

## ***Scilla bifolia* group in the Western Carpathians and adjacent part of the Pannonian lowland: annotated chromosome counts**

*Scilla bifolia* agg. v Západných Karpatoch a príľahlej časti Panónie: komentované chromozómové počty

Judita Kochjarová

Botanical Garden at Komenský University in Bratislava, detached unit Blatnica,  
SK-038 15 Blatnica, Slovakia, e-mail: kochjarova@rec.uniba.sk

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The chromosome numbers of 95 populations of taxa belonging to the *Scilla bifolia* group growing in the territory of Western Carpathians, and adjacent part of the Pannonian lowland (Slovakia, Hungary, Austria, Czech Republic – Moravia) are presented. *Scilla kladnii* Schur (41 populations) and *S. vindobonensis* Speta (18 populations) have only the chromosome number  $2n = 18$ . Both these diploid taxa seem to be karyologically uniform throughout their distribution. For *S. drumensis* (Speta) Speta subsp. *drumensis* (2 populations), and *S. drumensis* subsp. *buekkensis* (Speta) Kereszty (15 populations) the chromosome number  $2n = 36$  was found. For *S. spetana* Kereszty (2 populations), the chromosome number  $2n = 54$  was confirmed for Hungary and Austria. For two groups of populations of *S. drumensis* s.l. from Slovakia (14 populations in total) the chromosome number is  $2n = 36$ , which is new information for the Western Carpathians. Apart from tetraploids, hexaploid populations with  $2n = 54$  were confirmed for three localities in Slovakia and Czech Republic (Moravia). All results are compared with earlier published data.

**Key words:** Carpathians, cytogeography, *Hyacinthaceae*, karyotaxonomy, *Monocotyledones*, Pannonia

### **Introduction**

West, and Central European indigenous populations of the genus *Scilla* L. were generally included in a single broadly defined species, *Scilla bifolia* L., until the 1970s. However, detailed taxonomical studies revealed the existence of a species aggregate – a polyploid series of taxa with a base-number of  $x = 9$  and chromosome numbers  $2n = 18, 36$ , and  $54$ , associated with several morphological and ecological characteristics. Taxonomy of the whole genus, including the *S. bifolia* aggregate, was studied mainly by Austrian botanists, F. Speta and J. Greilhuber, and later by Hungarian authors, namely Z. Kereszty and collaborators. They published a series of studies focusing on taxonomy, karyology, numerical analysis of morphological characteristics, chorology, phytosociology of taxa, etc. (Speta 1971, 1974, 1976, 1977, 1979, 1982, 1994, 1998, Greilhuber & Speta 1977, 1985, Greilhuber 1978, 1979, 1982, Greilhuber et al. 1981, Greilhuber & Strehl 1985, Kereszty 1983, 1987a–c, 1995, Kereszty et al. 1986, Kereszty & Podani 1984, Kereszty & Szilágyi 1984, 1986). However, some parts of Central Europe, e.g. Western Carpathians and the adjacent part of Pannonian lowland, were only partially or not studied.

Two diploid taxa occur there: *S. vindobonensis* Speta ( $2n = 18$ ), and *S. kladnii* Schur [syn. *S. subtriphylla* Schur, *S. bifolia* subsp. *subtriphylla* (Schur) Domin] ( $2n = 18$ ). They are supposed to be confined to certain geographical areas: *S. kladnii* is an endemic species

with a Carpathian range, most localities are in the Southern and Eastern Carpathians, but some reach to Moravia within the Western Carpathians (Trávníček 1996). *Scilla vindobonensis* should be considered a Pannonian species, occurring mainly in floodplain forests along the river Danube, and growing in the alluvia of some of its tributaries. The northern limit of the distribution of *S. vindobonensis* is the Elbe river alluvia near Dresden in E Germany (Speta 1977, 1980). Two subspecies of *S. vindobonensis* are distinguished, *S. vindobonensis* subsp. *vindobonensis* and *S. vindobonensis* subsp. *borhidiana* Kereszty, based on morphology and ecology. The subspecies *borhidiana* grows only in a restricted area of the Mecsek-hegység and Villányi-hegység Mts in S Hungary (Kereszty et al. 1986, Kereszty 1987b, c). Diploid species *S. bifolia* L. ( $2n = 18$ ) occurs mostly in W Europe (France, Germany, Switzerland, Italy), Austria and Slovenia, but has not yet been recorded in the Czech Republic, Hungary or Slovakia (Speta 1974, 1977, Greilhuber & Speta 1977, 1985, Trávníček 1996, 2002).

Apart from diploids, polyploid populations with  $2n = 36$  and  $54$  were found in Central Europe. Their taxonomic classification is still incomplete. Their karyology has been studied, but the data on the chromosome numbers are dispersed in several contributions by different authors (Greilhuber & Speta 1985, Kereszty & Szilágyi 1984, 1986, Kochjarová 2000, Kulová 1991, Letz et al. 1999, Májovský et al. 1970, Májovský & Váchová 1982, Murín & Májovský 1979, Speta 1974, 1977, 2000, Trávníček 1996, Váchová 1987, 1997). The tetraploid Central European populations are usually included in *S. drunensis* (Speta) Speta (syn. *S. bifolia* subsp. *drunensis* Speta): the populations occurring in floodplain forests in Austria, Hungary and the Czech Republic are usually classified as *S. drunensis* s. str. ( $2n = 36$ ), while plants in the hills and low mountains at the northern limit of the Pannonian lowland (N Hungary, S and Central Slovakia) are distinguished as a separate subspecies, *S. drunensis* subsp. *buekkensis* (Speta) Kereszty ( $2n = 36, 54$ ) (Speta 1977, Kereszty 1987b, Trávníček 1996, 2002). The hexaploid populations, occurring in Hungary and Austria are defined as the separate species *S. spetana* Kereszty ( $2n = 54$ ), but the hexaploids, reported from Slovakia and the Czech Republic (Moravia), are not yet taxonomically classified (Kereszty 1987b, Greilhuber & Strehl 1985, Letz et al. 1999, Speta 2000, Trávníček 1996, 2002).

A detailed discussion of some earlier published doubtful data ( $2n = 20$  and  $26$  for *S. bifolia*) was published by Speta (1971, 1979). They were based on incorrect determination of plant material, or wrong interpretation of results.

The aim of the present study is to ascertain the chromosome numbers of *Scilla bifolia* agg. taxa occurring in the Western Carpathians and adjacent part of the Pannonian lowland, within Slovakia, Czech Republic (Moravia), Hungary and Austria. The analyses of the tetraploid and hexaploid populations seem to be particularly significant for the taxonomy of this group.

### Material and methods

Wild collected mature plants cultivated in the Botanical garden, Blatnica, were used as material for the chromosome study. Material from 95 populations was analysed (about 5 bulbs from each population). Pot grown plants were kept in an unheated greenhouse for the analyses. Voucher specimens, collected at the same time at the same sites, are depos-

ited in herbarium BBZ. The locality (phytogeographical or orographical unit, town/village, other data on the site), collector(-s) in alphabetical order and date of collection are given for each population analysed.

The root-tips obtained from each sample were pretreated with a saturated solution of paradichlorobenzene for 3 hours at room temperature, fixed in a freshly prepared mixture of 96% ethanol and 99% acetic acid (3:1) for about 24 hours and stored in a solution of 75% ethanol in cold conditions for analyses. Hydrolysis was carried out in a mixture of 37% hydrochloric acid and 96% ethanol (1:1) for 3–4 minutes. After rinsing in running water (10–15 minutes), the meristems were cut off and squashed in a drop of propionic orcein at a temperature of about 60°C.

## Results and discussion

### *Scilla kladnii* Schur

2n = 18

Localities (Fig. 1): **Slovakia: Ipeľsko-rimavská brázda:** **1.** Town of Lučenec, SE, the Kohársky potok stream valley (coll. Hrivnák 13. 4. 2000). – **2.** Village of Buzitka-Nový Sad, E, north of the Prostredné hill (coll. Belanová & Hrivnák 10. 4. 2003). – **3.** Village of Breznička near the town of Poltár, the ravine forest S of the village and above the Ipeľ river water tank (coll. Hrivnák 17. 3. 2002). – **4.** Town of Rimavská Sobota, WNW, the Čierna lúka stream valley (coll. Belanová & Hrivnák 10. 4. 2003). – **5.** Town of Rimavská Sobota, WNW, stream valley, loc. “Sobôtka” (coll. Belanová & Hrivnák 10. 4. 2003). – **6.** Village of Drienčany, the Blh stream valley (coll. Belanová & Hrivnák 27. 4. 2002). – **7.** Village of Licince, S, the left side of the Muránka river, ca 230 m a.s.l. (coll. Blanár 14. 3. 2002). **Slovenský kras:** **8.** Town of Plešivec, N, base of slope near the factory “Hámor” (coll. Hrivnák, Kochjarová & Vlčko 9. 4. 2003). – **9.** Town of Plešivec, NNW, the nature reserve “Pod Strážnym hrebeňom”, the northeast foothill (coll. Hrivnák, Kochjarová & Vlčko 9. 4. 2003). **Slovenské rudohorie:** **10.** Town of Revúca, the old cemetery in the NW part of the town (coll. Blanár & Kochjarová 29. 3. 2002). – **11.** Town of Revúca, the Muránka river alluvium near to the railway station, loc. “Za Laca”, ca 310 m a.s.l. (coll. Blanár 16. 4. 2000). – **12.** Village of Revúcka Lehota, the forest “Brezovo”, near the water tank Miková, 300 m a.s.l. (coll. Blanár & Kochjarová 1. 4. 2000). – **13.** Village of Lubeník, NEE-part of the Štyri chotáre hill, ca 280 m a.s.l. (coll. Blanár & Kochjarová 1. 4. 2000). – **14.** Village of Kameňany, ESE-part of the Drieňová hill, ca 260 m a.s.l. (coll. Blanár 23. 4. 2000). – **15.** Village of Ratková, S, the Západný Turiec stream valley, ca 280 m a.s.l. (coll. Blanár 28. 3. 2002). **Muránska planina:** **16.** Town of Tisovec, SW, the Hlboký jarok ravine (coll. Blanár, Hrivnák & Kochjarová 18. 4. 2001). – **17.** Village of Muráň, under the nature reserve “Poludnica”, loc. „Piecky“ (coll. Kochjarová 30. 3. 2002). – **18.** Village of Muráň, the Dolinský potok stream valley, loc. “Suchý dol” (coll. Kochjarová 21. 4. 2003). **Krivánska Malá Fatra:** **19.** Village of Kraľovany, the Bystrička stream valley, under the Mt Stoh (coll. Kochjarová 4. 5. 2001). – **20.** Village of Kraľovany, Mt Osnica, the southeast slope, 1200–1300 m a.s.l. (coll. Kochjarová 6. 5. 2003). – **21.** Village of Kraľovany, Mt Osnica, the northwest slope, 1220 m a.s.l. (coll. Kochjarová 6. 5. 2003). **Veľká Fatra:** **22.** Village of Necpaly, the Necpalská dolina stream valley (coll. Kochjarová 15. 4. 2002). – **23.** Village of Necpaly, Mt Borišov, the beech forest under the chalet “Chata pod Borišovom” (coll. Kochjarová 6. 5. 2002). – **24.** Village of Necpaly, on the top of Mt Šoproň (coll. Kochjarová 6. 5. 2002). – **25.** Village of Necpaly, Mt Ploská, the west slope, 1340 m a.s.l. (coll. Kochjarová & Trávníček 7. 5. 2003). – **26.** Village of Blatnica, the mountain ridge between Mt Kráľova studňa (1384 m) and Mt Krížna (1574 m) (coll. Kochjarová 9. 5. 2001). – **27.** Village of Blatnica, the mountain ridge between Mt Kráľova studňa (1384 m) and Mt Smrekov (1441 m) (coll. Kochjarová 9. 5. 2001). – **28.** Village of Blatnica, the beech forest under the Mt Kráľova studňa (1348 m) (coll. Kochjarová 9. 5. 2001). – **29.** Town of Ružomberok, the Bukovinka hill (coll. Kochjarová 29. 4. 2003). **Chočské vrchy:** **30.** Town of Ružomberok-Rybárpole, the south foot of the Čebrať hill (coll. Kochjarová & Hrivnák 10. 4. 2002). **Nízke Tatry:** **31.** Village of Donovaly, the saddle between Mt Nová hoľa and Mt Zvolen, 1350 m a.s.l. (coll. Kochjarová 9. 5. 2003). **Turčianska kotlina:** **32.** Village of Socovce, hill Stráža (coll. Kochjarová 1. 5. 2003). – **33.** Village of Belá, NW, loc. “Zásady” (coll. Kochjarová 16. 4. 2003). – **34.** Village of Záborie, hill Hradište (coll. Kochjarová 24. 4. 2001). – **35.** Village of Dražkovce, near the church (coll. Kochjarová 17. 4. 2002). – **36.** Town of Vrútky, loc. “Belejova lúka” (coll. Kochjarová 17. 4. 2002). – **37.** Village of Sučany, hill Skala (coll. Kochjarová 15. 4. 2002). – **38.** Village of Sučany, hill Bukovina (coll. Kochjarová 24. 4. 2001). – **39.** Village of Turčianska Štiavnička, the castle park loc. “Borová” (coll. Hrivnák & Kochjarová 10. 4.

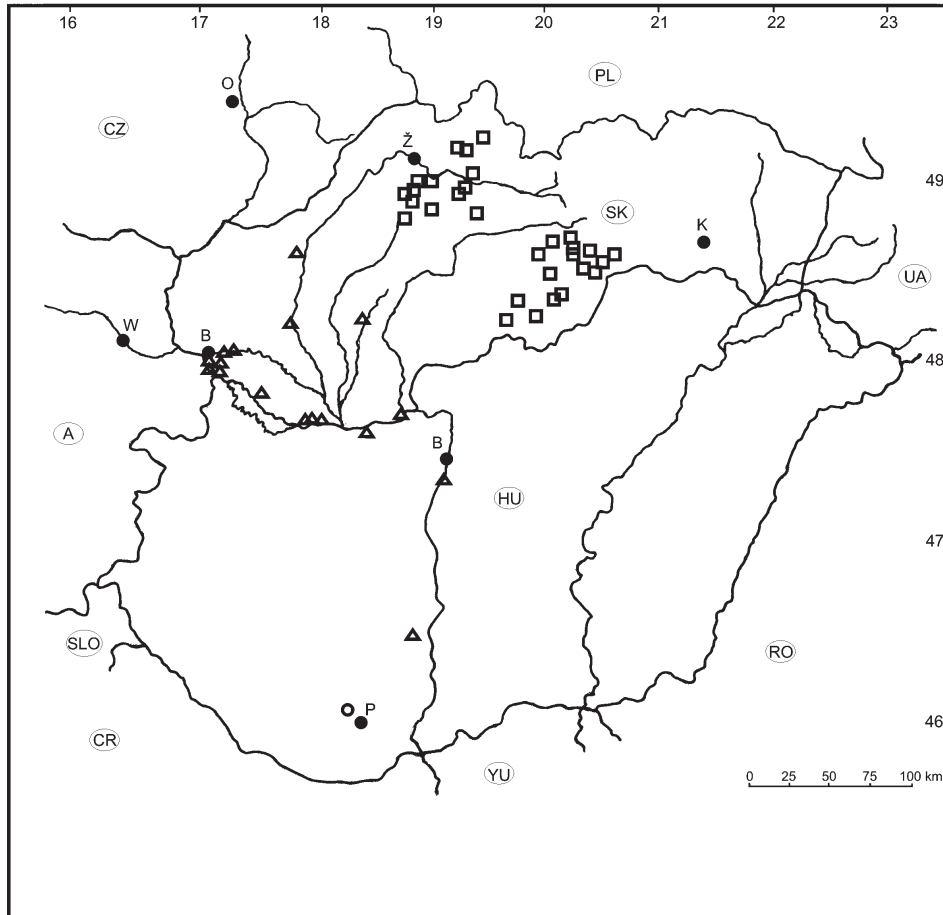


Fig. 1. – Distribution of the diploid populations ( $2n = 18$ ) analysed: *Scilla vindobonensis* subsp. *vindobonensis* ( $\Delta$ ); *Scilla vindobonensis* subsp. *borhidiana* ( $\circ$ ); *Scilla kladni* ( $\square$ ).

2002). **Liptovská kotlina: 40.** Town of Ružomberok, the south part of the town, under the monument from Second World War (coll. Hrivnák 9. 4. 2002). **Západné Beskydy: 41.** Village of Oravský Podzámok, the alluvial forest opposite the castle (coll. Kochjarová 4. 5. 2003).

The same chromosome number,  $2n = 18$ , is recorded for plants throughout the whole distribution area (Speta 1977, 1994, 1980, Greilhuber 1979, Májovský & Váchová 1982, Greilhuber & Speta 1985, Kereszty & Szilágyi 1984, 1986, Kereszty et al. 1986, Sveshnikova 1988, Kulová 1991, Letz et al. 1999, Kochjarová 2000, Trávníček 2002). Two counts from E Slovakia published as *S. bifolia* agg. in all probability are for this species (Murín & Májovský 1979, see the discussion in Speta 1980), as are several from Slovakia designated as *S. bifolia* L. subsp. *danubialis* (Váchová 1987, see also discussion in Trávníček 1996, and Kochjarová 2000).

*Scilla vindobonensis* Speta subsp. *vindobonensis*

2n = 18

**Localities** (Fig. 1): **Slovakia: Podunajská nížina:** **1.** Town of Piešťany, the floodplain forest between the villages of Veľké Orvište, and Bašovce (coll. Kochjarová 31. 3. 2003). – **2.** Town of Sereď, 5 km SW from the centre, the floodplain forest “Malý háj” (coll. Hrivnák & Vlčko 20. 3. 2001). – **3.** Village of Úťany nad Žitavou, the floodplain forest near Veľký les nature reserve (coll. Hrivnák, Kochjarová & Vlčko 12. 3. 2003). – **4.** Town of Bratislava, the floodplain forest “Jelení háj” near the bridge Lafranconi (coll. Kochjarová 5. 4. 2002). – **5.** Town of Bratislava-Petržalka the floodplain forest near crossroad to village of Jarovce (coll. Hrivnák, Kochjarová & Vlčko 12. 3. 2003). – **6.** Town of Bratislava-Rusovce, the floodplain forest near the castle park (coll. Kochjarová 4. 4. 2002). – **7.** Between the villages of Ivánka pri Dunaji, and Zálesie (coll. Devečka 17. 3. 2002). – **8.** Village of Malinovo, E, at the cut-off lake of the Danube (coll. Támová 17. 3. 2002). – **9.** Village of Malinovo, the floodplain forest “Na štrkovisku” (coll. Hrivnák, Kochjarová & Vlčko 12. 3. 2003). – **10.** Village of Gabčíkovo, the floodplain forest at the Forest research institute (coll. Hrivnák, Kochjarová & Vlčko 12. 3. 2003). – **11.** Village of Iža, W, the floodplain forest near the archaeological finding site “Kelemantia” (coll. Kochjarová & Vlčko 19. 3. 2002). – **12.** Village of Iža, the eastern part of the village, Danube river-dam (coll. Kochjarová & Vlčko 19. 3. 2002). – **13.** Village of Veľký Lél, the eastern part of the Veľkolélský ostrov river island (coll. Kochjarová & Vlčko 19. 3. 2003). – **14.** Village of Čenkov, the forest south of the nature reserve “Čenkovská step” (coll. Kochjarová & Vlčko 19. 3. 2003).

**Hungary:** **15.** Village of Dunaalmás, Danube river alluvium, the floodplain forest north of the village (coll. Kochjarová & Vlčko 19. 3. 2003). – **16.** Village of Adony, E, Danube island “Csepel-sziget” (coll. Hrivnák, Ujházy & Vlčko 10. 3. 2002). – **17.** Village of Paks, NNE, Danube river alluvium (coll. Hrivnák, Ujházy & Vlčko 8. 3. 2002).

*Scilla vindobonensis* subsp. *borhidiana* Kereszty

2n = 18

**Locality** (Fig. 1): **Hungary:** **18.** Mecsek Mts, Town of Pécs, the Misina hill, the southwest slope (coll. Hrivnák, Ujházy & Vlčko 10. 3. 2002).

The same chromosome number, 2n = 18 is recorded throughout the whole distribution area of *S. vindobonensis* (Speta 1971, 1974, 1977, 1980, 2000, Greilhuber & Speta 1977, 1985, Greilhuber 1978, 1979, Kereszty & Szilágyi 1984, 1986, Kereszty et al. 1986, Váchová 1987, 1997, Kulová 1991, Svoma 1981 sec. Speta 2000, Trávníček 2002). Some data, published for *S. bifolia* L. in all probability are for this species: Pólya (1950), Garajová in Májovský et al. (1970); see also discussion in Speta (1971, 1977). There is a single reference to tetraploids (2n = 36) in N Hungary, locality Vámosszabadi (distr. Győr, Danube river alluvium), published by Kereszty & Szilágyi (1984: 56, 57, 61). In all probability this is a mistake, although the authors have not corrected it in their subsequent papers (Kereszty & Szilágyi 1986: 171, Kereszty et al. 1986: 109).

*Scilla drunensis* (Speta) Speta subsp. *drunensis*

2n = 36

**Localities** (Fig. 2): **Czech Republic: Moravia, Vizovická vrchovina Mts:** **1.** Village of Veletiny, E of the village (coll. Kochjarová & Vlčko 2. 4. 2003). – **2.** Village of Vlčnov, the forest “Vlčnovský háj” (coll. Kochjarová & Vlčko 2. 4. 2003).

The counts presented here confirm earlier reports for *S. drunensis* s. str. (2n = 36): Speta (1974, 1977, 2000), Greilhuber & Speta (1985), Kereszty & Szilágyi (1984, 1986), Kulová (1991).

*Scilla drunensis* subsp. *buekkensis* (Speta) Kereszty

2n = 36

**Localities** (Fig. 2): **Slovakia: Ipelsko-rimavská brázda:** **1.** Town of Lučenec, NW, the castle park “Halič” (coll. Hrivnák, Kochjarová & Vlčko 25. 3. 2001). – **2.** Village of Belina, the Belinské skaly rocks (coll. Belanová & Hrivnák 10. 4. 2003). – **3.** Village of Breznička, near the town of Poltár, S from the village, above the Ipeľ water tank, the oak forest on the southwest slope (coll. Hrivnák 17. 3. 2002). **Slovenský kras:** **4.** Village of Jelšavská

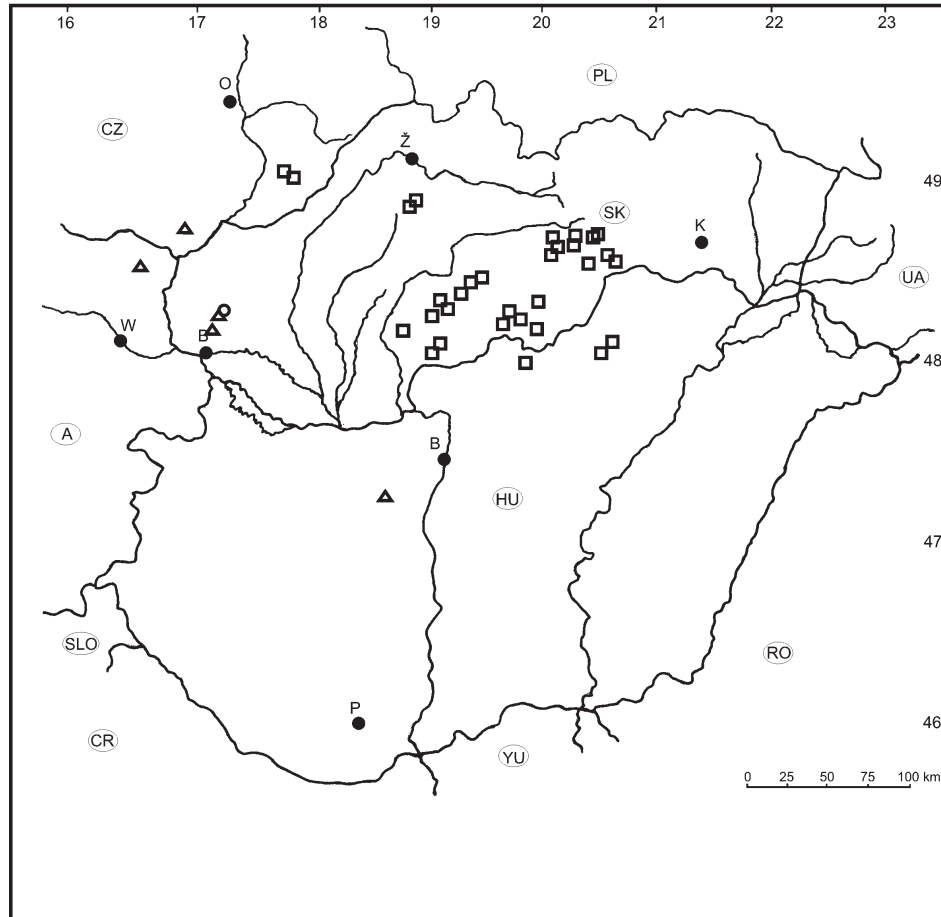


Fig. 2. – Distribution of the polyploid populations analysed:  $2n = 36$  (□);  $2n = 54$  (△);  $2n = 36, 54$  mixed population (○).

Teplica, the north base of hill Muteň, 260 m a.s.l. (coll. Blanár 20. 4. 2001). – **5.** Village of Slavec, E, the Silická planina plateau, hill Vysoké bralo, 672 m (coll. Hrivnák, Kochjarová & Vlčko 9. 4. 2003). – **6.** Town of Plešivec, N, the Plešivecká planina plateau, between Ďulová hill and Vysoký vrch forest house (coll. Hrivnák, Kochjarová & Vlčko 9. 4. 2003). – **Podunajská nížina:** **7.** Village of Nová Dedina, N of the town of Levice, loc. “Svätý Urban” (coll. Vlčko 17. 3. 2002). – **Poľana:** **8.** Town of Detva, the nature reserve “Rohy” (coll. Kochjarová & Vlčko 10. 4. 2000). – **Muránska planina:** **9.** Town of Tisovec, Mt Hradová, ca 850 m a.s.l. (coll. Blanár & Kochjarová 10. 4. 2001). – **10.** Town of Tisovec, the mountain meadow “Díždovnica”, ca 1160 m a.s.l. (coll. Blanár 5. 5. 2001). – **11.** Village of Muráň, the mountain ridge Šance (1000 m a.s.l.) (coll. Blanár & Kochjarová 30. 3. 2002). – **12.** Village of Muráň, the castle hill Cigánka, ca 950 m a.s.l. (coll. Blanár & Kochjarová 4. 4. 2001). – **13.** Village of Muráň, the mountain ridge Poludnica, ca 900 m a.s.l. (coll. Blanár & Kochjarová 14. 4. 2001).

**Hungary:** **14.** Bükk-hegység Mts, the forest between the villages of Felső Tárkány, and Répáshuta (coll. Hrivnák, Kochjarová & Vlčko 26. 3. 2003). – **15.** Bükk-hegység Mts, village of Répáshuta, near the mountain chalet, *locus classicus* of *S. buekkensis* Speta (coll. Hrivnák, Kochjarová & Vlčko 26. 3. 2003).

Earlier reports for *S. drunensis* subsp. *buekkensis*: 2n = 36, 54 (Speta 1977, Váchová 1987), 2n = 36 (Greilhuber 1979, Kereszty & Szilágyi 1984, 1986, Kereszty et al. 1986, Kulová 1991, Letz et al. 1999, Kochjarová 2000).

*Scilla drunensis* s.l. (colline populations)

2n = 36

**Localities** (Fig. 2): **Slovakia: Ipésko-rimavská brázda:** **1.** Town of Lučenec, the Kohársky potok stream alluvium (coll. Hrivnák & Vlčko 10. 4. 2000). – **2.** Village of Horné Turovce, WSW, the Krupinica river alluvium (coll. Vlčko 30. 3. 2003). – **3.** Village of Jelšovec, the Jalšovník stream alluvium, oak-hornbeam forest, 220 m a.s.l. (coll. Hrivnák 30. 4. 2002). – **4.** Village of Domaníky, E from the village (coll. Vlčko 30. 3. 2003). – **5.** Village of Dolné Turovce, the floodplain forest on the Krupinica river alluvium, 1 km W from the village (coll. Záchenská 2. 4. 2002). **Slovenské stredohorie:** **6.** Town of Krupina, the floodplain forest on the Krupinica river alluvium, 6 km N from the town (coll. Vlčko 30. 3. 2003). – **7.** Village of Bzovík, S from the Bzovický mlyn settlement (coll. Vlčko 30. 3. 2003).

**Hungary:** **8.** Medves Mts, village of Somoskőújfalu, the Salgó hill (coll. Hrivnák, Kochjarová & Vlčko 26. 3. 2003).

In Slovakia only *S. drunensis* subsp. *buekkensis* is known. Populations, classified as “*Scilla drunensis* (colline)”, were found at more localities in the Central and S Slovakia, and N Hungary respectively (one locality). They grow mostly in the alluvia of small rivers and streams. Several morphological characteristics of these plants do not correspond to the original description of *S. buekkensis* (they accord more with the description of *S. drunensis* s. str.).

*Scilla drunensis* s.l. (mountain populations)

2n = 36

**Localities** (Fig. 2): **Slovakia: Poľana:** **1.** Mt Predná Poľana, mountain meadows NE from the hotel (coll. Hrivnák 9. 5. 2001). **Slovenské rudohorie:** **2.** Town of Tisovec, Mt Vysoký vrch, ca 1100 m a.s.l. (coll. Blanár 23. 4. 2002). – **3.** Village of Muránska Zdychava, Mt Stolica, loc. “Mníšanka” (coll. Blanár & Kochjarová 19. 5. 2003). – **4.** Village of Muránska Zdychava, the mountain meadow “Kašajka” (ca 1100 m a.s.l.) (coll. Blanár & Kochjarová 1. 5. 2001). **Veľká Fatra:** **5.** Village of Blatnica, Mt Ostredok, 1360 m a.s.l. (coll. Kochjarová & Trávníček 7. 5. 2003). – **6.** Village of Blatnica, Mt Ostredok, the western slope above the “Drobkov” forest house (coll. Kochjarová & Trávníček 7. 5. 2003).

Populations, classified as “*S. drunensis* (mountain)” were found at more localities in Central and E Slovakia, namely the mountain belt of Poľana, Slovenské rudohorie and the Veľká Fatra Mts (Western Carpathians). Most of the morphological characteristics accord with the description of *S. drunensis* s. str.

*Scilla spetana* Kereszty

2n = 54

**Localities** (Fig. 2): **Hungary:** **1.** Velencei-hegység Mts, the Nadap hill – locus classicus of *S. spetana* (coll. Hrivnák, Ujházy & Vlčko 10. 3. 2002).

**Austria:** **2.** Weinviertel Mts, the valley Kreuttal (coll. Kochjarová & Vlčko 2. 4. 2003).

These results accord with earlier reports for *S. spetana* from the same localities in Hungary, and Austria (Kereszty & Szilágyi 1984, Greilhuber & Strehl 1985, cf. Speta 2000).

*Scilla bifolia* agg. (taxonomically doubtful polyploids)

2n = 36, 54

**Localities** (Fig. 2): **Slovakia:** **1.** Malé Karpaty Mts, village of Vinosady, southeast slope under the “Holubyho lesostep” nature reserve (coll. Kochjarová 31. 3. 2003); 2n = 36, 54. – **2.** Malé Karpaty Mts, village of Pezinok, the Čajla valley (coll. Kochjarová 31. 3. 2003) 2n = 54.

**Czech Republic:** **3.** Moravia, Jihomoravský úval river basin, village of Mikulčice, the forest near the archaeological finding site (coll. Kochjarová & Vlčko 2. 4. 2003); 2n = 54.

The counts, presented here, confirm earlier data from the Malé Karpaty Mts and S Moravia:  $2n = 54$  (Váchová 1987, Kulová 1991, Letz et al. 1999, Trávníček 1996, 2002). Apart from the hexaploid individuals, tetraploids were found in the same population at Vinosady in the Malé Karpaty Mts. A similar situation occurs in *S. drunensis* subsp. *buekkensis* in Bükk Mts. (locus classicus) (Speta 1977, cf. Kereszty & Szilágyi 1984) and some other polyploid populations (B. Trávníček 2004, personal communication).

To ascertain the relationship of hexaploid populations from Slovakia and Moravia to *S. spetana*, a detailed study of all polyploid populations is needed, including analyses of individual plants.

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### Súhrn

Príspevok zhŕňa analýzy chromozómových počtov 95 populácií *Scilla bifolia* agg. z oblasti Západných Karpát a priľahlej časti Panónie (Slovensko, Česká Republika – Morava, Maďarsko, Rakúsko), konfrontovaný s doposiaľ publikovanými dátami z celého areálu študovaného okruhu taxónov. Ukazuje sa, že dva diploidné druhy z agregátu *S. bifolia*, vyskytujúce sa v stredo európskom priestore, *S. vindobonensis* Speta a *S. kladnii* Schur, sú karyologicky jednotné v celom areáli. Chromozómový počet  $2n = 18$ , udávaný v prácach viacerých autorov, bol potvrdený výsledkami analýz 41 populácií *S. kladnii* zo slovenskej časti Západných Karpát a výsledkami analýz 18 populácií *S. vindobonensis* z povodia Dunaja (Slovensko, Maďarsko). Výsledky týchto analýz vo viacerých prípadoch pomôžu precíznejšie vymedziť hranice rozšírenia *S. vindobonensis* a *S. kladnii* v strednej Európe, najmä však na území Slovenska, kde donedávna chýbali súbornejšie chorologické informácie.

Tetraploidné populácie, vyskytujúce sa v strednej Európe, patria napospol druhu *S. drunensis* (Speta) Speta ( $2n = 36$ ), pričom rastliny z lužných lesov v Rakúsku a Českej republike boli doteraz zväčša klasifikované ako nominálny poddruh *S. drunensis* subsp. *drunensis*, zatiaľ čo rastliny z teplejších predhorí Západných Karpát (severné Maďarsko, južné Slovensko) sa obvykle vyčleňovali do osobitného poddruhu *S. drunensis* subsp. *buekkensis* (Speta) Kereszty. Chromozómový počet  $2n = 36$  bol potvrdený výsledkami analýz 2 populácií *S. drunensis* subsp. *drunensis* z Moravy a analýzami 15 populácií *S. drunensis* subsp. *buekkensis* zo Slovenska a Maďarska.

Tetraploidný počet chromozómov  $2n = 36$  bol však zistený aj v prípade ďalších 14 populácií, vyskytujúcich sa v slovenskej časti Západných Karpát, resp. ojedinele aj na severe Maďarska, ktoré svojou znakovou výbavou nezodpovedajú opisu *S. drunensis* subsp. *buekkensis*. Tieto sú v príspevku predbežne označené ako *S. drunensis* s.l. „kolínne populácie“ (materiál z 8 lokalít, sústredených zväčša v alúviách menších tokov na území stredného a južného Slovenska, s presahom do severného Maďarska) a *S. drunensis* s.l. „montánne populácie“ (materiál zo 6 lokalít, sústredených v montánnom stupni Veľkej Fatry, Poľany a Slovenského rudohoria). Mofologicky majú jednoznačne bližšie ku *S. drunensis* s. str., než ku poddruhu *buekkensis*. Podrobnejší rozbor morfológických znakov a následná taxonomická klasifikácia nie sú predmetom tejto štúdie, a preto budú riešené na inom mieste.

Hexaploidný počet chromozómov ( $2n = 54$ ) sa podarilo potvrdiť na oboch zatiaľ známych lokalitách výskytu *S. spetana* Kereszty (analyzovaná bola jedna populácia v Maďarsku – locus classicus a jedna populácia v Dolnom Rakúsku). Hexaploidný počet  $2n = 54$  bol zistený aj pri analýzách troch populácií, vyskytujúcich sa na južnej Morave a na juhozápadnom Slovensku, pričom v jednej zo skúmaných populácií (lok. Malé Karpaty, Vinosady) boli popri väčšine hexaploidných zistené aj tetraploidné jedince s počtom chromozómov  $2n = 36$ . Uspokojujúce riešenie tejto problematiky (taxonomická klasifikácia hexaploidných populácií, resp. vyjasnenie ich vzťahu ku *S. spetana*) vyžaduje ďalšie dôkladné štúdium vrátane separovaných analýz viacerých exemplárov v rámci jednej populácie.



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