# Mediterranean chromosome number reports – 20

edited by G. Kamari, C. Blanché & S. Siljak-Yakovlev

**Abstract**

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This is the twentieth of a series of reports of chromosome numbers from Mediterranean area, peri-Alpine communities and the Atlantic Islands, in English or French language. It comprises contributions on 28 taxa: *Atriplex*, *Chenopodium* and *Suaeda* from Bulgaria, by N. Grozeva (Nos 1709-1714); *Atriplex* and *Chenopodium* from Bulgaria, by N. Grozeva (Nos 1715-1721); *Genista* and *Anthyllis* from Lebanon-Syria and Spain, by T. Cusma Velari, L. Feoli Chiapella, V. Kosovel & M. Livneh (Nos 1722-1724); *Stachys*, *Seseli* and *Petrocoptis* from Spain by J. Simon, M. Bosch, A. Rovira & C. Blanché (Nos 1725-1727); *Crocus*, *Asphodelus*, *Ornithogalum*, *Ophrys*, *Barlia, Cyclamen* and *Anemone* from Greece by S. Samaropoulou, P. Bareka & G. Kamari (Nos 1728-1735); *Pilosella* from Italy, by E. Di Gristina, A. Geraci & F. M. Raimondo (No 1736).

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**Reports (1709-1714) by Neli Grozeva**

**1709.** ***Atriplex hastata*** L. — 2*n* = 18 (Figs 1-2).

**Bu:** Danubian plain, Svistov town, 43º 37‘ N, 25º 20‘ E, ruderal terrains, 50 m, 21 Sept 2009, *Grozeva NG*-300 (SOM).

**—** Thracian Lowland, Chirpan town, 42º 12’ N, 25º 20’ E, ruderal places, 493 m, 17 Sept 2009, *Grozeva NG*-305 (SOM).

This is the first record of *A. hastata* from Bulgaria. It confirms the earlier counts published from elsewhere (see Fedorov 1969).

**1710.** ***Atriplex patula*** L. — 2*n* = 36 (Figs 3-4).

**Bu:** Eastern Rhodope Mts, Kurdzhali town, 41º 39’ N, 25º 38’ E, ruderal places, 275 m, 10 Sept 2009, *Grozeva NG*-277 (SOM).

**—** Eastern Sredna Gora Mt., Dolno Novo Selo village, 42º 25’ N, 25º 14’ E, ruderal places,
557 m, 4 Sept 2008,, *Grozeva NG*-259 (SOM).

The chromosome number reported here is the first record for *A. patula* from Bulgaria. The result obtained 2*n* = 36 is in agreement with most reports (see Fedorov 1969, Löve & Löve 1982, Bassett & Crompton 1971, Taschereau 1972, Queiros 1975, Muzianty & al 1981, Juan & Pastor 1990). Some other chromosome numbers have been also reported for the same species: 2*n* = 18 (Winge 1917, Kjellmark 1934, Witte 1947 in Löve & Löve 1961, Juan & Pastor 1990), *n* = 27 (Taylor & Mulligan 1968 in Mizianty & al. 1981), 2*n* = 72 (Queirós 1975).

**1711.** ***Chenopodium missouriense*** Aellen — 2*n* = 54 (Fig. 5).

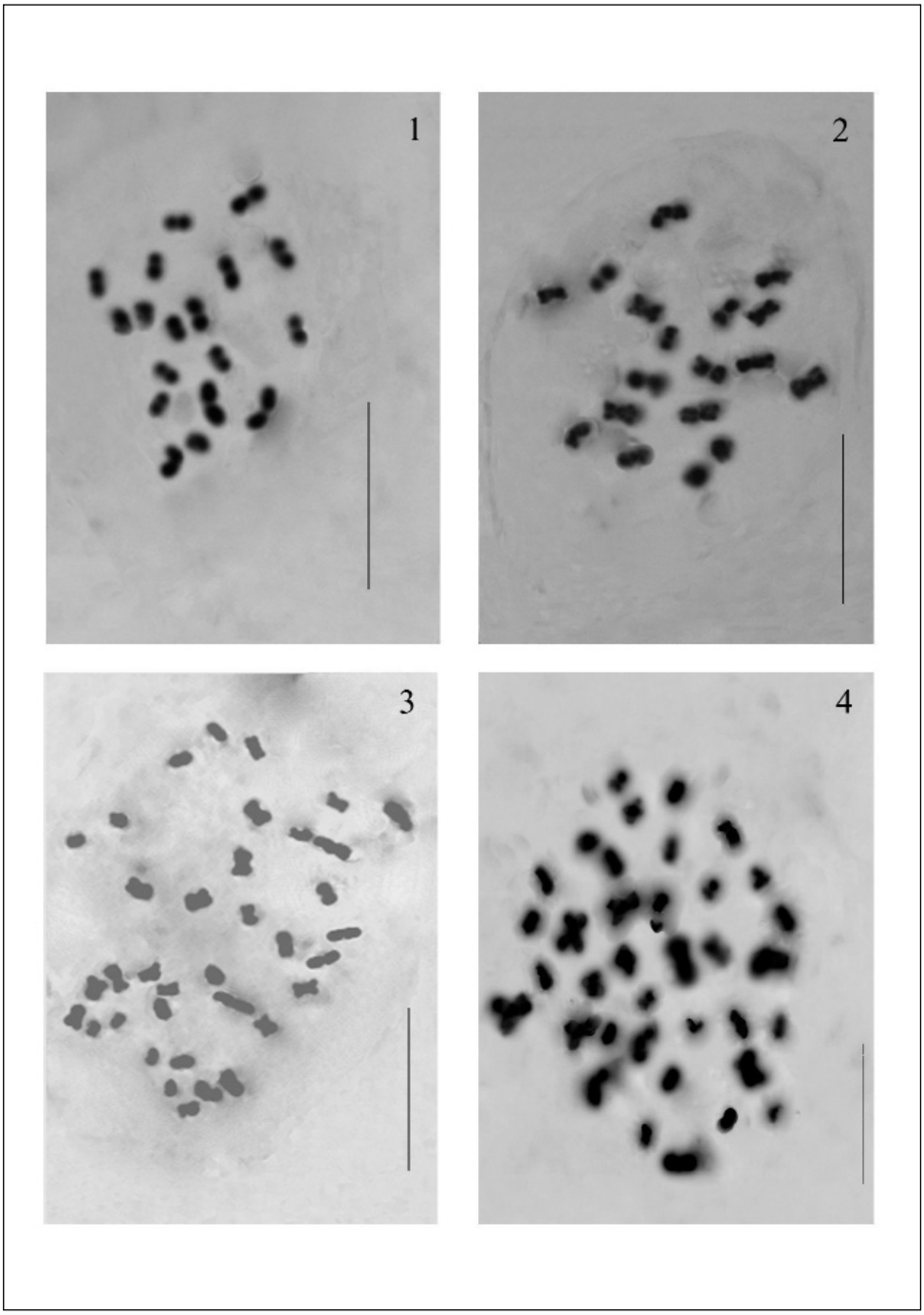
**Bu:** Tundza Hilly Country, Karanovo village, 42° 31’ N 25° 55’ E, ruderal places, 133 m, 12
Sept 2009, *Grozeva NG*-144 (SOM).

This chromosome count confirms the data of Grozeva (2008) from Bulgaria and of Kjellmark (1934), Homsher (1963), Zosimovich (1965) and Keener (1970) from abroad.

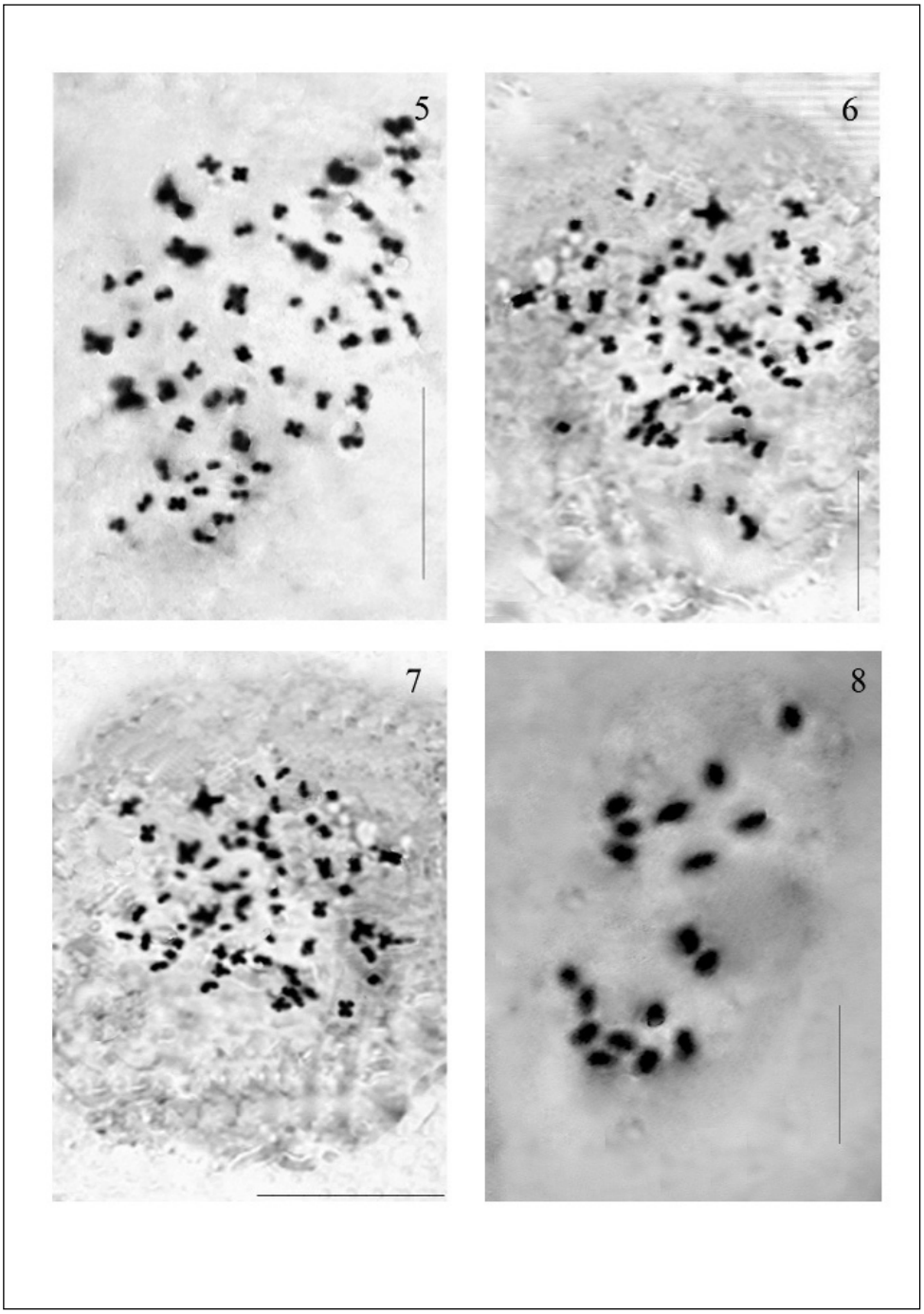
**1712.** ***Chenopodium probstii*** **Aellen —** 2*n* = 54 (Figs 6-7).

**Bu:** Easthern Rhodope Mts, Ivaylovgrad town, 41º 32’ N, 26º 08’ E, ruderal places, 104 m, 25 Sept 2009, *Grozeva NG*-353 (SOM).

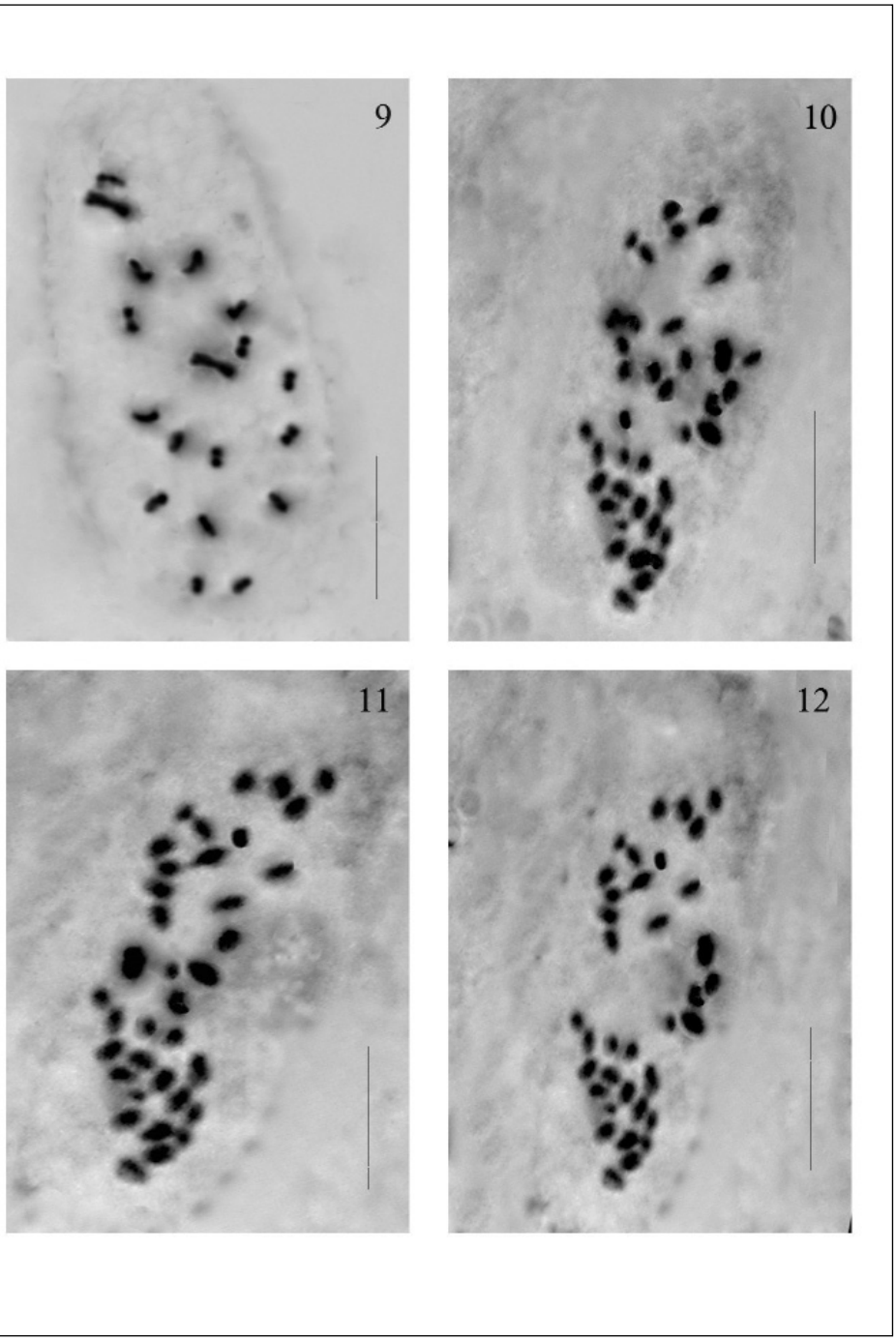
**—** Thracian Lowland, Chirpan town, 42º 12’ N, 25º 20’ E, ruderal places, 493 m, 17 Sept 2009, *Grozeva NG*-355 (SOM).




Figs 1-4. Microphotographs of root tip mitosis of: **1-2,** *Atriplex hastata*, 2*n* = 18; **3-4,** *A. patula*, 2*n* = 36. – Scale bars = 10 μm.




Figs 5-8. Microphotographs of root tip mitosis of: **5,** *Chenopodium missouriense*, 2*n* = 54; **6-7,** *Ch. probstii*, 2*n* = 54; **8,** *Suaeda altissima*, 2*n* = 18. – Scale bars = 10 µm.




Figs 9-12. Microphotographs of root tip mitosis of: **9,** *Suaeda altissima*, 2*n* = 18; **10-12**, *S. maritima*, 2*n* = 36. – Scale bars = 10 μm.

The chromosome number $2n = 54$ confirms the previous count from Bulgaria (Grozeva 2008). The same result is also reported by Kjellmark (1934), Zosimovich (1965) and Schwarzova (1986).

**1713. *Suaeda altissima* (**L.) Pall. — $2n = 18$ (Figs 8-9).

**Bu:** Southern Black Sea coast, Atanasovsko lake, 42º 39‘ N, 27º 28‘ E, sands around the beach, 30 m, 26 Sept 2008, *Grozeva NG*-362 (SOM).

— Southern Black Sea coast, Pomoriysko lake, 42º 35‘ N, 27º 37‘ E, sandy terrains, 10 m, 26 Sept 2008, *Grozeva NG*-363 (SOM).

This chromosome number $2n = 18$ is in accordance with previously reported data from Bulgaria (Kozuharov & Kuzmanov 1969 in Kuzmanov 1993). The same number has been reported by many authors (see in Fedorov 1969, Ebrahimzadeh & al. 1994, Lomonosova & Krasnikov 2006, Lomonosova & al. 2001, 2003, 2007).

**1714. *Suaeda maritima*** Waldst. & Kit. — $2n = 36$ (Figs 10-12).

**Bu:** Southern Black Sea coast, Atanasovsko lake, 42º 39’ N, 27º 28’ E, sands around the beach, 30 m, 26 Sept 2008, *Grozeva NG*-364 (SOM).

— Southern Black Sea coast, Pomoriysko lake, 42º 35’ N, 27º 37’ E, sandy terrains, 10 m, 26 Sept 2008, *Grozeva NG*-365 (SOM).

— Southern Black Sea coast, Nessebar old town, 42° 39’ N, 27° 44’ E, sandy terrains, 0 m, 27 Sept 2008, *Grozeva NG*-367 (SOM).

The chromosome number reported here is the first record for *S. maritima* from Bulgaria and agrees with reports of Mesquita (1953), Queirós (1975), Bassett & Crompton (1978), Canzobre (1989), Lomonosova & Freitag (2009). A chromosome number of $2n = 18$ is given in Fedorov (1969).

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**Reports (1715-1721) by Neli Grozeva**

**1715.** ***Atriplex nitens*** Schkuhr **—** 2*n* = 18 (Figs 1-2).

**Bu:** Eastern Rhodope Mts, Kurdzhali town, 41º 39' N, 25º 38' E, ruderal places, 275 m, 10 Sept 2008, *Grozeva NG*-265 (SOM).
**—** Eastern Sredna Gora Mt., Gorno Novo Selo village, 42º 27' N, 25º 14' E, ruderal places, 597 m, 4 Sept 2008, , *Grozeva NG*-249 (SOM).

These are the first karyological results based on Bulgarian material of *A. nitens*. The diploid chromosome number 2*n* = 18 found by us confirms the previous reports (see Fedorov 1969, Májovský & al. 1970).

**1716.** ***Atriplex rosea*** L. **—** 2*n* = 18 (Figs 3-4).

**Bu:** Southern Black Sea coast, Burgas town, 42º 30' N, 27º 28' E, ruderal places, 30 m, 20 Sept 2008, *Grozeva NG*-280 (SOM).
**—** Thracian Lowland, Stara Zagora town, 42º 25' N, 25º 38' E, ruderal places, 196 m, 27 Sept 2009, *Grozeva NG*-295 (SOM).

The chromosome number 2*n* = 18 is reported here for the first time from Bulgaria. It confirms the earlier counts published from elsewhere (Wulff 1937; Mulligan 1957; Bassett & Crompton 1970; Löve & Löve 1974; Kliphuis & Barkoudan 1977; Fukui & Mukai 1988; Juan & Pastor 1990). Pastor & al. (1988) also reported *n* = 9.

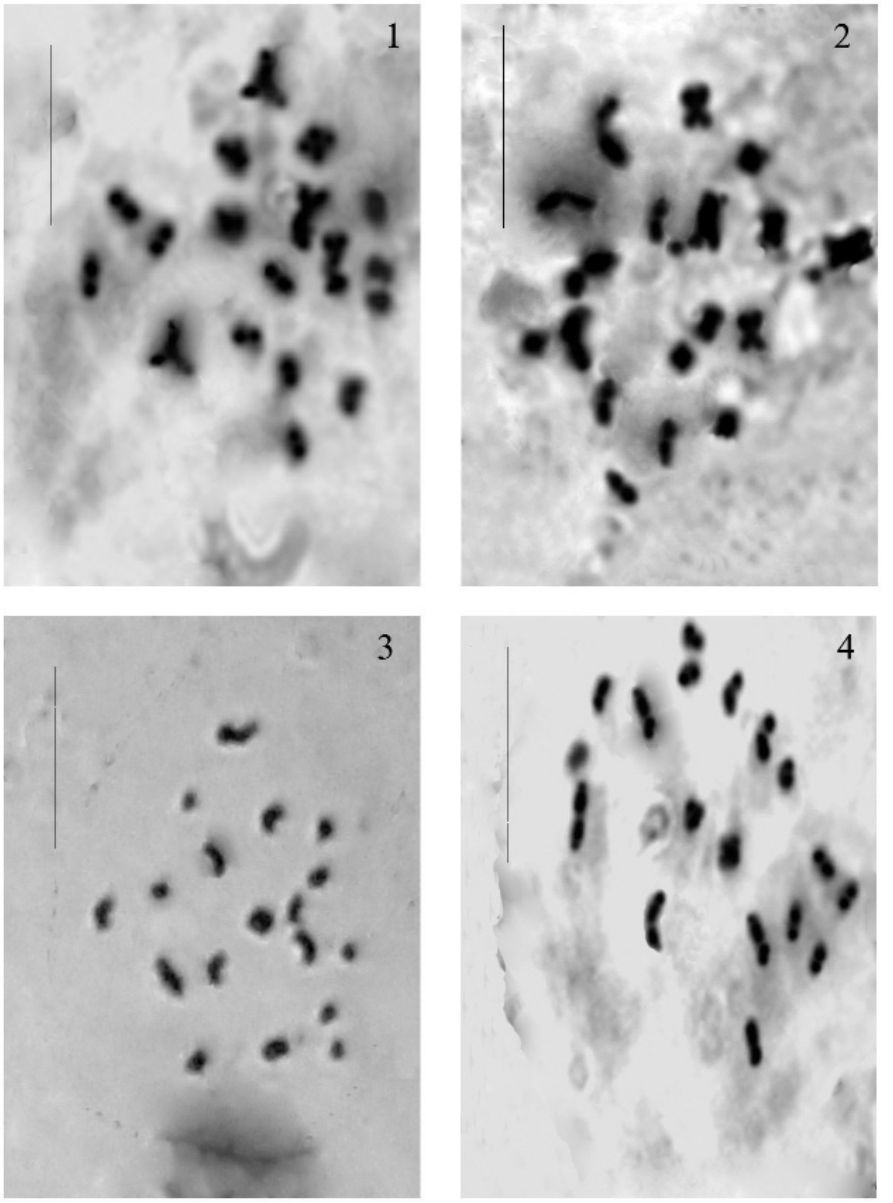
**1717.** ***Atriplex hortensis*** L. **—** 2*n* = 18 (Figs 5-6).

**Bu:** Danubian plain, Svistov town, 43º 37' N, 25º 20' E, ruderal terrains, 50 m, 18 Aug 2007, *Grozeva NG*-262 (SOM).
**—** Thracian Lowland, Bogomilovo village, 42º 23' N, 25º 33' E, ruderal places, 192 m, 27 Sept 2009, *Grozeva NG*-280 (SOM).

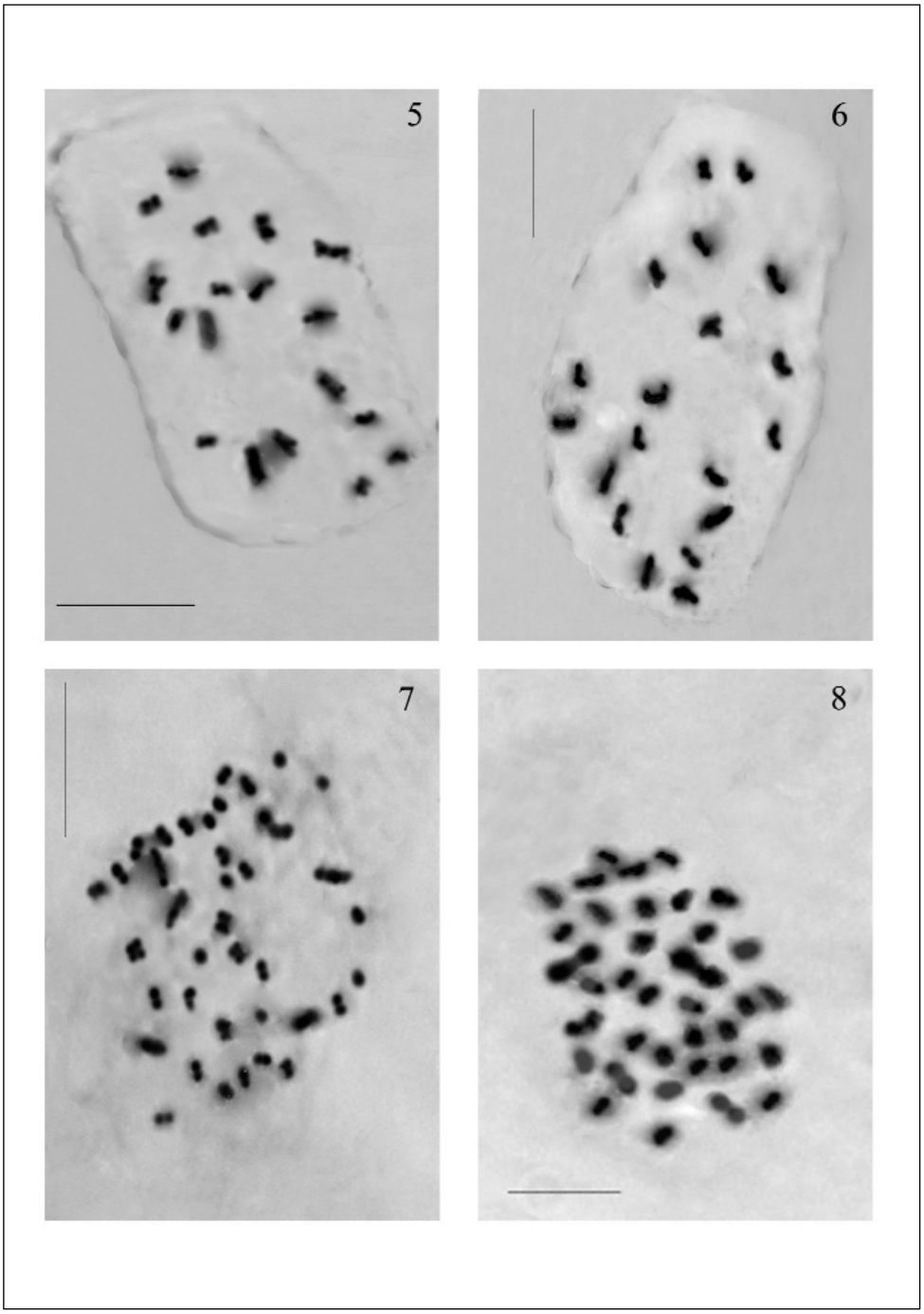
The species is studied for the first time on Bulgarian material. The result obtained 2*n* = 18, is in agreement with the previous reports (Tjebbes 1928; La Cour 193; Kjellmark 1934; see Májovský & al. 1970).

**1718.** ***Atriplex oblongifolia*** Waldst. & Kit. **—** 2*n* = 36 (Figs 7-8).

**Bu:** Thracian Lowland, Rakitnitsa village, 42º 20' N, 25º 31' E, ruderal places, 182 m, 21 Sept 2009, *Grozeva NG*-278 (SOM).




Figs 1-4. Microphotographs of root tip mitosis of: **1-2,** *Atriplex nitens*, 2*n* = 18; **3-4,** *A. rosea*, 2*n* = 18. – Scale bars = 10 μm.




Figs 5-8. Microphotographs of root tip mitosis of: **5-6,** *Atriplex hortensis*, 2*n* = 18; **7-8,** *A. oblongifolia*, 2*n* = 36. – Scale bars = 10 μm.

— Tundza Hilly Country, the village Golyam Manastir, 42º 12' N, 26º 21' E, ruderal places, 213 m, 12 Sept 2008, *Grozeva NG*-247 (SOM).

The chromosome number reported here is the first record for *A. oblongifolia* from Bulgaria and agrees with reports of Bassett & Crompton (1971), Hindáková & Schwarzová (1987).

**1719. *Chenopodium opulifolium*** L. — 2*n* = 54 (Figs 9-10).

**Bu:** North-Eastern Bulgaria, General Toshevo town, 43º 42' N, 28º 02' E, ruderal places, 230 m, 5 Sept 2004, *Grozeva* NG-42 (SOM).

— Thracian Lowland, Chirpan town, 42º 12' N, 25º 20' E, weed in sown fields, 168 m, 8 Sept 2007, *Grozeva* NG-131 (SOM).

The species was studied for the first time in Bulgaria. The result abtained 2*n* = 54 is in agreement with most reports (Cole 1962; Mehra & Malik 1963; Uotila 1973; Löve & Löve 1974; Dvořák & al. 1980; Schwarzová 1978, 1986; Dvořák & Dadakova 1984). Some other chromosome numbers were also reported for the same species: 2*n* = 36 (Wulff 1937) and 2*n* = 18 (Kawatani & Ohno 1956).

**1720. *Chenopodium urbicum*** L. — 2*n* = 18 (Fig. 11).

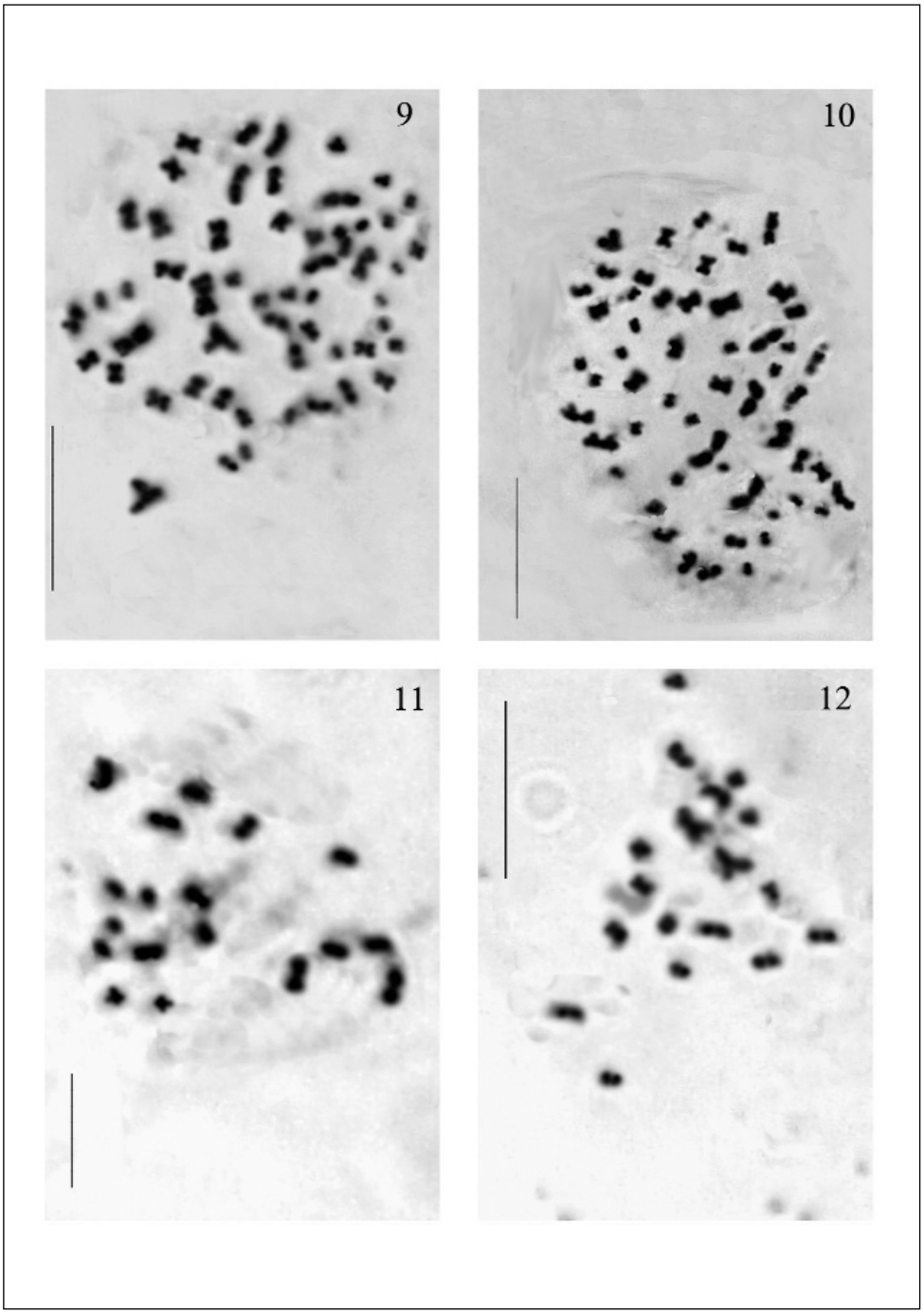
**Bu:** North-Eastern Bulgaria, Turgovishte town, 43º 32' N, 22º 42' E, grassy places along the road Turgovishte - Popovo, 170 m, 30 Jul 2007, *Grozeva NG*-167 (SOM).

This is the first karyological study on Bulgarian material, and confirms data that many authors published from elsewhere (Kawatani & Ohno 1956; Váchová & Murin in Májovský & al. 1970; Uotila 1973; Queiros 1975; Probatova & al 2009). The chromosome number 2*n* = 36 was also reported by Cole (1962).

**1721. *Chenopodium vulvaria*** Sm. — 2*n* = 18 (Fig. 12).

**Bu:** Easthern Rhodope Mts, Ivaylovgrad town, 41º 32 'N, 26º 08' E, ruderal places, 104 m, 25 Sept 2005, *Grozeva NG*-153 (SOM).

This is the first record of a chromosome number of *C. vulvaria* from Bulgaria. Our count confirms previous records (Winge 1917; Kawatani & Ohno 1962; Homsher 1963; Löve & Löve 1974; Schwarzová 1980).




Figs 9-12. Microphotographs of root tip mitosis of: **9-10,** *Chenopodium opulifolium*, 2*n* = 54; **11,** *Ch. urbicum*, 2*n* = 18, **12**, *Ch. vulvaria*, 2*n* = 18. – Scale bars = 10 μm.

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## Reports (1722-1724) by Tiziana Cusma Velari, Laura Feoli Chiapella, Vera Kosovel & Mike Livneh

**1722. *Genista libanotica*** Boiss. — 2*n* = 46+2-3B, 48+1-2B (Fig. 1a).

**LS:** Mt. Hermon, 33° 25' N, 35° 51' E**,** 1640 m a.s.l., 9 Aug 2000, *M. Livneh* (TSB).

The species is distributed in the eastern Mediterranean region: Syria, Lebanon and neighbouring zone of southern Turkey (Hatay) (Post 1932, Gibbs 1966, 1970, Mouterde 1978-1984).

The chromosome numbers 2*n* = 46+2-3B and 2*n* = 48+1-2B were counted on the basis of 10 metaphase plates. Chromosome size ranges from 0.99 to 2.31 µm and from 0.32 to 0.40 µm for B chromosomes. No previous karyological data are known for this taxon.

*Genista libanotica* belongs to sect. *Genista,* with diversity centre in eastern Europe (Gibbs 1966; Greuter & al. 1989). The number 2*n* = 48 is the most frequently encountered in all the other species of this section: *G. tinctoria* L., *G. depressa* Bieb., *G. lydia* Boiss., *G. rumelica* Velen., *G. januensis* Viv. (among others, Krusheva 1975, 1986; Cusma Velari & al. 2006). More rarely, other numbers are counted, as 2*n* = 96 in *G. tinctoria* and *G. depressa* (among others, Krusheva 1975; Cusma Velari & al. 2006) and 2*n* = 120 in *G. depressa* (Strid & Franzén 1983).

All the species of sect. *Genista* present chromosome numbers which can be traced back to x = 12 (Sañudo 1979, Goldblatt 1981, Cusma Velari & Feoli Chiapella 2009). The literature data have always pointed to euploid numbers: mostly tetraploid (2*n* = 48), even though *G. tintoria s.l.* and *G. depressa* present some cases of octoploidy (2*n* = 96) and, rarely, decaploidy (2*n* = 120). Only in *G. libanotica* were highlighted both euploid (2*n* = 48) and aneuploid (2*n* = 46) numbers.

**1723. *Genista versicolor*** Boiss. (= *G. baetica* Spach) — 2*n* = 36+2-4B, 38+0-3B, 39+1-3B, 40+0-3B (Figs 1b, c).

**Hs:** Granada, Sierra Nevada, near Parador, siliceous schists, 37° 7' N, 3° 26' W, 2000 m a.s.l., 12 Aug 1983, *L. Feoli Chiapella* (TSB).

— Granada, Baza, 37° 26' N, 2° 43' W, seeds obtained from Botanical Garden, Córdoba (s.n., s.coll., s.exsicc.).

*Genista versicolor* is endemic to the southern part of the Iberic Peninsula: Sierra Nevada, Sierra de Baza and Sierra de los Filabres (Gibbs 1966, Talavera 1999). According to Gibbs (1966), *Genista baetica* is one of the co-dominant species of the association *Genisto baeticae-Juniperetum nanae* Quézel 1953, localized at c. 1900-2700 m a.s.l.

This species is characterized by a certain variability of chromosome numbers, often with B chromosomes: $2n$ = 36+2-4B, 38+0-3B, 39+1-3B, 40+0-3B. The only counting reported in literature is that of Sañudo (1971, sub *Genista baetica*), who found $n$ = 18, $2n$ = 36 for a population from Sierra Nevada. These chromosome numbers can be traced back to the basic number x = 9 (Sañudo 1971, Cusma Velari & al. 1998, 2001, Talavera 1999). It is worth noting that in this taxon, besides the tetraploid number $2n$ = 36, various aneuploid numbers ($2n$ = 38, 39, 40) have been encountered as well. Chromosome size ranges from 0.88 to 3.19 μm.

The basic chromosome number x = 9 is by far the most frequent in sect. *Erinacoides* Spach, particularly in a series of species endemic to southern and eastern Spain. For *Genista longipes* Pau Sañudo (1971, 1973) and Sañudo & Ruiz Rejon (1975) reported $n$ = 9, $2n$ = 18 for populations from Sierra Espuña (Murcia) and M. Maimón (Almería), sub *G. lobelii* DC. subsp. *longipes* (Pau) Heywood. Sañudo (1974) and Sañudo & Ruiz Rejon (1975), on the other hand, counted $n$ = 18, $2n$ = 36 on a population of the same taxon from Sierra Tejeda (Granada), regarded by Vicioso (1953) as *G. tejedensis* (Porta & Rigo ex Hervier) C. Vicioso. The plants from Sierra Tejeda are ascribed by Talavera (1999) to *G. longipes* ssp. *viciosoi* Talavera & Cabezudo.

For *G. pumila* (Debeaux & É. Rev. ex Hervier) Vierh., Sañudo (1971, 1973) found $n$ = 9 and $2n$ = 18 on material from Almansa (Albacete), sub *G. pumila* subsp. *mugronensis* (Vierh.) Rivas Martínez. Moreover Sañudo (1971, 1973) found $n$ = 18, $2n$ = 36, 37, 38 on populations from Sacedón (Guadalajara), Sierra del Pozo (Jaén), Medinaceli and Burgo de Osma (Soria) assigned to *G. pumila* subsp. *pumila*. Also in this taxon, besides the euploid number ($2n$ = 36), were encountered also some aneuploid numbers ($2n$ = 37, 38), according to Sañudo (1971), owing to meiotic anomalies (non disjunction of one bivalent).

The nomenclature follows Talavera (1999).

**1724. *Anthyllis lagascana*** Benedí — $2n$ = 14.

**Hs:** Valencia, La Canyada, La Vallesa, 39° 32' N, 0° 29' W, 1999, Jardí Botànic de València (s.n., s.coll., s.exsicc.).

*Anthyllis lagascana* is distributed in the southeastern Iberic Peninsula and in northwestern Africa (Algeria) (Quezel & Santa 1962; Benedí 2000).

The chromosome number $2n$ = 14 confirms the only reference reported for a population from Hellín (Albacete) by Fernández Piqueras (1976, 1979) and Fernández Piqueras & Sañudo (1980), sub *A. henoniana* Coss.

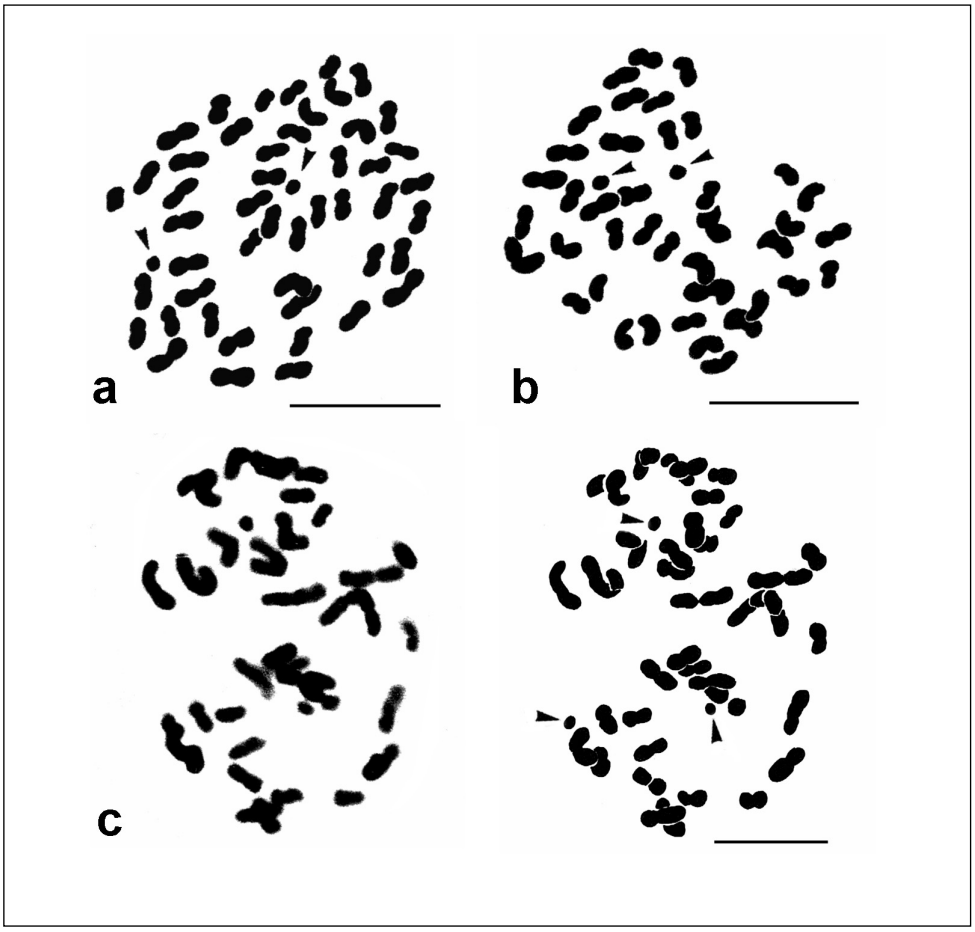


Fig. 1. Drawings of somatic metaphase plates of: **a,** *Genista libanotica* (Mt. Hermon), 2*n* = 48+2B; **b,** *G. versicolor* (Sierra Nevada), 2*n* = 40+2B; **c,** photomicrograph and relative drawing of somatic metaphase plate of *G. versicolor* (Baza), 2*n* = 40+3B. − Arrows indicate B-chromosomes. Scale bars = 5 μm.

*Anthyllis lagascana* belongs to sect. *Aspalathoides* DC. (Benedí 2000). The number 2*n* = 14 can be traced back to the basic number x = 7, common in the species of this section (Fernández Piqueras 1979, Fernández Piqueras & Sañudo 1980, Benedí 2000). *A. lagascana* results diploid, as *A. hermanniae* L., a Mediterranean species distributed from Corsica to Anatolia (Greuter & al. 1989; Benedí 2000); for the latter taxon, Cardona & Contandriopoulos (1983) found 2*n* = 14 for a population from Greece (Patras), Cardona & al. (1986) for several populations from Corsica, and Cusma Velari & al. (2002) for some populations from Sardinia. *A. hystrix* (Willk. ex Barceló) Cardona, Contandriopoulos & Sierra, endemic to Minorca (Benedí 2000), on the contrary, results dodecaploid; Cardona & Contandriopoulos (1983) and Cardona & al. (1986) in fact counted *n* = 42 and/or 2*n* = 84 in a population from Sa Mola de Fornells (northern Minorca).

**Acknowledgements**

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**Reports (1725-1727) by Joan Simon, Maria Bosch, Ana Rovira & Cèsar Blanché**

**1725. *Stachys maritima*** Gouan — 2*n* = 34.

**Hs:** Catalonia, Platja de Pals (Baix Empordà), 41º 59’ N, 3º 11’ E, sand dunes, 5 m a.s.l., 8 Jul 2002, *C. Blanché* (BCN s/n).

Circum mediterranean species (Greuter & al. 1986), severely endangered or extinct in western populations (Molero & al. 2007). Small chromosome size of 0.8-1.2 µm. No previous karyological data are known for W Mediterranean populations of this taxon. 2*n* = 34 has also been reported from Albania, Bulgaria and Turkey (Aydin 1978; Baltisberger 1991; Koeva-Todorovska 1988).

**1726. *Seseli farrenyi*** Molero & Pujadas — 2*n* = 18.

**Hs:** Catalonia, Cap de Creus, Es Camallerús (Alt Empordà), 42º 19’ N, 3º 19’ E, seashore siliceous schists, 30 m a.s.l., 20 Oct 2001, *A. Rovira* (BCN s/n).

Extremely narrow endemic restricted to less than 1 km$^2$ in the Cap de Creus area. Our report from root mitosis confirms the only previously known number ($n$ = 9) published by Fernández-Casas & al. (1979) obtained from meiotic observations and collected in the population of Ses Estenedors.

**1727. *Petrocoptis montsicciana*** O. Bolòs & Rivas Mart. — 2$n$ = 24.

**Hs:** Catalonia, Camarasa, el Cinquet (La Noguera), 41º 54' N, 0º 53' E, calcareous cliffs, 250 m m a. s. l., 15 May 1999, *M. Bosch* (BCN s/n).

Endemic species of the Pre-Pyrenean range (NE Iberian peninsula), although some authors considered this taxon as a mere synonym of *P. pardoi* Pau (and even to be included within the genus *Silene* L., cf. Mayol & Rosselló 1999), a southernmost vicariant described from the Bergants river valley (Els Ports district, by the Valencia/Aragon borderline).

Chromosome size ranges from 1.2–3.2 μm. The chromosome number 2$n$ = 24 is the first report for *P. montsicciana s. str*. Southernmost studied populations (*P. pardoi s. str*.) share the same number (Merxmüller & Grau 1968; Fernández-Casas & Ruiz-Rejón 1974; Boscaiu & al. 1997), as well as other *Petrocoptis* (*P. crassifolia* Rouy or *P. hispanica* (Willk.) Pau, Merxmüller & Grau 1968 and Cardona 1977). López-Pujol & al. (2001) considered *P. montsicciana-P. pardoi* as a pair of progenitor-derivative species with strong genetic differentiation among populations and L. Navarro (pers. comm.) observed clearly distinct reproductive strategies (autogamous *vs.* allogamous) between southern and northern populations, separated by c. 150 km.

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## Reports (1728-1735) by Sofia Samaropoulou, Pepy Bareka & Georgia Kamari

**1728.** ***Crocus laevigatus*** Spruner ex Nyman **—** 2*n* = 22 (Fig. 1).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Pendeli near Dionisos area, 38º 05’ N, 23º 53’ E, 9 Nov 2009, *Samaropoulou* cult. no S69 (UPA).

*Crocus laevigatus* is a Greek endemic species that occurs in south and south-central Greece and south Aegean region, mostly on scrub or stony grassland (Mathew 1980).

The chromosome number 2*n* = 22, counted here, is mentioned for the first time. The karyotype consists of 2*n* = 6m+6sm+2sm-SAT+8st = 22 chromosomes, ranging in size between 2.34 and 8.47 µm. According to our knowledge, there is an earlier chromosome record with 2*n* = 26 from the Andros island of Kyklades (Snogerup 1994).

**1729.** ***Asphodelus aestivus*** Rchb. **—** 2*n* = 28 (Fig. 2).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Imittos, 37º 57’ N, 23º 48’ E, 7 Nov 2009, *Samaropoulou* cult no S56 (UPA).

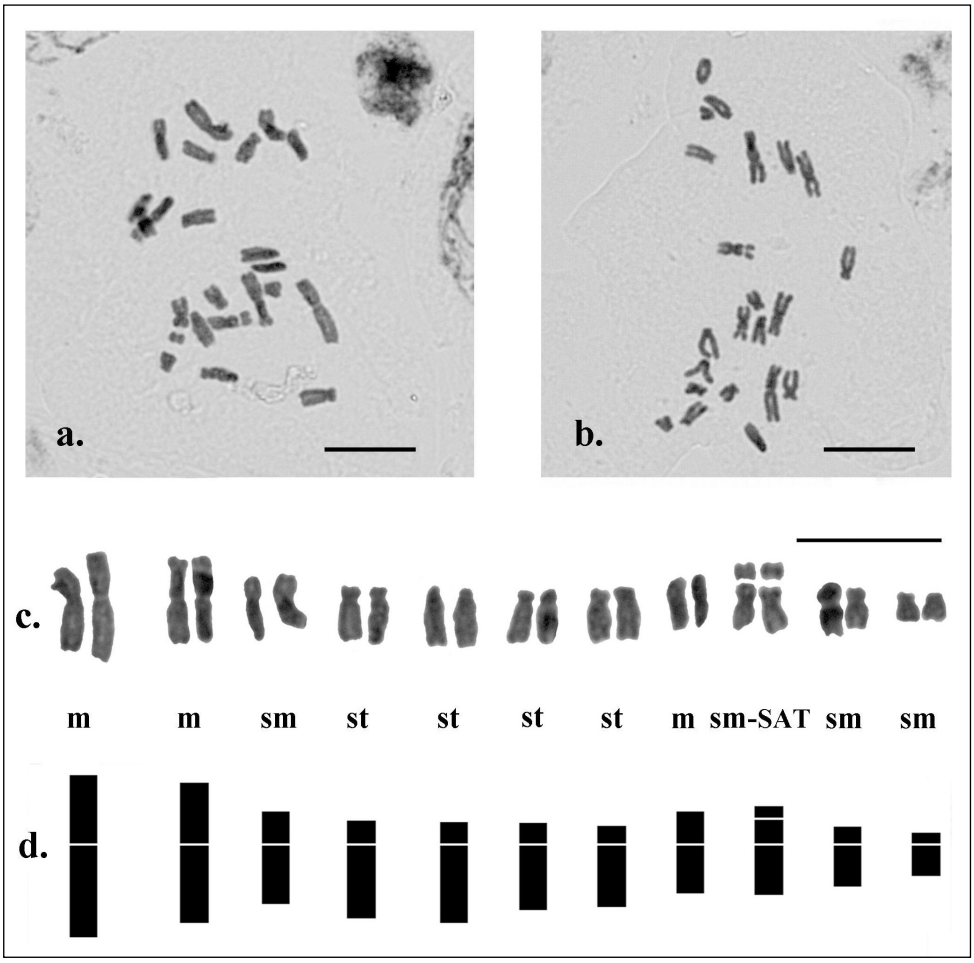


Fig. 1. **a & b,** Microphotographs of mitotic metaphase plates, **c,** karyogram and **d,** idiogram of *Crocus laevigatus*, 2*n* = 22. – Scale bars = 10 μm.

*Asphodelus aestivus* has a wide distribution from south Europe to north Africa and east-wast to west Asia, occurring usually in uncultivated fields (Richardson & Smythies 1980).

This is the first karyological record of the species from Greece. The karyotype is almost symmetrical, tetraploid, consisting of 2*n* = 4m/sm+8sm+4sm-SAT+12sm/st = 28 chromosomes, varying in size between 3.25 and 6.55 μm. It is noteworthy that in all homologus chromosome pairs of the tetraploid complement structural heterozygosity is observed (Fig. 2b) with respect of the chromosome size and morphology. Probably the tetraploid karyotype is a result of an allopolyploidy.

Our results are in agreement with previous counts from Former Yugoslavia (Sunsik & Lovka 1973, as *Asphodelus microcarpus*). Also, other records from Spain (Ruiz Rejon & al. 1981) mention the chromosome numbers 2*n* = 14 & 70.

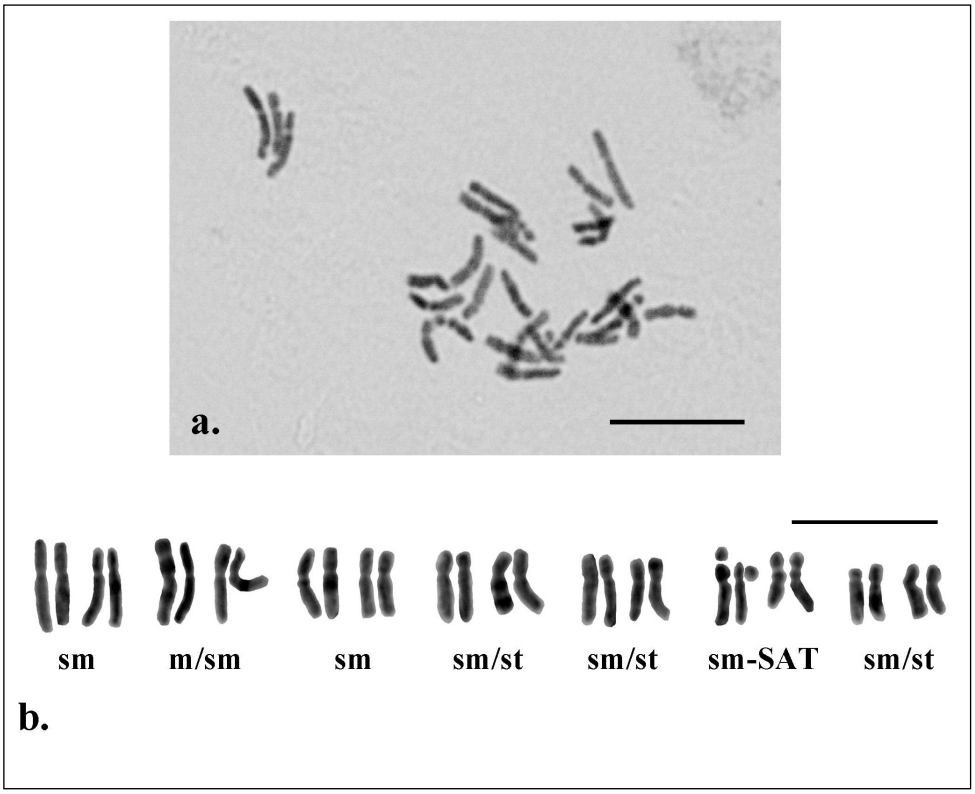


Fig. 2. **a,** Microphotograph of mitotic metaphase plate and **b,** karyogram of *Asphodelus aestivus*, 2*n* = 28. – Scale bars = 10 μm.

**1730. *Ornithogalum sibthorpii*** Greuter **—** 2*n* = 18 (Fig. 3).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Parnitha, near Katsimidi area, 38º 13' N, 23º 47' E, 2 Nov 2008, *Samaropoulou* cult no S10 (UPA).

The species is distributed from Balkan Peninsula to Aegean region and occurs in dry hillsides (Zahariadi 1980).

The chromosome number 2*n* = 18 counted here agrees with previous report from Rumania (Moore 1982). On material from Greece was, previously, reported the numbers 2*n* = 14, 15 and 16 (Landstrom 1989). Moreover, for the species has also been mentioned the chromosome numbers 2*n* = 16+1 from Turkey and 2*n* = 28 from Trieste (Cullen & Ratter 1967), as well as 2*n* = 24 from Rumania and 2*n* = 14, 28 from Bulgaria (Moore 1982).

The karyotype is almost symmetrical consisting of 2*n* = 4m+8sm+2sm/st+2st+2st-SAT = 18 chromosomes, ranging in size between 5.45 and 15.43 μm.

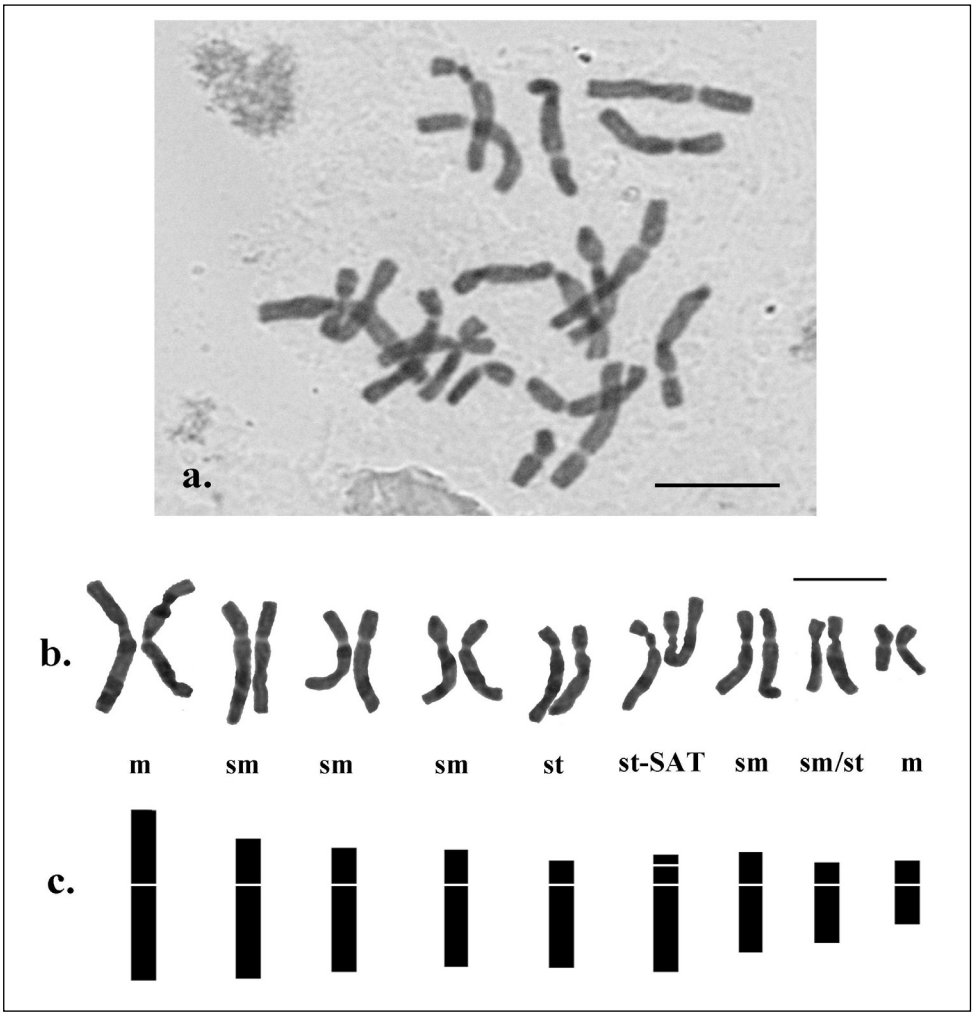


Fig. 3. **a,** Microphotograph of mitotic metaphase plate, **b,** karyogram and **c,** idiogram of *Ornithogalum sibthorpii*, 2*n* = 18. – Scale bars = 10 μm.

**1731. *Ophrys fusca*** L. **—** 2*n* = 36 (Fig. 4a).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Pendeli, near Dionisos area, 38º 05' N, 23º 53' E, 9 Nov 2009, *Samaropoulou* cult no S63 (UPA).

*Ophrys fusca* is a Euro-Mediterranean element, localized on rocky, bushy and grassy places (De Soó 1980).

The chromosome number 2*n* = 2x = 36 reported here is the first count obtained from Greek material. Our results are in accordance to the reports from Italy (Greilhuber &

Ehrendorfer 1975, Del Prete & Giordani 1978, Scrugli 1978, Mazzola & al. 1982, Bianco & al. 1987 and Bianco & al. 1989).

The karyotype is symmetrical with small, mostly metacentric chromosomes, varying in size from 1.16 to 2.50 μm.

**1732. *Barlia robertiana*** (Loisel.) Greuter — $2n = 36$ (Fig. 4b).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Imittos, 37º 57' N, 23º 48' E, 7 Nov 2009, *Samaropoulou* cult no S57 (UPA).

This Mediterranean taxon occurs in calcareous hillsides, open grassy or rocky slopes, *Pinus* and *Quercus* woodland, macchie and phrygana (Moore 1980).

The chromosome number $2n = 36$ confirms data reported by Constantinidis & Kamari (1995) in material from Peloponnisos, Raynaud (1971), Natarajan (1978), Cauwet-Marc & Balayer (1986) in material from France and Scrugli & al. (1976), Mazzola & al. (1981), D'Emerico & al. (1992, 1993) in material from Italy. Furthermore, the chromosome number $2n = 60$ has been reported for the species by Cauwet-Marc & Balayer (1986), in material from France.

The karyotype is tetraploid, symmetrical and the size of the chromosomes ranges between 1.45 and 3.77 μm.

**1733. *Cyclamen graecum*** Link — $2n \approx 80$ (Fig. 4c).

**Gr:** Sterea Hellas, Nomos Attikis, Zografou area, near the University campus of Athens, 37º 57' N, 23º 47' E, 13 Oct 2009, *Samaropoulou* cult no S47 (UPA).

This taxon is distributed in SW & S Anatolia and Greece and located on *Pinus brutia* forest, clefts of limestone rocks and *Quercus* macchie (Meikle 1978).

Our count is in accordance with previous reports for the species, by Glasau (1939) with $2n = 78$-80 and by Ishizaka (2003) with $2n = 84$, from elsewhere. Moreover, Legro (1959) has reported in material from Greece the chromosome numbers $2n = 84$, 85, 86 and 136. The chromosome complement consists of mostly metacentric, small chromosomes, varying in size from 0.65 to 1.30 μm.

**1734. *Cyclamen hederifolium*** Aiton — $2n = 34$ (Fig. 4d).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Parnitha, near the top Agia Triada, 38º 09' N, 23º 43' E, 19 Oct 2008, *Samaropoulou* cult no S1 (UPA).

*Cyclamen hederifolium* is a Mediterranean element which often occurs in rocky slopes and banks, usually in shade (Meikle 1978).

The chromosome number $2n = 34$ confirms former reports by Lovka & al. (1972, as

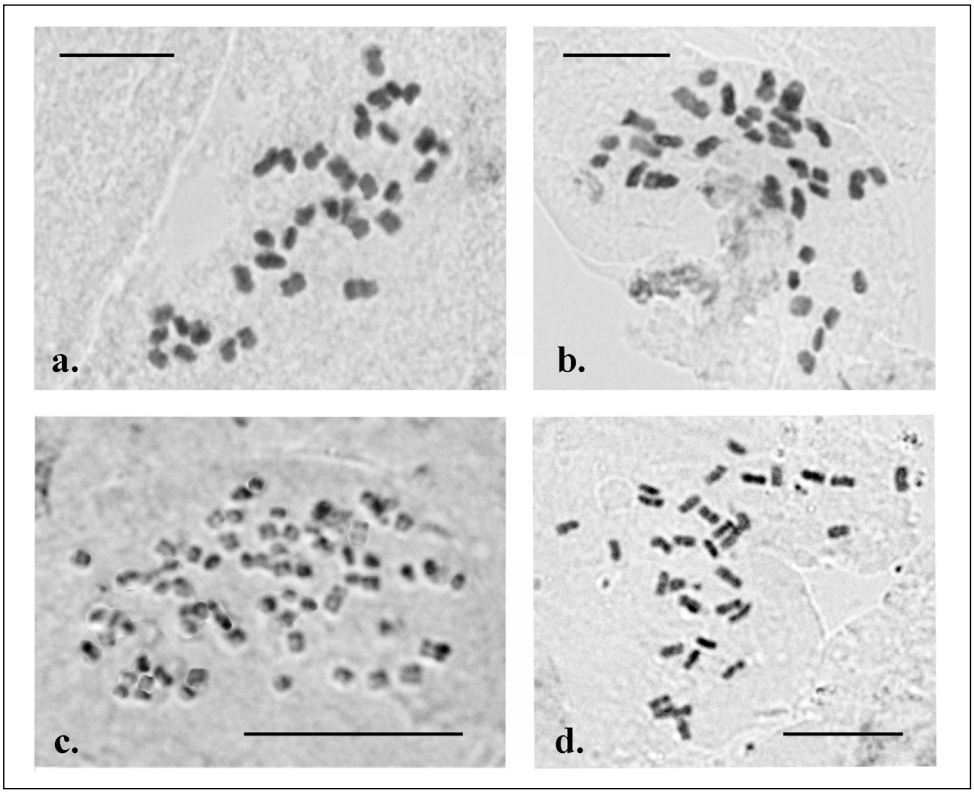


Fig. 4. Microphotographs of mitotic metaphase plates of: **a,** *Ophrys fusca*, 2*n* = 36; **b,** *Barlia robertiana*, 2*n* = 36; **c,** *Cyclamen* graecum, 2*n* ≈ 80 and **d,** *C. hederifolium*, 2*n* = 34. – Scale bars = 10 μm.

*Cyclamen linnearifolium*) and Sunsik & Lovka (1973, as *Cyclamen neapolitanum*) in material from Former Yugoslavia, Van Loon & Oudemans (1982, as *Cyclamen neapolitanum*) from FYROM, Strid & Franzen (1981) from mount Olimpos and, finally, by Bennett & Grimshaw (1991) from Peloponnisos.

Our result is not in accordance to the chromosome number given by Benett & Grimshaw (1991, 2*n* = 4x = 68) in material from Greece (Lefkada, Poros and Zakinthos islands) and by Kriemadi & al. (2002, 2*n* = 68) from Lefkada island. Moreover, Bennett & Grimshaw (l.c.) have also reported the chromosome number 2*n* = 54 in material from Italy.

The karyotype is symmetrical with mostly metacentric and submetacentric chromosomes, whose size varies between 1.36 μm and 2.73 μm.

**1735.** ***Anemone pavonina*** Lam. **—** 2*n* = 16 (Fig. 5).

**Gr:** Sterea Hellas, Nomos Attikis, Mt. Pendeli, Dionisos area, 38º 05’ N, 23º 53’ E, 9 Nov 2009, *Samaropoulou* cult no S66 (UPA).

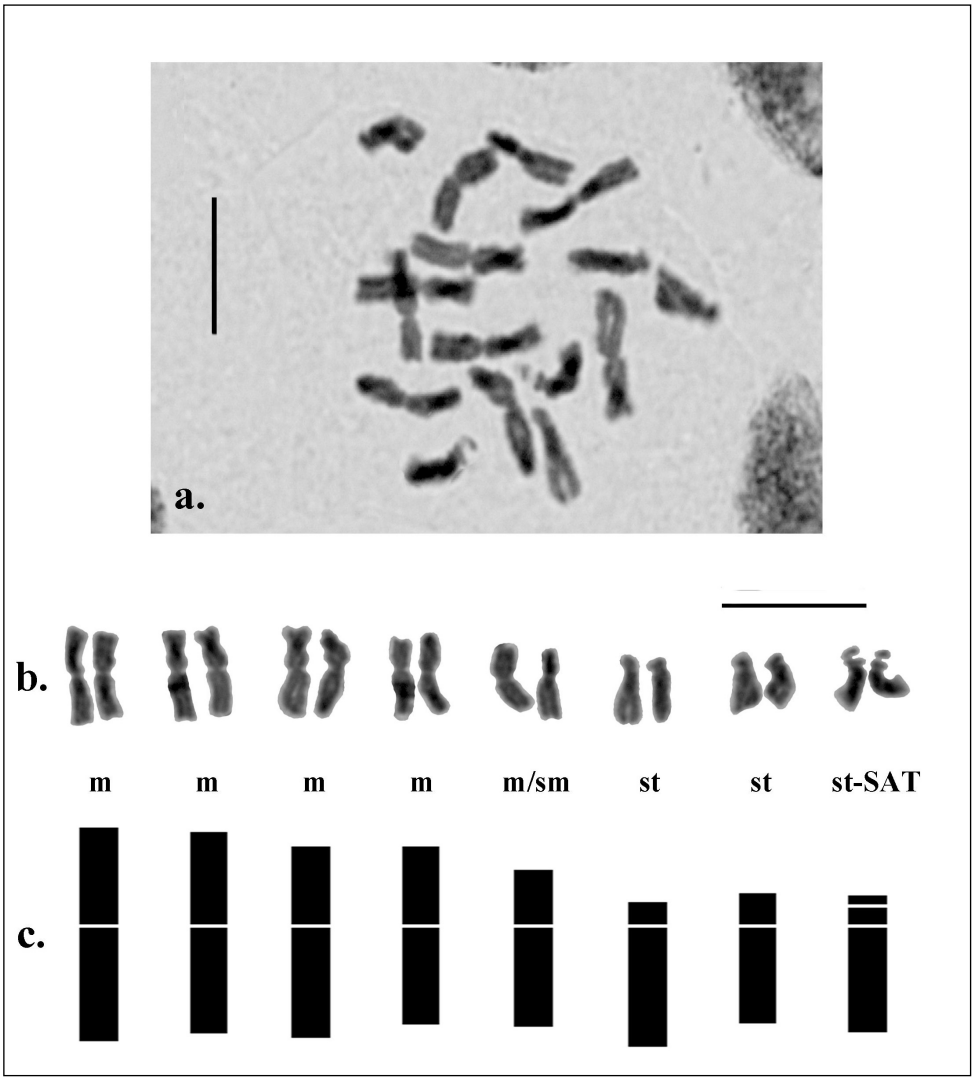


Fig. 5. **a,** Microphotograph of mitotic metaphase plate, **b,** karyogram and **c,** idiogram of *Anemone pavonina*, 2*n* = 16. – Scale bars = 10 µm.

*Anemone pavonina* is distributed in Mediterranean area and southern and western Europe and occurs in rocky places, frygana and uncultivated fields (Tutin 1964).

The karyotype is almost asymmetrical and consists of 2*n* = 8m+2m/sm+4st+2st-SAT = 16 chromosomes, ranging in size between 5.32 and 9.10 µm. The smallest in size chromosome pair always bears satellites.

The chromosome number 2*n* = 16 has previously also reported by Signorini & Mori (1994) in material from Tuscany, Italy. In addition, our results agree with Marks &

Schweizer (1974) and Unal (1979) in material from Instabul, Turkey and Strid & Franzén (1981) in material from Mt. Olimpos, Greece.

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**Report (1736) by E. Di Gristina, A. Geraci & F. M. Raimondo**

**1736. *Pilosella officinarum*** Vaill. — 2*n* = 54 (Fig. 1).

**It:** L'Aquila, Magliano De′ Marsi, Massa d'Albe, Monte Velino, stony pastures on limestone, 1580 m a.s.l., 42° 08' N, 13° 21' E, 22 Jul 2009, *E. Di Gristina* s.n. (PAL).

The genus *Pilosella* Vaill., which in the past was considered as a subgenus of *Hieracium* L., represents one of the most taxonomically critical vascular plant groups of the temperate flora. Within the genus, the most representative taxon because of the high variability is *P. officinarum* Vaill. (*H. pilosella* L.).

This taxon is an hemicryptophyte rosulate flowering from the late Spring to the early Autumn. Concerning its distribution, this is an European-Caucasian element (Pignatti 1982), naturalized in New Zealand, North America and Patagonia (Mráz & al. 2008). In Italy the species is present throughout the territory except for Sicily (Domina & Di Gristina 2007) and Sardinia (Arrigoni 1987).

The chromosome number 2*n* = 6x = 54, found here, obtained by the observation of 20 metaphase plates of 10 individuals, is included in the variability reported for this taxon. Five ploidy levels (2x, 4x, 5x, 6x and 7x) are known for natural populations (Mráz & al. 2008). The most frequent cytotypes in Europe are tetraploids (2*n* = 4x = 36), widespread in CW Europe, and pentaploids mainly found in northern Europe and on the Alps (Mráz &

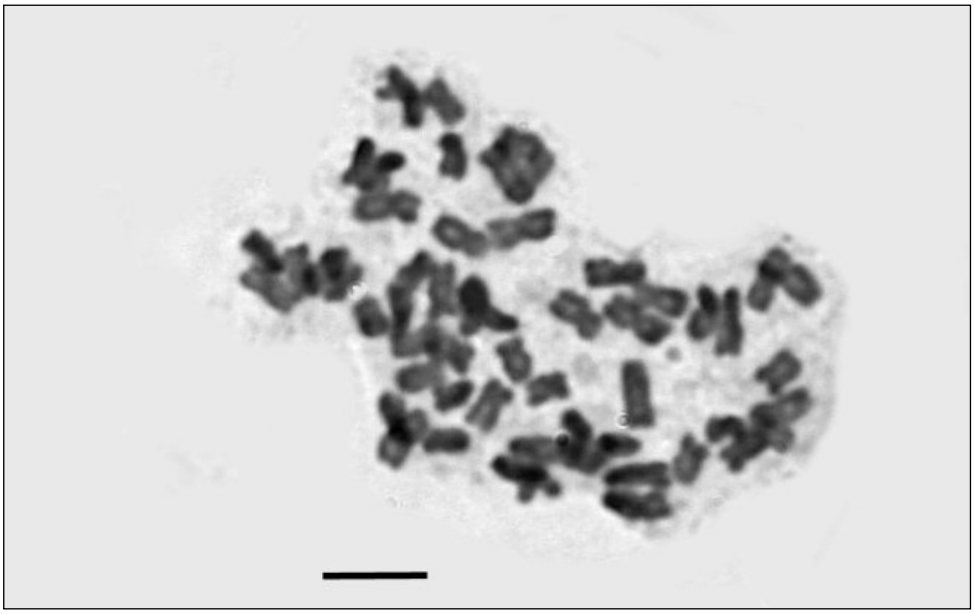

Fig. 1. Mitotic metaphase plate of *Pilosella officinarum* with, 2*n* = 54. – Scale bar = 5 µm.

al. 2008). Hexaploid cytotypes ($2n$ = 6x = 54) prevail on the Alps, while eptaploids ($2n$ = 7x = 63) occur only in Sweden, Holland and Czech Republic. Diploids ($2n$ = 2x = 18) are less frequent and they are reported only in the SW of the Alps.

For the Italian territory, karyological research carried out in northern Italy and in Apulia showed chromosome numbers 18, 36, 45 and 54 (Scannerini 1971; Gadella 1972; Mráz & al. 2008).

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