

## Chromosome number and DNA ploidy level reports from Central Europe – 1

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**Abstract:** This is the first part of an intended series of chromosome number and DNA ploidy level reports from Central Europe, including the whole Carpatho-Pannonian region. Here, the chromosome counts/estimations of DNA ploidy level using flow cytometry are given for 10 taxa: *Asplenium cuneifolium* ( $n = 36II$ ) by S. JEŤEN & H. RASBACH from Slovakia (no. 1); *Tephroseris papposa* ( $2n = 48$ ) and *T. capitata* ( $2n = 96$ ) by J. KOCHJAROVÁ from Slovakia and Romania (nos. 2–3); *Allium fussii* ( $2n = 16$ ), *Brachyactis ciliata* ( $2n = 14$ ), *Campanula gentilis* ( $2n = 34$ ), *C. moravica* ( $2n \sim 4x$ ), *C. rotundifolia* s. l. ( $2n = 68$ ,  $2n \sim 4x$ ), *C. tatrae* ( $2n \sim 4x$ ), *Potentilla aurea* subsp. *chrysocraspeda* ( $2n = 14$ ) and *Tephroseris papposa* ( $2n = 48$ ) by P. MRÁZ from the Czech Republic, Hungary, Romania, Slovakia and Ukraine (nos. 4–11). For the first time the chromosome count is given for *Allium fussii* (*A. paniculatum* group). One existing chromosome number for *Tephroseris papposa* given in the literature ( $2n = 40$ ) is with high probability incorrect.

**Key words:** *Alliaceae*, *Aspleniaceae*, *Asteraceae*, *Campanulaceae*, cytotaxonomy, FCM, *Rosaceae*, *Senecio*.

### Editorial

The series of chromosome number and DNA ploidy level reports is expected to be published once or twice per each volume of *Biologia*, Bratislava, depending on the amount of contributions received. Although, this series is a part of large project “Database of chromosome counts of pteridophytes and flowering plants of the Slovak Republic” (APVT-51-006002), the main goal is the stimulation of karyotaxonomical research mainly in the regions with very scarce karyological data (e.g. Romania, Ukraine). The geographical area comprises the whole Carpathian mountain range and Pannonian basin (covering the whole area of Slovakia and almost all Hungary, most part of Romania and some parts of Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Poland, Serbia, Slovenia and Ukraine, see Fig. 1., KLIMENT 1999), and adjacent part of Central Europe including the following countries: Austria, Czech Republic, Germany, Hungary, Poland, Slovenia and Switzerland. New and first chromosome counts/estimations of DNA ploidy level may be accepted. Nomenclature should follow the main compendia devoted to these regions (national floras and checklists, *Flora Europaea*, *Atlas Florae Europaeae*, *Liste der Gefäßpflanzen Mitteleuropas*, etc.), however in well-

founded cases the author(s) may use different taxonomic concept. Author abbreviations should follow Authors of Plant Names (BRUMMITT & POWELL, 1992; for the current version see <http://www.ipni.org>). Each count should be accompanied with full description of the locality (geographical co-ordinates are welcomed, as well as the code of Central European grid mapping project for the relevant countries, cf. NIKLFELD, 1971), the name of the person who counted chromosome number/performed FCM analysis and the voucher specimen reference (herbarium acronyms following HOLMGREN et al., 1990; for updated version see: <http://www.nybg.org/bsci/ih/ih.html>). If herbarium specimen is missing, the reason should be given. In case of the report on DNA ploidy level, internal standard of the previously counted taxon (preferably the same taxon or closely related) and the ratio between nuclei fluorescence intensity of internal reference and analyzed sample should be included. Drawings, photographs (with scale bars) and references may be added following the Instructions for authors used in *Biologia*, Bratislava (see also <http://ibot.sav.sk/Biologia/index.html>). Authors, following the layout of the present reports, are invited to submit their manuscripts in English exclusively to the editor of this report preferably by e-mail.

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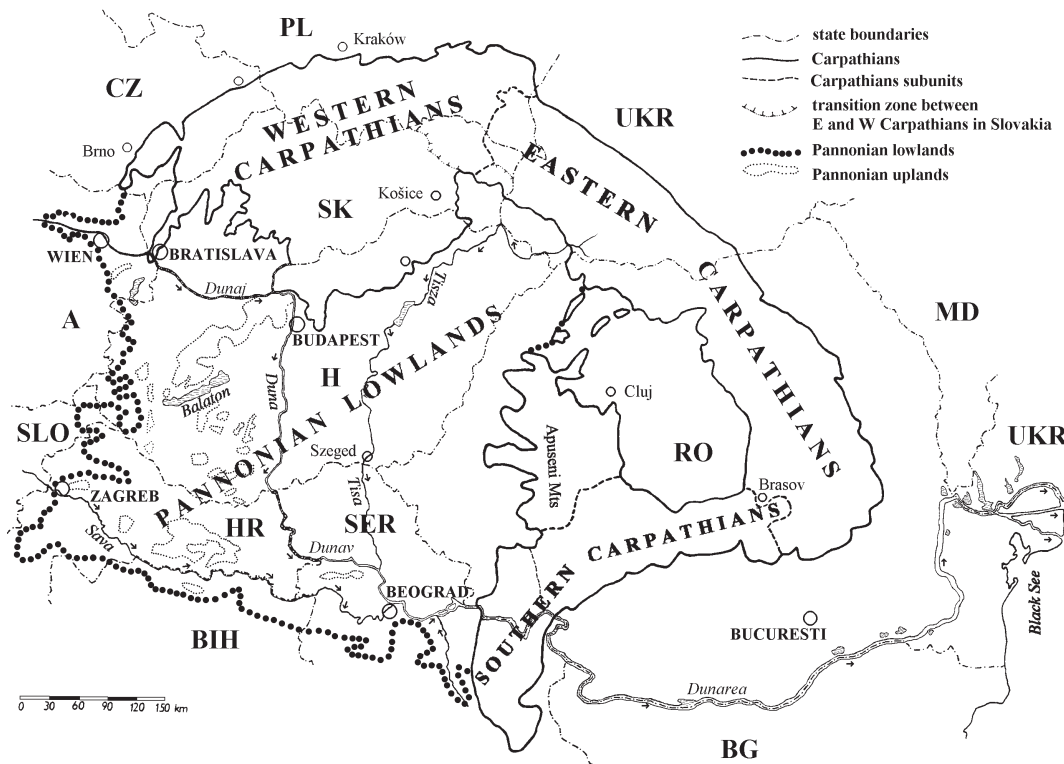


Fig. 1. Carpatho-Pannonian region [map originally published by KLIMENT (1999), here slightly modified].

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#### Report (1) by Stefan JEBEN<sup>1</sup> & Helga RASBACH<sup>2</sup>

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#### 1. *Asplenium cuneifolium* VIV.

$n = 36II$  RASBACH

**Locality:** Slovakia, Western Carpathians, distr. Prešov, village of Sedlice, *loco dicto* Dunitová skalka, serpentine rocks in the northern part of the village, ca 500 m a. s. l., 48°55'32" N, 21°07'35" E (7092d), coll. and det. J. HOLZBECHER, 1978 (Herb. S. JESSEN SJ-1349).

This is the first chromosome count for this critically endangered species from Slovakia.

#### Reports (2–3) by Judita KOCHJAROVA

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#### 2. *Tephroseris papposa* (RCHB.) SCHUR

$2n = 48$  KOCHJAROVA

**Localities:** 1. Romania, Eastern Carpathians, Munții Rodnei Mts, mountain ridge between Mt. Omul and Mt. Cișia, ca 2000 m a. s. l., coll. R. LETZ, 12. VII. 1995, det. J. KOCHJAROVÁ (BBZ *s.n.* – Herbarium of the Botanical Garden of the Comenius University in Blatnica). 2. Slovakia, Eastern Carpathians, Bukovské vrchy Mts, west slope of Mt. Ďurkovec above the village of Runina, 1170 m a. s. l., 49°05'55" N, 22°25'34" E (69100b), coll. J. KOCHJAROVÁ & J. KLIMENT, 7. VII. 1998, det. J. KOCHJAROVÁ (BBZ *s.n.* – Herbarium of the Botanical Garden of the Comenius University in Blatnica).

A different chromosome count  $2n = 40$  for this species was published by FREY (1969) for populations from Eastern Carpathians [treated as *Senecio papposus* (RCHB.) LESS]. However, the chromosome number  $2n = 40$  corresponds more to most taxa of *Senecio* L. (*s. str.*) having the chromosome number  $2n = 40$  (based on  $x = 10$ ), rather than to the genus *Tephroseris* (RCHB.) RCHB. with the basic chromosome number  $x = 8$ . The same chromosome number  $2n = 48$  for *T. papposa* was published by MRÁZ (2005).

**3. *Tephrosieris capitata* (WAHLENB.) GRISEB.****2n = 96** KOCHJAROVÁ

**Locality:** Romania, Southern Carpathians, Munții Bucegi Mts, Săua Cerbului saddle above the Valea Cerbului valley, 2400 m a. s. l., coll. and det. J. KOCHJAROVÁ 27. VI. 2001 (BBZ *s.n.* – Herbarium of the Botanical Garden of the Comenius University in Blatnica).

This species apparently has two different chromosome numbers, namely  $2n = 64$  from Western Carpathians, Tatra Mts (VÁCHOVÁ, 1970; KOCHJAROVÁ, 1997), and  $2n = 96$  from the southwestern Alps (FAVARGER, 1965; ZICKLER, 1968), both based on  $x = 8$ .

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**Reports (4–11) by Patrik MRÁZ**

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**4. *Allium fussii* A. KERN. (*Allium paniculatum* group)****2n = 16** MRÁZ

**Locality:** Romania, Eastern Carpathians, Munții Hăghimașului Mts, village Tulgeș, Mt. Pietra Runcului, N of the village, calcareous rock, ca 1250 m a. s. l., coll. and det. P. MRÁZ, 17. VII. 2000 (SAV *s.n.*, 1 plant). According to BRULLO et al. (1996), "... *A. fussii* must be treated as a distinct species..." within the *A. paniculatum* group. This taxon was described from the same mountain range as the plant analyzed here. However, the herbarium specimens from Mt. Pietra Runcului do not fully match the diagnostic characters given in BRULLO et al. (1996). I have found the differences in the spathe, which can be twice (or slightly more) the length of inflorescence, tepals are usually 6 mm long (rarely

reach 7 mm, however the latter character may be influenced by the drying of specimens). CIOCĂRLAN (2000) reported that *A. paniculatum* s. str. is distributed in Romania mainly in the basins and plains of S and SE part of the country. In the Romanian Carpathians, this species is according to him replaced by the closely related *A. fuscum* (incl. *A. fussii*, treated at the rank of subspecies). The diploid status ( $2n = 16$ ) of *A. fussii* is the same as in *A. paniculatum* s. str. counted in the plants from Slovakia (MURÍN et al., 1999) and in *A. fuscum* s. str. from Banat region (BRULLO et al., 1996). In Slovakia *A. paniculatum* reaches the northern limit of distribution of the whole *A. paniculatum* group (cf. SOMOGYI, 1999). The very variable *A. paniculatum* group needs a thorough taxonomic revision.

**5. *Brachyactis ciliata* LEDEB.****2n = 14** MRÁZ

**Locality:** Slovakia, Western Carpathians, Volovské vrchy Mts, city of Košice, *loco dicto* Červený breh, the former sludge pit in the surrounding of abandoned magnesite mines below Mt. Bankov, 295 m a. s. l., 48°43'57" N, 21°13'17" E (7293c), coll. P. MRÁZ & V. MRÁZOVÁ, 5. X. 2002, det. P. MRÁZ (Herb. P. MRÁZ *s.n.*, SAV *s.n.*, stated on 5 seeds).

This (sub-)halophyte species was found for the first time in Slovakia by MIKOLÁŠ (1988) on several localities in the city of Košice and in its vicinity, but it was omitted in the Checklist of Vascular Plants of Slovakia (cf. MARHOLD, 1998). In 2002, we found a new, very abundant (some hundreds individuals) population in the NW edge of the city of Košice (Slovakia). The presented count ( $2n = 14$ ) agrees with those of PROBATOVA & SOKOLOVSKAYA (1983). Contrary to this count, KRASNIKOV & KOROLYUK (1995) published  $2n = 18$  for plants from Siberia.

**6. *Campanula gentilis* KOVANDA****2n = 34** MRÁZ

**Locality:** Czech Republic, České středohoří Mts, distr. Lovosice, village of Režní Újezd, Mt. Boreč, on the scree, ca 380 m a. s. l., 50°30'52" N, 13°59'16" E (5450c), coll. and det. P. MRÁZ, V. 2003 (SAV *s.n.*, 2 plants, cult. no. C3, C4).

The diploid chromosome count of *Campanula gentilis* agrees with those stated by KOVANDA from the same locality (KOVANDA, 1970).

**7. *Campanula moravica* (SPITZN.) KOVANDA****2n ~ 4x** MRÁZ (internal reference: *C. gentilis*, cult. no. C4,  $2n = 2x$ , peak ratio 1.9–2.0)

**Localities:** **1.** Hungary, Western Carpathians, Zemplén hegység Mts, village of Füzér, NW slopes of the castle hill, 527 m a.s.l., 48°32'34" N, 21°27'36" E (7494d), coll. P. MRÁZ & B. ŠINGLIAROVÁ, 19. X. 2004, det. P. MRÁZ (SAV *s.n.*, 2 plants, cult. nos. C21, C22). **2.** Slovakia, Western Carpathians, Čierna hora Mts, village of Družstevná pri Hornáde, on the

slopes above the state route towards to the village of Trebejov, 230 m a.s.l., 48°48'35" N, 21°14'14" E (7193c), coll. P. MRÁZ & B. ŠINGLIAROVÁ, 6. X. 2004, det. P. MRÁZ (SAV *s.n.*, 1 plant). **3.** Slovakia, Western Carpathians, Čierna hora Mts, city of Košice, S slope of Mt. Hradová, 385 m a. s. l., 48°45'28" N, 21°14'10" E (7293a), coll. and det. P. MRÁZ, 3. X. 2004 (SAV *s.n.*, 2 plants, cult. nos. C19, C20). **4.** Slovakia, Western Carpathians, Volovské vrchy Mts, city of Košice, *loco dicto* Červený breh bellow Mt. Bankov, ca 360 m a. s. l., 48°45'10" N, 21°13'55" E (7293c), coll. and det. P. MRÁZ, 27. IX. 2004 (SAV *s.n.*, 2 plants, cult. nos. C15, C16). **5.** Slovakia, Western Carpathians, Branisko Mts, village of Lipovce, ca 0.5 km E of the settlement of Lačnov, 790 m a. s. l., 49°04'07" N, 20°55'46" E (6991b), coll. P. MRÁZ & B. ŠINGLIAROVÁ, 6. X. 2004, det. P. MRÁZ (SAV *s.n.*, 1 plant).

*C. moravica*, the most widespread taxon of the *C. rotundifolia* complex in Western Carpathians, is tetra- or hexaploid, but the latter ploidy level is confined mostly to the SW part of its area of distribution (NE Austria, SW Slovakia) (cf. KOVANDA, 1970). The tetraploid levels estimated here agree with the prevailing tetraploid populations.

#### 8. *Campanula tatrae* BORB.

**2n** ~ **4x** MRÁZ (internal reference: *C. gentilis*, cult. no. C4,  $2n = 2x$ , peak ratio 1.9)

**Locality:** Slovakia, Západné Beskydy Mts, S slopes of Mt. Babia hora, ca 1400 m a. s. l., 49°34'10" N, 19°31'27" E (6483a), coll. P. MRÁZ & R. LETZ, 5. VIII. 2004, det. P. MRÁZ (SAV *s.n.*, Herb. P. MRÁZ *s.n.*, 1 plant cult. no. C14).

From the highest peaks of the Západné Beskydy Mts (both Polish and Slovak parts) the stenoedemic taxon is given in the literature under the names *Campanula mentiens* (WITASEK) PRAIN et al. or *C. tatrae* subsp. *mentiens* (WITASEK) KOVANDA (e.g. KOVANDA, 1977; MARHOLD, 1998). As the morphological variation of the populations from the Západné Beskydy Mts overlap with those of *C. tatrae* s.str., *C. menties* is included in the present report within this very polymorphic and also tetraploid taxon (KOVANDA, 1970).

#### 9. *Campanula rotundifolia* s. l.

**2n** = **68** MRÁZ; **2n** ~ **4x** MRÁZ (internal reference: *C. gentilis*,  $2n = 2x$ , cult. no. C4, peak ratio 1.9)

**Localities:** **1.** Ukraine, Eastern Carpathians, Skhidni Beskidi Mts, Mt. Pikui, sandstone rocks, ca 1400 m a. s. l., coll. P. MRÁZ & J. CHRTEK jun., 21. VII. 2003, det. P. MRÁZ (SAV *s.n.*, 1 plant cult. no. C5,  $2n = 68$ ). **2.** Ukraine, Eastern Carpathians, Chorna Hora Mts, Polonina Breskulska ridge, alpine meadows in the saddle between Mt. Hoverla and Mt. Breskul, 1800 m a. s. l., 48°09'10" N, 24°30'15" E, coll. P. MRÁZ & J. CHRTEK jun., 23. VII. 2003, det. P. MRÁZ (SAV *s.n.*, 1 plant cult. no. C11,  $2n = ca 68$ ,  $2n \sim 4x$ ).

BÖCHER (1966, sec. KOVANDA 1977) counted  $2n = 68$  for collection of *C. kladniana* from Eastern Carpathians. The counts stated here agree with BÖCHER's report. Two subalpine/alpine taxa, usually at species or subspecies level, are recognized in the Eastern and Southern Carpathians: *C. rotundifolia* subsp. *polymorpha* (WITASEK) TACIK (syn. *C. tatrae*) and *C. rotundifolia* subsp. *kladniana* (SCHUR) TACIK (cf. e.g. CIOCÂRLAN, 2000). Contrary to this concept, the former taxon (*C. tatrae*) is usually treated in the Western Carpathians as an endemic species (see KLIMENT, 1999 and references therein). It seems that the populations at least from the Western and Eastern Carpathians are morphologically very close. Because a further study should be performed to confirm/exclude this hypothesis, the nomenclature in this report is kept in a wide sense.

#### 10. *Potentilla aurea* subsp. *chrysocraspeda*

(LEHM.) NYMAN

**2n** = **14** MRÁZ

**Locality:** Romania, Southern Carpathians, Munții Retezatului Mts, Valea Pietrele valley, ca 1750 m a. s. l., coll. and det. P. MRÁZ, 8. VII. 2001 (1 plant, without voucher specimen).

This mostly Balkan taxon is sometimes treated as *Potentilla ternata* C. KOCH. The present count agrees with those of BALTISBERGER (1988). The analyzed plant, identified according to CIOCÂRLAN (2000), was unintentionally brought to an experimental cultivation together with a collected plant of the genus *Hieracium*. As the plant died before the herbarium specimen could be made, it is represented just by the permanent slide deposited at the Institute of Biology & Ecology, P. J. Šafárik University in Košice.

#### 11. *Tephroseris papposa* (RCHB.) SCHUR

**2n** = **48** MRÁZ

**Locality:** Romania, Eastern Carpathians, Munții Rodnei Mts, subalpine meadows, among the shrubs of *Pinus mugo*, above the tourist path Borșa – Stația Meteo, ca 0.3 km NW from the Stația Meteo, northern slope of Mt. Pietrosul Mare, ca 1835–1850 m a. s. l., 47°39' N, 24°39' E, coll. and det. P. MRÁZ, 5. VII. 2001 (SAV *s.n.*, 1 plant).

FREY (1969) reported an unusual  $2n = 40$  for this species from the Polish part of Eastern Carpathians. Contrary to this record, KOCHJAROVÁ (2003) published two counts  $2n = 48$  from two localities in Eastern Carpathians (Slovakia and Romania). Our chromosome number from a single specimen from Mt. Pietrosul Mare (Romania, Eastern Carpathians) confirms the data by KOCHJAROVÁ (2005).

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