

## Chromosome number and DNA ploidy level reports of vascular plants – 4

edited by Patrik MRÁZ

**Abstract:** The fourth part of commented chromosome number and DNA ploidy level reports includes following original reports: *Avenula compressa* ( $2n = 14$ ,  $2n \sim 2x \sim 14$ ), *A. pubescens* ( $2n = 14$ ,  $2n \sim 2x \sim 14$ ) and *A. versicolor* ( $2n = 14$ ,  $2n \sim 2x \sim 14$ ) by M. Perný, L. Mártonfiová & I. Hodálová from the Czech Republic, Hungary and Slovakia (reports nos. 35–37); *Pilosella baubini* ( $2n = 36$ ), *P. cymosa* ( $2n = 18$ ,  $2n \sim 2x \sim 18$ ), *P. lactucella* ( $2n = 18$ ,  $2n \sim 2x \sim 18$ ), *P. macrantha* ( $2n \sim 2x \sim 18$ ), *P. officinarum* ( $2n \sim 5x \sim 45$ ,  $2n = 54$ ,  $2n \sim 6x \sim 54$ ), *P. peleteriana* ( $2n = 18$ ), *P. petraea* ( $2n \sim 2x \sim 18$ ), *P. pseudopilosella* ( $2n = 18$ ,  $2n \sim 2x \sim 18$ ), *P. ×stoloniflora* ( $2n = 45$ ) from Bulgaria, France, Italy, Romania, Serbia, Slovakia, Sweden and Switzerland by P. Mráz & B. Šingliarová (nos. 38–46).

**Key words:** Asteraceae; flow cytometry; *Hieracium*; karyology; Poaceae

### Editorial

The previous parts of the reports were entitled Chromosome number and DNA ploidy level reports from Central Europe (Mráz 2005, 2006, 2007). Starting with present reports no restriction for geographical origin of plant material will be applied and all original reports throughout the world are welcome for submission. Original unpublished data should be submitted in electronic form to the editor of this column Patrik Mráz: patrik.mraz@unifr.ch (Department of Biology, Ecology and Evolution Unit, University of Fribourg, CH-1700 Fribourg, Switzerland).

### Reports (35–37) by Marián Perný<sup>1,2</sup>, Lenka Mártonfiová<sup>3</sup> & Iva Hodálová<sup>1</sup>

<sup>1</sup>*Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, SK-84523 Bratislava, Slovakia; e-mail: marian.perny@savba.sk, iva.hodalova@savba.sk*

<sup>2</sup>*Faculty of Natural Sciences, Matej Bel University, Tajovského 40, SK-97401 Banská Bystrica, Slovakia*

<sup>3</sup>*P. J. Šafárik University, Botanical Garden, Mánesova 23, SK-04154 Košice, Slovakia; e-mail: lenka.martonfiova@upjs.sk*

Samples for DNA-ploidy level estimations using flow cytometry and DAPI as a stain were prepared from young leaves from plants transferred from the field and cultivated in the experimental garden. Internal reference standard was *Bellis perennis* L., 2C DNA = 3.38 pg (Schönswetter et al. 2007).

### 35. *Avenula compressa* (Heuff.) W. Sauer & Chmel. (Poaceae)

#### $2n = 14$ Mártonfiová

**Locality:** Hungary, Pilis Mts, dry grasslands S above the village of Pomáz, 190 m a.s.l., 47°38'53" N, 18°59'53" E, coll. and det. M. Perný & I. Hodálová, 27. V. 2008 (SAV, no. Perný 08-151-1)

#### $2n \sim 2x \sim 14$ Perný & Hodálová

**Localities:** **1.** Hungary, Pilis Mts, dry grasslands S above the village of Pomáz, 190 m a.s.l., 47°38'53" N, 18°59'53" E, coll. and det. M. Perný & I. Hodálová, 27. V. 2008 (SAV, no. Perný 08-151-1, 08-151-2, 08-151-3, 08-151-4, 08-151-5). **2.** Hungary, Visegrádi-hegység Hills, the village of Piliszentlászló, dry grassland near a small quarry NW of the village, 365 m a.s.l., 47°44'10" N, 18°58'23" E, coll. and det. M. Perný & I. Hodálová, 27. V. 2008 (SAV, no. Perný 08-150-1, 150-2, 150-3)

The chromosome count and the DNA-ploidy level estimates correspond to published diploid chromosome number for this species (e.g. Sauer & Heubl 1984, Lange 1995).

Fluorescence intensity (against *Bellis perennis* with unit value) for eight analysed plants of *A. compressa* varied between 1.48–1.54 (mean 1.51).

### 36. *Avenula pubescens* (Huds.) Dumort. (Poaceae)

#### $2n = 14$ Mártonfiová

**Locality:** Slovakia, Nízke Tatry Mts, town of Banská Bystrica, meadows above the part Podlavice, 585 m a.s.l., 48°43'52" N, 19°05'20" E, coll. and det. M. Perný, 22. VIII. 2008 (SAV, no. Perný 08-220-1)

#### $2n \sim 2x \sim 14$ Perný & Hodálová

**Localities:** **1.** Czech Republic, Bělohorská tabule, near the village of Kuchař, 390 m a.s.l., 49°15'00" N, 14°59'13" E, coll. and det. M. Perný & I. Hodálová, 20. V. 2008 (SAV, no. Perný 08-147-1, 08-147-2, 08-147-3). **2.** Czech Republic, Poděbradské Polabí, the village

of Chrást (near Poříčany), 220 m a.s.l., 50°06'08" N, 14°54'36" E, coll. and det. M. Perný & I. Hodálová, 20. V. 2008 (SAV, no. Perný 08-148-1, 08-148-2, 08-148-3). **3.** Czech Republic, Pavlovské kopce Hills, S of the village of Klentnice (near Mikulov), 345 m a.s.l., 48°49'52" N, 16°38'30" E, coll. and det. M. Perný & I. Hodálová, 21. V. 2008 (SAV, no. Perný 08-149-1, 08-149-2, 08-149-3). **4.** Slovakia, Nízke Tatry Mts, town of Banská Bystrica, meadows above the part Podlavice, 585 m a.s.l., 48°43'52" N, 19°05'20" E, coll. and det. M. Perný, 22. VIII. 2008 (SAV, no. Perný 08-220-1, 08-220-2, 08-220-3). **5.** Slovakia, Nízke Tatry Mts, the village of Donovaly, part Bully, 1037 m a.s.l., 48°52'07" N, 19°13'10" E, coll. and det. M. Perný, 21. VIII. 2008 (SAV, no. Perný 08-219-1, 08-219-2, 08-219-3). **6.** Hungary, Budai-hegység Hills, city of Budapest, Széchenyi-hegy Hill, 435 m a.s.l., 47°29'21" N, 18°58'52" E, coll. and det. M. Perný & K. Olšovská, 16. V. 2008 (SAV, no. Perný 123-1, 123-2, 123-3). **7.** Hungary, Visegrádi-hegység Hills, ca. 6 km SE of the town of Esztergom, ruderal grassland along the road, 157 m a.s.l., 47°45' N, 18°47'04" E, coll. and det. M. Perný & I. Hodálová, 27. V. 2008 (SAV, no. Perný 08-154-1, 08-154-2). **8.** Hungary, Bükk-hegység Hills, S of the town of Miskolctapolca, between Kis-kőmázsa and Nagy-kőmázsa, 342 m a.s.l., 48°03'20" N, 20°42'34" E, coll. and det. M. Perný & K. Olšovská, 15. V. 2008 (SAV, no. Perný 141-1, 141-2).

The presented diploid chromosome number and the DNA-ploidy level estimates agree with the majority of published counts (e.g. Hindáková & Činčura 1968, Sauer 1984, Frey 1991). Tetraploid chromosome count was published only from Bulgaria (Kozuharov & Petrova 1991).

Fluorescence intensity (against *Bellis perennis* with unit value) for 22 analysed plants of *A. pubescens* varied between 1.84–2.00 (mean 1.89).

**37. *Avenula versicolor* (Vill.) M. Laínz (Poaceae)**  
**2n = 14** Mártonfiová

**Locality:** Slovakia, Nízke Tatry Mts, below the Veľká Chochuľa Hill, 1724 m a.s.l., 48°53'26" N, 19°19'44" E, coll. and det. M. Perný, 30. VII. 2008 (SAV, no. Perný 08-218-3)

**2n ~ 2x ~ 14** Perný & Hodálová

**Localities:** **1.** Slovakia, Nízke Tatry Mts, below the Veľká Chochuľa Hill, 1724 m a.s.l., 48°53'26" N, 19°19'44" E, coll. and det. M. Perný, 30. VII. 2008 (SAV, no. Perný 08-218-1, 08-218-2, 08-218-3, 08-218-4, 08-218-5). **2.** Slovakia, Nízke Tatry Mts, near the Kumštové sedlo Saddle, 1553 m a.s.l., 48°55'19" N, 19°41'56" E, coll. and det. M. Perný, 29. VII. 2008 (SAV, no. Perný 08-217-1, 08-217-2, 08-217-3, 08-217-4, 08-217-5). **3.** Slovakia, Vysoké Tatry Mts, Predné Kopské sedlo Saddle, 1778 m a.s.l., 49°13'37" N, 20°13'17" E, coll. and det. M. Perný, 12. IX. 2008 (SAV, no. Perný 08-221-1, 08-221-2, 08-221-3, 08-221-4, 08-221-5).

The presented diploid chromosome number and the DNA-ploidy level estimates agree with published counts

(e.g., Májovský et al. 1974, Sauer & Heubl 1984, Pashuk 1987).

Fluorescence intensity (against *Bellis perennis* with unit value) for 15 analysed plants of *A. versicolor* varied between 1.19–1.24 (mean 1.22).

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**Reports (38–46) by Patrik Mráz<sup>1</sup> & Barbora Šingliarová<sup>2</sup>**

<sup>1</sup>*Département de Biologie, Unité d'Ecologie & Evolution, Université de Fribourg, CH-1700 Fribourg, Switzerland*

<sup>2</sup>*Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, SK-845 23 Bratislava, Slovakia, e-mail: barbora.singliarova@savba.sk*

Analysis of the relative DNA content was performed with FACSCalibur instrument (Becton Dickinson, USA) using propidium iodide as a stain. The clones of previously cytologically studied diploid ( $2n = 2x = 18$ ) plants of *Pilosella lactucella* (cf. Rotreklová et al. 2002, 2005) were used as internal reference standard.

**38. *Pilosella bauhini* (Schult.) Arv.-Touv. (Asteraceae)**

**2n = 36** Mráz

**Locality:** Slovakia, Branisko Mts, village of Lipovce, calcareous rocks at the entrance to the Lačnovský kaňon gorges, 550 m a.s.l., 49°03'12.42" N, 20°56'27.44" E, coll. and det. P. Mráz & B. Šingliarová, 6. X. 2004 (SAV s.n., one plant, cult. no. 1744).

The tetraploid count from the Eastern Slovakia concurs with the general cytogeographic pattern reported for this species by Rotreklová (2004).

**39. *Pilosella cymosa* (L.) F. W. Schultz & Sch. Bip. (Asteraceae)**

**2n = 18** Šingliarová, **2n ~ 2x ~ 18** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 1.0)

**Locality:** Slovakia, Spišská kotlina basin, village of Primovce, Nature Reserve of Primovské skaly, 600 m a.s.l., 49°00'56.76" N, 20°22'58.13" E, coll. and det. P. Mráz, 20. VIII. 2008 (SAV s.n., 9 plants, the karyologically counted plant is marked by asterisk, cult. nos. Cym1, Cym2, Cym3, Cym4, Cym5\*, Cym6, Cym7, Cym8, Cym9).

This is the first diploid count / DNA-ploidy level estimation from Slovakia. The locality represents the relic rocky outcrops with co-occurring *Allium strictum*. Beside the tetraploid chromosome number ( $2n = 4x = 36$ ), the most frequent for this species,

also diploid, hexaploid and heptaploid were reported (Měsíček & Jarolímová 1992; Schuhwerk & Lippert 1997, 1998, 2002; Šimek 2000; Vladimirov & Szelağ 2001; Rotreklová et al. 2005).

**40. *Pilosella lactucella* (Wallr.) P.D. Sell & C. West (Asteraceae)**

**2n = 18** Šingliarová, Mráz

**Localities:** **1.** Serbia, Kopaonik Mts, Mt. Suvo Rudište, 1917 m a.s.l., 43°16'28" N, 20°48'55" E, coll. and det. B. Šingliarová & R. Lakoštík, 2. VII. 2007 (SAV s.n., 1 plant, cult. no. Kop\_lac1, 2n = 18, counted by Šingliarová). **2.** Romania, Munșii Parîngului Mts, Cabana Rosu, ca 1671 m a.s.l., 45°23'0.6" N, E 23°28'19.9" E, coll. and det. P. Mráz & J. Chrtek, 11. VII. 2004 (SAV s.n., 1 plant, 2n = 18, counted by Mráz).

**2n ~ 2x ~ 18** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 1.0)

**Locality:** Italy, South Tyrol, Mt. Pufplatsch, 2160 m a.s.l., 46°33'07" N, 11°36'47" E, coll. and det. B. Šingliarová & R. Lakoštík, 8. VIII. 2007 (SAV s.n., 2 plants, cult. no. Puf2, Puf3, 2n ~ 2x).

A diploid cytotype (2n = 18) is the most common in this species. Rare triploid and tetraploid counts have also been published (Schuhwerk 1996 and references therein).

**41. *Pilosella macrantha* (Ten.) F.W. Schultz & Sch. Bip. (Asteraceae)**

**2n ~ 2x ~ 18** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 0.84–0.89)

**Locality:** Bulgaria, Stara planina Mts, Mt. Botev, 2352 m a.s.l., 42°42'54" N, 24°55'01" E, coll. and det. B. Šingliarová & R. Lakoštík, 11. VII. 2007 (SAV s.n., 3 plants, cult. no. Bot1, Bot9, Bot24).

Our DNA-ploidy level estimations concur with the literature (Schuhwerk 1996 and references therein). Higher ploidy levels are either artificially induced polyploids (Christoff & Christoff 1948), or might belong to other taxa.

**42. *Pilosella officinarum* F.W. Schultz & Sch. Bip. (Asteraceae)**

**2n ~ 5x ~ 45** Mráz, Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 2.06–2.11)

**Localities:** **1.** Sweden, by the highway E4, N of Jönköping, 233 m a. s. l., 58°00'06.9" N, 14°27'04.7" E, coll. and det. P. Mráz, 16. VIII. 2006 (without voucher, 1 plant, cult. no. Jon1, 2n ~ 5x, estimated by Šingliarová). **2.** Romania, Muntele Mare Mts, village of Poșaga, near Scărișa Belioara, pastures, 46°29' N, 23°22' E, coll. and det. R. Letz, 18. VI. 2005 (SAV s.n., 1 plant, 2n ~ 5x, estimated by Mráz).

**2n = 54** Mráz

**Locality:** France, Alpes Maritimes, Col de Tende, southern slopes, 1330 m a. s. l., 44°08'18" N, 7°33'59" E, coll. and det. P. Mráz and J. Chrtek, 28. VIII. 2005 (SAV s.n., 1 plant, cult. no. 1853)

**2n ~ 6x ~ 54** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 2.46–2.55).

**Locality:** Switzerland, Canton of Valais, Simplon pass, 2000 m a.s.l., 46°15' N, 08°00'50" E, coll. and det. P. Mráz as subsp. *velutinum*, 11. IX. 2006 (SAV s.n., 3 plants, cult. no. Sim\_off1, Sim\_off2, Sim\_off3).

Five ploidy levels (2x, 4x, 5x, 6x, 7x) have been reported in *P. officinarum* (reviewed by Mráz et al. 2008). Our data fit well with general cytogeographical pattern observed in Europe (Mráz et al. 2008)

**43. *Pilosella peleteriana* (Mérat) F. W. Schultz & Sch. Bip. (Asteraceae)**

**2n = 18** Mráz

**Locality:** France, Les Hautes Alpes, town of Briançon, Le bois de l'Ours, 1450 m a. s. l., 44°55'06.5" N, 06°37'37.2" E, col. and det. P. Mráz, VII. 2003 (SAV s.n., 1 plant, cult. no. 1354).

Diploids (2n = 18) and tetraploids (2n = 36) are known for the taxon (Schuhwerk 1996 and references therein).

**44. *Pilosella petraea* F. W. Schultz & Sch. Bip. (Asteraceae)**

**2n ~ 2x ~ 18** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 1.08–1.09)

**Locality:** Romania, Banat Mts, village of Ciclova-Montană, Mt. Piatra Rolului coll. P. Mráz & V. Mrázová, det. P. Mráz, 6. VIII. 2008 (SAV s.n., 9 plants, cult. no. ore1–9).

This is the first record of DNA-ploidy level estimate for the taxon. Szelağ (2007) briefly mentioned that *P. petraea* (originally as *Hieracium oreades*) is diploid, but without giving any precise locality, collector(s), etc.

**45. *Pilosella pseudopilosella* (Ten.) Soják (Asteraceae)**

**2n = 18** Šingliarová, **2n ~ 2x ~ 18** Šingliarová (fluorescence intensity against *P. lactucella* with unit value: 0.87–0.95)

**Localities:** **1.** Bulgaria, Rila Mts, Mt. Jastrebets, 2359 m a.s.l., 42°13'29" N, 23°34'46" E, coll. and det. B. Šingliarová & R. Lakoštík, 20. VII. 2006 (SAV s.n., 2 plants, cult. no. Mus\_pse1, Mus\_pse2). **2.** Bulgaria, Rila Mts, surrounding of Grantschar chalet, 2200 m a.s.l., 42°07'16" N, 23°35'29" E, coll. and det. B. Šingliarová & R. Lakoštík, 9. VII. 2007 (SAV s.n., 3 plant, cult. no. Gran1, Gran10, Gran11). **3.** Bulgaria, Pirin Mts, Mt. Bezbog, 2414 m a.s.l., 41°43'35" N, 23°30'57" E, coll. and det. B. Šingliarová & R. Lakoštík, 23. VII. 2006 (SAV s.n., 1 plant, cult. no. Bez07/7).

Diploids (2n = 18) and tetraploids (2n = 36) are known in this taxon (Schuhwerk 1996 and references therein).

**46. *Pilosella* × *stoloniflora* (Waldst. & Kit.). F. W. Schultz & Sch. Bip. (*P. aurantiaca* × *P. officinarum*) (Asteraceae)**

**2n = 45** Mráz

**Locality:** Romania, Munții Parîngului, Cabana Rosu, 45°23'0.6" N, E 23°28'19.9" E, ca 1671 m a.s.l., coll.

and det. P. Mráz & J. Chrtek, 11. VII. 2004 (SAV s.n., 1 plant).

Four ploidy levels (from  $3x$  to  $6x$ ) have been reported for this hybrid (reviewed in Krahulcová & Krahulec 1999).

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