

STUDIES IN CHROMOSOME NUMBERS OF YUGOSLAVIAN ANGIOSPERMS

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Introduction

The flora of Yugoslavia is very rich in species, especially that of the republics Makedonija and Crna Gora.

Macedonian flora shows many Central-European as well as Mediterranean influences and has a very high percentage of endemics. The same holds true for the flora of Crna Gora, of which the coastal regions have a predominantly mediterranean flora and the inland regions a more Central-European one. The highly differentiated and variable flora of Yugoslavia invited as it were to a botanical excursion. This excursion, under the guidance of Drs. Berg, Gadella and Wessels Boer, was made in the month of July 1968. Many plants were collected near Tetovo (Makedonija: Šar Planina and Mavrovsko Jezero) and near Kolašin (Crna Gora: Biogradsko Jezero and near the Monastery of Morača). Many seeds and some live plants were assembled for cytological investigation, since little information is available with regard to the angiosperm flora of Yugoslavia. The results of these studies will be dealt with in this paper. 67 species will be treated, of which 4 had not been studied cytologically before. As a result of the special interest in the genera *Sedum*, *Potentilla*, *Cardamine*, *Myosotis* and *Hieracium*, a large number of living collections were assembled for biosystematic investigations. Only the results obtained in the genus *Hieracium* will be dealt with in this paper, the remaining genera will be treated later in separate papers.

Material and Methods

Living plants were collected as well as seed samples. The seeds were sown in the Botanical Garden of the State University of Utrecht. Chromosome counts were made from root-tips of potted plants. The tips were fixed in Karpechenko's fixative, embedded in paraffin-wax, sectioned at 15

micron and stained according to Heidenhain's heamatoxylin method. Specimens relating to this study are preserved in the herbarium of Utrecht.

Results

The results of the chromosome counts are given in the following table. This table gives a survey of the species investigated, the source of the material, collection numbers and the chromosome numbers. Notes on some species (marked with an asterisk) have been added.

Boraginaceae

1. *Anchusa officinalis* L.
coll. no. : 8901 2n = 16.
origin : Slovenija, roadside near Borl.
2. *Cerinthe minor* L.
coll. no. : 8821 2n = 18.
origin : Makedonija, between Gostivar and Mavrovsko Jezero.
- 3*. *Symphytum officinale* L.
coll. no. : 8868 and 8869 2n = 48.
origin : Slovenija, near Borl.

Campanulaceae

4. *Campanula lingulata* W. et K.
coll. no. : 8877 and 9003 2n = 34.
origin : Makedonija, east of Tetovo
coll. no. : 8982 and 8985 2n = 34.
origin : Crna Gora, near monastery of Morača.
- 5*. *Campanula patula* L.
coll. no. : 8833 and 9068 2n = 20.
origin : Makedonija, between Dobri and Belovište.
coll. no. : 8940 2n = 40.
origin : Crna Gora, near Biogradsko Jezero.
coll. no. : 8988 2n = 40.
origin : Makedonija, near Mavrovo.
6. *Jasione orbiculata* Gris.
coll. no. : 8952 2n = 12.
origin : Makedonija, Šar Planina, Vakuf Šar.

Caryophyllaceae

7. *Arenaria serpyllifolia* L.
coll. no. : 8801 2n = 40.
origin : Makedonija, near Mavrovo.
coll. no. : 9019 2n = 40.
origin : Makedonija, Šar Planina, Popova Šapka.
- 8*. *Minuartia verna* (L.) Hiern. subsp. *collina* (Neilr.) Halliday
coll. no. : 8945 2n = 24.
origin : Makedonija, Šar Planina, Vakuf Šar.

- 9*. *Petrorhagia saxifraga* (L.) Link.
 coll. no. : 8900 2 n = 30.
 origin : Srbija, near Smederevo.
10. *Silene italica* (L.) Pers.
 coll. no. : 9007 2 n = 24.
 origin : Crna Gora, near Biogradsko Jezero.
11. *Silene paradoxa* L.
 coll. no. : 9034 2 n = 24.
 origin : Makedonija, between Mavrovo and Debar.

Compositae

12. *Centaurea solstitialis* L.
 coll. no. : 8911 2 n = 16.
 origin : Hrvatska (Croatia), near Plat.
13. *Crepis foetida* L.
 coll. no. : 8837 2 n = 10.
 origin : Makedonija, Šar Planina, Popova Šapka.
 coll. no. : 8882 2 n = 10.
 origin : Makedonija, near Tetovo.
 coll. no. : 8975 2 n = 10.
 origin : Crna Gora, near monastery of Morača.
- 14*. *Hieracium hoppeanum* Schult. subsp. *leucocephalum* Vuk.
 coll. no. : 9062 2 n = 18.
 origin : Makedonija, between Dobri and Belovište.
- 15*. *Hieracium hoppeanum* Schult. subsp. *macranthopsis* Zahn
 coll. no. : 9065 2 n = 18.
 origin : Makedonija, between Dobri and Belovište.
- 16*. *Hieracium hoppeanum* Schult. subsp. *macranthum* Boiss.
 coll. no. : 9063 2 n = 18.
 origin : Makedonija, between Dobri and Belovište.
- 17*. *Hieracium hoppeanum* Schult. grex *macranthum* (Ten.) Zahn
 coll. no. : 8933 2 n = 18.
 origin : Makedonija, near Mavrovo.
 coll. no. : 8839 2 n = 18.
 origin : Makedonija, between Tetovo and Popova Šapka.
- 18*. *Hieracium hoppeanum* Schult. subsp. *multisetum* NP.
 coll. no. : 8936, 8937 2 n = 18.
 origin : Crna Gora, near Biogradsko Jezero.
19. *Hieracium murorum* L.
 coll. no. : 9033 2 n = 36.
 origin : Makedonija, between Mavrovo and Debar.
- 20*. *Hieracium pilosella* L.
 coll. no. : 8990 2 n = 54.
 origin : Makedonija, near Mavrovo.
21. *Senecio rupester* Waldst. et Kit.
 coll. no. : 8824 2 n = 20.
 origin : Makedonija, near Mavrovo.
22. *Xeranthemum annuum* L.
 coll. no. : 8876 2 n = 12.
 origin : Srbija, near Leskovac.

Cruciferae

23. *Alyssoides utriculata* (L.) Medicus.
coll. no. : 8977 2n = 16.
origin : Crna Gora, near monastery of Morača.
24. *Alyssum saxatile* L.
coll. no. : 9028 2n = 16.
origin : Makedonija, between Mavrovo and Debar.
25. *Arabidopsis thaliana* (L.) Heynh.
coll. no. : 8822 2n = 10.
origin : Makedonija, between Gostivar and Mavrovsko Jezero.
26. *Arabis sagittata* (Bertol.) D. C.
coll. no. : 8912 2n = 16.
origin : Crna Gora, near monastery of Morača.
27. *Arabis turrita* L.
coll. no. : 9025 2n = 16.
origin : Makedonija, between Mavrovo and Debar.
28. *Cardamine resedifolia* L.
coll. no. : 9016 2n = 16.
origin : Crna Gora, near Biogradsko Jezero.
29. *Draba aizoides* L.
coll. no. : 8965 2n = 16.
origin : Makedonija, Šar Planina, near Popova Šapka.
- 30*. *Erysimum hieracifolium* L.
coll. no. : 8797 2n = 16.
origin : Kosovo-Metohija, Pečka patrijaršija.
- 31*. *Peltaria perennis* (Ard.) Mgf.
coll. no. : 8942 2n = 14.
origin : Crna Gora, near Biogradsko Jezero.
32. *Thlaspi montanum* L.
coll. no. : 8957 2n = 28.
origin : Makedonija, Šar Planina, Vakuf Šar, 1900 m.

Dipsacaceae

33. *Scabiosa argentea* L.
coll. no. : 8878 2n = 16.
origin : Makedonija, near Tetovo.
34. *Scabiosa ochroleuca* L.
coll. no. : 9021 2n = 16.
origin : Makedonija, between Mavrovo and Debar.

Gramineae

35. *Alopecurus utriculatus* Pers.
coll. no. : 8889 2n = 14.
origin : Hrvatska, near Ivanić-Grad.

Labiatae

36. *Lamium garganicum* L.
coll. no. : 9029 2n = 18.
origin : Makedonija between Mavrovo and Debar.
37. *Prunella vulgaris* L.
coll. no. : 8928 2n = 28.
origin : Makedonija, between Tetovo and Popova Šapka.

38. *Salvia viridis* L. var. *horminum* (L.) Battand. et Trabut.
coll. no : 8994 2 n = 16.
origin : Makedonija, near Tetovo.
39. *Scutellaria altissima* L.
coll. no. : 9005 2 n = 34.
origin : Crna Gora, near Biogradsko Jezero.
40. *Thymus kosteleckyanus* Opiz.
coll. no. : 9024 2 n = 28.
origin : Makedonija, between Mavrovo and Debar.
41. *Thymus montanus* Waldst. et Kit.
coll. no. : 8873 2 n = 28.
origin : Srbija, near Leskovac.
42. *Thymus pulegioides* L.
coll. no. : 8989 2 n = 28.
origin : Makedonija, Šar Planina, near Popova
Šapka.

Malvaceae

- 43*. *Althaea hirsuta* L.
coll. no. : 8899 2 n = 56.
origin : Crna Gora, near monastery of Morača.

Papilionaceae

- 44*. *Chamaespartium sagittale* (L.) Gibbs
coll. no. : 8931 2 n = 44 (46).
origin : Crna Gora, near Biogradsko Jezero.
45. *Lathyrus montanus* Bernh.
coll. no. : 8905 2 n = 14.
origin : Slovenija, near Podkoren.
46. *Lathyrus vernus* (L.) Bernh.
coll. no. : 9036 2 n = 14.
origin : Makedonija, near Mavrovo.
47. *Lotus corniculatus* L.
coll. no. : 8921 2 n = 24.
origin : Crna Gora, roadside Titograd—Budva.
coll. no. : 9012 2 n = 24.
origin : Crna Gora, Biogradsko Jezero.
- 48*. *Trifolium angustifolium* L.
coll. no. : 8884 2 n = 16.
origin : Srbija, near Leskovac.
49. *Trifolium fragiferum* L.
coll. no. : 8923 2 n = 16.
origin : Crna Gora, near Skadarsko Jezero (lake of
Scutari).
50. *Vicia sativa* L.
coll. no. : 8870 2 n = 12.
origin : Slovenija, near Borl.

Plantaginaceae

- 51*. *Plantago media* L.
coll. no. : 8974 2 n = 12.
origin : Crna Gora, near monastery of Morača, di-
rection of Titograd.

52. *Plantago coronopus* L.
 coll. no. : 8917 2 n = 10.
 origin : Hrvatska, near Gradac.

Plumbaginaceae

53. *Armeria maritima* (Mill.) Willd.
 coll. no. : 8906 2 n = 18.
 origin : Hrvatska, near Gradac.

Ranunculaceae

54. *Nigella damascena* L.
 coll. no. : 8908 2 n = 12.
 origin : Hrvatska, near Gradac.

Rubiaceae

55. *Asperula odorata* L.
 coll. no. : 9004 2 n = 44.
 origin : Makedonija, Šar Planina, near Popova
 Sapka.

Saxifragaceae

- 56.* *Parnassia palustris* L.
 coll. no. : 8437 2 n = 18.
 origin : Crna Gora, near Biogradsko Jezero.

Scrophulariaceae

57. *Digitalis lanata* Ehrl.
 coll. no. : 8991 2 n = 56.
 origin : Makedonija, near Tetovo.
 coll. no. : 9066 2 n = 56.
 origin : Makedonija, between Dobri and Belovište.
58. *Linaria genistifolia* (L.) Mill.
 coll. no. : 8879 2 n = 12.
 origin : Srbija, near Smederevo.
59. *Linaria vulgaris* Mill.
 coll. no. : 8879 2 n = 12.
 origin : Makedonija, near Tetovo.
60. *Scrophularia nodosa* L.
 coll. no. : 9050 2 n = 36.
 origin : Makedonija, between Mavrovo and Debar.
61. *Veronica beccabunga* L.
 coll. no. : 8823 2 n = 18.
 origin : Makedonija, between Gostivar and Mavrov-
 sko Jezero.
 coll. no. : 8968 2 n = 18.
 origin : Crna Gora, near Biogradsko Jezero.
62. *Veronica serpyllifolia* L.
 coll. no. : 8818 2 n = 14.
 origin : Makedonija, between Gostivar and Mavrov-
 sko Jezero.

Umbelliferae

63. *Orlaya grandiflora* (L.) Hoffm.
coll. : no. 8984 2n = 20.
origin : Crna Gora, near monastery of Morača.

Urticaceae

64. *Parietaria officinalis* L.
coll. no. : 8881 2n = 14.
origin : Srbija, near Smederevo.

Violaceae

65. *Viola arvensis* Murray
coll. no. : 8860 2n = 34.
origin : Makedonija, Šar Planina, near Popova
Šapka.
66. *Viola gracilis* Sibth. et Sm.
coll. no. : 8836 2n = 20.
origin : Makedonija, Šar Planina, near Popova
Šapka.
67. *Viola tricolor* L. subsp. *subalpina* Gaudin
coll. no. : 8939 2n = 26.
origin : Crna Gora, between Kolašin and Biograd-
sko Jezero.

Notes on some species

The results obtained in most species are in agreement with the counts published by other authors. Many of these species had been counted only once before and usually originate from a locality outside Yugoslavia.

Four species were studied cytologically for the first time: *Scabiosa argentea* L. (2n = 16); *Viola gracilis* Sibth. et Sm. (2n = 20); *Silene paradoxa* L. (2n = 24) and *Hieracium murorum* L. (2n = 36).

In three species other chromosome numbers were counted than previously reported by other authors, whereas in 10 other species the occurrence of intraspecific polyploid series could be demonstrated. These 13 species will be treated more in detail.

3*. *Symphytum officinale* L.

Symphytum officinale is a very variable species, not only morphologically, but also cytologically (Gadella and Kliphuis 1967). In the Netherlands three cytotypes occur: 2n = 24 (diploid); 2n = 40; 2n = 48 (tetraploid). The diploid plants are white flowered throughout their range, those with the chromosome number 2n = 40 are usually purple-flowered (exceptionally white-flowered) and the tetraploids are characterized by various flower colours, usually in the same population, ranging from creamy-white to dark purple and red. Diploid plants are rare in Europe, their occurrence could be demonstrated in scattered localities in the D. D.R., Czechoslovakia, Hungary, Italy, Great Britain and the Netherlands. It seems likely that these white-flowered plants also occur in Yugoslavia, presumably in the North of the country.

Tetraploid plants, on the other hand, are common in Europe. Only exceptionally all plants of the same population show the same flower colour in Western Europe, but in Central Europe (Austria and Hungary) the tetraploid plants are always purple-flowered. The plants collected in Slovenija, near Borl, proved to be tetraploid and also purple-flowered. According to Steven (1851) and Popov (1953) no white-flowered individuals have been reported from Russia. These data seem to indicate that the variation of the flower colour is correlated with geographical factors, so that possibly the term *topocline* can be employed for this situation. At any rate, more data must be assembled before we can arrive at more definite conclusions. The authors intend to continue their studies on this subject and would highly appreciate to receive living plants or seeds of *Symphytum officinale*, preferably with indication of the flower-colour of the plants of the local population concerned.

5* *Campanula patula* L.

Gadella (1964) reported the chromosome number $2n = 40$ for this species. Closely related to *Campanula patula* L. is *Campanula abietina* ($2n = 80$). This taxon is regarded by some authors as a variety of *Campanula patula*. As *C. abietina* deviates not only in cytological, but also in morphological respect, this opinion does not seem to be correct. The diploid and tetraploid plants of *Campanula patula* are (macro-morphologically indistinguishable, only the pollengrains of the former are smaller than those of the latter. The tetraploid cytotype was found in Austria and Yugoslavia up till now (Gadella, l. c.). Contandriopoulos (1966) reported diploids from Yugoslavia and Greece. The present authors demonstrated the occurrence of both diploids and tetraploids in Yugoslavia; it appeared to be impossible to find clear-cut morphological differences between these two cytotypes.

8* *Minuartia verna* (L.) Hiern. subsp. *collina* (Neilr.) Halliday

Favarger (1967) studied several populations of *Minuartia verna*. He found diploids and tetraploids. In his opinion the diploids belong to the subspecies *verna* and the tetraploids should be assigned to the subspecies *collina*. The diploids occur in the Pyrenees, the Alps and the Jura, the tetraploid material was found in Greece (Mount Parnassus; Pili) and in S. W. Bulgaria.

According to Favarger the tetraploid plants mentioned by Halliday (in Löve and Löve, 1961) which originated from the Botanical Garden of Zagreb and from Hungary, probably belong to the subspecies *collina*. The plants studied by the present authors originate from the Šar Planina, Makedonija, and were identified with the key given by Halliday in *Flora Europaea* I, p. 131. The most important characters of these plants are:

- a. leaves linear-subulate to setaceous, not stiffly patent, margins entire.
- b. axillary vegetative fascicles present.
- c. petals obtuse, widest above the middle.
- d. cymes 4—5—6 flowered.
- e. petals equalling sepals.
- f. anthers yellow.

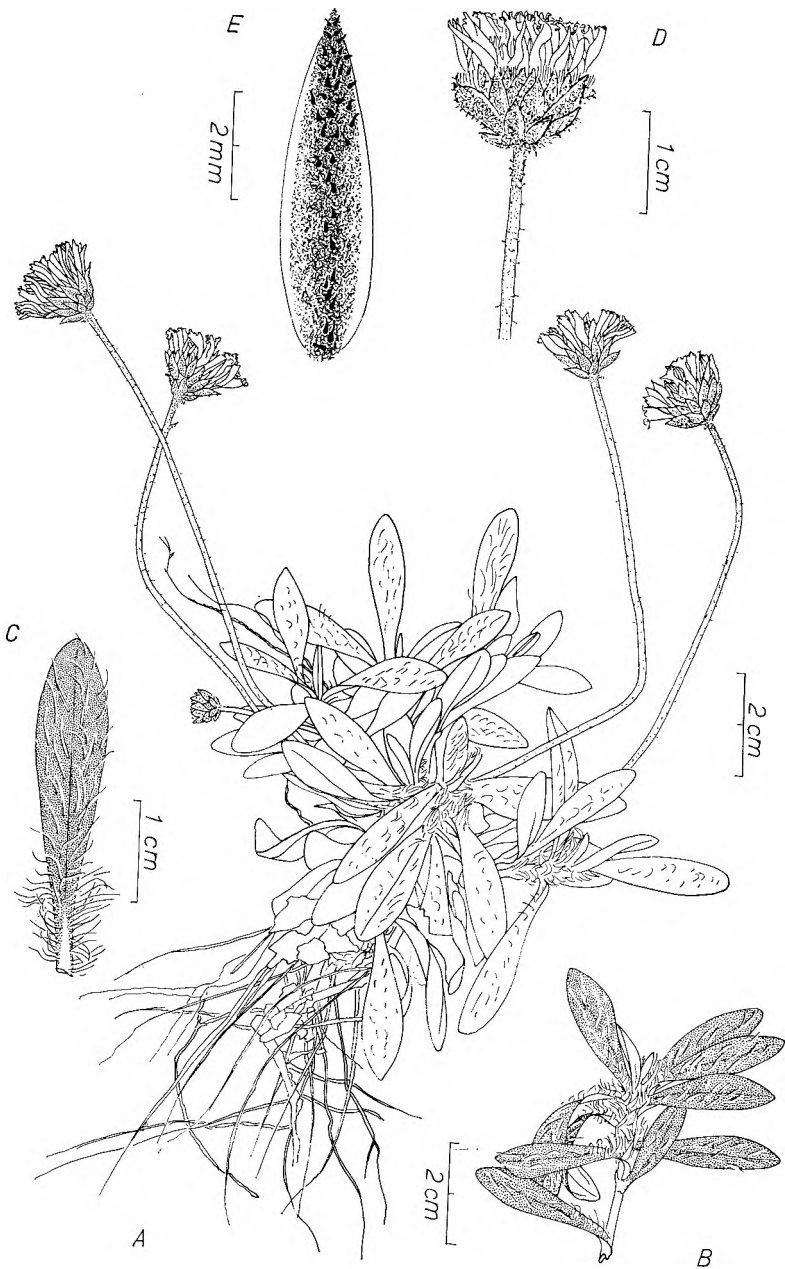


Fig. 1.

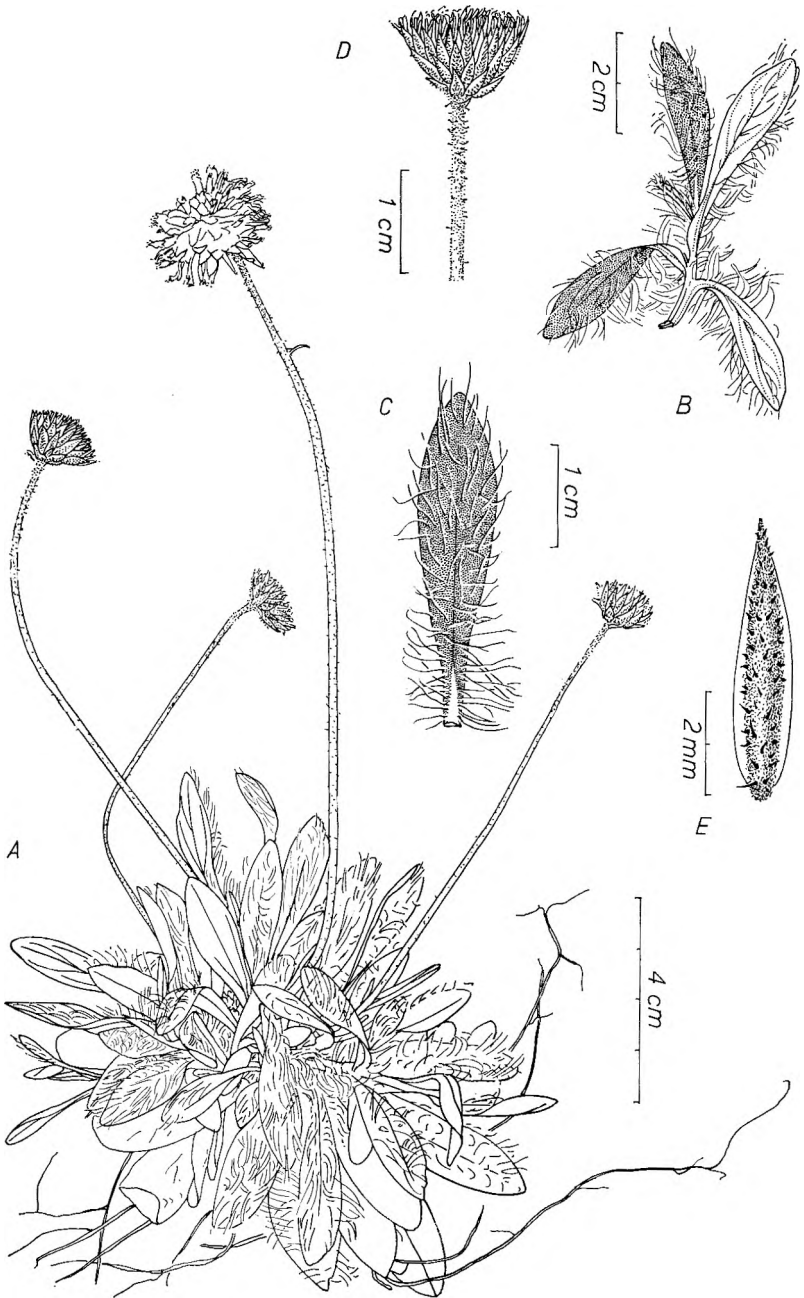


Fig. 2.

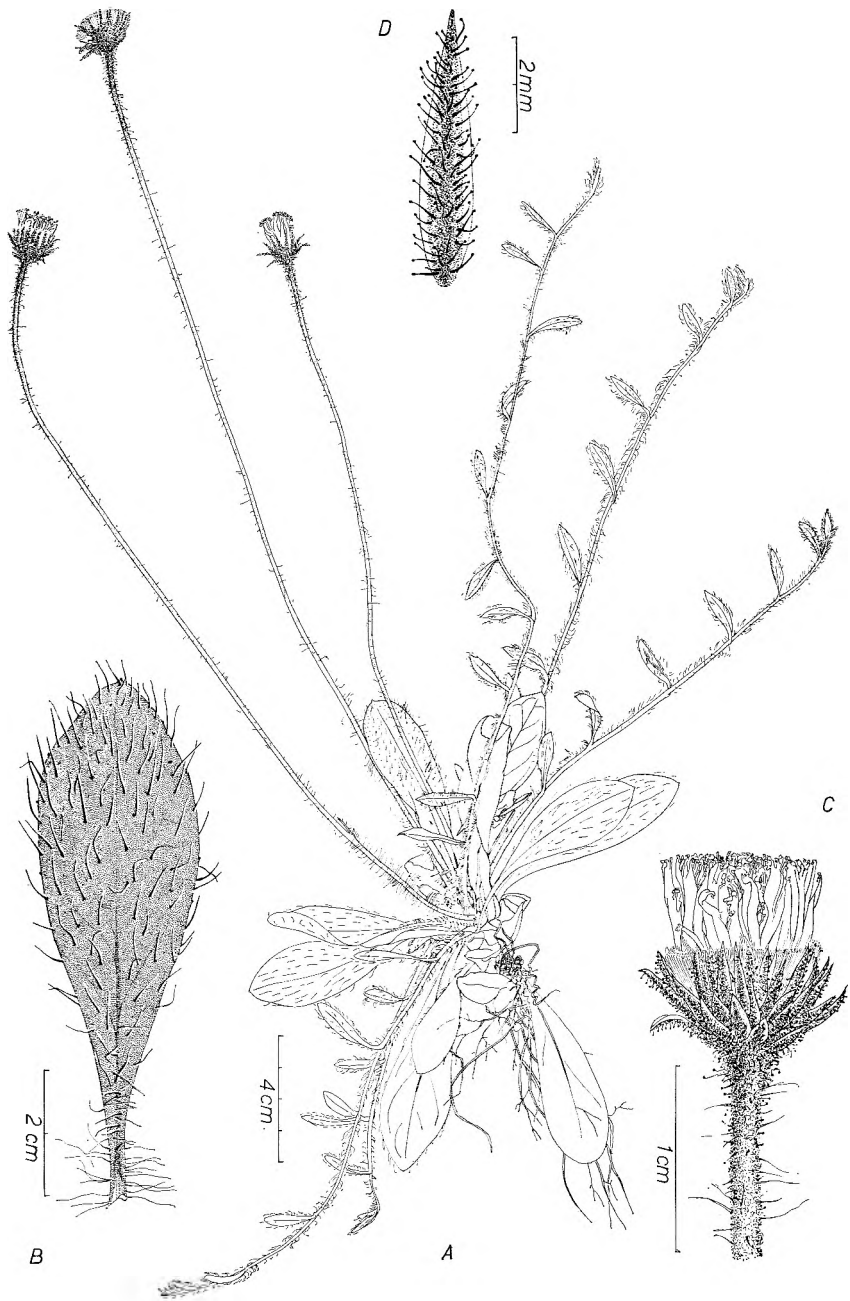


Fig. 3.

◀ —————

Fig. 1. *Hieracium hoppeanum* Schult. grex *macranthum* (Ten.) Zahn: $2n = 18$ — coll. no. 8839.

A. habit; B. Stolon with leaves of about equal size; C. Rosette-leaf, upper side; D. Capitule, showing broad bracts; E. bract of the involucre.

Fig. 2. *Hieracium hoppeanum* Schult. subsp. *multisetum* NP. : $2n = 18$ — coll. no. 8937.

A. Habit; B. Stolon with leaves of about equal size; C. Rosette leaf, upper side; D. Capitule, the flowers withered; E. Bract of the involucre.

Fig. 3. *Hieracium pilosella* L. : $2n = 54$ — coll. no. 8990.

A. Habit; B. Rosette leaf, upper side; C. Capitule, showing the bracts of the involucre with many glandular hairs; D. Bract of the involucre with many glandular hairs. Note the long and slender stolons with leaves gradually diminishing in size.

Five of these characters point in the direction of the subspecies *collina*, only the number of flowers per cyme is in better agreement with subspecies *verna*. For that reason the authors regard the Yugoslavian plants as belonging to the subspecies *collina*. The chromosome number of the plants ($2n = 24$) does not lend support to Favarger's supposition that probably all plants of the subspecies *collina* are tetraploid.

9*. *Petrorhagia saxifraga* (L.) Link.

This species was studied by Rohweder (1934) and by Larsen (1954), who counted $2n = 60$ in Austrian material, and by Favarger (1946) in cultivated material of unknown origin, with the same result. The plants collected near Smederevo (Srbija), however, turned out to be diploid ($2n = 30$).

14/18*; 20*. *Hieracium hoppeanum* Schult. and *Hieracium pilosella* L.

Several plants of the section *Pilosellina* of the genus *Hieracium* were collected. They were examined by the *Hieracium*-specialist Prof. Dr. J. L. van Soest of the Rijksherbarium of Leyden, the Netherlands, to whom the authors are greatly indebted for his careful identification of the material.

Most plants turned out to belong to *Hieracium hoppeanum* Schult. and are diploid. The plants collected in Makedonija near Mavrovo and between Tetovo and Popova Sapka are diploid. They belong to the grex *macranthum*, but it proved impossible to assign them with certainty to one of the subspecies of this group (see fig. 1). The other plants are also diploid ($2n = 18$) and belong to the subspecies *macranthopsis*, *multisetum* (see fig. 2) and *leucocephalum*. Christoff and Christoff (in Tischler 1950) counted $2n = 90$, but Favarger (1965) reported the number $2n = 18$ for material originating from Tessin (Switzerland).

The plants collected near Debar (Makedonija) belong to the species *Hieracium pilosella* and are hexaploid ($2n = 54$). The drawing shows that the stolons are long and slender and provided with leaves that are gradually diminishing in size, characters which are regarded as typical for *H. pilosella* (see fig. 3). Up till now, only once diploid plants were collected, i. c. near Aosta (N. Italy), where a large population of these sexually reproducing plants was found (Gadella and Kliphuis 1970a). All other European populations turned out to be polyploid $2n = 36$, $2n = 45$, $2n = 54$). Many populations were studied in Scandinavia (Turesson and Turesson 1960), in the Netherlands (Gadella and Kliphuis 1968 a, c.), in Poland (Skalińska 1967), in the French and Italian Alps (Gadella and Kliphuis 1970 a + b) and finally in Austria (Gadella, Kliphuis and Kramer 1970). The distribution of the different cytotypes is not clear, but more chromosome counts have to be made, especially in southern and eastern Europe, before we can arrive at more definite conclusions.

30*. *Erysimum hieracifolium* L.

J a r e t z k y (1928) and L ö v e and L ö v e (1956) counted $2n = 32$ in material of unknown origin and of Icelandic origin, respectively. P o l a t s c h e k (1966) reported tetraploid material from various places in Austria (Schlößen; Weiten; Absdorf/Wagram; Moosbrunn; Stopfenreuth). M u l l i g a n (1959) found hexaploid plants ($2n = 48$) in Canada, Ontario, where the species appeared to be introduced. This number was confirmed by M u l l i g a n and F r a n k t o n (1967) in plants from Ottawa. They are of the opinion that some plants from six other populations in Canada possibly exhibit agamospermy, judging from the fact that these plants set abundant seed in spite of meiotic irregularities in the pollen fertility. It appeared that diploid plants were not known up till now. Therefore, the record of the number $2n = 16$, counted in plants originating from Peć (Kosovo-Metohija) is of interest for the study of this variable species. The present authors completely agree with P o l a t s c h e k's (l. c) statement: »Für die Klärung des Formenkreises sind weitere cytologische Beiträge notwendig«.

31*. *Peltaria perennis* (Ard.) Mgf.

In this species the occurrence of intraspecific polyploidy was demonstrated by P o l a t s c h e k (1966). He found diploid plants in Austria and tetraploid plants ($2n = 28$) near Mosor, Yugoslavia. The present authors found diploid plants in Yugoslavia, in the environment of the lake near Biograd (Crna Gora).

43*. *Althaea hirsuta* L.

The chromosome number of *A. hirsuta*, $2n = 56$, counted by the present authors, does not agree with the results obtained by D e l a y (1969), who reported the haploid number $n = 25$. The basic number of the genus *Althaea* is undoubtedly $x = 7$, since several species of the genus have $2n = 28$, $2n = 42$, $2n = 70$ and $2n = 84$. The number $2n = 56$ (octoploid level) was not found before. In the light of this evidence Delay's report needs a reinvestigation.

44*. *Chamaespartium sagittale* (L.) Gibbs.

S a n t o s (1945) published the numbers $2n = 46$ and $2n = 48$, determined in cultivated plants originating from the botanical gardens of Utrecht and Leyden, respectively. The material studied by the present authors provided serious cytological difficulties. Most metaphase plates showed $2n = 44$, but in some others $2n = 43$ and $2n = 46$ was counted.

48*. *Trifolium angustifolium* L.

The authors could confirm L a r s e n's (1960) observation, who determined the number $2n = 16$ in material originating from the Canary Islands. K a r p e c h e n k o's (1925) report ($2n = 14$) is probably erroneous.

51*. *Plantago media* L.

Rahn (1954, 1966) demonstrated the occurrence of diploid plants in S. France and in Rumania and reported the same number in plants of unknown origin, obtained from various botanical gardens. The number $2n = 24$ was counted by various authors (for references see Löve and Löve, 1961). The Yugoslavian plants, collected near the Monastery of Morača are diploid. These observations invite to a more thorough cytogeographic investigation in this species, especially in Southern and Eastern Europe.

56*. *Parnassia palustris* L.

Parnassia palustris was studied cytologically by many authors (for references see Gaddella and Kliphuis, 1968 b). According to Löve (1950) *P. palustris* s. l. is represented in Europe by tetraploid and diploid plants, with the chromosome number $2n = 36$ and $2n = 18$, respectively. The first cytotype has a circumpolar distribution, the latter a more southern one.

In the Netherlands, where both diploids and tetraploids occur, it proved impossible to separate the diploids from the tetraploids on morphological grounds. The Dutch tetraploids, however, are separable morphologically from the arctic tetraploids.

The Yugoslavian plants from the Šar Planina mountains are diploids and have the same combination of morphological characters as the Dutch diploids and tetraploids. Therefore, the present authors are of the opinion that these plants should be assigned to *Parnassia palustris* L. subsp. *palustris*.

Summary

The chromosome number of 67 species of Yugoslavian plants was determined. Most plants were collected in Makedonija and Crna Gora. The chromosome number of 4 species could be determined for the first time, whereas in 10 other species intraspecific polyploidy was demonstrated. Finally, in three species the results of previous investigations could not be confirmed. Notes on some species are given.

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S A D R Ź A J

ISTRAŽIVANJA KROMOSOMSKOG BROJA NEKIH CVJETNJAČA IZ JUGOSLAVIJE

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Autori su istraživali broj kromosoma u 67 vrsta cvjetnjača iz Jugoslavije. Većina biljaka sakupljena je u Makedoniji i Crnoj Gori, a manji dio u Srbiji, Hrvatskoj i Sloveniji. Navedeni brojevi kromosoma u većini slučajeva (40 vrsta) odgovaraju već prije publiciranim rezultatima drugih autora. Međutim u mnogih vrsta kromosomski brojevi su prije bili utvrđeni na osnovi samo jednog brojenja na biljkama, sa nalazišta većinom izvan Jugoslavije.

Prvi put je utvrđen broj kromosoma za vrste *Scabiosa argentea* L. ($2n = 16$), *Viola gracilis* Sibth. et Sm. ($2n = 20$), *Silene paradoxa* L. ($2n = 24$) i *Hieracium murorum* L. ($2n = 36$). U 10 vrsta utvrđeno je postojanje interspecijske poliploidije, a za tri vrste dobiveni su brojevi kromosoma koji ne potvrđuju rezultate prijašnjih autora. Također su u ovom radu izloženi biosistematski podaci za neke vrste roda *Hieracium*.

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