New varieties of Alchemilla monticola (Rosaceae), and the taxonomic issue involved

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Résumé

Plocek, A. (1976). Nouvelles variétés d'Alchemilla monticola (Rosacées), et les conclusions taxonomiques qui en découlent. *Candollea* 31: 95-105. En anglais.

Après culture dans des conditions uniformes, il est apparu que des matériaux d'*Alchemilla monticola* d'une même provenance – les prairies subalpines d'une montagne des Carpathes occidentales – pouvaient être référés à trois variantes génétiquement fixées: la variété type, largement répandue, ainsi que deux variétés locales décrites ici comme nouvelles. Une troisième variété locale, croissant dans les monts Tatra, qui avait été décrite par Pawłowski sous *A. pastoralis,* est recombinée sous *A. monticola.* L'auteur rejette la possibilité d'une différenciation par autoségrégation dans le complexe de l'*A. vulgaris.* Il souligne la nécessité qu'il y a de distinguer des catégories infraspécifiques dans ce groupe, et discute longuement les usages et abus qu'en ont fait les auteurs précédents.

Abstract

Plocek, A. (1976). New varieties of Alchemilla monticola (Rosaceae), and the taxonomic issue involved. *Candollea* 31: 95-105. French abstract.

Material of *Alchemilla monticola* from the subalpine meadows of a single mountain of the Western Carpathians, having been cultivated under uniform conditions, proved to be referable to three hereditarily fixed variants: the widespread typical variety and two local varieties described as new. A third local variety, from the Tatra Mountains, originally described by Pawłowski under *A. pastoralis,* is here recombined under *A. monticola.* The author rejects the possibility of differentiation by autosegregation within the *A. vulgaris* complex. He stresses the need for recognizing infraspecific categories in this group, the use and misuse of which, by former authors, are discussed at length.

In the course of a study of infraspecific variation of *Alchemilla monticola* Opiz in Czechoslovakia, I made a mass gathering of this species from the subalpine situation in the Velká Fatra Mountains (W. Carpathians). Because of the suspicious polymorphy already observed in the field, the collection was not dried but grown in the garden, with other transplant populations of the same species. Three years later, it has become clear that the gathering splits into three distinct variants. One of these refers to normal *A. monticola,* the other two are hereunder described as new varieties.

Alchemilla monticola Opiz var. **contractilis** Plocek, **var. nova**

Typus: Slovakia, Carpathi occidentales, montes Velká Fatra, in monte Krížna, 1450-1550 m, 15.7.1972, *Plocek;* die 15.6.1975 specimen typicum ex plantis originalibus in horto auctoris praeservatis collectum (holotypus, PR).

A varietate typicâ notis sequentibus differt: antheseos tempore posteriore; alio foliorum colore; loborum dentibus grossioribus; lobis basalibus brevioribus; laminâ undulatâ; caule elongato; floribus breviter pedicellatis, in glomerulos compactos contractis; sepalis subtriangulari-ovatis, subacutis; indumento in sepalorum parte dorsali parciore; stylo pro ratâ brevi (fig. 1, 4).

Habitat in pratis subalpinis (olim in parte pascuis) et iuxta itinera pedestria in eis, in regione supra indicatâ ubi substrata calcarea occurrunt.

Alchemilla monticola Opiz var. **crassa** Plocek, **var. nova**

Typus: ex montibus Velká Fatra, in monte Krížna, 1450-1550 m, 15.7.1972, *Plocek;* die 15.6.1975 specimen typicum ex plantis originalibus in horto auctoris in cultura praeservatis collectum (holotypus, PR).

A varietate typicâ notis sequentibus differt: foliis caulibusque crassis; hypanthio subcampanulato, crasso, pilis plerumque nullis; episepalis sepalis non multo brevioribus (fig. 2, 5).

Habitat cum praecedenti.

Distinctive features of the new taxa

The close relationship of both new varieties to *A. monticola* cannot be doubted, despite many differences; hence a subordinated treatment seems to be appropriate. This is also supported by the very small area of both deviates, so far as is known, and by their obscure adaptive significance. There is nothing to contradict my belief that both originated in the Velká Fatra Mts. from normal *A. monticola* by mutation. Reexamination of the original locality will show if other deviates from *A. monticola* occur there. Calcareous substrates, grazing in earlier periods and subalpine altitudes are commonly recognized as factors which could promote the local differentiation of alchemillas (cf. Walters 1970).

Annotations on the main distinctive features of both new varieties follow. Comparison to var. *monticola* of the same provenance is usually implied.

Habit, coloration, consistency

A. monticola var. *contractilis:* different shade of green (purer, includes a smaller amount of dirty tint); leaf rosettes seem to be slightly lower and petioles shorter, stems, on the contrary, elongated, ascending or prostrate; mature leaves are plicate. *A. monticola* var. *crassa:* all parts thickish, otherwise normal.

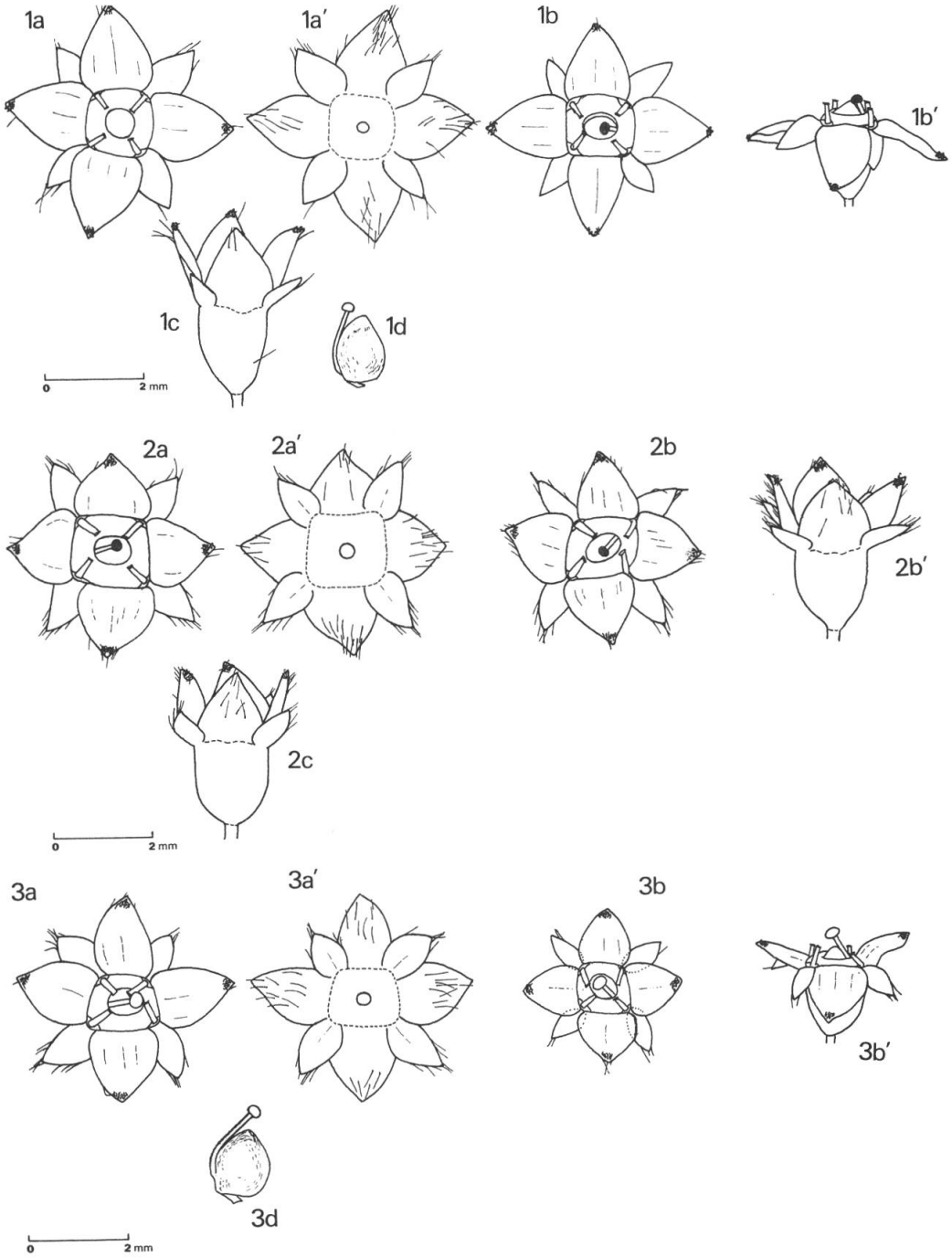

Fig. 1-3. – *Alchemilla* flowers and fruits, drawn by the author from photographs of living cultivated material (Praha, 3.6.1975). – 1, *A. monticola* var. *contractilis,* originating from the locus classicus; 2, *A. monticola* var. *crassa,* same origin; 3, *A. monticola* var. *monticola,* originating from the Bílé Karpaty Mts., Brumov, 550 m. – **a-c,** mature flowers (hence anthers missing) from above **(a, b),** from below **(a')** and in profile **(b', c); d,** almost ripe fruits. – The flowers of each figure were taken from the same stem; the couples **a-a'** and **b-b',** respectively, represent the same flower.

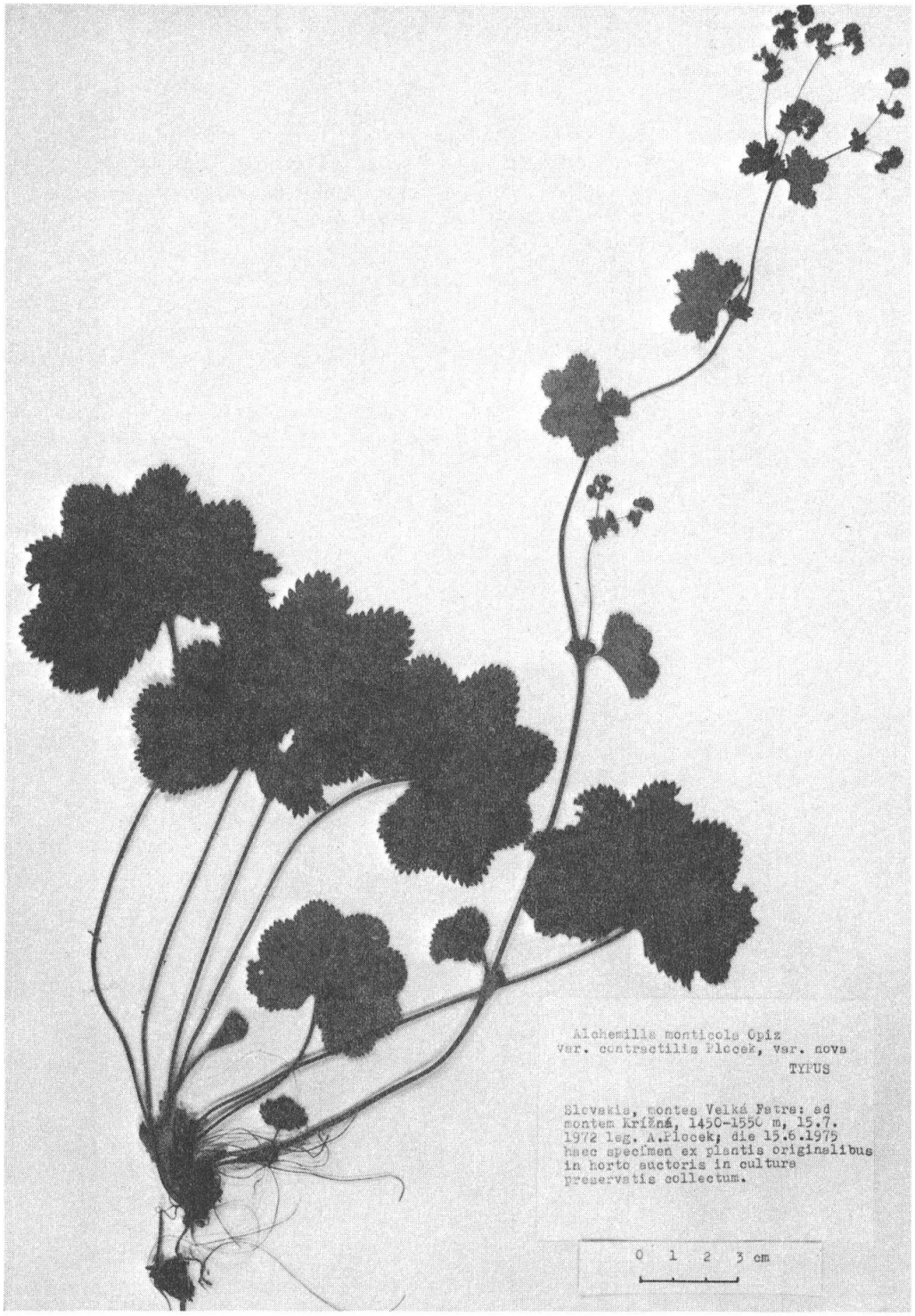

Fig. 4. – *Alchemilla monticola* Opiz var. *contractilis* Plocek, holotype.

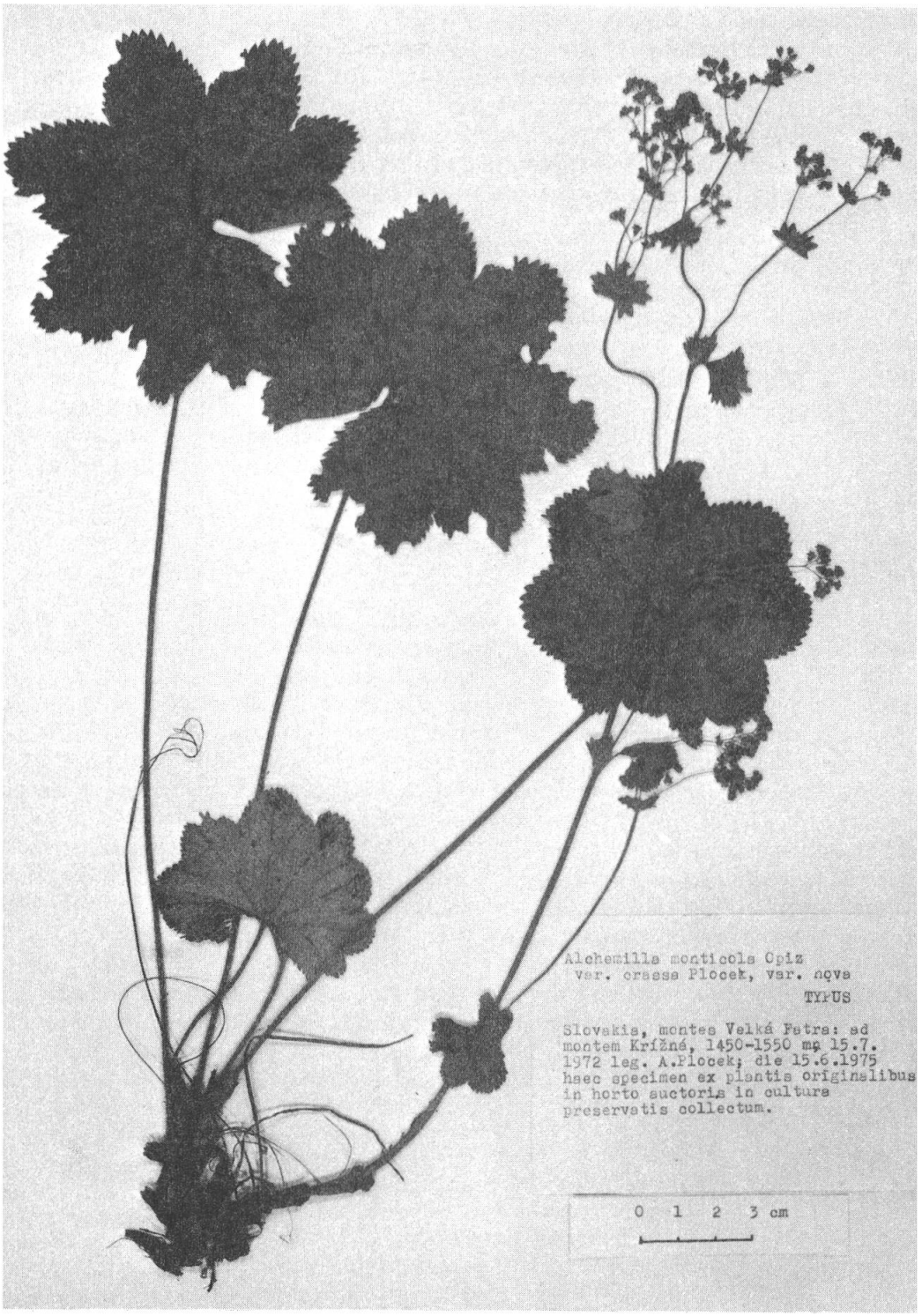

Fig. 5. – *Alchemilla monticola* Opiz var. *crassa* Plocek, holotype.

Both varieties lack red coloration at the base of the basal stipules, thus resembling the type. This character is generally very important in *Alchemilla* taxonomy. Bradshaw (1963) found a tendency to inverse correlation between the amount of light affecting the basal parts of the leaf rosettes, and the phenotypic manifestation of this red coloration, if inherited. However, development of the reddish tint on leaves and stem is likely to be correlated positively with the light conditions. Observation of the latter is difficult in culture in Prague, because of the smoky atmosphere which filters the rays responsible for the coloration.

Leaf shape

A. monticola var. *contractilis:* several leaf characters evidently simulate those of f. (status) *truncata,* notably lower, ± truncate basal lobes, more profound toothing, a slightly smaller number of lobes (in average), fewer teeth associated with the increase in their size (difference recognized only statistically), basal sinus more apparent. *A. monticola* var. *crassa:* leaf of normal shape, but sinus narrower and leaf blade more roundish. Incisions between lobes are inconspicuous in both varieties.

Indumentum

A. monticola var. *contractilis:* on an average, fewer hairs on the outer side of the sepals and on the margin of the episepals; contrary to this, the leaves and petioles are more hairy than in the type, distinctly penicillate teeth are especially obvious; hairs on the leaf veins are slightly more erect. *A. monticola* var. *crassa:* glabrous hypanthia, otherwise normal indumentum.

A. monticola typically has at least a few hairs on the hypanthia, but the occasional deviation of exclusively glabrous hypanthia was reported in this species by Juzepczuk (1954: 140), then by Pawłowski in var. *subpastoralis;* now it is found in var. *crassa.* I would expect it to appear elsewhere within the range of the species. Subtle character deviations like this are certainly polytopic in origin, but they are possibly associated with other subtle changes which makes the overall phenotypic combination unique from place to place. This may also be true of *"adpressepilosa"* variants, if these exist.

Since *A. monticola* var. *crassa,* var. *contractilis* and var. *subpastoralis* are so far known from subalpine to alpine habitats only, it can be speculated that hereditary, less hairy variants (in a single indumental trait at least) of normally more hairy alchemillas increase their frequency with altitude. Such an idea was already included in the viewpoint of Buser (1894).

Flowers

A. monticola var. *contractilis:* anthesis begins c. 1-2 weeks later than in var. *monticola* (tested in culture, type variety represented by several populations lowland to alpine provenience), similarly later than in var. *crassa;* flowers with short pedicels, arranged in contracted glomerules (hence the epithet); subtriangular episepals and sepals (fig. 1), not so round-sided as in the type (fig. 3); hypanthium slender, style often short; in one individual, c. 15% of 2-styled flowers were observed.

A. monticola var. *crassa:* thickish subcampanulate hypanthia; episepals not much shorter than sepals (cf. fig. 2).

Characters of flower proportion (quantitatively expressed from the dimensions of sepal, episepal and hypanthium) have been submitted to a comparative study (in prep.), embracing the Czechoslovakian range of *A. monticola* populations. This reveals so far that the proportion in var. *contractilis* is normally encountered within the range of var. *monticola,* while that of var. *crassa* is less often found within this range.

Discussion

Reproductive isolation

Gustafsson (1947: 197) supposed, when speaking of the cultivation results obtained by Turesson, that at least part of the differentiation found within *Alchemilla* apomicts could be attributable to autosegregation. He went on: "This ought to depend on restitution nuclei, pseudohomeotypic divisions, or quite simply on slight deviations in chromosome numbers." Autosegregation as conceived by the same author (l.c.: 187-188) was exclusively related to the development via suppressed meiosis from the EMC. Hjelmquist (1956) pointed out, however, that in the plants of *Alchemilla vulgaris* hitherto examined the EMC did not persist beyond the stage of prophase, while the embryo sac developed from the normal nucellar cell by pure mitosis. The above suggestion by Gustafsson, I think, was extrapolated to *Alchemilla* from other genera, such as *Hieracium* or *Taraxacum.* With no real arguments for any other alternative, therefore, the source of recent hereditary variations within *Alchemilla vulgaris* can always be labelled as "mutation", whatever may be the complexities of the mechanisms. It has been unfortunate that the above speculative view by Gustafsson has received nearly factual treatment in subsequent literature (e.g. Turesson 1956: 404, 1957: 421, Davis & Heywood 1963: 384).

Infraspecific rank

Infraspecific rank has been rarely utilized in the modern accounts of alchemillas. Bradshaw (1963) advocated the subspecific treatment for *A. filicaulis* Bus. var. *vestita* Bus. Walters (1970) studied the dwarf variant of *A. faeroënsis* (Lange) Bus., which was given the rank of variety, and reviewed the pertinent problems. Lindberg (1909) and Zamelis & Kvite (1929) also focussed their attention on the putative one-character mutant which they recognized under the name *A. acutangula* Bus. f. *adpressepilosa* H. Lindb. (hairs appressed instead of patent). Later, an alleged deviation of this kind was recorded by other authors, in other species. The evidence is not sufficient, however, to decide whether plants of Lindberg and Zamelis always referred to *A. acutiloba* Opiz (= *A. acutangula* Bus.), or whether it was sometimes a modification. Since confusion is at times possible, the subject needs revision in transplants. Regrettably I have been unable to find so far any true *"adpressepilosa"* variant, whether in nature or in herbaria.

Some other authors, who otherwise adhered to the modern taxonomic concept of the group, described new forms and varieties that are at the best but of dubious

value. Notably Snarskis (1939) coined many such names, though invalidly (under Art. 36 of the 'Code').

Nevertheless, it is of great interest that he also attempted to recognize taxonomically parallel seasonal variations (f. *autumnalis,* f. *aestivalis*), while no other *Alchemilla* student did. Snarskis (1971) retained his earlier concept and supplied diagnoses in Latin, although he still did not manage to validate his infraspecific names (at least those concerning *A. monticola*) under Art. 37 of the 'Code'.

Pawłowski, like Snarskis, as well as Juzepczuk, Rothmaler and Buser, sometimes recognized parallel *Alchemilla* forms, e.g. from density of indument (f. *hirsutior,* f. *glabrior*), or from the height of the plant (f. *vegeta,* f. *aprica*). Although these names have little taxonomic value, they may cover a considerable number of hereditary variations.

Pawłowski published only one new *Alchemilla* variety, namely, *A. pastoralis* Bus. var. *subpastoralis* Pawł. This latter was unreasonably equated by Fröhner (1964: 684) with *A. acutiloba* Opiz f. *intonsa* Fröhner (type: HAL, n.v.), recognized by single hairs on the hypanthium. Since *A. acutiloba* f. *intonsa* (excl. syn.) cannot be distinguished with certainty from the variation range of *A. acutiloba,* it is in fact its synonym. On the other hand, *A. pastoralis* var. *subpastoralis* really belongs to *A. monticola (= A. pastoralis),* representing (in respect to the type) its poorly recognized but probably distinct local alpine variant, from Czerwone Wierchy (Tatra). I gathered *A. monticola* there in 1974 and found among the specimens plants with glabrous hypanthia and possibly other correlated distinctions, clearly referable to the above variety. Hence the taxonomic value is evident, and the necessary combination, **Alchemilla monticola** Opiz var. **subpastoralis** (Pawł.) Plocek, **comb. nova** is herewith made (≡ *A. pastoralis* Bus. var. *subpastoralis* Pawłowski 1956: 490; holotype: KRA!, isotypes: hb. Pawł.! in KRAM.

Juzepczuk described c. 200 *Alchemilla* species as new, in a series of papers between 1922 and 1957. He probably never used any subordinate rank in this group apart from the valueless forma. He thus applied a fortunate concept of classification, since Walters & Pawłowski (1968), at least, fully appreciated this approach. On the other hand, Juzepczuk at times suggested some difficulties in the specific delimitation of *Alchemilla* apomicts, notably when he admitted situations such as two geographically remote variants, extraordinarily similar yet still being two species; or two geographically remote variants, still distinct but already being a single species (Juzepczuk 1954: 137). Surely another worker would not at once reject the option of a subordinate treatment. Sympatric *Alchemilla* variants may be similarly difficult, as far as my experience goes.

It is also remarkable that Juzepczuk (l.c.: 141) did not deny that a mutation in an apomictic *Alchemilla* is a possible mode of origin of a new species, at least in rare cases. Walters (1966) could not evidently discard such a possibility. Fröhner (1975), however, believes only in minute changes by such an agency, taxonomically unrecognizable in most cases.

Buser's concept of the infraspecific ranks in *Alchemilla* species was most refined, gradually developing as the amount of information about the respective taxa increased. It consisted basically, of two intentional elements.

Firstly, a recognition of paralell forms (f. *truncata,* f. *aprica,* f. *vegeta,* f. *umbrosa,* etc.), also adopted by the authors mentioned above. Preferably, we might speak of f. (status) *truncata,* f. (status) *aprica,* etc., having in mind the incongruence of the modern use of the term forma (*e.g.,* Davis & Heywodd 1963).

The rank of "lusus, status, comme on voudra" was originally proposed by Buser (1894: 40) for the epithet *truncata,* although not applied thereafter. The characterization of f. (status) *truncata* has been generally thought of as one of Buser's masterpieces (cf. Diels 1906: 37-40). The term qualifies a neotenous modification. Buser (1898: 211-212) says: "Es sind diese 'f. *truncatae*' keine eigentlichen Varietäten, sondern an ungünstigsten, äusserst mageren Stellen gewachsene Individuen mit geringer differencirten, den Jugendzuständen normaler Pflanzen ähnlichen Blattformen. Sie können bei jeder [*Alchemilla*-]Art vorkommen". 'Helikomorphie' was used by Fröhner (1975) in a similar sense, that is, in a much narrower sense than it was intended by Diels (1906: 22). So far as f. (status) *truncata* of an *Alchemilla* species is concerned, the term 'Helikomorphie' is both confusing and superfluous, and may be abandoned. The known point is, that certain species of *Alchemilla* ser. *Vulgares* (mostly those of altitudinally or environmentally extreme habitats) display, amongst other characters, some which to a greater or lesser extent resemble those of a neotenous modification, for example, more profound toothing, fewer teeth and lobes, truncate basal leaf lobes. But these characters are apparently hereditarily fixed. The evolutionary implication of this was first considered by Buser (1894), and in the works of Diels (1906), Schroeter (1924), Walters (1970 and elsewhere) and Fröhner (1975), some controversial interpretations were reached. At the moment, I suggest that one of the new varieties *(A. monticola* var. *contractilis)* also displays several characters of a f. (status) *truncata.*

The second element of Buser's infraspecific concept was evidently based on the notion of local or regional differentiation. Its weighted taxonomic recognition (operating with a rank from forma to subspecies, and sometimes even species) permeated Buser's taxonomic approach, probably more strongly in his latest works, such as that of 1906. The following quotations illustrate this topic, the original orthography of names being retained. *Alchimilla pallens* Bus. subsp. *longinodis* Bus.: "Zierliche kleine Lokalart des Typus *A. pallens* und neben diesem vorkommend" (Buser 1906a: 207). – *Alchimilla coruscans* Bus. var. *subpectinata* Bus.: "... Es halten diese Unterschiede aber nicht Stand und finden sich alle Übergänge zum Typus... Erscheint so als eine extreme Lokalform der *A. coruscans"* (Buser 1906a: 206). – *Alchimilla splendens* Christ: "... 2 races régionales, celle du Bas-Valais, f. *infravallesiaca,* et celle des Alpes Bernoises, f. *bernensis"* (Buser 1895: 113). – *Alchimilla splendens* Christ var. *bernensis* Bus. f. *aprica* Bus.: *"A. splendens* zeichnet sich durch die Bildung kleiner Lokalarten aus" (Buser 1906a: 209). – *Alchimilla splendens* Christ subsp. *paicheana* Bus.: *"A. Paicheana* steht schon halbwegs zu *A. faeroënsis,* die selbst auch eine Unterart des *splendens*-Typus darstellt" (Buser 1906a: 209). – *Alchimilla connivens* Bus. *β wichurae: "A. wichurae,* peut être considéré comme la race parallèle boréale-arctique du *connivens* alpin" (Buser 1894: 111). – *Alchimilla montana* F. W. Schmidt (Syn. *A. connivens* Bus.) subsp. *Wichurae* Bus.: "Im Norden Europas ist der Typus *montana* durch die Parallelform *A. wichurae* vertreten" (Buser 1906b: 139).

It appears that not only the bare fact of the separation, but also its overall magnitude was intentionally considered by Buser, unlike many other students of apomicts. This was of course a reasonable basis for a weighted taxonomic treatment using infraspecific ranks. Walters (1966) argued the justification of the latter in apomictic groups such as *Alchemilla,* while Fröhner (1975) did not tackle the problem. Although Buser's attitude is realistic, I cannot imagine that situations demanding the use of infraspecific ranks will be often encountered in alchemillas,

simply because of the amount of field studies and cultivation which are necessary to reveal such variation.

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