

TAXONOMIC, CHOROLOGIC AND COENO-ECOLOGIC FEATURES OF THE *ALCHEMILLA COLORATA* SPECIES

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ABSTRACT

Monographic research on the *Alchemilla* genus has been motivated by its complexity. *Alchemilla* species are mountainous, subalpine and alpine plants, perennial, small to medium. Their identification is usually difficult. The aim was to find new characters and criteria for the most precise delimitation of the different microspecies. Apart from the delimitation and description of species of this genus and in addition to morphological criteria, other criteria are required, such as ecology, chorology, phytogeography, karyology etc.

Alchemillacolorata, analyzed in this paper, is a microspecies that has separated itself from the aggregate species *Alchemillahybrida* (L.) Mill. In addition to taxonomy information, ceno-ecological characteristics and new data on the chorology of this taxon in the Romanian Carpathians are presented.

INTRODUCTION

Alchemilla species are mountainous, subalpine and alpine plants, perennial, small to medium. Their identification is usually difficult. In this sense, *Alchemillacolorata*, a microspecies that emerged from the aggregate species *A. hybrida* (L.) Mill., present in the Romanian Carpathians, is analyzed in detail.

A. colorata (R) is on the Red List of higher plants in Romania (Oltean M. & al. 1994).

MATERIAL AND METHOD

The researches on the species of the *Alchemilla* genus were carried out on the itinerary in the Romanian Carpathians. For identification of the *Alchemillacolorata* species we have used the specialty literature (Assenov 1973, Buia 1956, Ciocârlan 2009, Fröhner 1990, 1994, Walters & Pawłowski 1968). In the identified *Alchemilla* species, including *A. colorata*, complex ecological, phytocenological seasonal observations were made, but also on the plantlet. The ecology is presented either on the basis of speciality literature data but also on the personal observations over the itinerary research of the species. The chorology is accomplished on the map type Atlas Florae Europaeae, with tetrathes of 50 x 50 km, using the indexes U.T.M. (Universal Transverse Mercator) transformed (Lehrer & Lehrer 1990). After consulting the main Herbariums from the country (BUCA, BUAG, BUCF, CRAI, HBV, CL, I, IAGB, SIB) the herbarium materials have been verified and the possible errors of identification were corrected. For Herbariums were used the abbreviations according to Index herbariorum (P. K. Holmgren 1990). The authors of the species are written according to present standards (Brummit & Powell 1992).

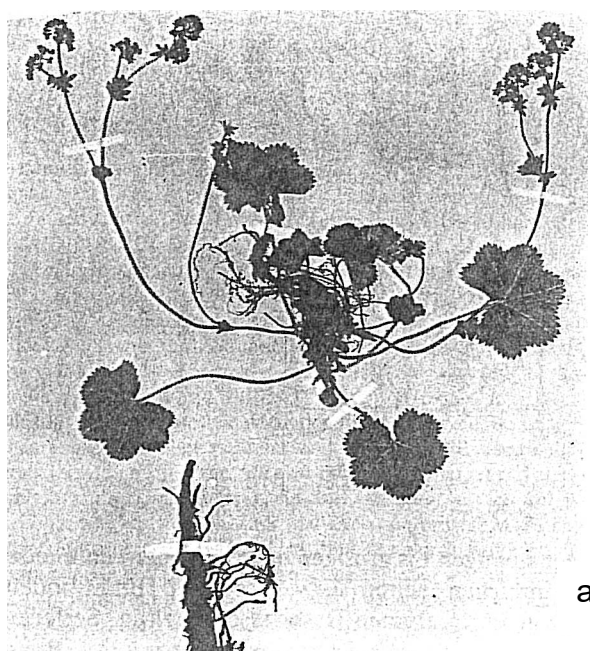
RESULTS AND DISCUSSIONS

Alchemilla colorata Buser 1891, Not. Alchim.: 10.

Syn.: - *A. pubescens* Lam. var. *colorata* (Buser) Briq. 1899 in Burnat, Fl. Alp. Marit. **3**: 139; - *A. pubescens* Wallr. subsp. *montana* (Willd.) Asch. et Graebn. var. *flabellata* (Buser) Asch. et Graebn. subvar. *colorata* (Buser) Asch. et Graebn. 1902, Syn. **6**: 403; - *A. hybrida* L. em. Mill. subsp. *colorata* (Buser) Gams 1927, in Hegi, Illustr. Fl. Mitteleur. **4**,2: 961; - *A. illyrica* Rothm., 1962, Feddes Repert. **66**,3: 227.

Description: Plant (fig. 1 a) small, rarely of medium size, with almost rigid hairs. Stems slender, ascending (rarely erect summer stems), 3-15 (27) cm high, 0.7-2 mm thick and up to three times longer than petioles of pink leaves, full length with patent hairs, erect-patents or twists (brushes on the lower internodes of the stem, at least partially twisted). Basal leaves with reniform to circular lamina (fig. 1 b), green-gray, 1.5-6 cm wide, wrinkled and wavy to the plane, with main and secondary ribs on the pronounced adaxial face deepened and on the abaxial face protruding strong in evidence. Loose hairy adaxial lamina, dense abaxial hairy bed, lobed up to about 1/4 (very rarely up to 1/2), with 7-9 lobes (fig. 1 c) rounded to cut, entire at the base (up to 3 mm), with 9-15 teeth, larger towards the top. Triangular-semi-ovate teeth, acute to obtuse, 0.8-3.5 mm long, 0.7-3 mm wide, up to 1.5 times longer than wide. Petiole 0.7-2 mm thick, densely hairy, with perpendicular-retracted hairs, adaxial flat to canaliculate, abaxial often reddish-brown. Stipules (fig. 1 d) 10-20 mm long, sometimes pink in base, with green tips, sharp to rounded, with 1-6 teeth. Stem leaves with a subcircular or nearly reniform lamina, with a wedge or truncate base, 7 (9) lobed, slightly hairy adaxial, dispersed or pronounced hairy abaxially; the lobes of the upper stem leaf (fig. 1 e) up to twice as long as wide, deeply toothed. Inflorescence 1-10 cm wide, with 20-200 flowers, partial inflorescences in the form of glomeruli. Flower pedicels 1-2.5 (3) mm long, glabrous, except those of lower flowers. Green flowers, inside most often quickly turn purple, 2-3 mm long, 2.5-4 mm wide, composed of four elements (fig. 1 f). Hypanthium (fig. 1 g) mature spherical to bell-shaped, at the top at most slightly narrowed, rounded to sharp at the base; hypanthia \pm densely hairy, rarely some glabrous hypanthia. Sepals semiovalate to ovate-triangular, as long as wide or slightly longer, obtuse to acute, smaller or equal to the hypanthium, on the outside densely hairy to poorly hairy, in postantesis erect to patent (fig. 1 g). Episepals elongate lanceolate to ovate, smaller than the hypanthium and smaller or rarely equal to the sepals, obviously narrower than these, abaxially with few hairs or only at the edge with hairs. The mature beaked achene, usually equal to the hypanthium, sometimes excretes up to 33% from the hypanthium. $2n =$ about 96; $-V - VIII$.

The plantlet has opposite cotyledons, petiolate, glabrous, with a circular-elliptical tongue. The protophyle has a lamina with three obvious ribs at the base.



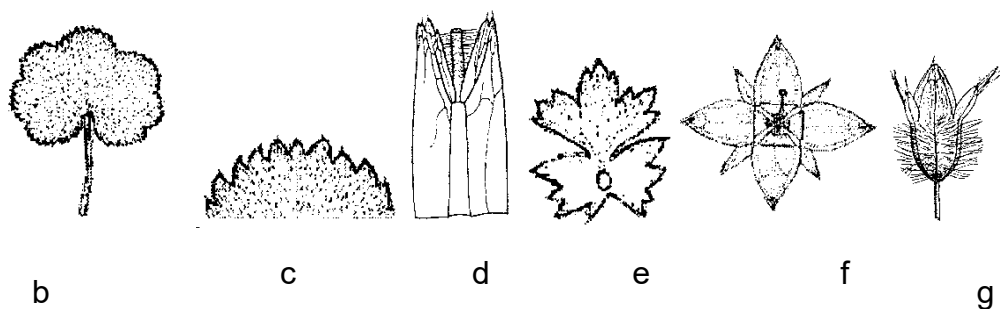


Fig. 1. *Alchemilla colorata*: a - general aspect; b –basal leaves; c - lobedetail (basal leaf); d –basal stipules; e –upper stem leaf, with stipules; f, g –flower details (a, d, g - după Fröhner 1990; b, c, e, f - după Fröhner 1998)

Taxonomic specifications: In the Romanian botanical literature, the species is mentioned either as *A. colorata* Buser (Borza 1947: 145, Beldie 1977: 263, Ciocârlan 2009: 324, Sârbu et al. 2013: 254), or under *A. hybrida* (L.) Mill. subsp. *colorata* (Buser) Gams (Buia 1956: 690). It can be confused with *A. erythropoda* Juz., which is distinguished by lobed leaves up to about 1/4, the pedicels of the flowers glabrous, except those of the lower flowers. It could also be confused with *A. exigua* Buser ex Paulin, which has glabrous or glabrescent hypanthia.

Ecology: It grows in meadows, junipers, on grassy rocks or on rubble, on skeletal soils, dry to the point of ripening, rich in limestone and / or bases, often weakly acid to acid (in subalpine), moderately rich in nutrients; mesothermophilic-microthermophilic; limestone; xerophilous - xeromesophilic; oligotrophic – eutrophic.

Chorology: Sporadic from boreal to alpine. In the Romanian Carpathians, the species *A. colorata* can be found in the following areas (fig. 2):

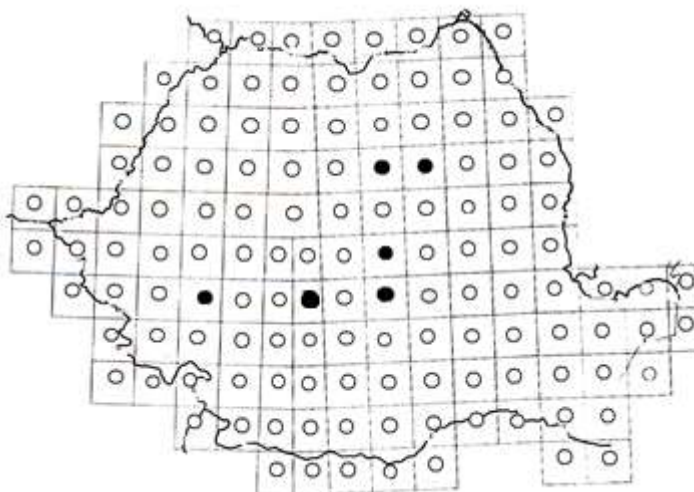


Fig. 2. The chorology of *A. colorata* species in Romania (orig.)

BV: Postăvaru Mountain, Piatra Mare Mountain (Buia 1956: 690 sub *A. hybrida* (L.) Mill. subsp. *colorata* (Buser) Gams) - LL 3.

CS: Țarcu-Godeanu Mountains: „Mt. Mic” (Buia 1956: 690) - FR 2.

HR: Giurgeului Mountains: “Hăghimașu Mare” - MM 1, “Öcsém” - LM 3, “Piatra Singuratică” (Buia 1956: 690) - LM 3.

PH: „Muntenia, distr. Prahova, Montibus Bucegi, in valle „Valea Cerbului”. Alt. 2500 - 1800 m, 9.VII.1931, E. I. Nyárády” under *A. silvestris* Schm., revised A. Plocek 1990 [CL 195.816]; „Muntenia, distr. Prahova, Montibus Bucegi, in herbidis subalpinis

Montis Jepii Mari supra pag. Sinaia, alt. cca. 1900 - 2000 m, 10.VIII.1929, E. I. Nyárády" under *A.silvestris* Schm. = *A. palmata* Gilib., revised A. Plocek 1990 [CL 195.816] - LL 4.

VL: Parâng Mountains: Iezerul Muntinului, alt. about 2,050 m 20.07.2017, Violeta Boruz [CRAI] – KL4.

Phytocoenology: In the literature it has been mentioned from the Romanian Carpathians in *Potentilloternatae-Nardion*, *Poionalpinae*, *Seslerionalbicantis*, on shallow, stony or rubble soils.

General distribution: S and E Carpathians. Alpine-Carpathian. Endemic to Europe.

CONCLUSIONS

Clarifications and completions were made regarding the chorology of the species *A. colorata* in the Romanian Carpathians. In many works about the flora and vegetation in Romania, given the difficulties of determination in the past, the botanists avoided specifying the microspecies, being satisfied with the aggregate species *Alchemilla hybrida* (L.) Mill., as it can be seen from the chorology data collected after consultation of herbs in the country.

Moreover, some taxonomic clarifications were made and cenological data were presented for the species *A. colorata* from the Romanian Carpathians.

REFERENCES

- Assenov I. 1973. *Alchemilla* L. – In: Jordanov D. (ed.), Fl. Reipubl. Popularis Bulgaricae 5: 274 - 329. In Aedibus Acad. Sci. Bulgaricae, Serdicae.
- Beldie A. 1967. *Flora și vegetația Munților Bucegi*. 578 pag. Edit. Acad. R.S. România. București.
- Beldie A. & Dihoru G. 1967. Asociațiile vegetale din Carpații României. Societatea de Științe Biologice. *Comunicări de botanică* 6: 133 - 238.
- Brummitt R. K. & Powell C. E. 1992. *Authors of Plant Names*. Kew: Royal Botanic Gardens, 732 pp.
- Buia A. 1956. *Alchemilla* L. – In: Săvulescu T. (ed.), Fl. Republ. Populare Române 4: 680 - 697. București: Edit. Acad. R. P. România.
- Chifu T. (editor), Irimia Irina, Zamfirescu Oana 2014. *Diversitatea fitosociologică a vegetației României. I. Vegetația erbacee naturală*. Iași: Institutul European.
- Chifu T. (editor), Irimia Irina, Zamfirescu Oana 2014. *Diversitatea fitosociologică a vegetației României. II. Vegetația erbacee antropizată. Tom. I Vegetația pajiștilor*. Iași: Institutul European.
- Ciocârlan V. 2009. *Flora ilustrată a României. Pteridophyta et Spermatophyta*. București: Edit. Ceres, 1141 pp.
- Coldea G. 2012. *Les associations végétales de Roumanie. Tome 2. Les associations anthropogènes*. Presa Universitară Clujeană, 482 pp.
- Coldea G. 2017. *Les associations végétales de Roumanie. Tome 1. Les associations herbacées naturelles*. Presa Universitară Clujeană & Accent, 270 pp.
- Fröhner S. 1990. *Alchemilla* L. – In: Hegi G. (ed.), Ill. Fl. Mitteleur. Vol. 4 (Part 2B): 13 - 242. Berlin und Hamburg: Verlag Paul Parey.
- Fröhner S. 1994. *Alchemilla* L. – In: Rothmaler W. (ed.), Exkursionsflora von Deutschland. Vol. 4: 282 - 295. Stuttgart: Gustav Fischer Verlag Jena.
- Holmgren Patricia K., Holmgren N. H. & Barnett L. C. 1990. *Index Herbariorum. Part I: The Herbaria of the World*. 8th Ed. Bronx: New York Botanical Garden.
- Kurtto A., Fröhner S. & Lampinen R. (eds.) 2007. *Atlas Florae Europaeae. Distribution of Vascular Plants in Europe. 14. Rosaceae (Alchemilla and*

- Aphanes*). 200 pag. The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo. Helsinki.
- Lehrer A. Z. & Lehrer Maria 1990. *Cartografierea faunei și florei României (coordonate arealografice)*. București: Edit. Ceres, 290 pp.
- Oltean M., Negrean G., Popescu A., Roman N., Dihoru G., Sanda V. & Mihăilescu Simona 1994. Lista Roșie a plantelor superioare din România. *Studii, Sinteze, Documentații de ecologie*. 52 pag. Acad. Rom. Institutul de Biologie.
- Pawłowski B. & Walters S. M. 1972. *Alchemilla* L. - In: Davis P. H. (ed.), *Flora of Turkey* 4: 80 - 105. Edinburgh.
- Sârbu I., Ștefan N., Oprea A. 2013. *Plante vasculare din România. Determinator ilustrat de teren*. 1320 pag. Edit. Victor B Victor, București.
- Walters S. M. & Pawłowski B. 1968. *Alchemilla* L. – In: Tutin T.G. & al. (eds.), *Flora Europaea* 2: 48 - 64. Cambridge: Cambridge Univ. Press.