

Veratrum flavum - a Forgotten Species of Balkan Flora

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In several trips which I undertook to Bulgaria or during my journeys through that country with botanical stops (1973, 1978, 1981, 1983, 1985) my attention was repeatedly attracted by a *Veratrum* from the sect. *Veratrum* (= sect. *Alboveratrum* Loesener fil.) differing at the first sight by its yellow flowers from both *V. album* L. and *V. lobelianum* Bernh. spread through central Europe. Yet, to my surprise, I found that the present-day floras and keys disregard its difference often mentioning only a single species — *Veratrum album* L. Literary data revealed that this Balkan type I met has been known nearly 150 years being variously taxonomically evaluated. This is reflected also in its names: *Veratrum flavum* (Griseb.) Loesener fil., *V. album* L. subsp. *flavum* (Griseb.) Soó, and *V. album* L. var. *flavum* Griseb.

It is interesting that even the new treatment of the genus *Veratrum* for Flora Europaea Vol. 5 (Heywood 1980: 16—17) mentions besides the only distantly related *V. nigrum* L. only *V. album* L. in a very broad conception. *V. lobelianum* Bernh. appears only in a note. The author mentions the different color of the flowers and the fact that it is recorded from a major part of the area given in the case of *V. album* with which it is sometimes sympatric. Heywood further adds also the different chromosome number: $2n = 32$ (*V. album* has $2n = 16$). Despite of this he summarizes his opinion as follows: „It differs from 2 [= *V. album*] in having the perianth-segments greenish on both surfaces and longer bracts, but other reputed differences in pedicel-length, flower-size and in hairiness do not seem to apply unambiguously to it and it must be regarded as doubtful status.“ Further only a brief note is added about *V. mišae* (Širjaew) Loesener fil. growing in „Arctic Russia“. So it makes our present-day knowledge of the problem scarcely better than in Linné's times.

The reason of the above described state may be seen in two circumstances, viz.:

1. The herbarium material is of bad quality. — The plants are often not collected due to their size and sapiness and the authors often only record the species. After the collection it is difficult to dry plants, they are attacked by

fungi, sometimes even partly rotten or at least they turn brown. Sometimes only branches of inflorescence or single leaves are collected.

2. There are probably only a few students (florists and taxonomists) who have a sufficient experience with plants of various types from different parts of the extensive Eurasian area or at least from Europe. In spite of that there are certain regions where at least *V. album* and *V. lobelianum* are distinguished (at the species or subspecies level, previously mostly as varieties). Some authors distinguish even further types or give further lower taxa within the described ones. These are especially botanists undertaking detailed investigation in the regions where more than one type appears, or those who have a good knowledge of one type and begin to work in a territory where another type occurs. These are usually the Central European botanists well familiar with *V. lobelianum* and *V. album* or at least one of them. The more they register the differences between the two or between them and the other type. It is important to have the opportunity of observing living, fully flowering plants. The main differences are namely factually in the color of the perianth-segments and in the shape of the inflorescence. There are only minor differences in the shape and size of the bracts in the inflorescence; such characters as indumentum, shape and size of the leaves are very unreliable or even nonexistent. The color of the flowers and form of the inflorescence after flowering are less distinct. In the herbarium material the characters are often absolutely unreliable for determination purposes. This nevertheless does not degrade the significance of such characters and cannot impede the distinguishing of the single types. Not every species, even in other genera, can be always determined, not all species can be reliably distinguished as the herbarium specimens.

The genus *Veratrum* is connected by its distribution with the northern hemisphere. In Europe it is represented by a small number of species only (approx. 4—5); more species are found in east Asia (including Japan) and in the western part of North America. Loesener, the author of a relatively detailed study of the genus *Veratrum* for his time (Loesener 1926, 1927 et 1928) gives altogether 48 species in 3 subgenera. Loesener divides his subg. *Euveratrum* Loesener fil. into two sections: sect. *Alboveratrum* Loesener fil. (into it belongs also the *V. album* — *V. lobelianum* complex) and sect. *Fuscoveratrum* Loesener fil. including from the European species *V. nigrum* L. With respect to the type of genus which is *V. album* and the present nomenclatoric rules this subgenus should be called *Veratrum* with sections *Veratrum* and *Fuscoveratrum* Loesener fil. The remaining two subgenera are sometimes even considered independent genera, on the contrary, by another authors they are estimated only as sections. An approximately equal number of species of the genus — 46 — is given also by Krause (1930). Also Z. J. H. Zimmermann, the author of

a more recent monograph (A Monograph of *Veratrum*. Ph. D. Diss. Univ. Wisconsin 322, 1958 — non vidi) gives altogether 45 species (sec. Meusel et al. 1965: 440).

Besides *V. nigrum* and the North American *V. luteum*, *V. album* was described already by Linné (1753: 1044). Linné's diagnosis is very brief:

„album 1. *Veratrum* racemo supradecomposito, corollis erectis.“

Also the distribution given by Linné indicates a very broad conception of the species: „Habitat in Russiae, Sibirae, Austriae, Helvetiae, Italiae, Graeciae montosis.“ This implies that also the question of species typification is to be solved. If *V. album* s. str. is distinguished from *V. lobelianum* and sometimes even from other species, it is identified with the plants in which the white color of their flowers is virtually effective.

Yet, *V. album* has its perianth-segments white on the inner side only whereas the outer side has only a white margin the perianth-segments being otherwise green. The white margin may nevertheless be variously broad. On the outer side of the perianth-segment there is either only a narrow green strip or the perianth-segment is nearly completely green with a narrow white peripheral margin. The inflorescence is a relatively short and broad panicle with relatively long lateral branches in the lower and middle parts. The apical unbranched part of the inflorescence (the apex of the main stem) is usually sigmoid or variously curved. The branches of the inflorescence are usually \pm horizontally patulous already during full bloom of the plant; after flowering they often bend somewhat downwards. The bracts in the axils of which the flowers are growing are relatively short (mostly shorter than the pedicels) and broad, usually ovate. The leaves, especially young, are conspicuously densely shortly pubescent to nearly tomentose. Chromosome number: $2n = 16$. (If $2n = 32$ is given the data probably relate to the following species.)

The distribution of *V. album* can be determined from the available material and literature only approximately. It occurs certainly in the Alps, Dinaric mountains and in the Carpathians. It is known from the Alps in Austria, Germany and Switzerland reaching southwards to Italy and Yugoslavia, westwards to France, eastwards to Hungary, northwards to Czechoslovakia (southern Bohemia only). In the Carpathian mountains it is known from the Slovak and Polish East Carpathians, further to the east and south-east (Ukrainian and Romanian East Carpathians, South Carpathians, Transylvanian Highland). Thus, the data referring to Southeastern Poland, the utmost eastern part of Czechoslovakia, Ukraine and Romania are correct. The occurrence further southeastwards in Europe (Bulgaria, Greece, Albania) requires verification. The same applies to the data from Turkey and Caucasian regions. Also the

data from the Iberian peninsula (Portugal, Spain) seem to refer only to the following species.

V. lobelianum Bernh. was distinguished already at the beginning of 19th century (Bernhardi 1807: 356); the author gives green flowers as the main characteristic. As it turns out the species appears on a very large area reaching reputedly (Loesener 1926: 131—132) from the mountains of the Iberian peninsula to Japan and North America; and the author evaluates some closely related types as independent species! In Europe it is up to now sometimes identified with *V. album* and — unless at least infraspecific taxa (subspecies, varieties) are given — the literary information about this species (similarly as in the preceding species) is considerably distorted.

The perianth-segments of flowering *V. lobelianum* are green on both sides (nearly of the same shade as the leaves). Yellowish tinge (\pm ochre, not lightly yellow) of the coloration appears only occasionally, prevailing after flowering when very often also the leaves or whole plants grow yellow. The inflorescence is relatively long and narrow (mostly several times longer than broad), with relatively short branches in the lower and middle part of the whole inflorescence. Additionally there develop branches also in the axils of the uppermost stem leaves. The apical, unbranched part of the inflorescence (main stem) is long, erect, markedly protruding from the branched part; during flowering the branches of the inflorescence are erecto-patent to patent diverting somewhat after flowering; only rarely they are completely horizontally patulous at (!) the fruit time. The bracts are relatively long and narrow ovate-lanceolate, acute, longer than the pedicels. On their obverse the leaves can be hairy (such plants prevail) or glabrous. Chromosome number: $2n = 32$ (evidently most data published for *V. album* refer to this species).

Its distribution cannot be quite exactly determined, either. It is nevertheless evident that this species is the most spread on of the given group. According to the material and the literary data which can be considered reliable, it grows in Spain, Portugal, France, Italy, Switzerland, Germany, Austria, Czechoslovakia, Poland, Ukraine and Romania. Its occurrence from Yugoslavia and Bulgaria, further south- and southeastwards in Europe, in Asia Minor and the Caucasian region is not quite clear. The data from this region can refer also to the following species *V. flavum* (Griseb.) Loesener fil. The questions how far it is really continuously distributed eastwards into Asia and North America and how far it is taxonomically uniform also require revision. It is worth noticing that the plants growing in the North (north of Fennoscandia, the Kola Peninsula, northern Russia and northern Siberia) included into *V. lobelianum* are sometimes considered an independent species *V. mišae* (Širjaew) Loesener fil. (Širjaew 1923, Loesener 1927: 65). These plants are distinguished by low

growth, small and narrow leaves, small inflorescence of a similar type as that in *V. lobelianum*. They evidently constitute a derivative of the above species developed in unfavourable conditions of the North; they certainly deserve the value of subspecies, if not an independent species.

The markedly different distribution of the two species is conspicuous in detailed comparison especially e. g. in Czechoslovakia. *V. lobelianum* occurs in a number of mountain ranges in the north of Bohemia and Moravia (descending along the rivers even into submontane regions), in Slovakia the plant is relatively abundantly distributed in the mountains of the whole West Carpathians and is found in the Slovak part of East Carpathians. On the contrary, it is missing in South Bohemia, where *V. album* is found.

In East Carpathians of Ukraine and Romania it is relatively rare often completely vicarising with *V. album*.

Similar situation probably exists also in other parts of the European territory. The list of countries where both species are known suggests that their distribution is nearly identical. Yet, a detailed comparison demonstrates that this is by far not the case. Although *V. album* as well as *V. lobelianum* were distinguished already a long time ago, they were not always recognized as such. This happens sometimes even nowadays (Heywood 1980: 16—17, Edmondson 1984: 328—329, Kožucharov, Andreev et Penev 1980: 181). Closer study of these plants in the last decenia results nevertheless in the fact that they are recognized at least as subspecies or independent species. As subspecies, they are considered e. g. by: Dostál (1950: 1742—1743, 1958: 760), Soó et Jávorka (1951: 843), Soó (1973: 55), Rothmaler (1976: 614), Tzvelev (1979: 210), Pignatti (1982: 344). At species level the two are evaluated e. g. by: Meusel et al. (1965: 440), Čopyk et al. (1977: 328—329), Fodor (1974: 156), Dostál (1982: 310) and Bordzilovskij (1950: 67—74). In many cases they are not given separately, yet the authors are led to it either by lack of reliable data or specific orientation of the publication (e. g. Ehrendorfer 1967: 231).

The third, completely omitted species is *V. flavum* (Griseb.) Loesener fil. It was described as a variety already at the end of mid 19th century (Grisebach 1943: 381) from the territory of present Bulgaria. Loesener (1926: 133) considered this type an independent species, Hayek (in Hayek et Markgraf 1932: 23) as originally Grisebach a variety (of the same opinion are Stojanov et Stefanov 1948: 229), recently Soó (1973: 55—56) a subspecies. Sometimes it is identified with *V. lobelianum*, sometimes even with *V. album* (Velenovský 1891: 167, Vălev 1964: 188—189, Kožucharov, Andreev et Penev 1980: 181). In the literature it is mentioned anyway only rarely.

In its flowering time *V. flavum* (Griseb.) Loesener fil. has the perianth-segments brightly (!) yellow to light greenish-yellow (at a distance the plants

resemble by their color species of the genus *Verbascum*), the coloration being the same on both sides. After flowering the perianth-segments grow greenish and their yellow coloration is somewhat less distinct. Similarly as in *V. album* s. str. the inflorescence is relatively short and broad, with relatively long lateral branches. The apical unbranched part of the inflorescence (main stem) is mostly erect and only a little longer than the patent lateral branches of the inflorescence. The outline of the inflorescence is often ovate (in *V. lobelianum* narrowly, in *V. album* broadly triangular — the whole panicles are \pm pyramidal). Relatively rarely the branches are horizontally patulous already during flowering; during fruiting they are relatively often horizontally patulous. The bracts in the axils of which the flowers are growing are — similarly as in *V. album* — also relatively short (shorter than the pedicels) and broad. They are usually ovate, orbicular-ovate to nearly orbicular, usually obtuse. On their reverse the leaves are densely pubescent to very shortly velvety tomentose. The chromosome number is not known. (The data in Bulgarian literature do not allow to make out clearly whether they refer to this type or whether they were only taken over from literature.)

In Bulgaria *V. flavum* grows in the Vitoša-, Stara Planina-, Rila- and the Rhodope-mountains — being also known from Greece (mountain ranges). Its occurrence in South Carpathians (Zahariadi 1966: 133) from the surroundings of Braşov seems probable. Less probable is on the other hand the report on the occurrence of this taxon in the Bacău region. In any case the above data, as well as the occurrence in Asia Minor, which cannot be excluded either, must be verified. Edmondson's data (Edmondson 1984: 328—329) as so broadly conceived that they could refer to any of the species treated in this paper. At the same time it remains dubious whether they concern material observed by the author himself in nature or whether were compiled only on the basis of herbarium material or only literature. Also the plants from the Caucasian area require revision.

The whole scope of problems of the above group requires further study even on the European territory, especially in living material in nature as well as e. g. in experimental plots. It will be necessary to assess in greater detail the chromosome numbers in various parts of the area of distribution, study also the question of potential hybrids, etc. Only then it will be possible to \pm definitely evaluate the taxonomic significance of the single types. The so-far known differences in the color of flowers, shape of inflorescence, shape and size of bracts seem so significant that with regard to the characteristic distribution of the single types their distinguishing on the same taxonomic level is quite justified.

Valid names for variety to species levels are already available and are given in the attached survey. It is necessary that not only taxonomists but also florists devote attention to distinguish the single types thus contributing to the knowled-

ge of the whole group. Accumulation of further inaccurate and incorrectly interpretable data has nowadays no sens.

European taxa of the *Veratrum album* — *V. lobelianum* complex:

V. album L. Sp. pl. 1044, 1753

V. lobelianum Bernh. Neues Journ. Bot. Schrader, Erfurt, 2: 356, 1807 subsp. *lobelianum*

V. lobelianum Bernh. subsp. *mišae* (Širjaev) Šourková comb. nova h. l. (Bas.: *Veratrum album* L. var. *mišae* Širjaev Acta Bot. Bohem., Praha, 2: 41, 1923)

V. flavum (Griseb.) Loesener fil. Verh. Bot. Ver. Prov. Brandenburg, Berlin-Dahlem, 68: 133, 1926

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