeta Boruz [SIB 094900]-GR26.

SV: Vatra Dornei (Buia 1956)-LN 74.

VL: Valea Lotrului (Pócs 1962)-GR33, Căpățânii Mountains, Mt. Buila: Comarnici Sheepfold, Vânturarița Peak (Buia & Păun 1957); Mt. Buila, between Comarnici Sheepfold and Vânturarița Peak, alt. cca. 1,400-1,700 m, 11.VIII.1953, leg. A. Buia, M. Păun & M. Trică, det. G. Popescu [CRAI]-KL70; Mt. Văleanu, near a collected slope river, alt. cca 1,700 m, 26.VII.2005, Violeta Boruz [CRAI]-GR 30/KL 60; Obârșia Lotrului, swampy field, alt. cca. 1,300 m, 21.X.2004, Violeta Boruz [CRAI]; near Vidra Dam, alt. 1,280 m, 18.VII.2005, Violeta Boruz [CRAI].

Coenology: *A. glabra* was identified in several floristic associations and combinations: *Agrosti-Festucetum rubrae* Horv. (1951) 1952 (in the common spruce floor, Parâng Mountains: along the Gherești Valley, Mt. Plaiul Caprei and towards Zănoaga Slăveiului); *Alnetum incanae* (Brockman 1907) Aichinger et Siegrist 1930 (on Jiețului Gorges, at cca. 1,000 m alt.); *Glycerietum plicatae* (Kulczynschi 1928) Oberd. 1954 (on Mt. Badea, in Parângul Mic, at Petroșani Sports Centre, 1,760 m alt., along a slope river); *Scorzonero roseae – Festucetum nigricantis* (Puşcaru et al. 1956) Coldea 1978 (in the boreal and juniper floor in Vâlcan Mountains: Constantinescu Plateau, Mutu Peak; Parâng Mountains: Dâlbanul, Paltinul, Coasta Crucii, Cracul Sălișstenilor, Tidvele and Căpățânii Mountains: Văleanu Peak); *Carici leporinae - Deschampsietum cespitosae* (Borza 1934) Beldie 1967 (in Lotru Mountains, common spruce floor, on Lotrului Valley, towards Câlcescu Lake, Villa Complex in Vidra and in Parâng Mountains: Rânca, Paltinul, Șaua Caprei, Capra Peak, Roșiile Lake, Zănoaga Slăveiului, Coasta lui Rus); *Juncetum conglomerati Prodan* 1939 (at Obârșia Lotrului, in the common spruce forest skirt, *A. glabra* was identified together with other three species of *Alchemilla: A. connivens* Buser, *A. crinita* Buser and *A. xanthochlora* Rothm.); *Urtico dioicae-Rumicetum alpini* (Șerbănescu 1939, Todor et Culică 1967) corr. Oltean et Dihoru 1986 (along the juniper paths, near Câlcescu glacial circus, together with two species of *Alchemilla*: *A. connivens* Buser and *A. crinita* Buser and on Plaiul Caprei Mountain, in the common spruce floor); *Chrysosplenio-Cardaminetum* (Tx. 1937) Maas 1959 (in Parâng Mountains: on Mt. Dâlbanul, Dengherul, Paltinul, Gaura Tidvelor, and towards Slăveiu Peak, in the upper boreal floor, on the margin of a river in the spruce); *Trifolio repenti-Poetum annuae* Todor et Culică 1967 on Văleanu Peak, Curmătura Rodeanu (Căpățânii Mountains).

In the association *Carici echinatae-Sphagnetum* (Balázs 1942) Soó 1955 in a swamp near the Mija Lake, and on the Capra Mountain (1,600 m alt.) near a panta river, in the boreal floor, we registered it in the following floristic combination: *Carex echinata* 2-3, *Sphagnum spp.* 1-2, *Alchemilla connivens* 1-2, *A. glabra* 1, *Deschampsia cespitosa* +-1, *Carex curta* 1, *Luzula sylvatica* +, *Epilobium nutans* +.

Distribution: It is a European species (mountainous). Outside Europe, it is considered adventive in the north-eastern part of the North America.

Conclusions

The problem of the *Alchemilla* species in the Romanian Carpathians is far to be solved, not even according to mountain units, such as the Parâng Massif. The paper represents a step in clarifying this genus within the Romanian flora. We tried a multilateral characterization of the *A. glabra* microspecies; besides the taxonomy information, we also

presented the coeno-ecologic features of this taxon. In the studied phytocoenoses within the Parâng, Căpățânii and Vâlcan Mountains, we noticed that the species grows from 1,000 m to about 2,000 m, where it especially cohabitates with species from the beech subfloor, the boreal and the subalpine floors, and less from the alpine floor. It often grows together with other species of *Alchemilla;* on a surface of 1-3 m^2, one can find three or four species, which form a thick carpet. It was registered in 10 lawn and bush associations, starting from the boreal floor up to the lower alpine floor.

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