Chromosome numbers and breeding systems of some European species of *Hieracium* subgen. *Pilosella*

Počty chromozomů a způsoby reprodukce některých evropských druhů jestřábníků (*Hieracium* subgen. *Pilosella*)

Olga Rotreklová[1], Anna Krahulcová[2], Patrik Mráz[3,4], Viera Mrázová[5], Lenka Mártonfiová[5], Tomáš Peckert[6] & Barbora Šingliarová[3]

[1]*Department of Botany, Faculty of Science, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic, e-mail: orotrekl@sci.muni.cz;* [2]*Institute of Botany, Academy of Sciences of the Czech Republic, CZ-252 43 Průhonice, Czech Republic, e-mail: krahulcova@ibot.cas.cz;* [3]*Institute of Biology & Ecology, Faculty of Sciences, P. J. Šafárik University, Mánesova 23, SK-041 54 Košice, Slovakia, e-mail: mrazpat@kosice.upjs.sk;* [4]*Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, SK-845 23 Bratislava, Slovakia;* [5]*Botanical Garden, P. J. Šafárik University, Mánesova 23, SK-041 54 Košice, Slovakia;* [6]*Department of Botany, Faculty of Science, Charles University, Benátská 2, CZ-128 01 Praha 2, Czech Republic*

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Chromosome numbers (ploidy levels) were recorded in the following 25 taxa of *Hieracium* subgen. *Pilosella*: *H. arvicola* Nägeli et Peter (2n = 45), *H. aurantiacum* L. (2n = 36, 45), *H. bauhini* Besser (2n = 36, 45), *H. bifurcum* M. Bieb. (2n = 45), *H. brachiatum* Bertol. ex DC. (2n = 36, 45), *H. caespitosum* Dumort. (2n = 36), *H. cymosum* L. (2n ~ 4x), *H. densiflorum* Tausch (2n = 36, ~ 4x), *H. echioides* Lumn. (2n = 18, 45), *H. fallacinum* F. W. Schultz (2n = 36, 45), *H. floribundum* Wimm. et Grab. (2n = 36, ~ 4x, 45,), *H. glomeratum* Froel. in DC. (2n = 45), *H. iseranum* Uechtr. (2n = 36), *H. kalksburgense* Wiesb. (2n ~ 5x), *H. lactucella* Wallr. (2n = 18), *H. macranthum* (Ten.) Ten. (2n = 18), *H. onegense* (Norrl.) Norrl. (2n = 18), *H. pilosella* L. (2n = 36, 45, 54), *H. piloselliflorum* Nägeli et Peter (2n = 45), *H. pilosellinum* F. W. Schultz (2n = 36, 45), *H. piloselloides* Vill. (2n = 27, 36, ~ 4x, 45, ~ 5x), *H. pistoriense* Nägeli et Peter (2n = 27), *H. rothianum* Wallr. (2n ~ 3x), *H. schultesii* F. W. Schultz (2n = 36, 45, ~ 5x), *H. zizianum* Tausch (2n = 27, 36, 54), and one hybrid, *H. onegense* × *H. pilosella* (2n = 36). Besides chromosome counts in root-tip meristems, flow cytometry was used to determine the DNA ploidy level in 83 samples of 9 species. The presence of a long marker chromosome was confirmed in tetraploid *H. caespitosum* and *H. iseranum*, in pentaploid *H. glomeratum*, and in both tetraploid and pentaploid *H. floribundum*. The documented mode of reproduction is sexual (*H. densiflorum*, *H. echioides*, *H. piloselloides*) and apomictic (*H. brachiatum*, *H. floribundum*, *H. pilosellinum, H. piloselloides, H. rothianum, H. zizianum*). *Hieracium bifurcum* and *H. pistoriense* are sterile. The chromosome number and/or mode of reproduction of *H. bifurcum* (almost sterile pentaploid), *H. pilosellinum* (apomictic pentaploid), *H. piloselloides* (apomictic triploid), *H. pistoriense* (sterile triploid), *H. rothianum* (apomictic triploid) and *H. zizianum* (apomictic triploid) are presented here for the first time. The sexual reproduction recorded in the pentaploid *H. echioides* is the second recorded case of this mode of reproduction in a pentaploid cytotype of *Hieracium* subgenus *Pilosella*. A previously unknown occurrence of *H. pistoriense* (*H. macranthum* – *H. bauhini*) in Slovakia is reported.

Keywords: *Compositae*, Czech Republic, DNA ploidy level, flow cytometry, France, Germany, Hungary, Italy, karyology, Poland, reproduction mode, Slovakia, Slovenia

Introduction

Hieracium subgen. *Pilosella* shows a great variability in morphology, karyology and breeding systems. Variability in chromosome number relative to mode of reproduction is reviewed in detail by Krahulcová et al. (2000). A brief résumé is also published by Rotreklová et al. (2002). Evidently a detailed knowledge of chromosome number (ploidy) and mode of reproduction of taxa is essential for understanding speciation differentiation within both subgenera of the genus *Hieracium*, i.e. *Pilosella* (Krahulec et al. 2004) and *Hieracium* (Chrtek et al. 2004). The putative origin of the facultatively apomictic species *H. floribundum*, *H. glomeratum*, *H. iseranum* and *H. piloselliflorum* by spontaneous natural hybridization, as discussed by Fehrer et al. (2005), can serve as an example. The possible origin of these hybridogeneous species was suggested, based on molecular, karyological and breeding system data augmented by the results of crosses between the putative parental species.

Here we present data, which resulted from broader parallel studies on *Hieracium* subgen. *Pilosella,* e.g. cytogeography of *H. bauhini* and *H. pilosella* as the source of variability in *Hieracium* subgen. *Pilosella* at various geographic scales.

In addition to new karyological data for seven species, this paper includes records of the chromosome numbers and mode of reproduction of 19 species of *Hieracium* subgen. *Pilosella* published in recent years for plants from other parts of their distribution area (Vladimirov & Szeląg 2001, Rotreklová et al. 2002, Schuhwerk & Lippert 2002, Mráz & Szeląg 2004).

Materials and methods

Plants were collected in 1996–2003 from natural habitats and cultivated in pots in the Botanical Garden of Masaryk University, Brno (O. R.), the Institute of Botany, Academy of Sciences of the Czech Republic, Průhonice (A. K., T. P.) and the Botanical Garden of P. J. Šafárik University, Košice (P. M.). Root tip cuttings of mature plants were used for chromosome counts. Methods used to count chromosomes are described in Rotreklová et al. (2002). A PA-I (Department of Botany, Masaryk University, Brno) and a PA-II ploidy analyzers (Institute of Botany, Průhonice), both produced by Partec GmbH, Münster, Germany and equipped with HBO-100 mercury arc lamps, were used for the flow-cytometric detection of DNA ploidy level (i.e. the relative DNA content) in some cases. Sample preparations were carried out in two stages (Otto 1990, Doležel & Göhde 1995). Stem tissues of a particular plant and a reference standard (0.5 cm^2 of leaf blade) were chopped with a new razor blade for about 20 s in a Petri dish containing 0.5 ml of ice-cold Otto I buffer (4.2 g citric acid monohydrate + 1 ml 0.5% Tween 20 adjusted to 200 ml and filtered through a 0.22 μm filter), then 0.5 ml more Otto I buffer was added. The solution was filtered through nylon cloth (50 μm mesh size). For DNA staining, 2 ml of Otto II buffer (0.4 M $Na_2HPO_4 \cdot 12H_2O$) including DAPI (4´,6-diamidino-2-phenylindole; 4 μg/ml final concentration) was used. As a reference standard for DNA ploidy level analyses, the diploid *Hieracium lactucella* (O. R.) or *Zea mays* (A. K.) was used. The breeding system was determined by comparing the seed set of open-pollinated and emasculated capitula: emasculated capitula of sexual plants produce no seed while both emasculated and open-polli-

nated capitula of apomictic plants produce seed. Capitula were emasculated by cutting off the upper half of a capitulum with a razor blade before anthesis.

Voucher specimens are deposited in the herbarium of the Department of Botany, Masaryk University, Brno (BRNU, plants examined by O. R.), in the herbarium of the Institute of Botany, Průhonice (PRA, plants examined by A. K. and T. P.) and in the Herbarium of P. Mráz, recently deposited at the Institute of Biology and Ecology, Košice.

Results and discussion

It is important to stress that the chromosome numbers given here (2n = number) are based on counting chromosomes, and do not provide the same information as the DNA ploidy level (2n ~ multiple of x) determined by flow cytometry. Other findings indicate that in the subgenus *Pilosella* (A. Krahulcová et al., unpublished) aneuploidy and/or different DNA contents of the parental genomes (even at the same ploidy level) of hybrids can slightly change the relationship between the chromosome number and the DNA ploidy level of an individual. This is particularly true for high-ploidy hybrids, i.e. for those with *H. pilosella* as one of the parents.

Hieracium subgen. *Pilosella* is divided into two species groups, referred to as basic and intermediate. Members of the latter are considered to be of hybrid origin and are intermediate between putative parental taxa, names of which are indicated at the beginning of each species' entry. This position is based solely on morphological characters and follows the evaluation of Zahn (1930) and Nägeli & Peter (1885).

Although most of the analyzed taxa belong to the so called intermediate or hybridogeneous species, some of them may be declared as nothotaxa, e.g. real hybrids of recent origin (F1 or very early generations). This is indicated by the rarity of these plants in the field, seed sterility, and co-occurrence with the parents. Survey of detected chromosome numbers and reproductive systems is given in Table 1.

Hieracium arvicola Nägeli et Peter, Die Hieracien Mittel-Europas 1: 666, 1885. 2n = 45

H. bauhini / H. piloselloides – H. caespitosum

Locality: **1.** Czech Republic, distr. Brno: village of Kuřim, railway station, 290 m a.s.l., 49°18'04" N 16°32'01" E, plants growing together with pentaploid *H. bauhini* (Rotreklová 2004), coll. O. Rotreklová, 9 June 1998, det. S. Bräutigam, 2n = 45 (1 plant), counted by O. Rotreklová.

The first record of a pentaploid cytotype from the Czech Republic augments a single reference to tetraploids occurring in Bavaria, Germany (Schuhwerk & Lippert 1997).

Hieracium aurantiacum L., Sp. Pl. 801, 1753. 2n = 36, 2n = 45

Localities: **1.** Czech Republic, Krušné hory Mts, distr. Sokolov: grassy place in a former tin mine 3.5 km NNE of the village of Přebuz, 890 m a.s.l., 50°24'00" N, 12°30'00" E, coll. F. Krahulec, 8 June 2000, 2n = 36 (2 plants), counted by A. Krahulcová. **2.** Slovakia, Belianske Tatry Mts: Predné Meďodoly valley, ca 1480 m a.s.l., 49°13'30" N, 20°14'30" E, coll. P. Mráz & V. Jurkovičová, 8 August 2000, 2n = 45 (1 plant, no. 855), counted by P. Mráz.

The species *H. aurantiacum* forms a polyploid series. Tetraploid plants (2n = 36), which are the most common, are confirmed here for the Krušné hory Mts, and pentaploid plants (2n = 45) for Slovakia (e.g. Rotreklová et al. 2002 and the references therein). In Bavaria,

Table 1. – List of species of *Hieracium* subgen. *Pilosella* included in this study, their chromosome numbers and breeding systems. Abbreviations of countries, from which particular cytotypes originated: Cz = Czech Republic, Sk = Slovakia, Hu = Hungary, Ge = Germany, Pl = Poland, Slo = Slovenia, It = Italy, Fr = France.

Species	Country	2n	Breeding system
H. arvicola Nägeli et Peter	Cz	45	
H. aurantiacum L.	Cz	36	
	Sk	45	
H. bauhini Besser	Sk	36, ca 45	
	Cz	45	
H. bifurcum M. Bieb.	Cz	45	almost sterile
H. brachiatum Bertol. ex DC.	Cz	45	apomictic
	Sk	36, 45	
	Slo	45	
H. caespitosum Dumort.	Ge, Pl	36	
H. cymosum L.	Sk	36	
H. densiflorum Tausch	Cz	36	sexual
H. echioides Lumn.	Cz	18, 45	both sexual
	Sk	18	sexual
	Pl, Hu	18	sexual
H. fallacinum F. W. Schult	Cz	36, 45	
H. floribundum Wimm. et Grab.	Cz	36	apomictic
	Pl	36, 45	
H. glomeratum Froel. in DC.	Cz, Pl	45	
H. iseranum Uechtr.	Pl	36	
H. kalksburgense Wiesb.	Cz	45	
H. lactucella Wallr.	Cz, Sk	18	
H. macranthum (Ten.) Ten.	Sk	18	
H. onegense (Norrl.) Norrl.	Sk	18	
H. onegense × *H. pilosella*	Sk	36	
H. pilosella L.	Pl, Ge	36	
	Cz	36, 45	
	Sk	45, 54	
H. piloselliflorum Nägeli et Peter	Pl	45	
H. pilosellinum F. W. Schultz	Cz	36	
		45	apomictic
H. piloselloides Vill.	Cz	36	apomictic
	Ge	27, 36, 45	all apomictic
	Sk, Hu, It	36	
	Slo	36	sexual
		45	apomictic
H. pistoriense Nägeli et Peter	Sk	27	sterile
H. rothianum Wallr.	Cz	27	apomictic
H. schultesii F. W. Schultz	Cz	36	
	Sk	45	
	Pl	45	
H. zizianum Tausch	Sk	36	
	Fr	27	apomictic
		54	

Germany, two hexaploid plants of *H. aurantiacum* (2n = 54), in addition to the tetraploid cytotype (Schuhwerk & Lippert 2002), were recently recorded. Both tetraploid (2n = 36) and pentaploid (2n = 45) plants are recorded in Romania (Mráz & Szeląg 2004).

Hieracium bauhini Besser, Prim. Fl. Galic. 2: 149, 1809. 2n = 36, 2n = 45

Localities: **1.** Slovakia, Tríbeč Mts: Klátová Nová Ves village, Sádok quarter, Chríb Hill, by the 13th century Romanian-Gothic church, 250 m a.s.l., 48°33'30" N, 18°16'10" E, coll. P. Mráz, V. Mrázová & R. Mráz, 2 November 2001, 2n = ca 45 (1 plant, no. 1181), counted by P. Mráz. **2.** Slovakia, Slovenský kras Mts, Plešivecká planina plateau: Plešivec town, on the forest road ca 0.5 km NE of Zbojnícka priepasť chasm, ca 3.5 km NNE of the railway station Plešivec, 545 m a.s.l., 48°34'22" N, 20°25'09" E, coll. P. Mráz, 30 May 2001, 2n = 36 (1 plant, no. 941), counted by P. Mráz. **3.** Slovakia, Slovenský kras Mts, Silická planina plateau: Silická Brezová village, ca 0.2 km SE of elevation marker Delené (500.7), ca 490 m a.s.l., 48°33'32" N, 20°24'55" E, coll. P. Mráz, 13 June 2001, 2n = ca 36 (1 plant, no. 964), counted by L. Mártonfiová. **4**. Slovakia, Slovenský kras Mts, Silická planina plateau: Brzotín village, Brzotínska skala Mt, ca 2 km SSE of the village, 620 m a.s.l., 48°33'10" N, 20°30'35" E, coll. P. Mráz, 28 May 2002, 2n = 36 (1 plant, no. 1189), counted by P. Mráz. **5.** Slovakia, Rožňavská kotlina basin: Krásnohorské Podhradie village, W slopes of the hill Krásna Hôrka, 423 m a.s.l., 48°34'35" N, 20°35'45" E, coll. P. Mráz, 29 May 2002, 2n = 36 (1 plant, no. 1194), counted by P. Mráz. **6.** Slovakia, Čierna hora Mts, Košice city: Kavečany quarter, in the Zoological garden grounds, 461 m a.s.l., 48°47'19.7" N, 21°12'01.7" E, coll. P. Mráz & V. Mrázová, 28 July 2001, 2n = 36 (1 plant, no. 1101), counted by P. Mráz. **7.** Czech Republic, Brno: SW margin of the city, along the road between city-parts Nový Lískovec and Kohoutovice, 49°11'02" N, 16°32'38" E, 350 m a.s.l., coll. O. Rotreklová, 29 June 2004, 2n = 45 (1 plant), counted by O. Rotreklová.

Tetraploid, pentaploid and hexaploid plants are recorded in this species (see Rotreklová 2004 for detailed references). Our data confirm the distribution pattern of particular cytotypes within Central Europe published by Rotreklová (2004): tetraploids occur commonly in the eastern part (Slovakia and Hungary), and pentaploids prevail in the western part (the Czech Republic, Germany, Belgium, Netherlands). In terms of morphology, all tetraploid plants belong to the *H. magyaricum* species group and the pentaploid plant from the Czech Republic to the *H. bauhini* species group (sensu Zahn 1930).

Hieracium bifurcum M. Bieb., Fl. Taur.-Caucas. 2: 251, 1808. 2n = 45, almost sterile.

H. echioides < *H. pilosella*

Localities: **1.** Czech Republic, distr. Znojmo: Hnanice village, vineyard of Šobes ca 2 km N of village, slope above the vineyard above the red tourist path, 270 m a.s.l., 48°49'08" N 15°58'26" E, coll. T. Peckert, 16 June 2001, 2n = 45 (4 plants), almost sterile (2 plants), counted by T. Peckert. **2.** Czech Republic, distr. Znojmo: rockery in the forest along the blue tourist path 4 km SE of the church in the Podmolí village, 340 m a.s.l., 48°49'18" N 15°58'66" E, coll. T. Peckert, 16 June 2001, 2n = 45 (2 plants), almost sterile (1 plant), counted by T. Peckert.

Only pentaploids (2n = 45) are known for this species from Austria (Schuhwerk & Lippert 1997). Our records are the first for the Czech Republic. The sterility of pentaploids was not previously reported for this species.

Hieracium brachiatum Bertol. ex DC. in Lam. et DC., Fl. Franc., ed. 3, 5: 442, 1815. 2n = 36; 2n = 45, apomictic

H. pilosella > *H. bauhini/H. piloselloides*

Localities: **1.** Czech Republic, distr. Znojmo: village of Přímětice, ca 330 m a.s.l., 48°53'57" N 16°03'16" E, coll. V. Grulich, 15 May 2000, 2n = 45, apomictic (1 plant), counted by O. Rotreklová. **2.** Czech Republic, distr. Blansko: Rozseč nad Kunštátem, crossroads 0.5 km N of the church in the village, 630 m a.s.l., 49°31'41" N 16°27'50" E, coll. M. Kočí, July 2000, 2n = 45, apomictic (2 plants), counted by O. Rotreklová. **3.** Czech Republic, distr. Slavkov u Brna: Kobeřice village, meadow on the SE margin of the village, 320 m a.s.l., 49°05'22" N

16°53'25" E, coll. Z. Lososová, 2 June 2002, 2n = 45, (1 plant), counted by O. Rotreklová. **4.** Czech Republic, Brno: SW margin of the city, along the road between city-parts Nový Lískovec and Kohoutovice, 49°11'02" N, 16°32'38" E, 350 m a.s.l., coll. O. Rotreklová, 29 June 2004, 2n = 45 (2 plants), counted by O. Rotreklová. Plants grew together with *H. pilosella* and pentaploid *H. bauhini* (see above). **5.** Slovakia, Slovenský kras Mts, Silická planina plateau: Silica village, xerotherm meadow ca 0.5 km SE of the village, red tourist path, 560 m a.s.l., 48°33'27" N, 20°31'55" E, coll. P. Mráz & V. Jurkovičová, 17 May 2000, 2n = 36, (1 plant, no. 742), counted by P. Mráz. **6.** Slovakia, Rožňavská kotlina basin: Krásnohorské Podhradie village, W slopes of the hill Krásna Hôrka, 423 m a.s.l., 48°34'35" N, 20°35'45" E, coll. P. Mráz, 29 May 2002, 2n = 45 (1 plant, no. 1196), counted by P. Mráz. **7.** Slovenia, Juliske Alps Mts: pasture on the NW margin of the Stara Fužina village, 580 m a.s.l., 46°17'30" N, 13°53'25" E, coll.V. Grulich, 18 June 1998, 2n = 45 (1 plant), counted by O. Rotreklová.

Pentaploids and an apomictic mode of reproduction are most frequently reported in this taxon and confirmed by our results. Pentaploids (2n = 45) occur in Germany (Bräutigam & Bräutigam 1996, Schuhwerk & Lippert 1997), the Czech Republic and Bulgaria (Rotreklová et al. 2002). Recently, Schuhwerk & Lippert (2002) recorded a triploid (2n = 27) and a tetraploid (2n = 36) plant from Bavaria in Germany. However, the few detailed population studies reveal a great variability in chromosome number, including high ploidy levels and aneuploidy (Germany: 2n = 36, 45, 63, Bräutigam & Bräutigam 1996; the Czech Republic: 2n = 45, 48, 63, 72, Krahulcová et al. 2000, Rotreklová et al. 2002). Recently, a hybrid swarm between a pentaploid *H. bauhini* and a tetraploid *H. pilosella* was studied in Bavaria, Germany (Schuhwerk & Lippert 2002). At this locality, pentaploid *H. brachiatum*, *H. pilosellinum* (2n = 45) and heptaploid *H. leptophyton* (2n = 63) were detected. Whereas both *H. brachiatum* and *H. leptophyton* are thought to be hybrids between *H. pilosella* and *H. bauhini*, the genome of *H. pilosellinum* possibly contains a third basic species, *H. cymosum* (Schuhwerk & Fischer 2003). As only one or two plants from each population were examined in our study, the high variation in chromosome number within populations was not detected. The tetraploid (2n = 36) and pentaploid (2n = 45) plants from Slovakia and pentaploid (2n = 45) plants from Slovenia are the first chromosome counts for *H. brachiatum* from those countries.

Hieracium caespitosum Dumort., Fl. Belg. 62, 1827.
2n = 36, with a long marker chromosome

[Syn. *Hieracium pratense* Tausch]

L o c a l i t i e s : **1.** Germany, Saxonia, East Lusatian Hills: former brown coal mine area near the village Schönau-Berzdorf, in the artificial valley of the Pliessnitz River between the heaps and in the periphery of the village near a new road, 200–230 m a.s.l., 51°03' N, 14°54' E, coll. F. Krahulec & A. Krahulcová (excursion during the 4th Hieracium Workshop), 3 June 2000, 2n = 36, with a long marker chromosome (2 plants), counted by A. Krahulcová. **2.** Poland, Góry Izerskie Mts: Velká Jizerská louka meadow close to Czech – Polish border, 7 km SSE of the town of Swieradów Zdrój, 830 m a.s.l., 50°51'00" N, 15°21'40" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 36, with a long marker chromosome (1 plant), counted by A. Krahulcová.

A pentaploid *H. caespitosum* detected using flow cytometry is recorded for the Saxonian locality no. 1 (Bräutigam & Bräutigam 1996). Tetraploid and pentaploid plants of *H. caespitosum* commonly occur (Krahulcová & Krahulec 1999 and the references therein, Fehrer et al. 2005). In addition, a rare triploid cytotype (2n = 27) is recorded from Poland (Skalińska 1967) and Bavaria in Germany (Schuhwerk & Lippert 2002). A long marker chromosome, which is strikingly larger than other chromosomes in the karyotype, was first observed in pentaploid plants of *H. cespitosum* from New Zealand (Jenkins & Jong 1997) and latter in some other species from the Czech Republic (Krahulcová & Krahulec 1999).

Hieracium cymosum L., Sp. Pl., ed. 2, 2: 1126, 1763. 2n ~ 4x

Locality: **1.** Slovakia, distr. Banská Bystrica: meadow 1km SW of the church in the Donovaly village, 970 m a.s.l., 48°53'17" N, 19°13'01" E, coll. O. Rotreklová & Z. Lososová, 26 June 2001, 2n ~ 4x (1 plant), flow cytometry analysis done by O. Rotreklová.

Although considerable variation from diploid to heptaploid is reported in the literature, the diploid (2n = 18) and the tetraploid (2n = 36) cytotypes are the most frequent. Diploids are reported from the Czech Republic (Měsíček & Javůrková-Jarolímová 1992, Šimek 2000), Germany (Schuhwerk & Lippert 1997, 2002) and Greece (Schuhwerk & Lippert 1997). Tetraploids are reported from Armenia (Nazarova 1984), Austria (Schuhwerk & Lippert 1997), Italy (Gadella & Kliphuis 1970a), the Netherlands (Gadella 1984), Poland (Vladimirov & Szeląg 2001), Romania (Mráz & Szeląg 2004) and Greece (Grau & Erben 1988). Other ploidy levels are more rare, e.g. triploid (2n = 27, Austria: Schuhwerk & Lippert 1997) and pentaploid (2n = 45, Germany: Schuhwerk & Lippert 1997, Macedonia: Schuhwerk & Lippert 1998 and Slovakia: Májovský et al. 2000). Hexaploids (2n = 54) are reported from Greece (Strid & Anderson 1985) and Poland (Vladimirov & Szeląg 2001). Both hexaploid and heptaploid plants are recorded by Gadella & Kliphuis (1970b) from the French Alps.

Hieracium densiflorum Tausch, Flora, Regensburg, 11, Ergänzungsbl. 1: 59, 1828.
2n = 36, 2n ~ 4x, sexual

H. bauhini – H. cymosum

Localities: **1.** Czech Republic, distr. Břeclav: Růžový kopec Hill 1 km NW of the town of Mikulov, ca 260 m a.s.l., 48°49'19" N, 16°37'21" E, coll. O. Rotreklová, 6 May 2000, 2n = 36 (2 plants), counted by O. Rotreklová. **2.** Czech Republic, distr. Břeclav: slope 2 km ENE of the church in the village of Borkovany, 240 m a.s.l., 49°02'10" N, 16°49'40" E, coll. O. Rotreklová & Z. Lososová, 14 May 2001, 2n = 36 (2 plants), sexual (1 plant), counted by O. Rotreklová; 2n ~ 4x, sexual (1 plant), flow cytometry analysis done by O. Rotreklová. **3.** Czech Republic, distr. Hodonín: Čejkovické Špidláky 2 km NE of the castle in the village of Čejkovice, 230 m a.s.l., 48°55'04" N, 16°57'42.8" E, coll. T. Vymyslický, 30 May 2001, 2n = 36, sexual (1 plant), counted by O. Rotreklová (Fig. 1c). **4.** Czech Republic, distr. Vyškov: Nature reserve Visengrunty 1.3 km SSW of the church in Bošovice village, 340 m a.s.l., 49°02'33" N, 16°49'42" E, coll. O. Rotreklová & Z. Lososová, 8 June 2001, 2n = 36, sexual (1 plant), counted by O. Rotreklová. **5.** Czech Republic, distr. Břeclav, Dunajovické kopce Hills: Jánská hora Hill, 2.7 km WSW of the church in Dolní Dunajovice village, 265 m a.s.l., 48°50'46" N, 16°33'25" E, coll. O. Rotreklová & J. Danihelka, 21 May 2002, 2n ~ 4x, sexual (3 plants), flow cytometry analysis done by O. Rotreklová. **6.** Czech Republic, distr. Slavkov u Brna: slopes 0.75 km SW of the church in Rašovice village, 250 m a.s.l., 49°07'07"N, 16°56'24"E 3 June 2002, coll. O. Rotreklová, 2n ~ 4x (3 plants), flow cytometry analysis done by O. Rotreklová.

Ploidy levels from triploid (2n = 27) to hexaploid (2n = 54) are published for this species. The chromosome number 2n = 36 is recorded for Germany (Schuhwerk & Lippert 1997), the Czech Republic and Slovenia (Rotreklová et al. 2002). A pentaploid ploidy level is recorded for Germany (Schuhwerk & Lippert 1997) and hexaploid one for Greece (Schuhwerk & Lippert 1998). In Bavaria, Germany, Schuhwerk & Lippert (2002) detected triploids (2n = 27), pentaploids (2n = 45) and hexaploids (2n = 54). In the Czech Republic, this species occurs mainly on dry grasslands in southern Moravia; in Bohemia, it occurs in the vicinity of Prague and of Kadaň, as well as in the České středohoří Mts. The chromosome numbers of Bohemian plants is unknown. The tetraploid plants (2n = 36) recorded in Moravian populations (Rotreklová et al. 2002, five localities) together with the new records presented here, indicate that *H. densiflorum* in Moravia is karyologically uniform. A sexual mode of reproduction, already reported in tetraploid *H. densiflorum* (Rotreklová et al. 2002), is confirmed.

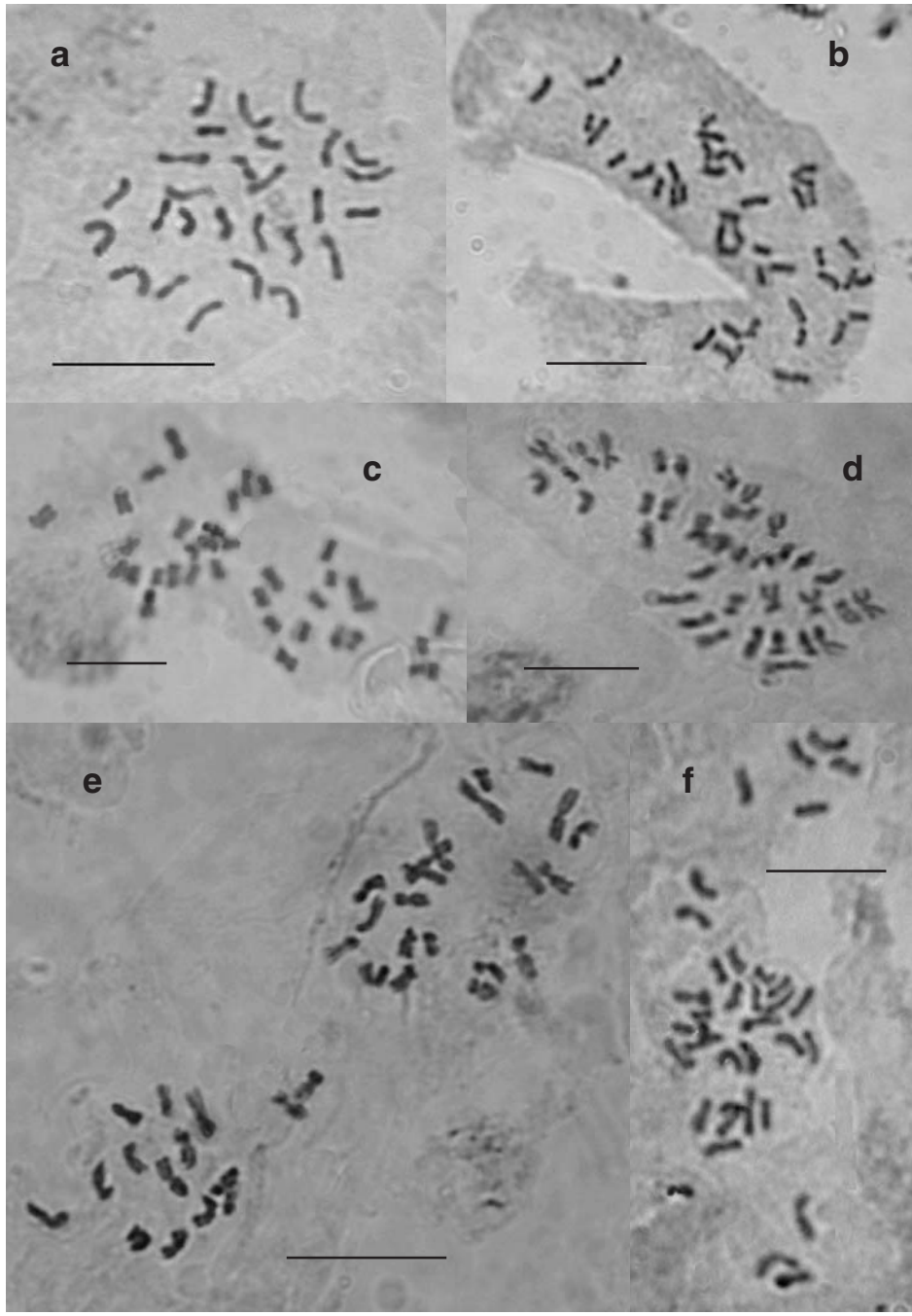

Fig. 1. – Microphotographs of somatic metaphases of six species of *Hieracium* subgen. *Pilosella*. a: *Hieracium pistoriense*, 2n = 27, Slovakia, distr. Nitra, village of Pohranice; b: *H. pilosellinum*, 2n = 45, Czech Republic, distr. Slavkov u Brna, village of Rašovice; c: *H. densiflorum*, 2n = 36, Czech Republic, distr. Hodonín, Čejkovické Špidláky; d: *H. piloselloides*, 2n = 36, Slovenia, Kranjska Gora, Planica valley; e: *H. pilosellinum*, 2n = 36, Czech Republic, distr. Břeclav, Dunajovické kopce Hills, Jánská hora Hill; f: *H. fallacinum*, 2n = 36, Czech Republic, distr. Břeclav, Dunajovické kopce Hills, Jánská hora Hill. [Scale bars = 10 μm]

Hieracium echioides Lumn., Fl. Poson. 348, 1791.
2n = 18, 2n ~ 2x; 2n = 45, both cytotypes sexual

Localities: **1.** Czech Republic, distr. Znojmo: Havranické vřesoviště heath, SW part Staré vinice, ca 1 km W of the village, 330 m a.s.l., 48°48'41" N, 14°05'44" E, coll. T. Peckert & J. Chrtek, September 2001 and May 2003, 2n = 45, sexual (3 plants), counted by T. Peckert. **2.** Czech Republic, distr. Mělník: village of Tišice, the sands along the railway Tišice – Neratovice, ca 100 m from railway station Tišice, 160 m a.s.l., 50°15'57"N, 14°33'07"E, coll. T. Peckert, 25 July 2002, 2n ~ 2x (8 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert. **3.** Czech Republic, distr. Litoměřice: Radobýl Hill, 3 km W of the center of the town of Litoměřice, 350 m a.s.l., 50°13'44"N, 14°05'34"E, coll. T. Peckert &. J. Chrtek, 31 May 2003, 2n ~ 2x, sexual (2 plants), flow cytometry analysis done by T. Peckert. **4.** Slovakia, distr. Malacky: Borský Mikuláš village, a pinewood along the road from Borský Mikuláš village to Šaštín village, 200 m a.s.l., 48°37'49" N, 17°11'24" E, coll. T. Peckert & J. Chrtek, 11 June 2002, 2n ~ 2x (8 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert. **5.** Slovakia, Zemplínske vrchy Mts: Streda nad Bodrogom village, ca 1 km SE from the centre of the village, loco dicto Veterné piesky in the massive of Tarbucka Hill, 140 m a.s.l., 48°22'40" N, 21°47'02" E, coll. P. Mráz & V. Mrázová, 16 April 2001, 2n = 18 (1 plant, no. 918), 2n = ca 18 (1 plant, no. 919), counted by L. Mártonfiová. **6.** Slovakia, Zemplínske vrchy Mts.: Streda nad Bodrogom village, Tarbucka Hill (277 m), the sands on the north hillside, 180 m a.s.l., 48°22'27" N, 21°46'59" E, coll. T. Peckert & J. Chrtek, 12 June 2001, 2n ~ 2x (14 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert. **7.** Poland, distr. Tarnobrzeg: Skorocice village, the nature reserve near the village, 210 m a.s.l., 50°29' N, 20°50' E, coll. T. Peckert, J. Chrtek & Z. Szeląg, 11 June 2001, 2n ~ 2x, sexual (1 plant), flow cytometry analysis done by T. Peckert. **8.** Poland, town of Sandomierz: "Góry Peprzove", slope above the Wisła River, ca 200 m a.s.l., 50°42' N, 21°48' E, coll. T. Peckert, J. Chrtek & Z. Szeląg, 11 June 2001, 2n ~ 2x (4 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert. **9.** Poland, town of Przemyśl, sandy ditch along the road from town of Przemyśl to the Ukrainian border, 210 m a.s.l., 49°47' N, 22°50' E, coll. T. Peckert, J. Chrtek & Z. Szeląg, 11 June 2001, 2n ~ 2x (11 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert. **10.** Hungary, Bakony Mts.: Fenyőfő village, the sands on the south-west border of the village, ca 320 m a.s.l., 47°17' N, 17°45' E, coll. T. Peckert & J. Chrtek, 9 July 2002, 2n ~ 2x (16 plants), sexual (2 plants), flow cytometry analysis done by T. Peckert.

In this species the ploidy range is from diploids to pentaploids (see Rotreklová et al. 2002 for a detailed survey). In this paper, a pentaploid cytotype (2n = 45) is the first reported for the Czech Republic. This is the second case of sexuality in pentaploid plants of *Hieracium* subgen. *Pilosella* (the first was published for pentaploid *H. pilosella,* Rotreklová et al. 2002). The diploid level (2n = 18) is the first record of this cytotype in *H. echioides* from Slovakia.

Hieracium fallacinum F. W. Schultz, Arch. Fl. Fr. Allem. 1: 56, 1844.
2n = 36, 2n ~ 4x, 2n = 45

H. densiflorum ≥ *H. pilosella*

Locality: **1.** Czech Republic, distr. Břeclav: Dunajovické kopce Hills, Jánská hora Hill, 2.7 km WSW of the church in the village of Dolní Dunajovice, 265 m a.s.l., 48°50'46" N, 16°33'25" E, coll. O. Rotreklová & J. Danihelka, 21 May 2002. At this locality *H. pilosella*, tetraploid *H. densiflorum* (see above) and additional plants of likely hybrid origin coexist. In total, six plants from three intermediate morphologically different clones were collected and cultivated. While the plants from clone 1 (closer to *H. pilosella* in morphology) corresponded to *H. pilosellinum* (see below), the plants from clone 2 and 3 (closer to *H. densiflorum)* corresponded to *H. fallacinum.* Tetraploid and pentaploid were detected in clone 2 (2n ~ 4x, 1 plant; 2n = 45, 1 plant) and only tetraploids in clone 3 (2n = 36, 2 plants, Fig. 1f). The chromosome counts and flow cytometry analysis done by O. Rotreklová.

Chromosome numbers for species of 2n = 45 and 2n = 54, are reported from Germany (Schuhwerk & Lippert 1997, 2002). This is the first record of tetraploids in this taxon and first karyological records from the Czech Republic.

Hieracium floribundum Wimm. et Grab., Fl. Siles. 2/2: 204, 1829.
2n = 36, 2n ~ 4x, apomictic; 2n = 45, with a long marker chromosome in both cytotypes

H. caespitosum > *H. lactucella*

Localities: **1.** Czech Republic, distr. Blansko: Rudice village, quarry in the SW margin of the village, 490 m a.s.l., 49°20'03" N, 16°43'06" E, coll. Z. Lososová, 24 May 2002, 2n = 36, with a long marker chromosome (3 plants), 2n ~ 4x (1 plant), apomictic (3 plants). The chromosome counts and flow cytometry analysis done by O. Rotreklová. **2.** Poland, Góry Izerskie Mts: near the settlement of Orle 3.5 km W of the village of Jakuszyce, 830 m a.s.l., 50°48'45" N, 15°23'50" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 45, with a long marker chromosome (1 plant), counted by A. Krahulcová. **3.** Poland, Lower Silesia, Massife of Ślęza: near N border of the preserve "Łąka Sulistrowicka", 6.5 km S of the town of Sobótka, 285 m a.s.l., 50°50'40" N, 16°43'30" E, coll. P. Kwiatkowski, 6 June 2001, 2n = 36, with a long marker chromosome (2 plants), counted by A. Krahulcová.

The tetraploid cytotype is the most common in this species in Central Europe (Rotreklová et al. 2002 and the references therein). The pentaploid cytotype is recorded for the Carpathians (Slovakia, Veľká Fatra Mts: Rotreklová et al. 2002) and "Bayerischer Wald" (Bavaria in Germany: Schuhwerk & Lippert 2002). The present record of a pentaploid *H. floribundum*, together with that of a tetraploid from the Góry Izerskie Mts by Rotreklová et al. (2002), suggests that both tetraploids and pentaploids coexist in this mountain range. At least, both cytotypes occur at locality no. 1, because the tetraploid *H. floribundum*, detected by flow cytometry, was reported by Fehrer et al. (2005) from the same area and locality, named Karlstal. The occurrence of triploid plants in Scandinavia, reported by Turesson & Turesson (1963), was recently confirmed for Sweden, Öland Island (Schuhwerk & Lippert 2002). The tetraploid chromosome number (2n = 36) is recorded here for plants from the type locality (Shlyakov 1989) in Lower Silesia (locality no. 3).

Hieracium glomeratum Froel. in DC. , Prodr. 7, 1: 207, 1838.
2n = 45, with a long marker chromosome

H. caespitosum – H. cymosum

Localities: **1.** Czech Republic, Krušné hory Mts, distr. Sokolov: grassy place in a former tin mine 3.5 km NNE of the village of Přebuz, 890 m a.s.l., 50°24'00" N, 12°30'00" E, coll. F. Krahulec, 8 June 2000, 2n = 45, with a long marker chromosome (1 plant), counted by A. Krahulcová. **2.** Poland, Góry Izerskie Mts: Velká Jizerská louka meadow close to Czech – Polish border, 7 km SSE of the town of Świeradów-Zdrój, 830 m a.s.l., 50°51'00" N, 15°21'40" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 45, with a long marker chromosome (1 plant), counted by A. Krahulcová.

The pentaploid chromosome number recorded here confirms one of two ploidy levels (tetraploid and pentaploid) previously recorded for this species (for an overview, see e.g. Krahulcová & Krahulec 1999, additional original counts in Rotreklová et al. 2002, Fehrer et al. 2005). Both cytotypes were recently recorded in Bavaria, Germany (Schuhwerk & Lippert 2002). The occurrence of pentaploid *H. glomeratum* (detected by flow cytometry) in the Góry Izerskie mountain range is also reported by Fehrer et al. (2005).

Hieracium iseranum Uechtr. in Fiek, Fl. Schles. 261, 1881.
2n = 36, with a long marker chromosome

H. floribundum > *H. pilosella*

Localities: **1.** Poland, Góry Izerskie Mts: near the settlement of Orle 3.5 km W of the village of Jakuszyce, 830 m a.s.l., 50°48'45" N, 15°23'50" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 36, with a long marker chromosome (1 plant), counted by A. Krahulcová.

The first report of the chromosome number of *H. iseranum* was for populations in the Krkonoše Mts, where all the plants are tetraploid (2n = 36) (Krahulcová & Krahulec 1999) except for one pentaploid (2n = 45) (Krahulcová et al. 2001). Tetraploid *H. iseranum* is also reported by Fehrer et al. (2005) from the same locality in Poland (the Góry Izerskie Mts, Karlstal), as well as from Germany (Upper Lusatia and the Erzgebirge). However, ploidy level was determined using flow cytometry and the presence of the characteristic marker chromosome not confirmed.

Hieracium kalksburgense Wiesb., General-Doublett.-Verz. Schles. Bot. Tauschver. 21: sine pago, 1883. 2n ~ 5x

[Syn. *H. canum* Peter, *H. laschii* Zahn]
H. cymosum < *H. pilosella*

Locality: **1.** Czech Republic, distr. Znojmo: vineyard Šobes 2.4 km WNW of the church in the Hnanice village, 280 m a.s.l., coll. T. Vymyslický, June 2002, 2n ~ 5x (1 plant), flow cytometry analysis done by O. Rotreklová. The plants coexisted with both putative parents, *H. cymosum* and *H. pilosella.*

The first chromosome numbers for this taxon, i.e. diploid (2n = 18), tetraploid (2n = 36) and pentaploid (2n = 45), were published for Germany by Schuhwerk & Lippert (1997, 2002). At one of the Bavarian localities in Germany, the tetraploid *H. kalksburgense* occurred with both putative parents, *H. pilosella* and a tetraploid *H. cymosum* (Schuhwerk & Lippert 2002). Our record is the first for the Czech Republic.

Hieracium lactucella Wallr., Sched. Crit. 1: 408, 1822. 2n = 18

Localities: **1.** Czech Republic, Brdy Hills, distr. Beroun: in the periphery of the military area ca 10 km SSW of the town of Hořovice, at the roadside in the spruce forest 0.5 km S of the settlement of Dolní Kvaň, 520 m a.s.l., 49°45'10" N, 13°51'00" E, coll. J. Hadinec, R. Hlaváček & Z. Skála, 13 June 2001, 2n = 18 (1 plant), counted by A. Krahulcová. **2.** Slovakia, Volovské vrchy Mts: Úhorná village, on the forest route from the Panské sedlo saddle to Mt Biele skaly, ca 2.3 km NW of the village, 1100 m a.s.l., 48°43'19" N, 20°39'01" E, coll. P. Mráz, 14 June 2002, 2n = 18 (1 plant, no. 1212), counted by P. Mráz. **3.** Slovakia, Volovské vrchy Mts: Vyšný Klátov village, Mt Predná Holica, meadow below the Lajoška chalet, 900 m a.s.l., 48°45'47" N, 21°04'38" E, coll. P. Mráz, 9 June 2002, 2n = 18 (1 plant, no. 1205), counted by P. Mráz. **4**. Slovakia, Veľká Fatra Mts, distr. Banská Bystrica: Baník Hill 1.1 km SSW of the church in Donovaly village, 1055 m a.s.l., 48°52'50" N, 19°13'30" E, coll. O. Rotreklová & Z. Lososová, 26 June 2001, 2n = 18 (2 plants), counted by O. Rotreklová.

The diploid chromosome numbers presented here confirm the constant ploidy level previously recorded for this sexual species (see Rotreklová et al. 2002 for supplementary data and references).

Hieracium macranthum (Ten.) Ten., Fl. Napol. 5: 190, 1836. 2n = 18

Localities: **1.** Slovakia, distr. Nitra: Pohranice village, SW slope of the Kolíňanský vrch Hill, 270 m a.s.l., 48°19'00" N, 18°09'00" E, coll. O. Rotreklová & P. Eliáš jr., 6 September 2002, 2n = 18 (1 plant), counted by O. Rotreklová. **2.** Slovakia, Biele Karpaty Mts: Lubina village, part Miškech dedinka, ski course on the southern slope of Chríb Hill, 430 m a.s.l., 48°48'20" N, 17°41'20" E, coll. P. Mráz & V. Jurkovičová, 30 April 2000, 2n = 18 (1 plant no. 733), counted by V. Mrázová, 2n = 18 (1 plant no. 734), counted by B. Šingliarová. **3.** Slovakia, Malé Karpaty Mts: Nové Mesto nad Váhom, ca 1.5 km WNW of the city centre, on SE slope of Mt Rovenec, meadow in the garden of Mr. J. Jurkovič, 250 m a.s.l., 48°48'05" N, 17°49'20" E, coll. P. Mráz, 27 May 2001, 2n = 18 (1 plant, no. 929), counted by P. Mráz. **4.** Slovakia, Tribeč Mts: Klátová Nová Ves village, Sádok quarter, Chríb Hill, by the 13th century Romanian-Gothic church from, 250 m a.s.l., 48°33'30" N, 18°16'10" E, coll. P. Mráz, V. Mrázová & R. Mráz, 2 November 2001, 2n = 18 (1 plant, no. 1183), counted by P. Mráz. **5.** Slovakia, Slanské vrchy Mts: Slanská Huta village, ca 2 km SE of the village, pasture on the margin of beech forest, 552 m a.s.l., 48°35'07.5" N,

21°28'16.6" E, coll. P. Mráz & V. Mrázová, 5 August 2001, 2n = 18 (1 plant, no. 1121), counted by B. Šingliarová. **6.** Slovakia, Slanské vrchy Mts: Slanská Huta village, on the mountain ridge between Veľký Milič Mt and Malý Milič Mt, on the path in the beech forest, 770 m a.s.l., 48°34'52.2" N, 21°27'52.3" E, coll. P. Mráz and V. Mrázová, 5 August 2001, 2n = ca 18 (1 plant, no. 1122), counted by B. Šingliarová. **7.** Slovakia, Zemplínske vrchy Mts: Ladmovce village, Nature reserve Kašvár, ca 0.3 km W of the elevation marker Šomoš (215.7), ca 200 m a.s.l., 48°24'55" N, 20°46'05" E, coll. P. Mráz & V. Mrázová, 16 April 2001, 2n = 18 (1 plant, no. 908), counted by P. Mráz & L. Mártonfiová. **8.** Slovakia, Zemplínske vrchy Mts: Streda nad Bodrogom village, ca 1 km SE from the village center, *loco dicto* Veterné piesky in the massive of Tarbucka Hill, 140 m a.s.l., 48°22'40" N, 21°47'02" E, coll. P. Mráz & V. Mrázová, 16 April 2001, 2n = 18 (1 plant, no. 920), counted by B. Šingliarová.

Gadella & Kliphuis (1972) report the occurrence of diploid *H. macranthum* in Macedonia. Our results confirm those published for Slovakia by Uhríková & Májovský (1980) and Feráková (in Májovský et al. 1987). The tetraploid plant reported by Raimondo et al. (1983) probably belongs to another polyploid taxon of the *H. pilosella* agg.

Hieracium onegense (Norrl.) Norrl. in T. Sael. et al., Herb. Mus. Fenn., ed. 2, 1: 118, 1889 [cit. sec. Shlyakov 1989: 351]. 2n = 18

[Syn. *H. caespitosum* subsp. *brevipilum* (Nägeli et Peter) P. D. Sell; *H. pratense* subsp. *silvicola* Zahn]

Locality: **1.** Slovakia, Volovské vrchy Mts: Smolnícka Huta village, meadow ca 0.5 km SW from the centre of the village, 550 m a.s.l., 48°44'20" N, 20°46'50" E, coll. P. Mráz & J. Mráz, 22 October 2000, 2n = 18 (1 plant, no. 879), counted by P. Mráz & L. Mártonfiová.

Our result confirmed the occurrence of this diploid taxon in Slovakia (Rotreklová et al. 2002).

H. onegense × *H. pilosella* 2n = 36

Localities: **1.** Slovakia, Volovské vrchy Mts: Smolnícka Huta village, meadow ca 0.5 km SW from the centre of the village, 550 m a.s.l., 48°44'20" N, 20°46'50" E, coll. P. Mráz & J. Mráz, 22 October 2000, rev. by J. Chrtek jr., 2n = 36 (1 plant, no. 884), counted by P. Mráz. The plants occur at the locality together with one of the putative parents, a diploid *H. onegense* (see above).

The tetraploid count presented here is the first for Slovak populations. Up till now, only the pentaploid level (2n = 45) has been reported for the related hybridogeneous taxon, *H. flagellare* subsp. *tatrense* Nägeli et Peter, from the Tatra Mts in S Poland (Skalińska 1967).

Hieracium pilosella L., Sp. Pl. 800, 1753. 2n = 36, 2n = 45, 2n = 54

Localities: **1.** Czech Republic, Krušné hory Mts, distr. Sokolov: grassy place in a former tin mine 3.5 km NNE of the village Přebuz, 890 m a.s.l., 50°24'00" N, 12°30'00" E, coll. F. Krahulec, 8 June 2000, 2n = 36 (1 plant), counted by A. Krahulcová. **2.** Czech Republic, Ještědský hřeben Mts, distr. Liberec: in the S periphery of the village of Kryštofovo údolí ca 5.5 km SSW of the town of Chrastava, 440 m a.s.l., 50°46'04" N, 14°55'57" E, coll. F. Krahulec & S. Bräutigam, 7 July 2001, 2n = 36 (1 plant), counted by A. Krahulcová. **3**. Czech Republic, Javorníky Mts, on the main ridge near the Portáš chalet, 900 m a.s.l., 49°17'47" N, 18°14'40" E, coll. P. Mráz & V. Jurkovičová, 14 October 2000, 2n = 45 (1 plant, no. 869), counted by P. Mráz & V. Mrázová. **4.** Poland, Góry Izerskie Mts: near the settlement of Orle 3.5 km W of the village of Jakuszyce, 830 m a.s.l., 50°48'45" N, 15°23'50" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 36 (2 plants), counted by A. Krahulcová. **5.** Germany, Sachsen, Niederschlesischer Oberlausitz-Kreis: Niederspree village, on the margin of forest road along the lake bank, 51° 24'10" N, 14° 52'60" E, 105 m a.s.l., coll. P. Mráz, 3 June 2000, 2n = 36 (1 plant, no. 751), counted by L. Mártonfiová. **6.** Slovakia, Ostrôžky Mts: Polichno village, meadow on the top of the Mt Bralce, 817 m a.s.l., 48°25'27.23" N, 19°27'44" E, coll. P. Mráz & V. Jurkovičová, 17 April 2001, 2n = 45 (1 plant no. 725), counted by P. Mráz. **7.** Slovakia, Chočské vrchy Hills: Prosiek village, 0.5 km N of the

village, pasture, 644 m a.s.l., 49°09'29.9" N, 19°29'54.4" E, coll. P. Mráz, 15 July 2000, 2n = ca 45 (1 plant no. 1076), counted by P. Mráz. **8.** Slovakia, Západné Tatry Mts: Pribilina village, Račkova dolina valley, meadow near the Agriculture University of Nitra chalet, 940 m a.s.l., 49°07'57" N, 19°46'59" E, coll. V. Mrázová, 18 June 2001, 2n = 45 (1 plant no. 978), counted by L. Mártonfiová. **9.** Slovakia, Západné Tatry Mts: Pribilina village, Račkova dolina valley, near the crossroad with the Jamnická dolina valley, 960 m a.s.l., 49°07'57" N, 19°46'59" E, coll. V. Mrázová, 18 June 2001, 2n = 45 (1 plant no. 977), counted by L. Mártonfiová. **10.** Slovakia, Vysoké Tatry Mts: ca 1.5 km NW of Štrbské pleso tarn, 1400 m a.s.l., 49°07'48" N, 20°02' 27" E, coll. P. Mráz & V. Mrázová, 7 August 2000, 2n = 45 (1 plant no. 838), counted by P. Mráz and L. Mártonfiová. **11.** Slovakia, Vysoké Tatry Mts: on the tourist path between Štrbské pleso tarn and Jamské pleso tarn, 1450 m a.s.l., 49°07'56" N, 20°02'28" E, coll. P. Mráz & V. Mrázová, August 2001, 2n = 45 (1 plant no. 1158), counted by P. Mráz. **12.** Slovakia, Volovské vrchy Mts: Hnilčík village, on the phylite rocks near the crossroad to Hnilčík-Roztoky quarter, 640 m a.s.l., 48°51'24.4" N, 20°34'28.6" E, coll. P. Mráz and V. Jurkovičová, 3 July 2000, 2n = 45 (2 plants nos. 767, 768), counted by L. Mártonfiová. **13.** Slovakia, Volovské vrchy Mts: Čučma village, S slopes of Mt Skalisko, ca 1220 m a.s.l., 48°44'47" N, 20°34'33" E, coll. P. Mráz & V. Jurkovičová, 13 June 2000, 2n = 54 (1 plant no. 762), counted by P. Mráz. **14.** Slovakia, Volovské vrchy Mts: Čučma village, ca 200 m SW of the top of Mt Skalisko (1293 m), 1250 m a.s.l., 48°44'38.4" N, 20°34'35.4" E, coll. P. Mráz & V. Mrázová, 12 June 2001, 2n = 45 (1 plant, no. 959), counted by P. Mráz. **15.** Slovakia, Volovské vrchy Mts: Čučma village, S slopes of Mt Skalisko, *loco dicto* Doboška ca 1 km N from elevation marker 874.2, 890 m a.s.l., 48°43'50" N, 20°35'25" E, coll. P. Mráz & V. Mrázová, 12 June 2001, 2n = 45 (2 plants, nos. 962, 963), counted by P. Mráz. **16.** Slovakia, Volovské vrchy Mts: Úhorná village, on the forest route from the Panské sedlo saddle to Mt Biele skaly, NW of the village, 1100 m a.s.l., 48°43'19" N, 20°39'01" E, coll. P. Mráz, June 2002, 2n = 45 (3 plants, nos. 1213, 1215, 1216), counted by P. Mráz. **17.** Slovakia, Volovské vrchy Mts: Prakovce village, *loco dicto* Hutno on E margin of the village, near the forest road, 400 m a.s.l., 48°49'08" N, 20°55'25" E, coll. P. Mráz, September 2000, 2n = 45 (1 plant, no. 867), counted by P. Mráz. **18.** Slovakia, Volovské vrchy Mts: Kojšov village, *loco dicto* Strieborná lúka ca 2.5 km NW of the village, 700 m a.s.l., 48°50'25" N, 20°59'20" E, coll. P. Mráz, 5 July 2000, 2n = 45 (1 plant, no. 774), counted by P. Mráz. **19.** Slovakia, Volovské vrchy Mts: Vyšný Klátov village, Mt Predná Holica, meadow below the Lajoška chalet, 900 m a.s.l., 48°45'47" N, 21°04'38" E, coll. P. Mráz, June 2002, 2n = 54 (4 plants, nos. 1207, 1208, 1210, 1211), counted by P. Mráz. **20.** Slovakia, Volovské vrchy Mts: Košice city, Botanical garden grounds, 236 m a.s.l., 48°44'03" N, 21°14'15" E, coll. P. Mráz, May 2000, 2n = 54 (1 plant, no. 735), counted by P. Mráz. **21.** Slovakia, Slovenský kras Mts: Plešivec town, Plešivecká planina plateau, on the forest route ca 0.5 km NE of Zbojnícka priepasť chasm, 545 m a.s.l., 48°34'22" N, 20°25'09" E, coll. P. Mráz, 30 May 2001, 2n = 54 (1 plant, no. 934), counted by P. Mráz. **22.** Slovakia, Slovenský kras Mts: Kečovo village, Silická planina plateau, xerothermic slopes on the N margin of the village, 350 m a.s.l., 48°29'45" N, 20°29'20" E, coll. P. Mráz, 30 May 2002, 2n = 54 (1 plant, no. 1200), counted by P. Mráz. **23.** Slovakia, Slovenský kras Mts: Zádiel village, Zádielska planina plateau, ca 0.5 km NW from elevation point 591.2, 580 m a.s.l., 48°37'58.3" N, 20°41'57.4" E, coll. E. Karasová, 25 May 2001, 2n = 54 (1 plant, no. 930), counted by L. Mártonfiová. **24.** Slovakia, Vihorlat Mts: Jasenov village, ca 0.5 km NE of the village, pasture, 150 m a.s.l., 48° 54'14.7" N, 21°54'36.6" E, coll. P. Mráz & V. Mrázová, 13 May 2001, 2n = 45 (1 plant no. 926), counted by P. Mráz, 2n = ca 45 (1 plant, no. 927), counted by P. Mráz. **25.** Slovakia, Zemplínske vrchy Mts: Veľká Tŕňa village, xerothermic margins of the road 1.5 km NNW of the village, pasture, 180 m a.s.l., 48° 28' 35" N, 21°40'24.5" E, coll. P. Mráz & V. Mrázová, 14 April 2001, 2n = 45 (1 plant, no. 913), counted by P. Mráz, 2n = ca 45 (1 plant, no. 914), counted by P. Mráz. **26.** Slovakia, Zemplínske vrchy Mts: Veľká Bara village, former vineyards, ca 100 m N from Piliš Hill (277.6), ca 240 m a.s.l., 48°25'47" N, 21°42'28.3" E, coll. P. Mráz & V. Mrázová, 15 April 2001, 2n = ca 45 (1 plant, no. 909), counted by L. Mártonfiová. **27.** Slovakia, Zemplínske vrchy Mts: Streda nad Bodrogom village, ca 1 km SE of the village centre, *loco dicto* Veterné piesky on the Tarbucka Hill massive, ca 140 m a.s.l., 48°22'40.5" N, 21° 47'02.4" E, coll. P. Mráz & V. Mrázová, 16 April 2001, 2n = ca 45 (1 plant, no. 921), counted by L. Mártonfiová. **28.** Slovakia, Zemplínske vrchy Mts: Kráľovský Chlmec village, Veľký kopec Hill (263.9), 260 m a.s.l., 48°25'01.4" N, 21°57'44.7" E, coll. P. Mráz & V. Mrázová, 17 April 2001, 2n = ca 45 (1 plant, no. 904), counted by L. Mártonfiová. **29.** Slovakia, Zemplínske vrchy Mts: Luhyňa village, N slopes of Ondrejský kopec Hill, oak forest margin, 160 m a.s.l., 48°30'03.8" N, 21°38'01.3" E, coll. P. Mráz & V. Mrázová, 14 April 2001, 2n = ca 54 (1 plant, no. 912), counted by P. Mráz.

The chromosome number 2n = 36 recorded here for two localities in the Czech Republic is that commonly recorded for *H. pilosella* in this country, including plants from the mountain ranges surrounding the Czech basin (Krahulcová & Krahulec 1999, Rotreklová et al. 2002). In contrast, only pentaploids (2n = 45) and hexaploids (2n = 54) were recorded in

Slovakia. However, Píšťanský & Mičieta (2000) record tetraploids from 27, pentaploids from 4 and hexaploids from 2 localities in Slovakia, but there are no voucher specimens available at present (K. Mičieta, personal communication).

Because Šingliarová & Mráz (2004) using flow cytometry on a sample of 80 plants from different parts of Slovakia detected only pentaploids and hexaploids, the high number of tetraploids reported by Píšťanský & Mičieta (2000) is surprising. Our results (both published here and unpublished) show that pentaploid plants occur mainly in the Western Carpathians and hexaploids in the warmer regions. Hexaploids also occur at higher altitudes, usually accompanied by other *Hieracium* taxa (e.g. *H. lactucella*), as previously observed by Skalińska (1967) in the High Tatra Mts. The eastern boundary of the common occurrence of tetraploids is probably in Moravia. Surveys of the karyological variability in *H. pilosella*, covering its whole distribution area, was reported by Krahulcová & Krahulec (1999) and Rotreklová et al. (2002). Recently, plants with tetraploid chromosome numbers were recorded in Bavaria, Germany (Schuhwerk & Lippert 2002).

Hieracium piloselliflorum Nägeli et Peter, Die Hieracien Mittel-Europas 1: 707, 1885. 2n = 45

H. floribundum < *H. pilosella*

Locality: **1**. Poland, Góry Izerskie Mts: Velká Jizerská louka meadow close to Czech – Polish border, 7 km SSE of the town of Świeradów-Zdrój, 830 m a.s.l., 50°51'00" N, 15°21'40" E, coll. F. Krahulec (excursion during the 4th Hieracium Workshop), 4 June 2000, 2n = 45 (1 plant), counted by A. Krahulcová.

The hybridogeneous species *H. piloselliflorum* consists of tetraploids, pentaploids and hexaploids, and most populations have an independent origin (Fehrer et al. 2005). All three ploidy levels are recorded in the Krkonoše Mts (Krahulcová et al. 2001), and tetraploids and pentaploids in other areas of the Czech Republic (Rotreklová et al. 2002). The pentaploid chromosome number presented confirms the occurrence of this cytotype in the Góry Izerskie Mts (Fehrer et al. 2005).

Hieracium pilosellinum F. W. Schultz, Arch. Fl. Fr. Allem. 1: 57, 1844.
2n = 36; 2n = 45, apomictic.

H. pilosella > *H. densiflorum*

Localities: **1.** Czech Republic, distr. Břeclav: Dunajovické kopce Hills, Jánská hora Hill, 2.7 km WSW of the church in the village of Dolní Dunajovice, 265 m a.s.l., 48°50'46" N, 16°33'25" E, coll. O. Rotreklová & J. Danihelka, 21 May 2002. 2n = 36 (1 plant) counted by O. Rotreklová (Fig. 1e). Plants grew here together with *H. pilosella,* tetraploid *H. densiflorum* and with tetraploid *H. fallacinum* (see above). **2.** Czech Republic, distr. Slavkov u Brna: slopes 0.75 km SW of the church in the village of Rašovice, 250 m a.s.l., 49°07'07" N, 16°56'24" E, 3 June 2002, coll. O. Rotreklová, 2n = 45, apomictic (1 plant), counted by O. Rotreklová (Fig. 1b). The plant coexisted here with *H. pilosella* and tetraploid *H. densiflorum* (see above).

The first chromosome number (2n = 45) for this species was recorded from Bavaria in Germany by Schuhwerk & Lippert (2002). Our data are the first for *H. pilosellinum* from the Czech Republic. The tetraploid number (2n = 36) is reported here for *H. pilosellinum* for the first time, as is the apomictic reproduction of the pentaploid cytotype.

Hieracium piloselloides Vill., Prosp. Pl. Dauph. 34, 1779.
2n = 27, apomictic; 2n = 36, 2n ~ 4x, both apomictic and sexual; 2n = 45, 2n ~ 5x, apomictic

Localities: **1.** Germany, Thuringia, distr. Jena: Leutra village, Nature reserve Leutrathal, slope with S exposure N of the village, ca 300 m a.s.l., 50°52'30" N, 11°33'52" E, coll. M. Chytrý, 11 June 1999, 2n = 45, apomictic (1 plant), counted by O. Rotreklová. **2.** Germany, Ausburg: near the Church of the Holy Cross, 500 m a.s.l., 48°22'18" N, 10°53'30" E, coll. M. Chytrý & Z. Lososová, 1 August 2001, 2n = 36, apomictic (1 plant), counted by O. Rotreklová. **3.** Germany, Bavaria, distr. Regensburg: quarry above the Naab River 1.5 km N of Nittendorf village, ca 400 m a.s.l., 49°01'30" N, 11°58'10" E, coll. O. Rotreklová & P. Šmarda, 11 July 2000, 2n = 36, apomictic (1 plant), 2n ~ 4x (1 plant), 2n ~ 5x (1 plant). The chromosome counts and flow cytometry analysis done by O. Rotreklová. **4.** Germany, Baden-Württemberg, Müllheim village, alluvium of the Rhine 8 km NW of the village, 47°52' N, 7°33' E, coll. P. Šmarda, June 2002, 2n = 27 (2 plants), apomictic (1 plant), counted by O. Rotreklová. **5.** Czech Republic, distr. Břeclav: Dunajovické kopce Hills, Jánská hora Hill, 3.25 km W-WNW of the church in the village of Dolní Dunajovice, 260 m a.s.l., 48°51'22" N, 16°33'04" E, coll. O. Rotreklová & J. Danihelka, 21 May 2002, 2n = 36, apomictic (2 plants), counted by O. Rotreklová. **6.** Slovakia, Nízké Tatry Mts.: S slope of Mt Chopok, slope along the road 200 m of chair lift near the Srdiečko chalet, 1080 m a.s.l., 48°56'14" N, 19°37'23" E, coll. O. Rotreklová & Z. Lososová, 27 June 2001, 2n ~ 4x (1 plant), flow cytometry analysis done by O. Rotreklová. **7.** Slovakia, Volovské vrchy Mts: Prakovce village, housing estate „SNP", in the park „SNP", introduced probably with grass seeds or with building material, 445 m a.s.l., 48°48'37.4" N, 20°54'34.1" E, coll. P. Mráz, 9 June 2002, 2n = 36 (1 plant, no. 1204), counted by P. Mráz. **8.** Hungary, distr. Szentendre: 1 km S of the village of Sziget-monostor, 150 m a.s.l., 47°41'45" N, 19°05'28" E, coll. P. Šmarda & T. Vymyslický, 23 June 2000, 2n = 36 (2 plants), counted by O. Rotreklová. **9.** Slovenia, distr. Kranjska Gora: Planica valley, car-park 2 km SSE of Rateče village, 1080 m a.s.l., 46°29'17" N, 13°43'17" E, coll. O. Rotreklová & Z. Lososová, 24 June 2000, 2n = 36 (2 plants), sexual (1 plant), counted by O. Rotreklová (Fig. 1d). **10.** Slovenia, distr. Kranjska Gora, Vršič Saddle, 1600 m a.s.l., 46°26'20" N, 13°44'50" E, coll. O. Rotreklová & Z. Lososová, 24 June 2000, 2n = 36, (1 plant), counted by O. Rotreklová. **11.** Slovenia, Juliske Alps Mts.: Trenta village, 620 m a.s.l., 46°22'80" N, 13°45'10" E, the plant raised from achenes, coll. Z. Lososová, 24 June 1999, 2n = 45, apomictic (1 plant), counted by O. Rotreklová. **12.** Slovenia, Juliske Alps Mts, Mt Triglav: Dolina Vrata valley, car park 1 km NE of the Aljažev dom chalet, 1090 m a.s.l., 46°25'30" N, 13°51'00" E, coll. O. Rotreklová & Z. Lososová, 22 June 2003, 2n ~ 4x (2 plants), flow cytometry analysis done by O. Rotreklová. **13.** Italy, Liguria: Monterosso al Mare village, 1 km N of the village, 353 m a. s. l, 44°09'45.6" N, 9°38'57.6" E, coll. P. Šmarda, 28 May 2003, 2n ~ 4x (1 plant), flow cytometry analysis done by O. Rotreklová.

Ploidy levels ranging from diploid (2n = 18) to hexaploid (2n = 54) were recorded (see Rotreklová et al. 2002 for survey of published data), with tetraploid plants (2n = 36) the most common. Recently the following chromosome counts for this species from Bavaria in Germany were published by Schuhwerk & Lippert (2002): 2n = 27, 2n = 36 and 2n = 45. Chromosome numbers for *H. piloselloides* from Slovakia and Hungary and this apomictic mode of reproduction are recorded here for the first time.

Hieracium pistoriense Nägeli et Peter, Die Hieracien Mittel-Europas 1: 601, 1885.
2n = 27, sterile

H. bauhini – H. macranthum

Locality: **1.** Slovakia, distr. Nitra: Pohranice village, SW slope of the Kolíňanský vrch Hill, 270 m a.s.l., 48°19'00" N, 18°09'00" E, coll. O. Rotreklová & P. Eliáš jr., 6 September 2002, 2n = 27, sterile (1 plant), counted by O. Rotreklová (Fig. 1a). The plant grew together with putative parents, a diploid *H. macranthum* (see above) and tetraploid *H. bauhini* (Rotreklová 2004).

Nägeli & Peter (1885) described under the name of *H. pistoriense* two intermediate taxa between *H. macranthum* and *H. bauhini*: *H. pistoriense* subsp. *pistoriense* and subsp. *gracilicaule*, the second of which was described from Mt Johannisberg [János hegy] near Budapest, Hungary. Our plants from Slovakia correspond in morphology to the subsp.

gracilicaule. The occurrence of *H. pistoriense* in Slovakia is not included in the checklist of Slovak vascular plants (Chrtek 1998), nor in Zahn's last monograph (Zahn 1930). Therefore, our record of this generally very rare taxon (see Zahn 1930) seems to be the first for Slovakia, as are our data on chromosome number and mode of reproduction.

Hieracium rothianum Wallr., Sched. Crit. 417, 1822. 2n ~ 3x, apomictic

H. echioides > *H. pilosella*

Locality: **1.** Czech Republic, distr. Břeclav: Dunajovické kopce Hills, Jánská hora Hill, 2.7 km WSW of the church in the village of Dolní Dunajovice, 265 m a.s.l., 48°50'46" N, 16°33'25" E, coll. O. Rotreklová & J. Danihelka, 21 May 2002, 2n ~ 3x, apomictic (1 plant), flow cytometry analysis done by O. Rotreklová. Plant was revised by T. Peckert.

The triploid level has not been previously found in *H. rothianum*. Only the chromosome number 2n = 36 is reported from Austria (Schuhwerk & Lippert 1997), the Czech Republic, Slovakia (both Rotreklová et al. 2002) and Germany (Schuhwerk & Lippert 2002). So far, all references are to the subspecies *rothianum*. Apomictic reproduction is already recorded for the tetraploid cytotype (Rotreklová et al. 2002).

Hieracium schultesii F. W. Schultz, Arch. Fl. Fr. Allem. 1: 35, 1842. 2n = 36; 2n = 45, 2n ~ 5x

H. lactucella – H. pilosella

Localities: **1.** Czech Republic, distr. Žďár nad Sázavou: meadow in the NW part of the village of Cikháj, together with *H. pilosella* and diploid *H. lactucella* (see Rotreklová et al. 2002), 650 m a.s.l., 49°39'07" N, 15°57'54" E, coll. O. Rotreklová, 30 May 2001, 2n = 36 (2 plants), counted by O. Rotreklová. **2.** Slovakia, Nízké Tatry Mts: Čertovica saddle 13 km S of the Liptovský Hrádok, slope along the road 0.5 km SW of Čertovica chalet, 1380 m a.s.l., together with *H. pilosella* and *H. lactucella*, 48°53'40" N, 19°43'00" E, coll. O. Rotreklová & Z. Lososová, 27 June 2001, 2n = 45 (2 plants), counted by O. Rotreklová. **3.** Slovakia, distr. Banská Bystrica: Baník Hill 1.1 km SSW of the church in the village of Donovaly, 1055 m a.s.l., 48°52'50" N, 19°13'30" E, together with diploid *H. lactucella* (see above) and *H. pilosella*, coll. O. Rotreklová & Z. Lososová, 26 June 2001, 2n = 45 (1 plant), counted by O. Rotreklová. **4.** Poland, Lower Silesia, Massife of Ślęza: near N border of the preserve "Łąka Sulistrowicka", 6.5 km S of the town of Sobótka, 290 m a.s.l., 50°50'40" N, 16°43'30" E, coll. P. Kwiatkowski, 6 June 2001, 2n ~ 5x (1 plant), flow cytometry analysis done by A. Krahulcová.

Information on the ploidy variation in *H. schultesii* is scarce. We present here additional records of pentaploid *H. schultesii*: the first two from the Krkonoše Mts (Krahulcová & Krahulec 1999) and the Western Carpathians (Rotreklová et al. 2002). Two new records of the pentaploid cytotype in Slovakia confirm the relatively common occurrence of pentaploids in the Western Carpathians assumed by Rotreklová et al. (2002). In addition, triploids and tetraploids are also recorded in this species (see Rotreklová et al. 2002 for references).

Hieracium zizianum Tausch, Flora, Regensburg, 11, Ergänzungsbl. 1: 62, 1828.
2n = 27, apomictic; 2n = 36, 54

H. piloselloides – H. cymosum

Localities: **1.** Slovakia, Volovské vrchy Mts: Prakovce village, *loco dicto* Ortvaň, by the road to the housing estate „SNP", introduced probably with building material, 405 m a.s.l., 48°48'55.6" N, 20°54'15.1" E, coll. P. Mráz, 9 June 2002, 2n = 36 (one plant, no. 1203), counted by P. Mráz. Plants from the same locality were determined as *H. zizianum* by S. Bräutigam on the basis of collections from 1996. **2.** France, Maritime Alps Mts, Mercantour National Park: Col de Tende, 8 km NNW of the village of Tende, 44°08'50" N, 7°33'50" E, coll. M. Kočí, 9 June 2000, 2n = 27 (1 plant), apomictic, 2n = 54 (1 plant), counted by O. Rotreklová. Plants were revised by S. Bräutigam.

The first chromosome numbers for this taxon were from Bavaria in Germany (2n = 36, 45) and Italy (2n = 36) (Schuhwerk & Lippert 2002). Our data are new for Slovakia and France, and for this species the triploid (2n = 27) and hexaploid (2n = 54) chromosome numbers are also new. The breeding system was also previously unknown.

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Souhrn

V práci jsou uvedeny výsledky studia počtů chromozomů (popřípadě ploidní úrovně) a reprodukčních systémů jestřábníků z podrodu *Pilosella* za uplynulé dva roky. Jsou zde uvedeny počty chromozomů následujících 26 taxonů včetně jednoho hybrida, pro část z nich i reprodukční systémy: *H. arvicola* Nägeli et Peter (2n = 45), *H. aurantiacum* L. (2n = 36, 45), *H. bauhini* Besser (2n = 36, 45), *H. bifurcum* M. Bieb. (2n = 45, téměř sterilní), *H. brachiatum* Bertol. ex DC. (2n = 36; 45, apomiktický), *H. caespitosum* Dumort. (2n = 36), *H. cymosum* L. (2n ~ 4x), *H. densiflorum* Tausch (2n = 36, ~ 4x, sexuální), *H. echioides* Lumn. (2n = 18, ~ 2x, 45, obě ploidní úrovně sexuální), *H. fallacinum* F. W. Schultz (2n = 36, 45), *H. floribundum* Wimm. et Grab. (2n = 36, ~ 4x, apomiktický; 2n = 45), *H. glomeratum* Froel. in DC. (2n = 45), *H. iseranum* Uechtr. (2n = 36), *H. kalksburgense* Wiesb. (2n ~ 5x), *H. lactucella* Wallr. (2n = 18), *H. macranthum* (Ten.) Ten. (2n = 18), *H. onegense* (Norrl.) Norrl. (2n = 18), *H. onegense* × *H. pilosella* (2n = 36), *H. pilosella* L. (2n = 36, 45, 54), *H. pilosellíflorum* Nägeli et Peter (2n = 45), *H. pilosellinum* F. W. Schultz (2n = 36, 45), *H. piloselloides* Vill. (2n = 27, apomiktický; 2n = 36, ~ 4x, apomiktický i sexuální; 45, ~ 5x, apomiktický), *H. pistoriense* Nägeli et Peter (2n = 27, sterilní). *H. rothianum* Wallr. (2n ~ 3x, apomiktický), *H. schultesii* F. W. Schultz (2n = 36, 45, ~ 5x) a *H. zizianum* Tausch (2n = 27, apomiktický; 2n = 36, 54). Vedle stanovení chromozomových počtů z meristémů kořenových špiček u většiny druhů byla ke zjištění ploidie u 10 druhů (86 rostlin) použita průtoková cytometrie. Dlouhý signální chromozom byl pozorován v karyotypu následujících taxonů: *H. caespitosum*, *H. floribundum*, *H. glomeratum* a *H. iseranum*. Chromozomové počty, případně též reprodukční mechanismy jsou poprvé publikovány pro druhy: *H. bifurcum* (téměř sterilní pentaploidní rostlina), *H. pilosellinum* (apomiktická pentaploidní rostlina), *H. piloselloides* (apomiktická triploidní rostlina), *H. pistoriense* (triploidní sterilní rostlina), *H. rothianum* (apomiktická triploidní rostlina) a *H. zizianum* (apomiktická triploidní rostlina). První nebo nový chromozomový počet byl zjištěn z následujících zemí: Česká republika: *H. arvicola* (2n = 45), *H. bifurcum* (2n = 45), *H. echioides* (2n = 45), *H. fallacinum* (2n = 36, 45), *H. floribundum* (2n = 45), *H. kalksburgense* (2n ~ 5x), *H. pilosellinum* (2n = 36, 45) a *H. rothianum* (2n = 27); Maďarsko: *H. piloselloides* (2n = 36); Slovensko: *H. brachiatum* (2n = 36, 45), *H. cymosum* (2n = 36), *H. echioides* (2n = 18), *H. piloselloides* (2n = 36) a *H. zizianum* (2n = 36); Slovinsko: *H. brachiatum* (2n = 45) a *H. piloselloides* (2n = 45); a Francie: *H. zizianum* (2n = 27, 54). V podrodu *Pilosella* je podruhé prezentován sexuální způsob reprodukce pentaploidního cytotypu (*H. echioides*). Dříve publikované (Rotreklová et al. 2002) a nové údaje o počtu chromozomů *H. densiflorum* z České republiky naznačují, že tento druh je na jižní Moravě pravděpodobně pouze tetraploidní. Nález velmi vzácného taxonu *H. pistoriense* (*H. bauhini – H. macranthum*) nedaleko Nitry je prvním údajem pro území Slovenska.

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