Mediterranean chromosome number reports – 16

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Abstract

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This is the sixteenth of a series of reports of chromosomes numbers from Mediterranean area, peri-Alpine communities and the Atlantic Islands, in English or French language. It comprises contributions on 160 taxa: *Ornithogalum*, *Prospero* from France, Italy and Greece, by G. Aquaro & L. Peruzzi (Nos 1457-1461); *Verbascum* from European Turkey, by F. Dane & G. Yýlmaz (Nos 1462-1465); *Bassia, Chenopodium, Corispermum* from Bulgaria, by N. Grozeva & M. Stoeva (1466-1472); *Mesembryanthemum, Rubus, Anagyris, Anthyllis, Astragalus, Bituminaria, Calicotome, Coronilla, Dorycnium, Hedysarum, Hippocrepis, Hymenocarpus, Lathyrus, Lotus, Lupinus, Medicago, Melilotus, Onobrychis, Ononis, Ornithopus, Scorpiurus, Securigera, Trifolium, Trigonella, Tripodium, Vicia* from Greece, by H. Runemark (Nos 1473-1571); *Acer, Corylus, Euonymus, Ostrya, Quercus, Rubus, Sorbus* from Bulgaria, by V. Goranova, P. Stanimirova & M. Anèev (Nos 1572-1583); *Abies, Acer, Carpinus, Celtis, Cornus, Corylus, Juniperus, Picea, Pinus, Quercus, Salix, Sorbus, Tamarix, Ulmus* from Bulgaria by A. Petrova, J. Zieliñski & R. Natcheva (Nos 1584-1603); *Adenocarpus, Cytisus, Colutea, Genista, Retama, Ulex, Stauracanthus, Hesperolaburnum* from Morocco, by H. Tahiri, P. Cubas, C. Pardo & A. Crespo (Nos 1604-1612); *Genista* from Bulgaria and Portugal, by T. Cusma Velari, L. Feoli Chiapella & V. Kosovel (1613-1614); *Genista* from Portugal, by T. Cusma Velari, L. Feoli Chiapella & A. Cristina Tavares (1615-1616).

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Reports (1457-1461) by Gabriella Aquaro & Lorenzo Peruzzi

1457. ***Ornithogalum orthophyllum*** subsp. ***baeticum*** (Boiss.) C. Zahariadi — $2n = 18$ (Figs 1-2).

Fr: S France: Les Vignes (Hérault, Causse du Larzac), ca. 800 m a.s.l., steppic grassland on dolomitic soil (*Ononidion striatae*, *Armerion junceae*), 43° 50' N, 3° 30' E, 2003, *J.-M. Tison* (*cult.* Hort. Bot. Calabria Univ., acc. no 475-3).

Ornithogalum orthophyllum subsp. *baeticum* (Boiss.) C. Zahariadi is a taxonomically problematic subspecies endemic to W Mediterranean area (Raamsdonk 1986), that was often confused with *O. collinum* Guss. (i.e. by Pastor 1987), which is instead a species belonging to a different subgenus and close to *O. gussonei* Ten. Moreover, on the basis of the typification effected by Raamsdonk (1982), the name *O. baeticum* Boiss., was often misapplied instead of *O. algeriense* Jord. & Fourr. (i.e. by Pastor 1987; Moret & Galland 1992 as "*Ornithogalum algeriense* subsp. *baeticum* (Boiss.) Moret", comb. inval.).

O. algeriense is a good species endemic to Morocco and Iberian Peninsula, showing a peculiar polyploid/disploid $2n = 52, 54$ chromosome complement (Moret & Couderc 1986; Moret & Galland 1992; Diosdado & al. 1993 as "*O. orthophyllum* Ten." Corsi & al. 1996; Fiorini & Raffaelli 1996, as "*O. orthophyllum* Ten."). Raamsdonk (1986) and Moret & Couderc (1986, Spanish "*O. kochii*") evidenced instead the diploid complement of *O. baeticum*, marked by a pair of chromosomes with intercalary satellites. This karyotype structure was evidenced also in the diploid *O. orthophyllum* Ten. subsp. *orthophyllum* (Raamsdonk 1986, as "*O. exscapum* Ten." (Peruzzi 2003), endemic to Central-southern Italy (Garbari & al. 2003).

The plant studied here confirms the diploid status and the basic karyotype structure of this species. Among the diploids, without offsets, representatives of *O. umbellatum* group the satellite-type well distinguishes at specific level, *O. orthophyllum* Ten. s.l. from *O. kochii* Parl. s.l. On the basis of karyotype structure, *O. orthophyllum* s.l. seems to be the diploid relative of all the polyploid species (also without offsets and with partially concrescent bulb-scales) of the C-W Mediterranean area, such as: *O. algeriense* Jord. & Fourr., *O. etruscum* Parl. and *O. umbratile* Tornadore & Garbari from Italy (Tornadore & al. 2003), *O. televrinum* Speta and *O. dalmaticum* Speta from W Balkans (Speta 1990a). All things considered, we refute the recent taxonomic setting in Vigo (2001), where the combination *O. umbellatum* subsp. *baeticum* (Boiss.) O. Bolòs & Vigo is proposed, being *O. umbellatum* L. polyploid and moreover having different satellite-type.

According to Levan & al. (1964), karyotype formula can be expressed as follows: $2n = 2x = 2m + 6sm + 2sm\text{-}SAT + 4sm + 4m = 18$.

Mean chromosome size (assessed from four metaphasic plates) ranges from 3.64 to 11.85 μm; while total haploid genome length is 61.11 μm.

1458. *Ornithogalum exscapum* var. ***parlatorei*** Peruzzi & N. G. Passal. — $2n = 18 + 1B$ (Figs 3-4).

It: Central and Southern Italy, Calabria: in the vicinities of Mendicino (province of Cosenza), ca. 600 m a.s.l., 39° 15' N, 16° 12' E, 10 Mar 2004, *G. Aquaro* (young ovaries collected *in situ*).

Ornithogalum exscapum var. *parlatorei* Peruzzi & N. G. Passal. was recorded until now only in few localities of Central and South Italy (Peruzzi & Passalacqua 2002).

Peruzzi & Passalacqua (2002) evidenced for this unit a diploid chromosome complement $2n = 18$, with the fourth pair of chromosomes showing intercalary satellites (other varieties having them on the fifth pair). The studied plant, coming from the vicinities of the *locus classicus* of *O. exscapum* var. *parlatorei*, substantially confirms that karyotype structure, but for the presence of an additional B-chromosome.

Indeed, according to Levan & al. (1964), karyotype formula can be expressed as follows: $2n = 2x = 4m + 2sm + 2sm\text{-}SAT + 10sm + 1m = 18 + 1B$.

Mean chromosome size (assessed from five metaphasic plates) ranges from 3.44 (2.91 the B-chromosome) to 10.40 μm; while total haploid genome length is 55.67 μm.

1459. *Ornithogalum kochii* subsp. ***monticola*** (Jord. & Fourr.) Peruzzi **comb. nov.** — $2n = 18$ (Figs 5-6).

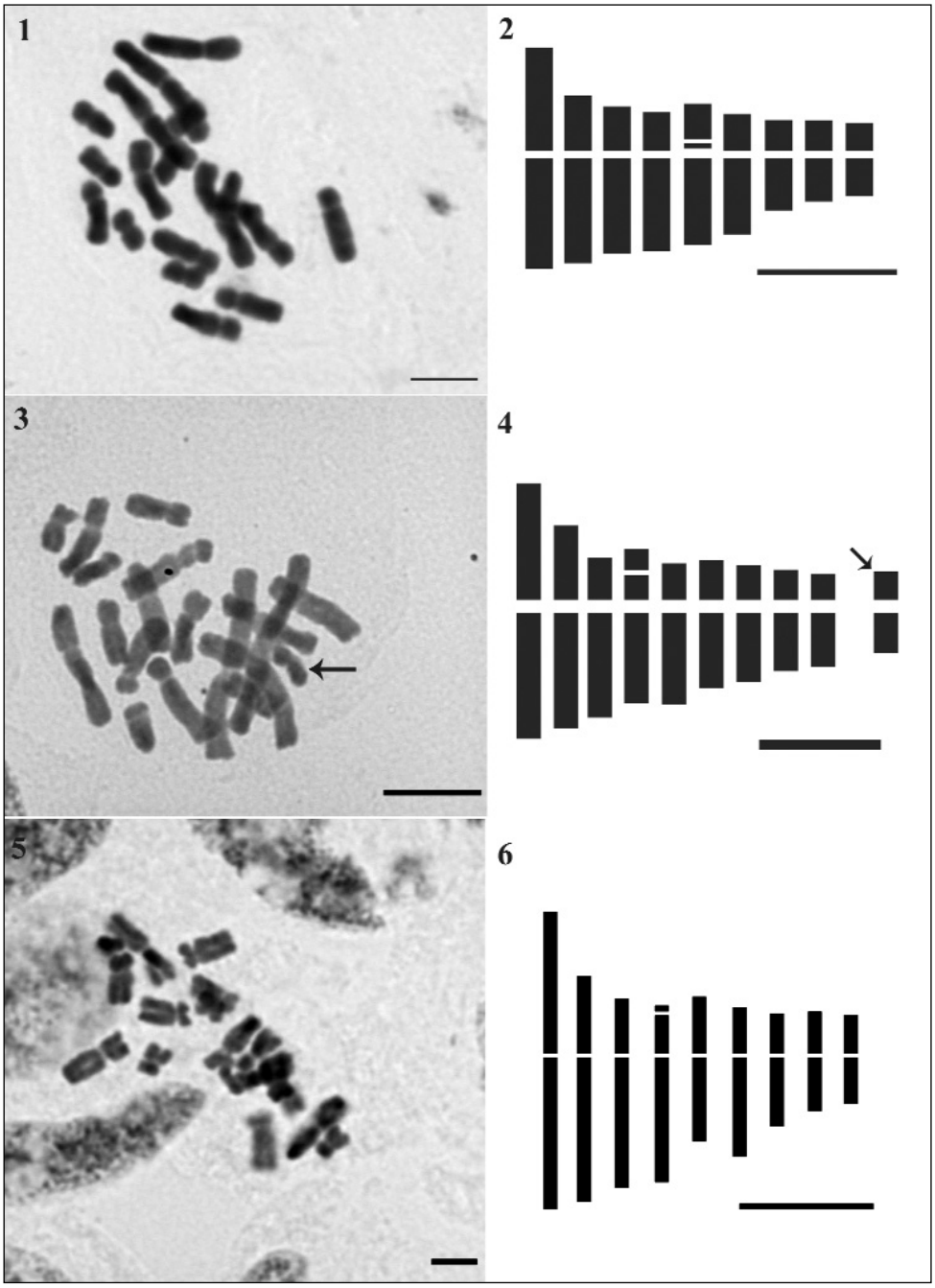
Bas: *O. monticola* Jord. & Fourr., Brev. Pl. Nov. 1: 54 (1866)
≡ *O. umbellatum* subsp. *monticola* (Jord. & Fourr.) O. Bolòs & Vigo, Fl. Països Catalans 4: 87 (2001)

Fr: SE France: Saint-Martin-d'Entraunes (Alpes Maritimes, Mercantour), col de la Cayolle, ca. 2200 m a.s.l., dry grassland on calcareous soil (*Seslerion variae*), 44° 05' N, 7° 15' E, 2003, *J.-M. Tison* (*cult.* Hort. Bot. Calabria Univ., acc. nï 667-3).

Ornithogalum kochii subsp. *monticola* (Jord. & Fourr.) Peruzzi is a subspecies endemic to E Alps, Massif Central and Vosges (Raamsdonk 1986), and belongs to a system of three diploid vicariant units, i.e. *O. kochii* Parl. subsp. *kochii* in W Alps and Central Europe (Tornadore & Marcucci 1988; Hermann 2002) and *O. kochii* subsp. *gorenflotii* Moret in Morocco (Speta 1990a, as *O. gorenflotii* (Moret) Speta).

Raamsdonk (1986), Moret & Couderc (1986, sub "*O. tenuifolium*"), Tornadore & Marcucci (1988), Speta (1990b) & Moret & al. (1991) evidenced the basically diploid $2n = 18$ chromosome complement of *O. kochii* subsp. *monticola*, marked by one chromosome pair showing terminal satellites. Substantially the same karyotype was also quoted for *O. kochii* subsp. *kochii* by Tornadore & Marcucci (1988), Giordani & Garbari (1989), Speta (2000), Herrmann (2002, as "*O. angustifolium* nom. prov.") and for *O. kochii* subsp. *gorenflotii* by Moret & Couderc (1986, Moroccan "*O. kochii*").

The studied plant confirms the diploid status and the basic karyotype structure of this species. On the basis of karyotype structure, *O. kochii* s.l. seems to be the diploid relative



Figs 1-6. Microphotographs and relative haploid idiograms of: **1-2,** *Ornithogalum baeticum*, 2*n* = 18. **3-4,** *O. exscapum* var. *parlatorei*, 2*n* = 18+1B. **5-6,** *O. kochii* subsp. *monticola*, 2*n* = 18. – Arrows indicate B-chromosome. – Scale bars = 5µm.

of all the polyploid species (also with hardly concrescent bulb-scales, but with offsets) of the C-W Mediterranean area, such as: *O. umbellatum* L., *O. divergens* Boreau (see beyond) and perhaps also *O. refractum* Kit. ex Willd. (Raamsdonk 1986; Peruzzi & Passalacqua 2002). We refute the taxonomic view of some authors: i.e. *Ornithogalum orthophyllum* subsp. *kochii* (Parl.) C. Zahariadi (Zahariadi 1980), that considered *O. kochii* as more or less closely related to *O. orthophyllum* (see above), that instead always show intercalary satellites. Very likely, *O. orthophyllum* s.l. and *O. kochii* s.l., with their respective polyploid relatives, belong to distinct phylogenetic lineages.

According to Levan & al. (1964), karyotype formula can be expressed as follows: $2n$ = 2x = 2m + 4sm + 2st-SAT+ 2m + 4sm + 4m = 18.

Mean chromosome size (assessed from five metaphasic plates) ranges from 3.16 to 10.97 μm; while total haploid genome length is 53.56 μm.

1460. *Ornithogalum umbellatum* L. [= *O. angustifolium* Boreau; *O. umbellatum* subsp. *angustifolium* (Boreau) P.D. Sell] — $2n$ = 27 (Figs 7-8).

Fr: S France: Heyrieux (Isère), ca. 250 m a.s.l., ruderalized wood of *Carpinus* and *Robinia*, 45° 00' N, 4° 55' E, 2003, *J.-M. Tison* (*cult.* Hort. Bot. Calabria Univ., acc. no 641-3)

Ornithogalum umbellatum L. aggregate occurs widely in southern-central Europe, and is marked by four main cytotypes: $2n$ = 27, 36, 45, 54. There are at least three different cytotaxonomic interpretations of this group, more or less contrasting to each other: Raamsdonk (1999) is of the opinion that $2n$ = 27 cytotype refers to *O. angustifolium* Boreau, while $2n$ = (36?), 45, 54 referred to *O. umbellatum* L. Speta (2000) treats instead $2n$ = 27 cytotype, as the true *O. umbellatum* L., $2n$ = 36, 45, as *O. vulgare* Sailer and $2n$ = 54, as *O. divergens* Boreau. Garbari & al. (2003), by considering these contrasting taxonomic opinions, prefer to apply the name *O. umbellatum* L. to $2n$ = 27 and $2n$ = 36, 45 cytotypes, by distinguishing at specific level only $2n$ = 54, as *O. divergens*.

All these problems stem from the contrasting taxonomic interpretations of the type (iconotype) of the name *O. umbellatum* L. (Stearn 1983), since the differences among $2n$ = 27 and $2n$ = 36, 45 cytotypes are rather thin, based only on features of bulbets: few, relatively big and dormant during the blooming period in the first; many, little and sprouting during the blooming period in the latter. Indeed, by examining the type of the name *O. umbellatum* L. (Stearn 1983: 154) it is not clear which of the two units is represented, because the depicted plant brings only three relatively big bulbets ($2n$ = 27-like), but one of them is sprouting ($2n$ = 36/45-like). By considering all these matters, we prefer to follow here the taxonomic proposal of Garbari & al. (2003), by considering also that the independence of hexaploid cytotype, as *O. divergens* was recently confirmed (Peruzzi & Passalacqua 2003). However, it is noteworthy that if in the future the name *O. umbellatum* L. will be rejected as a *nomen confusum*, as proposed for instance by Stearn & Landström (1991), the first available names would be *O. angustifolium* Boreau for $2n$ = 27 and *O. vulgare* Sailer for $2n$ = 36, 45 cytotypes.

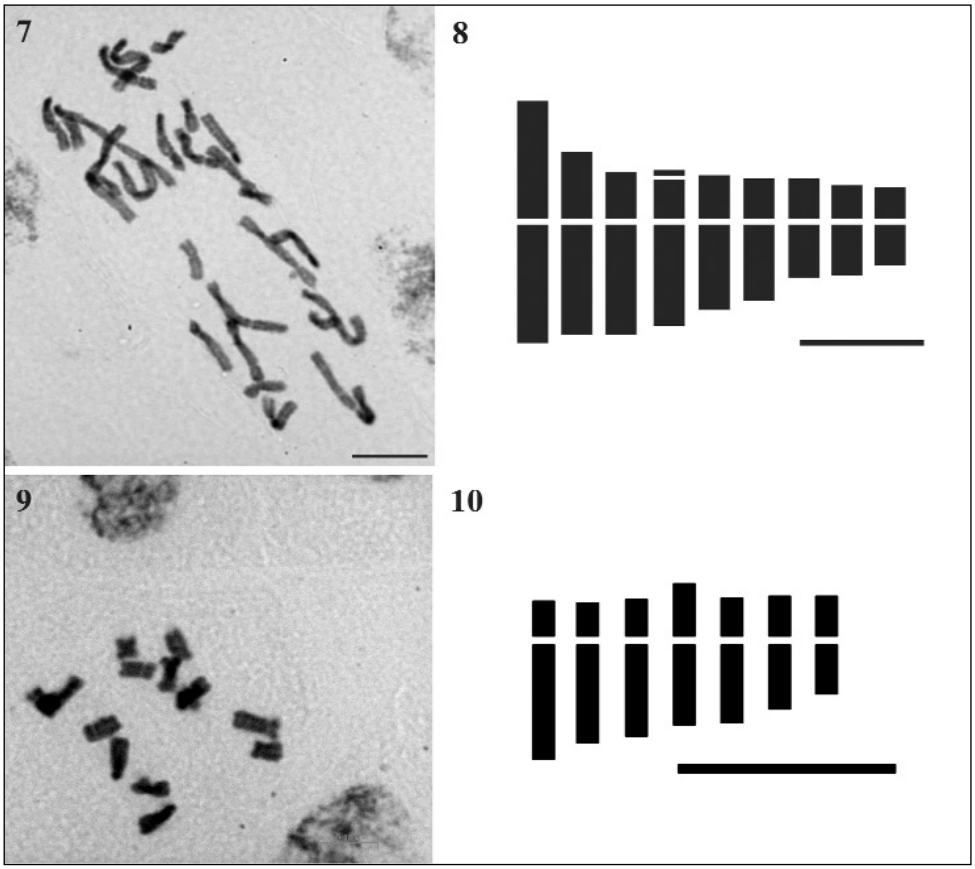
Our counting and karyotype structure well agrees with data reported by Raamsdonk (1986), Moret & al. (1991), Marcucci & Tornadore (1997), Speta (2000) from many localities of N Mediterranean and C Europe.

According to Levan & al. (1964), karyotype formula can be expressed as follows: 2*n* = 3x = 6m + 3sm + 3sm-SAT + 6sm + 9m = 27.

Mean chromosome size (assessed from two metaphasic plates) ranges from 3.67 to 11.51 μm; while total haploid genome length is 60.68 μm.

1461. *Prospero autumnale* (L.) Speta (= *Scilla autumnalis* L.) — 2*n* = 14 (Figs 9-10), 2*n* = 42.

It: S Italy, Calabria: Cassano allo Ionio (prov. Cosenza), rocks near Grotte di Sant'Angelo, ca. 400 m a.s.l., 39° 47' N, 16° 18' E, 4 Oct 2004, *L. Peruzzi, G.*



Figs 7-10. Microphotographs and relative haploid idiograms of: **7-8,** *Ornithogalum umbellatum*, 2*n* = 3x = 27. **9-10,** *Prospero autumnale*, 2*n* = 14. – Scale bars = 5μm.

Aquaro, N. G. Passalacqua (*cult.* Hort. Bot. Calabria Univ., acc. nï 322; CLU nï 12886) – 2*n* = 14.

— S Italy, Calabria: native within the Botanic Garden of Calabria University, Arcavacata di Rende (province of Cosenza), ca. 200 m a.s.l., 39° 23' N, 16° 13' E, 10 Oct 2004, *G. Aquaro* (CLU nï 12882-3) – 2*n* = 14.

Gr: Mt. Parnassus near Delphi, 38° 33' N, 22° 24' E, 1989, *Cesca* (*temporarily cult.* Hort. Bot. Calabria Univ.) – 2*n* = 42.

Prospero autumnale is a typical hysteranthous, autumn-flowering species, widely distributed in dry grasslands of the whole Mediterranean area, from southern England to the Kaspian sea, and from Morocco to the northern Iraq (Speta 1993). This species is well known as extraordinarily variable by a karyological point of view, by showing at least fourteen different cytotypes all over its distributional range.

The diploid level 2*n* = 14 in *Prospero autumnale* (L.) Speta was evidenced for the first time by Battaglia (1953) on plants from Algeria. Subsequently, the same chromosome number was found also in many samples from W Mediterranean/W Europe (Battaglia 1957, 1964b; Valdés 1970; Findley & McNeill 1974; Valdés & al. 1977; Ruiz-Rejón 1978; Ruiz-Rejón & Oliver Jiménez 1978; Ruiz-Rejón & al. 1980a; Guillén & Ruiz-Rejón 1984; Pajarón Sotomayor 1986; Mejías & Luque. 1987; White & al. 1988; Jamilena & al. 1995; Ebert & al. 1996), Sicily (Battaglia 1957, 1964b; Guillén & Ruiz-Rejón 1984; Geraci & Schicchi 2002), Sardinia-Corse system (Battaglia 1964b; Ebert & al. 1996), eastern Mediterranean area (Battaglia 1964a, 1964b; Popova 1972; Maggini & al. 1976; Tzanoudakis & al. 1991; Speta 1993; Ebert & al. 1996) and Krym/Caucasus (Magulaev 1986; Zakharjeva 1990). Ebert & al. (1996) quoted a 2*n* = 14 cytotype also from a single locality in S Italy (Campania: Palinuro). The possible occurrence of B-chromosomes in diploids was evidenced several times (Battaglia 1963, 1964a; Guillén & Ruiz-Rejón 1984; Tzanoudakis & al. 1991), while 2*n* = 12 cytotypes were quoted in some locality of E Mediterranean (Tarnavschi 1948; Speta 1986; Phitos 1988; Tzanoudakis & al. 1991; Ebert & al. 1996), 2*n* = 11 (Bartolo & al. 1984) and 2*n* = 10 (Ainsworth & al. 1983) chromosomes were counted in plants from Libya. Finally, Johnson & Brandham (1997) found plants having 2*n* = 16 chromosomes.

Triploids 2*n* = 3x = 21 were reported from Spain by Guillén & Ruiz-Rejón (1984).

Tetraploid cytotypes 2*n* = 4x = 28 were instead evidenced for the first time by Heitz (1931) on material of unspecified origin and subsequently on plants from: W Mediterranean/W Europe (Battaglia 1957, 1964b; Giménez Martín 1959; Valdés 1970; Barros Neves 1973; Ruiz-Rejon 1974; Natarajan 1979a, b; Loon 1980; Ruiz-Rejón & al. 1980b; Hong 1982; Ainsworth & al. 1983; Pastor Díaz 1985; Parker & al. 1991; Dempsey & al. 1994; Corsi & al. 1996), Sicily (Geraci & Schicchi 2002), Sardinia (Martinoli 1949; Battaglia 1964b; Bacchetta 2000), many localities of peninsular Italy (Battaglia 1957; Maggini & al. 1976; Bellomaria & Hruska 1981; Frizzi 1984; Baldini 1988; Illuminati & al. 1995) and eastern Mediterranean area (Lovka & al. 1972; Popova 1972; Sopova & Sekovski 1981; Tzanoudakis & al. 1991; Speta 1993; Cheshmedziev 1994). Only Illuminati & al. (1995) evidenced the possible occurrence of 2 B-chromosomes in tetraploids from C Italy. Satô (1942) and Delay (1967) quote 2*n* = 29 cytotypes, while Speta (1993) reports a 2*n* = 26 cytotype.

Lovka (1995) reports a $2n = 36$ counting, possibly referable to a pentaploid/aneuploid cytotype.

Hexaploid cytotypes $2n = 6x = 42$ were quoted in plants from: United Kingdom (Maude 1939, 1940; Battaglia 1964b; Ainsworth & al. 1983), Morocco (Battaglia 1964b; Corsi & al. 1996), Sicily (Geraci & Schicchi 2002), NE Italy (Battaglia 1957, 1964b) and eastern Mediterranean area (Baksay 1956; Battaglia 1964b; Maggini & al. 1976; Tzanoudakis & al. 1991; Speta 1993; Ebert & al. 1996).

A heptaploid plant, with $2n = 7x = 49$ chromosomes was found at Delphi in Greece by Ebert & al. (1996), where, additionally, two more different cytotypes ($2n = 14$ & $2n = 42$) are admixted. Finally, octoploid ($2n = 8x = 56$) and decaploid ($2n = 10x = 70$) populations were recorded in the Balkans (Speta 1993).

Accordingly, our data confirm the occurrence of diploids also in two other localities of peninsular Italy, where, however, tetraploid cytotypes are dominant.

Karyotype formula (Levan & al. 1964) can be expressed as follows: $2n = 2x = 2st + 4sm + 2m + 2sm + 4m = 14$. Karyotype morphology is in general agreement to that reported for this species by other authors, even if we were not able to evidence any intercalary satellite (Battaglia 1953). In few plates of both provenances, not used to build the normal diploid karyotype of this species, we observed a supernumerary chromosome segment in the first chromosome pair, very similar to that observed in diploids studied by Guillén & Ruiz-Rejón (1984) and Jamilena & al. (1995) from Spain and by Hong (1982) from Tunisia.

Mean chromosome size (assessed from three metaphasic plates for each provenance) ranges from 2.14 to 3.59 μm; while total haploid genome length is 20.40 μm. Chromosome size in the studied plants appears significantly smaller than that reported by many of the above cited authors. On the other hand, Ebert & al. (1996) evidenced noteworthy variation in size of chromosomes in diploids from different localities.

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Reports (1462-1465) by Feruzan Dane & Gülden Yılmaz

1462. ***Verbascum densiflorum*** Bertol. (*V. thapsiforme* Schrader; incl. *V. macrantherum* Halacsy*, V. velenovskyi* Horak) — 2*n* = 30 (Figs 1a-b).

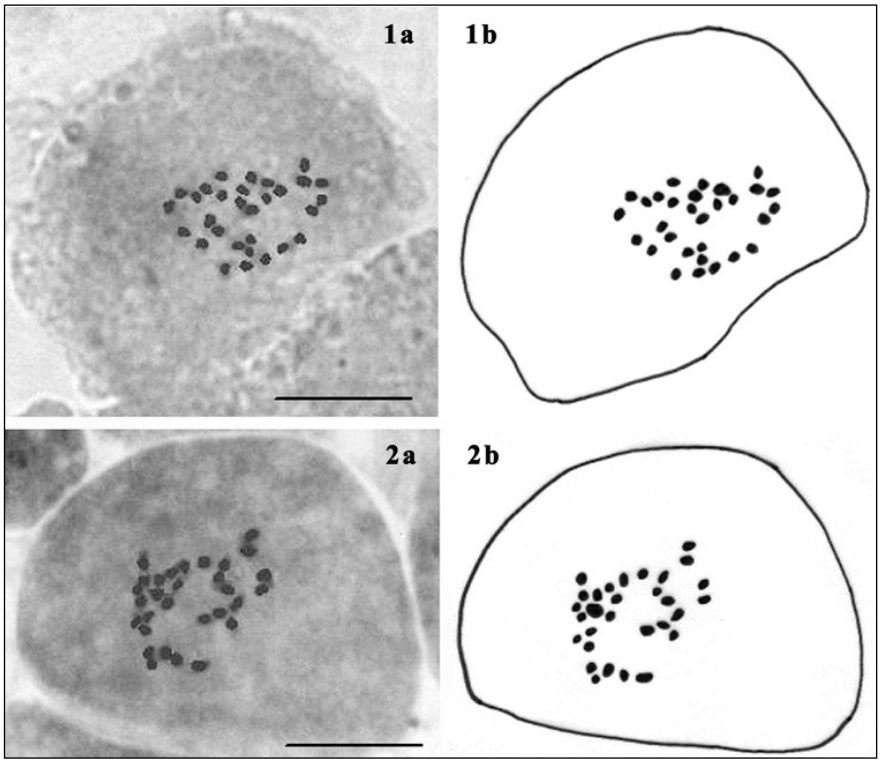
Tu: European Turkey, A1(E) Edirne: Center, TU Campus 41° 41’ N, 26° 32’ E, road sides, 65 m, 30 Jul 2001, *Dane & Yılmaz* 8338 (EDTU).

Our counts of 2*n* = 30 chromosomes (Fig. 1) is different to 2*n* = 32 previouly given by Hakansson (1926), Löve & Löve (1974), Peev (1976) and Majovsky & al. (1974), as well as with 2*n* = 36 which also reported by Murin (1997).

1463. ***Verbascum lagurus*** Fischer & C. A. Meyer (incl. *V. ponticum* Stefanov) — 2*n* = 30 (Figs 2a-b).

Tu: European Turkey, A1(E) Edirne: Center, TU Campus, 41° 41’ N, 26° 32’ E, road sides, 65 m, 27 Jul 2001, *Dane & Yılmaz* 8336 (EDTU).

This species is a Balkan endemic. The diploid chromosome number 2*n* = 30 (Fig. 2) agrees with reports of Koktay (1975) and also by Demiriz & Koktay (1980) in material from Istanbul [A2(E)].



Figs 1-2: a, Microphotograph and b, relative drawing of: **1**, *Verbascum densiflorum*, 2*n* = 30 (EDTU 8338). **2**, *V. lagurus*, 2*n* = 30 (EDTU 83368). – Scale bars = 10 µm.

1464. *Verbascum phlomoides* L. (incl. *V. belasitzae* Stoj. & Stefanov) — 2*n* = 32 (Figs 3a-b).

Tu: European Turkey, A1(E) Edirne : Center, TU Campus, 41° 41' N, 26° 32' E, road sides, 65 m, 10 Oct 2001, *Dane & Yılmaz* 8339 (EDTU).

The diploid chromosome number of *V. phlomoides* was found to be 2*n* = 32 (Fig. 3) is in accordance to Thischler (1915) and Hakansson (1926). Darlington & Janaki Ammal (1945), Koktay (1975) and Demiriz & Koktay (1980) also count *n* = 16, but by Arts-Damler (1960) reports is *n* = 17.

1465. *Verbascum sinuatum* L. — 2*n* = 30 (Figs 4a-b).

Tu: A1(E) Edirne : Center, TU Campus, 41° 41' N, 26° 32' E, roadsides, 65 m, 03 Jul 2001, *Dane & Yılmaz* 8335 (EDTU).

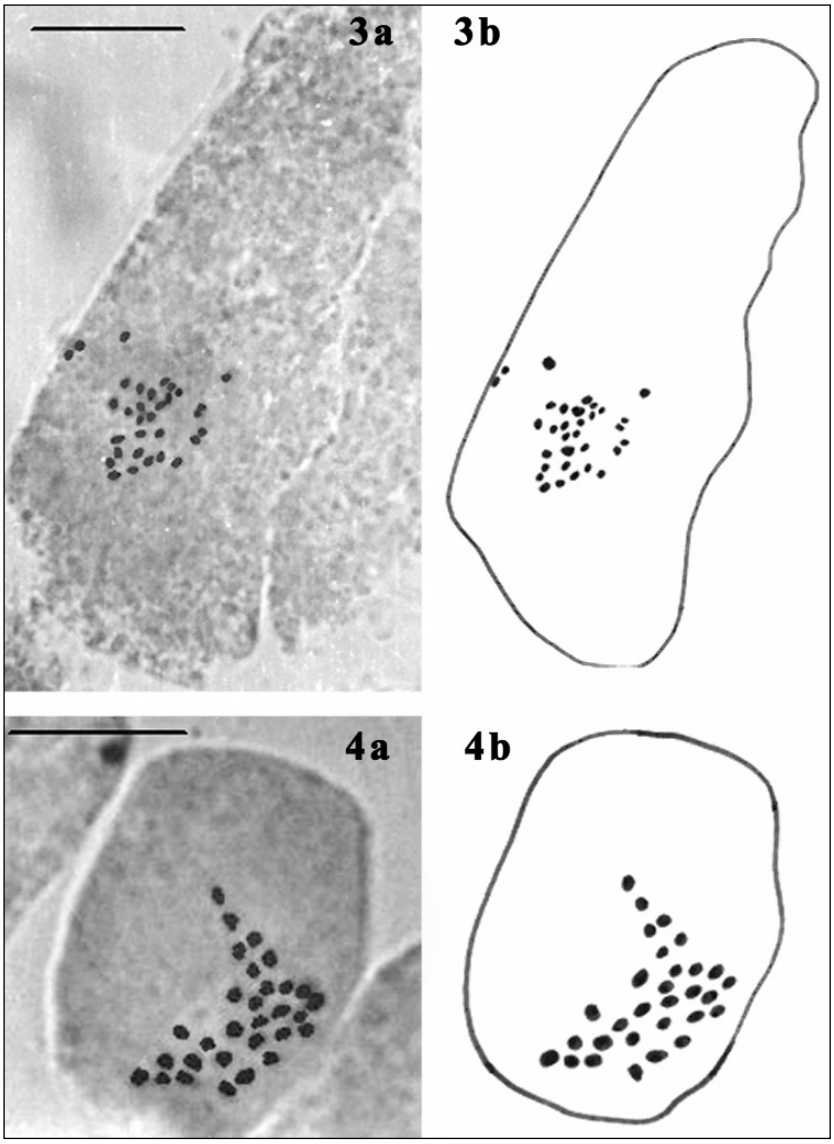


Fig. 3-4: a, Microphotograph and b, relative drawing of: **3**, *Verbascum phlomoides*, 2*n* = 32 (EDTU 8339). **4**, *V. sinuatum*, 2*n* = 30 (EDTU 8335). – Scale bars = 10 µm.

The diploid chromosome number of *V. sinuatum* was found to be 2*n* = 30 (Fig. 4). Mori (1957), Strid (1971), Nilsson & Lassen (1971), Speta (1974), Koktay (1975), Demiriz & Koktay (1980), Fernandes (1977) and Verlaque & al. (1995) also counted 2*n* = 30. However, Labadie (1976) counted 2*n* = 18 and Chuksanova & Kaplanbekova (1971) 2*n* = 24.

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Reports (1466-1472) by Neli Grozeva & Milka Stoeva

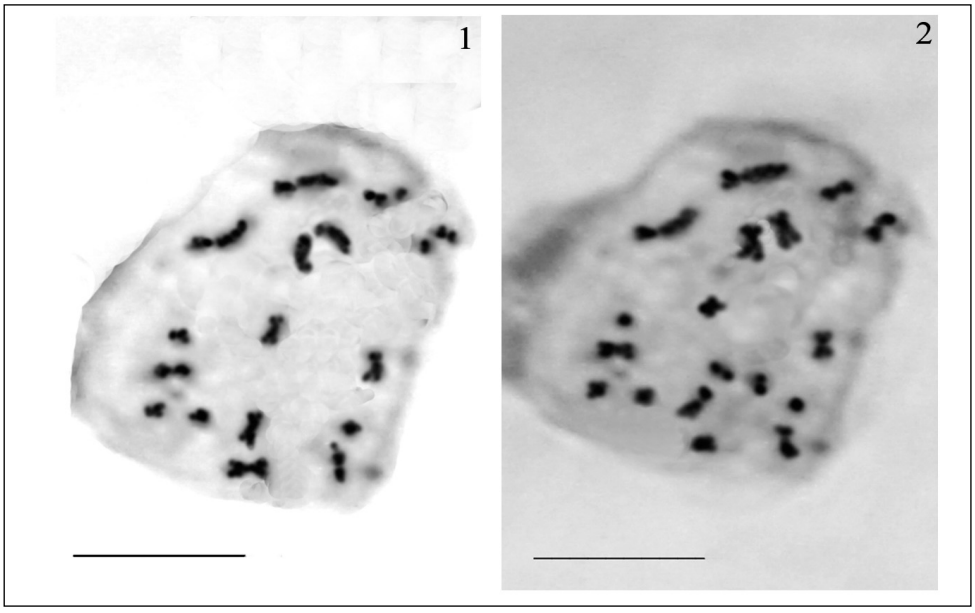
1466. *Bassia hirsuta* (L.) Asch. — 2*n* = 18 (Figs 1-2).

Bu: Southern Black Sea coast, Atanasovsko lake, 42º 39' N, 27º 28' E, sandy places, 30 m, 17 Oct 2005, *Grozeva* NG-180 (SOM).
— Southern Black Sea coast, Pomoriysko lake, sandy terrains, 42º 35' N, 27º 37' E, 10 m, 15 Oct 2005, *Grozeva* NG-185 (SOM).

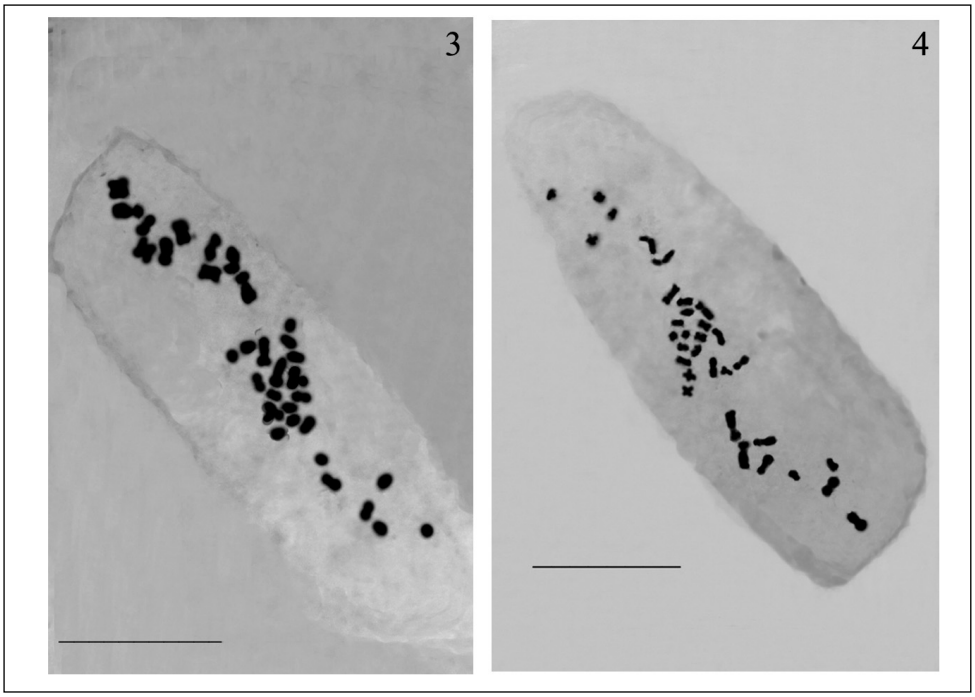
The species is included in Red Data Book of Bulgaria (subscriptum) in category EN. This is the first karyological study for it on Bulgarian material. The chromosome number 2*n* = 18, corresponds to the data reported by the other authors (Winge 1917; Wulff 1937; Zakharyeva 1985).

1467. *Chenopodium ambrosioides* L. — 2*n* = 32 (Figs 3-5).

Bu: Danubian plain, Island Milka near Belene town, 43º 40' N, 25º 10' E, 27 m, ruderal places, 12 Oct 2003, *Grozeva* NG-201 (SOM).
— Thracian Lowland, Plovdiv town, near the river Maritza, 42º 09' N, 24º 45' E, 164 m, ruderal places, 14 Oct 2001, *Grozeva* NG-32 (SOM).



Figs 1-2: Microphotographs of root tip mitosis of: *Bassia hirsuta*, 2*n* = 18. – Scale bars = 10 μm.



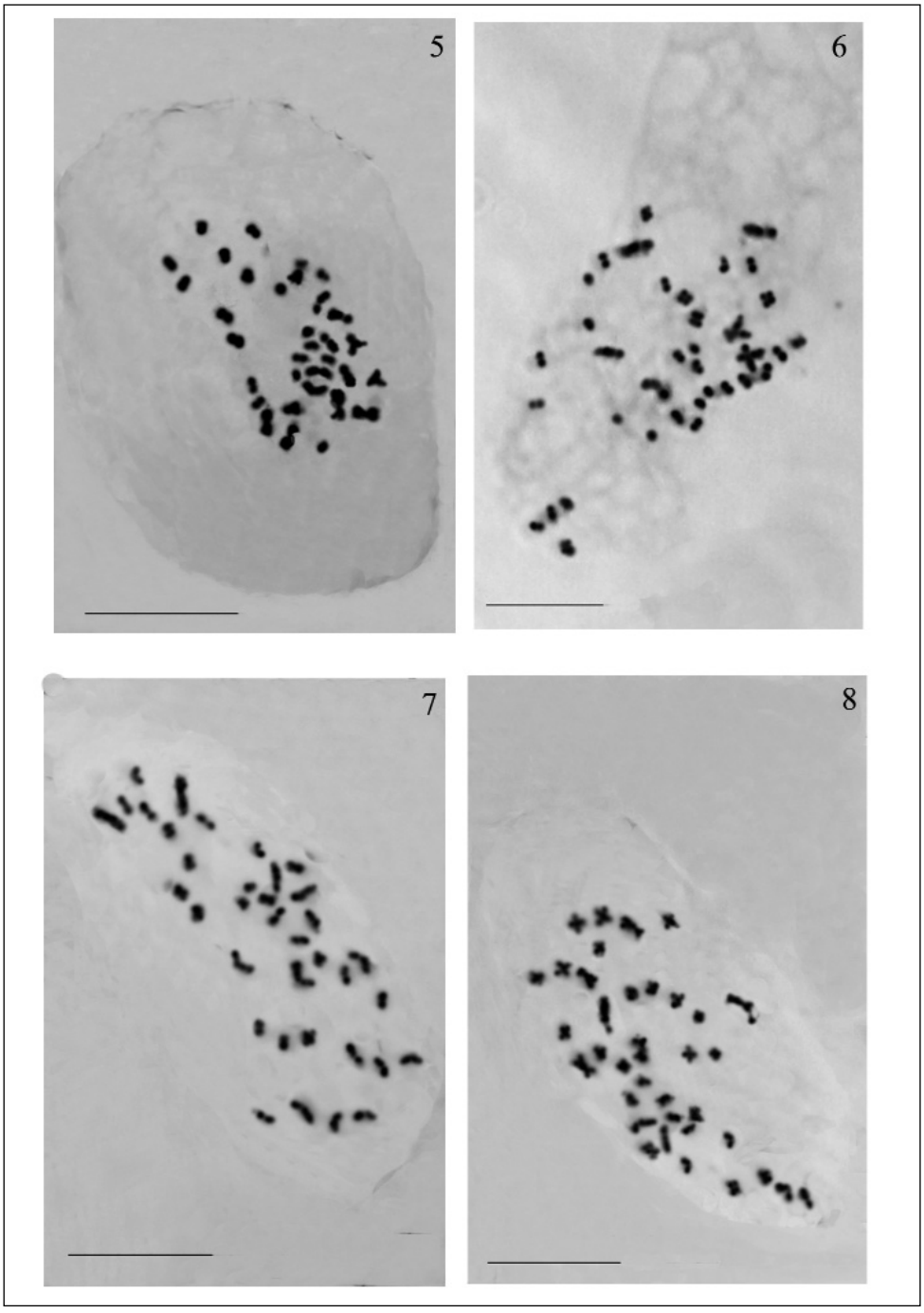
Figs 3-4: Microphotographs of root tip mitosis of: *Chenopodium ambrosioides*, 2*n* = 32. – Scale bars = 10 μm.

— Thracian Lowland, the locality Ostrova near Plovdiv town, 42º 09' N, 24º 45' E, 164, side of the river, 15 Oct 2001, *Grozeva* NG-104 (SOM).

The species is studied for the first time in Bulgarian material. The result obtained 2*n* = 32 is in agreement with most reports (Lorz 1937; Woroschilov 1942; Kawatani & Ohno 1950; Raghavan & Arora 1958; Mehra & Malik 1963; Keener 1970; Murin & Ferakova 1974; Schwarzova 1978). Some other chromosome numbers were also reported for the same species: 2*n* = 16 (Mehra & Malik 1963); 2*n* = 36 (Kjellmark 1934; Heiser & Whitaker 1948; Zosimovič 1965); 2*n* = 64 (Suzuka & Koriba 1949).

1468. *Chenopodium bonus-henricus* L. — 2*n* = 36 (Figs 6-8).

Bu: Central Balkan Range, Buzludzha summit, 42º 44' N, 25º 24' E, 1398 m, pasture ground, 22 Sept 2002, *Grozeva* NG-28 (SOM).
— Pirin Mt., near Razlog town, 41º 53' N, 23º 28' E, 812 m, at open grassis habitats, 12 Sept 2005, *Grozeva* NG-115 (SOM).
— Western Rhodope Mts, near by Beglica hut, 41º 50' N, 24º 09' E, 1500 m, pasture ground, 10 Sept 2002, *Grozeva* NG-114 (SOM).



Figs 5-8. Microphotographs of root tip mitosis of: **5,** *Chenopodium ambrosioides*, 2*n* = 32; **6-8,** *Chenopodium bonus-henricus*, 2*n* = 36. – Scale bars = 10 μm.

The chromosome number 2*n* = 36 confirms the previous result from Rila Mt., Bulgaria (Van Loon & Van Setten 1982). The same number is also reported from other regions (see Winge 1917; Kjellmark 1934; Wulff 1936; Rohweder 1937; Kawatani & Ohno 1950; Zosimovič 1965; Majovsky & Murin 1987).

1469. *Chenopodium botrys* L. — 2*n* = 18 (Figs 9-11).

Bu: Danubian plain, Belene town, 43º 39' N, 25º 07' E, 35 m, ruderal places, 5 Sept 2002, *Grozeva* NG-35 (SOM).
— North-Eastern Bulgaria, Razgrad town, 43º 46' N, 26º 31' E, 200 m, in ruderal places, 27 Jul 2003, *Grozeva* NG-100 (SOM).
— Central Balkan Range, Trojan town, 42º 53' N, 24º 43' E, 400 m, ruderal places, 17 Jul 2003, *Grozeva* NG-99 (SOM).

The chromosome number 2*n* = 18 is reported here for the first time from Bulgaria and matches with the previous counts from elsewhere (Mulligan 1961; Mehra & Malik 1963; Keener 1970; Bassett & Crompton 1971; Schwarzova 1978, 1980; Dvořák & al. 1980). However, Kawatani & Ohno (1950) reported *n* = 8 for *C. botrys*.

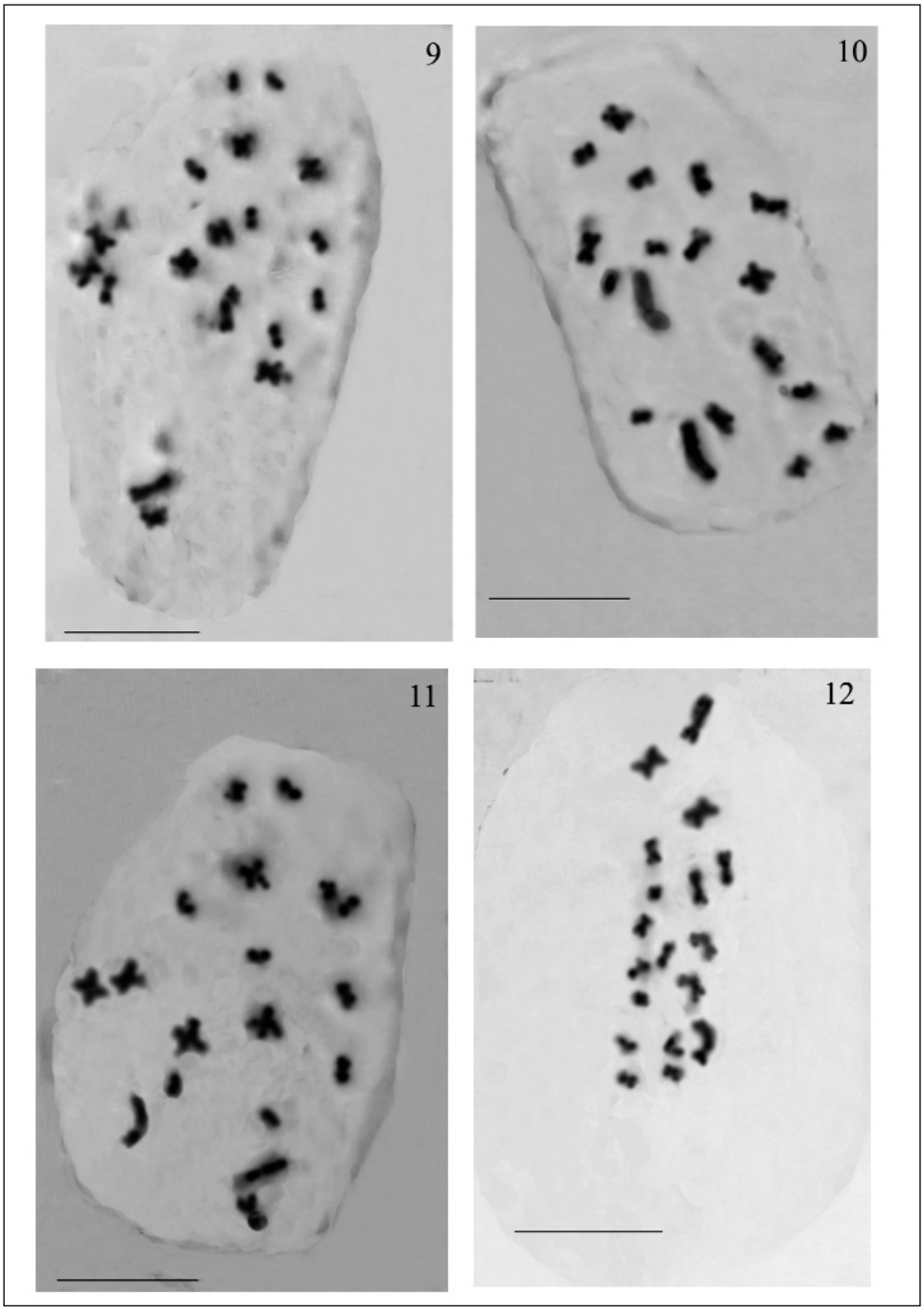
1470. *Chenopodium foliosum* Asch. — 2n = 18 (Figs 12-14).

Bu: Central Balkan Range, Kalofer town, 42º 37' N, 24º 59' E, 666 m, ruderal places, 11 Sept 2003, *Grozeva* NG-77 (SOM).
— Western Rhodope Mts, in front of Beglica hut, 41º 50' N, 24º 09' E, 1500 m, ruderal places, 11 Sept 2002, *Grozeva* NG-116 (SOM).
— Tundza Hilly Country, the village Golyam Manastir, 42º 12' N, 26º 21' E, 213 m, ruderal places, 28 Aug 2002, *Grozeva* NG-37 (SOM).

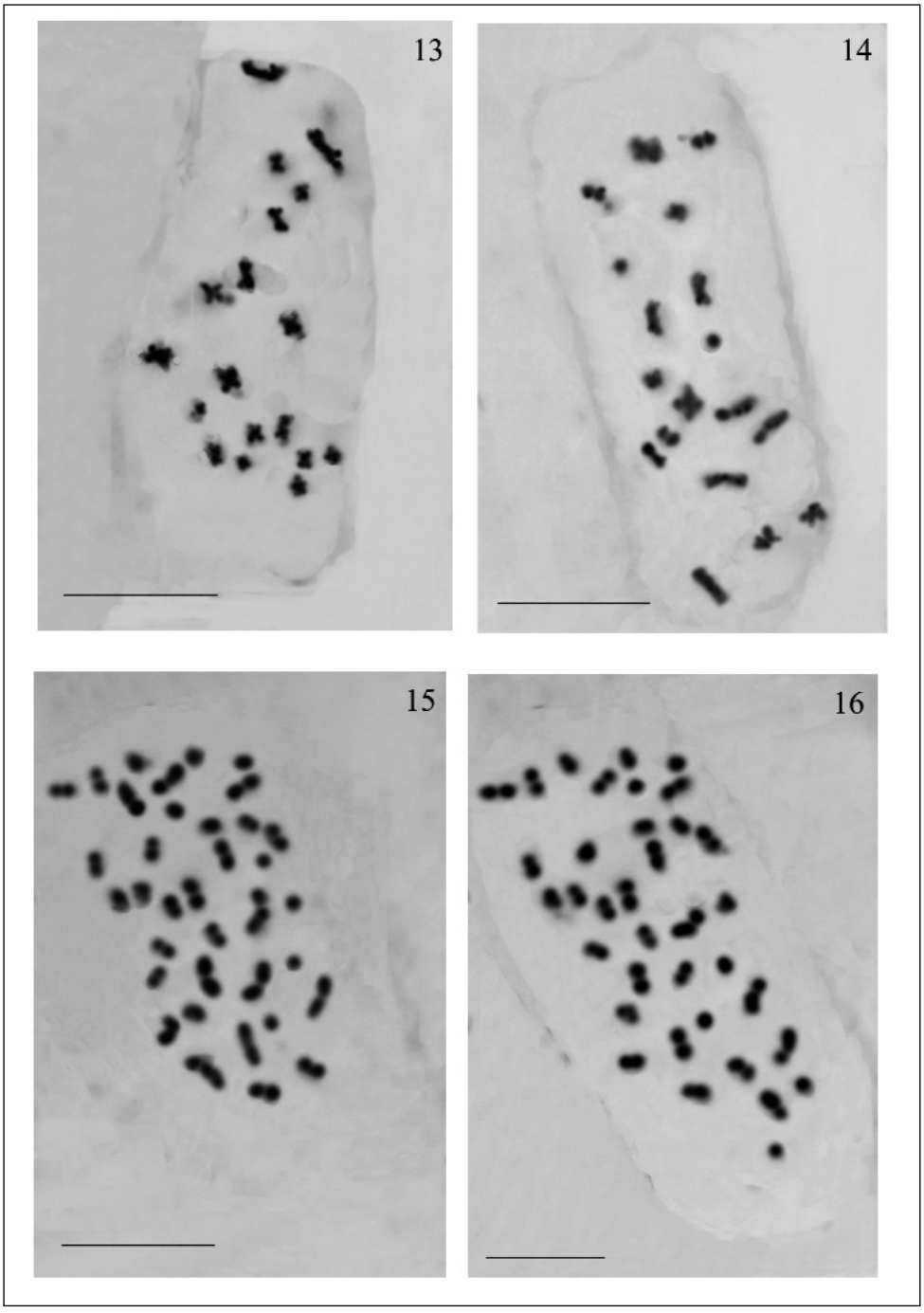
The chromosome number 2*n* = 18 confirms the previous count from Sipka, Bulgaria (Van Loon & Van Setten 1982). The same result is also reported by Kawatani & Ohno (1956), Fedorov (1969), Dvořák & al. (1977) and Schwarzova (1980).

1471. *Chenopodium multifidum* L. — 2*n* = 36 (Figs 15-17).

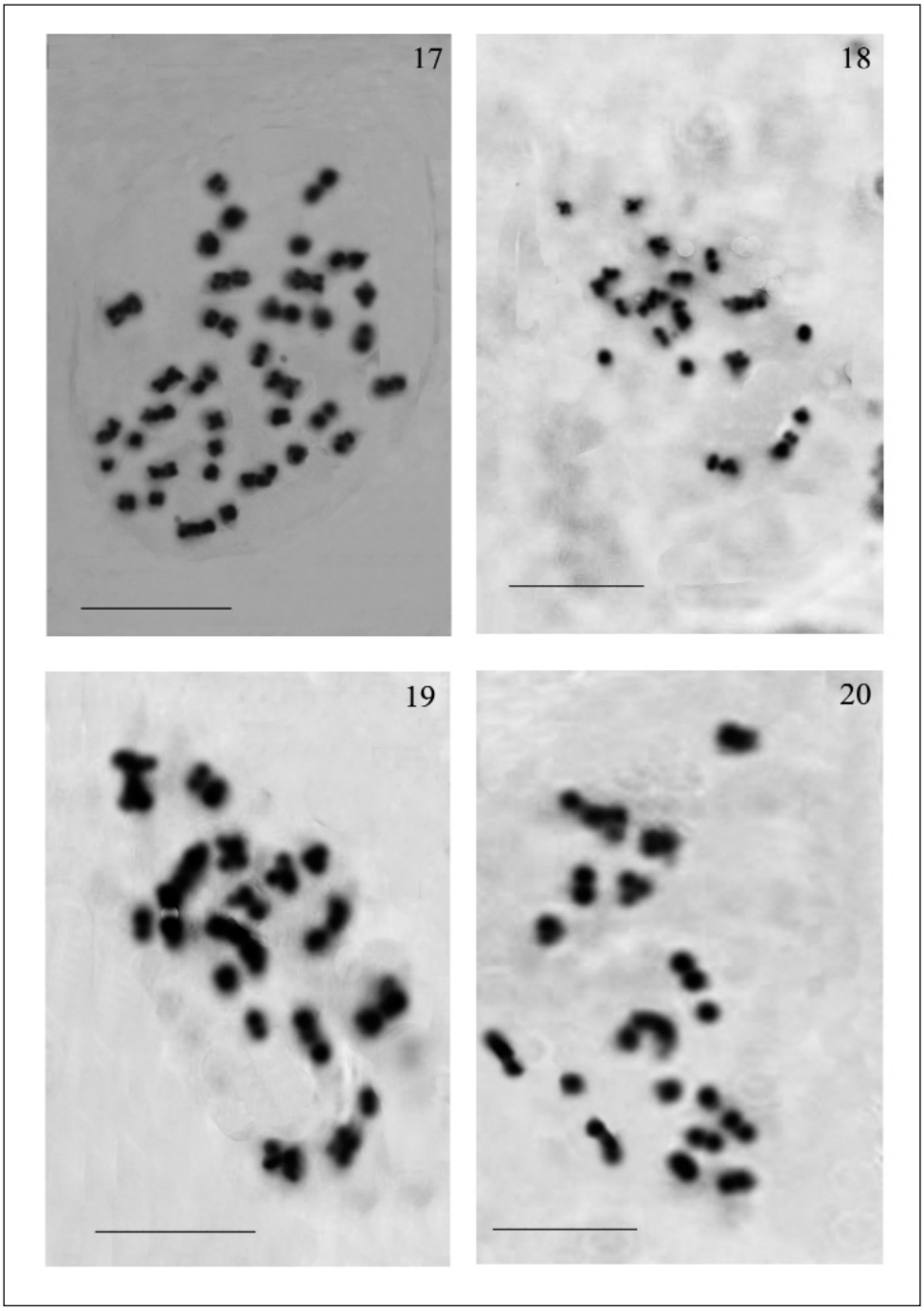
Bu: Western Sredna Gora Mt., Ikhtiman town, 42º 26' N, 23º 49' E, 658 m, ruderal places, 2 Sept 2001, *Grozeva* NG-106 (SOM).
— Eastern Rhodope Mts, Ivaylovgrad town, 41º 32' N, 26º 08' E, 104 m, ruderal places, 22 Sept 2002, *Grozeva* NG-107 (SOM).
— Thracian Lowland, Asenovgrad town, 42º 01' N, 24º 52' E, 104 m, ruderal places, 8 Sept 2004, *Grozeva* NG-109 (SOM).



Figs 9-12. Microphotographs of root tip mitosis of: **9-11,** *Chenopodium botrys*, 2*n* = 18; **12**, *Chenopodium foliosum*, 2*n* = 18. – Scale bars = 10 μm.



Figs 13-16. Microphotographs of root tip mitosis of: **13-14,** *Chenopodium foliosum*, 2*n* = 18; **15-16**, *Chenopodium multifidum*, 2*n* = 36. – Scale bars = 10 μm.



Figs 17-20. Microphotographs of root tip mitosis of: **17,** *Chenopodium multifidum*, 2*n* = 36; **18-20**, *Corispermum nitidum*, 2*n* = 18. – Scale bars = 10 µm.

The chromosome number here established coincides with the previous Bulgarian result from Danube plain (Markova 1968). Kawatani & Ohno (1956) and Giusti (1970) reported also 2*n*=32.

1472. *Corispermum nitidum* Kit. & Schult — 2*n* = 18 (Figs 18-20).

Bu: Southern Black Sea coast, Burgas town, 42º 30' N, 27º 30' E, 30 m, the sands around the beach, 26 Sept 2003, *Grozeva* NG-278 (SOM).
— Southern Black Sea coast, Pomorie town, 42º 36' N, 27º 39' E, the sands around the beach, 3 Oct 2002, *Grozeva* NG-257 (SOM).
— Southern Black Sea coast, Nessebar new town, 42º 39' N, 27º 44' E, sand dunes, 22 Sept 2001, *Grozeva* NG-233 (SOM).

Our count confirm previous records (see Fedorov 1969; Majovsky 1987). This is the first karyological study on Bulgarian material.

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Reports (1473-1571) by Hans Runemark

The herbarium sheets from which seeds were taken (collectors and numbers in italics) as well as voucher specimens of cultivated plants are preserved in the general herbarium in LD. For plants only raised by seeds collected in the field, the voucher number is preceded by *R.*

1473. *Mesembryanthemum nodiflorum* L. — 2*n* = 36 [Correction, not 2*n* = 20].

In my chromosome report 590 [Flora Mediterranea vol. 6, p. 224 (1996)] the number 2*n* = 20 was erroneously reported from 9 localities in the Aegean area. I am indepted to Dr. Britt Snogerup, that when moving vouchers to the general herbarium in LD, observed that the vouchers of *M. nodiflorum* all had the chromosome number 2*n* = 36 written on the labels. In my card index of chromosome counts I also only found 2*n* = 36, as well as in the drawings from the 47 plants cytologically studied.

1474. *Rubus sanctus* Schreber — 2*n* = 14.

Gr: Kiklades. Naxos, 3 km S of Axapsis, 60 m, 37º 06’ N, 25º 24’ E, 30 Jul 1958, *H. Runemark seeds*, *R* 1543.

1475. ***Anagyris foetida*** L. — 2*n* = 18.

Gr: Kiklades. Naxos, Oros Zeus, N part, 650 m, 37º 02' N, 25º 30' E, 4 Aug 1958, *H. Runemark & S. Snogerup seeds*, *R* 1534.

1476. ***Anthyllis splendens*** Willd. (*A. aegaea* Turrill) — 2*n* = 14.

Gr: Kiklades. Amorgos, Krikelas Oros, SE part, 200 m, 36º 55' N, 26º 03' E, 3 Jul 1958, *H. Runemark & S. Snogerup* 12280.

A. splendens is a rare chasmophyte, confined to high litoral limestone cliffs in the Kiklades and E Crete (map in Runemark 1969: 116). It is closely related to the W and C Mediterranean *A. barba-jovis* L. (also with 2*n* = 14).

1477. ***Anthyllis vulneraria*** subsp. ***rubrifolia*** (DC.) Archangeli — 2*n* = 12.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3320; Naxos, Stavros Keramotis, 37º 06' N, 25º 32' E, 11 Jun 1957, *H. Runemark* 4450; Sifnos, Ormos Kondos, 36º 54' N, 24º 42' E, 13 May 1958, *H. Runemark & S. Snogerup* 8353.

1478. ***Astragalus hamosus*** L. — 2*n* = c. 44.

Gr: Kiklades. Naxos, Oros Zeus, N part, 500 m, 37º 02' N, 25º 30' E, 4 Aug 1958, *H. Runemark & S. Snogerup seeds, R* 1528; Ano Koufonisi (S of Naxos), 36º 56' N, 25º 36' E, 14 Apr 1957, *H. Runemark* 1073.
— Dodecanisa. Karpathos, the island of Saria, S part, 35º 51' N, 27º 14' E, 4 May 1958, *H. Runemark & S. Snogerup* 7626; Ounia Nisia, the W Islet (W of Karpathos), 35º 50' N, 26º 27' E, 6 Jun 1967, *H. Runemark & B. Bentzer* 28309.

1479. ***Astragalus pelecinus*** (L.) Barneby — 2*n* = 16.

Gr: Kiklades. Serifos, Koutalas, sandy shore, 37º 08' N, 24º 27' E, 28 May 1967, *H. Runemark & B. Bentzer* 27987.
— E Aegean islands. Ikaria, Ormos Ag. Nikolaos, 37º 32' N, 26º 03' E, 20 May 1958, *H. Runemark & S. Snogerup* 6068; Ikaria, above Perichou, 37º 34' N, 26º 09' E, 14 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1391.

1480. ***Astragalus sinaicus*** Boiss. — 2*n* = 16.

Gr: Kiklades. Keros (S of Naxos), the bay N of the islet Andreas, 36º 53' N, 25º 38' E, 9 Jun 1958, *H. Runemark & S. Snogerup* 10819b; the small island of Antikeros (S of

Keros), 36º 57' N, 25º 29' E, 6 Jul 1958, *H. Runemark & S. Snogerup* 12355; Naxos, Mavrianos (W of the bay of Motsouna), 37º 06' N, 25º 34' E, 6 Jun 1958, *H. Runemark & S. Snogerup* 10572.

— Dodecanisa. Karpathos, Saria, NW of Ormos Armiro, 200 m, 35º 51' N, 27º 14' E, 5 May 1958, *H. Runemark & S. Snogerup* 7776.

1481. ***Astragalus spruneri*** Boiss. — 2*n* = 16.

Gr: Kiklades. Denousa (E of Naxos), 2 km S-SE of Ormos Rousa, 37º 07' N, 25º 50' E, 24 May 1958, *H. Runemark & S. Snogerup* 9527.

1482. ***Bituminaria bituminosa*** (L.) Stirton — 2*n* = 20.

Gr: Kiklades. Naxos, 1 km NE of Mitria, 37º 08' N, 25º 27' E, 26 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1323; Antimilos, (NW of Milos), 36º 48' N, 24º 15' E, 15 May 1958, *H. Runemark & S. Snogerup* 8677.

1483. ***Calicotome villosa*** (Poiret) Link — 2*n* = 48.

Gr: Kiklades. Skinousa (S of Naxos), 36º 52' N, 25º 31' E, 9 Jun 1957, *H. Runemark seeds*, *R* 3.

1484. ***Coronilla scorpioides*** (L.) Koch — 2*n* = 12.

Gr: Kiklades. Naxos, the beach 3 km N of Mitria, 37º 08' N, 25º 25' E, 18 May 1957, *H. Runemark* 3137; Iraklia (S of Naxos), S of Chora, 36º 50' N, 25º 28' E, 8 Jun 1957, *R* 4303; Skinousa (S of Naxos), 36º 52' N, 25º 31' E, 9 Jun 1957, *H. Runemark* 4349.

— Dodecanisa. Kinaros (E of Amorgos), 36º 59' N, 26º 17' E, 2 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1405.

1485. ***Coronilla valentina*** subsp. ***glauca*** (L.) Batt. — 2*n* = 12.

Gr: Attiki. Porto Rafti, 5 km S of Ag. Nikolaos, 37º 52' N, 24º 03' E, 30 May 1963, S. Snogerup 20339.

1486. ***Dorycnium hirsutum*** (L.) Ser. — 2*n* = 14.

Gr: Kiklades. Ano Koufonisi (S of Naxos), 36º 57' N, 25º 36' E, 10 Jun 1960, *H. Runemark & B. Nordenstam*15622.

1487. *Hedysarum spinosissimum* L. (*Sulla spinosissima*) — 2*n* = 16.

Gr: Kiklades. Ios, N of the harbour, 36º 44' N, 25º 17' E, 5 May 1957, *H. Runemark* 2283; Iraklia (S of Naxos), Ormos Pigadi, 36º 50' N, 25º 29' E, 10 Apr 1958, *H. Runemark & S. Snogerup* 5313; Anafi, 1 km E of Kalamos monastery, 36º 21' N, 25º 51' E, 8 May 1958, *H. Runemark & S. Snogerup* 8125.
— Dodecanisa. Sirina, S of the village, 36º 20' N, 26º 41' E, 2 May 1958, *H. Runemark & S. Snogerup* 7310.

1488. *Hippocrepis biflora* Sprengel — 2*n* = 14.

Gr: Kiklades. Anafi, Kalamos, E of the monastery, 0 to 100 m, 26º 22' N, 25º 50' E, 8 May 1958, *H. Runemark & S. Snogerup* 8065b.
— E Aegean islands. Ikaria, Ag. Kirikos, 37º 38' N, 26º 11' E, 11 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1364.

1489. *Hippocrepis ciliata* Willd. — 2*n* = 14.

Gr: Kiklades. Naxos, S of Kato Potamia, 37º 04' N, 25º 26' E, 29 May 1957, *H. Runemark seeds*, *R* 126.
— Dodecanisa. Karpathos, Saria, 1 km NW of Ormos Armiro, 35º 51' N, 27º 14' E, 5 May 1958, *H. Runemark & S. Snogerup* 7759.

1490. *Hippocrepis emerus* subsp. ***emeroides*** Hayek — 2*n* = 14.

Gr: Kiklades. Amorgos, Krikelas Oros, cliffs, 600 m, 36º 55' N, 26º 03' E, 4 Jul 1958, *H. Runemark & S. Snogerup* 12275.
— E Aegean islands. Ikaria, Peranora Vouno, cliffs, 450 m, 37º 34' N, 26º 11' E, 18 Jun 1958, *H. Runemark & S. Snogerup* 11482.
— Ionian islands. Kerkira, 1 km N of Benitses, 39º 35' N, 19º 54' E, 6 Jun 1966, S. Snogerup 23562.

1491. *Hymenocarpus circinnatus* (L.) Savi — 2*n* = 16.

Gr: Kiklades. Naxos, 1 km NE of Apiranthos, 37º 05' N, 25º 32' E, 16 May 1957, *H. Runemark* 2888; Sifnos, the bay E of Akr. Kondropo, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8545; Ios, N of the harbour, 36º 44' N, 25º 17' E, 5 May 1957, *H. Runemark* 2271.
— Dodecanisa. Karpathos, Saria, Ormos Armiro, 35º 50' N, 27º 14' E, 5 May 1958, *H. Runemark & S. Snogerup* 7673.

1492. *Lathyrus annuus* L. — 2*n* = 14.

Gr: Kiklades. Antiparos (W of Paros), near the village, 37º 02' N, 25º 05' E, 17 May 1967, *H. Runemark & B. Bentzer* 28825.

1493. *Lathyrus aphaca* L. — 2*n* = 14.

Gr: Kiklades. Santorin, Thera, 36º 25' N, 25º 26' E, 16 Apr 1967, *H. Runemark & B. Bentzer* 26991; Serifos, W of Livadion, 37º 09' N, 24º 30' E, 26 Apr 1967, *H. Runemark & B. Bentzer* 27544.
— E Aegean islands. Samos, SW part of Mt. Kerki, 400 to 800 m, 37º 43' N, 26º 36' E, 26 May 1962, *H. Runemark & S. Snogerup* 19598.

1494. *Lathyrus clymenum* L. — 2*n* = 14.

Gr: Kiklades. Sifnos, E of Akr. Kondropo, 300 m, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8642.

1495. *Lathyrus saxatilis* (Vent.) Viv. — 2*n* = 14.

Gr: Kiklades. Amorgos, Toularia, 36º 55' N, 25º 59' E, 25 Apr 1969, *H. Runemark, A. Strid & M. Gustafsson* 41303.

1496. *Lotus angustissimus* L. — 2*n* = 12.

Gr: Kiklades. Naxos, N of the W peak of Koronos Oros, 200 m, 37º 08' N, 25º 29' E, 2 Jun 1958, *H. Runemark & S. Snogerup* 9976.
— E Aegean islands. Ikaria, "Kaka Rafija", 200 m, 37º 33' N, 26º 06' E, 15 Jul 1958, *H. Runemark & S. Snogerup* 12621.

1497. *Lotus cytisoides* L. — 2*n* = 14.

Gr: Kiklades. The islet of Anidros (between Anafi and Amorgos), 36º 38' N, 25º 41' E, 9 May 1958, *H. Runemark & S. Snogerup* 8248; Denousa (E. of Naxos), Ormos Rousa, 37º 07' N, 25º 49' E, 23 May 1958, *H. Runemark & S. Snogerup* 9303.
— E Aegean islands. Ikaria, Akr. Papas, 37º 31' N, 25º 59' E, 14 Jun 1958, *H. Runemark & S. Snogerup* 11054.
— Dodecanisa. The islet of Chamili (Kamila) between Astipalea and E. Crete, 35º 52' N, 26º 14' E, 6 May 1958, *H. Runemark & S. Snogerup* 7889.

1498. *Lotus edulis* L. — 2*n* = 14.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3359; Naxos, Komiaki, 500 m, 37º 10' N, 25º 33' E, 4 Jun 1957, *H. Runemark* 4047; Denousa (E of Naxos), Ormos Rousa, 37º 07' N, 25º 49' E, 23 may 1958, *H. Runemark & S. Snogerup* 9302.

1499. *Lotus halophilus* Boiss. & Spruner — 2*n* = 14.

Gr: Kiklades. Naxos, the beach S of the town, 37º 06' N, 25º 23' E, 15 Apr 1958, *H. Runemark & S. Snogerup* 5551.

1500. *Lotus ornithopodioides* L. — 2*n* = 14.

Gr: Kiklades. Antikeros (islet S of Keros), 36º 57' N, 25º 29' E, 6 Jul 1958, *H. Runemark & S. Snogerup* 12371; Naxos, 2 km SE of Ag. Theodoro, 250 m, 37º 10' N, 25º 30' E, 20 May 1958, *H. Runemark & S. Snogerup* 8987; Sifnos, deserted village E of Akr. Kondropo, 350 m, 36º 58' N, 24º 41' E, 13 May 1958, *H. Runemark & S. Snogerup* 8644.

— Dodecanisa. Sirina (SE of Astipalea); N-NE of the village, 36º 20' N, 26º 41' E, 2 May 1958, *H. Runemark & S. Snogerup* 7358; Karpathos, Saria, Ormos Armiro, 35º 50' N, 27º 14' E, 5 May 1958, *H. Runemark & S. Snogerup* 7679.

1501. *Lotus peregrinus* L. — 2*n* = 28.

Gr: Kiklades. Naxos, Axapsis to Mitria, 37º 07' N, 25º 26' E, 3 Jun 1957, *H. Runemark* 3926; Anafi, Drepanon, 36º 24' N, 25º 46' E, 23 Apr 1969, *H. Runemark, A. Strid & M. Gustafsson* 41129.

1502. *Lotus subbiflorus* Lag. — 2*n* = 24.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3333; Mikonos, the bay E of Ormos Ornos, 37º 25' N, 25º 20' E, 18 Jun 1960, *H. Runemark & B. Nordenstam*16165.

1503. *Lotus tetragonolobus* L. — 2*n* = 14.

Gr: Kiklades. Sifnos, Ormos Kondos, 36º 54' N, 24º 43' E, 13 May 1958, *H. Runemark & S. Snogerup* 8517.

1504. ***Lupinus angustifolius*** L. subsp. ***angustifolius*** — 2*n* = 40.

Gr: Kiklades. Naxos, S of Apollona, along small stream, 37º 11' N, 25º 33' E, 4 Jun 1957, *H. Runemark* 3970.

1505.*Medicago coronata* (L.) Bartal. — 2*n* = 16.

Gr: Kiklades. Naxos, Mt. SE of Apollona, 300 m, 37º 10' N, 25º 33' E, 5 Jun 1957, *H. Runemark* 4063.

1506. ***Medicago disciformis*** DC. — 2*n* = 16.

Gr: Dodecanisa. Karpathos, Saria, N of Ormos Armiro, 35º 50' N, 27º 14' E, 5 May 1958, *H. Runemark & S. Snogerup* 7675.

1507. ***Medicago heyniana*** Greuter — 2*n* = 16.

Gr: Kiklades. Anafi, 1 km E of the monastery of Kalamos, 36º 21' N, 25º 51' E, 8 May 1958, *H. Runemark* 3220 (*H. Runemark & S. Snogerup* 8119).

1508. ***Medicago littoralis*** Loisel. — 2*n* = 16.

Gr: Kiklades. Naxos, Akr. Pardenos, 37º 02' N, 25º 22' E, 23 Apr 1957, *H. Runemark* 1477; Naxos, S of the town, 37º 06' N, 25º 23' E, 4 May 1957, *H. Runemark* 2174; Iraklia (S of Naxos), S of the harbour, 36º 50' N, 25º 29' E, 7 Jun 1957, *H. Runemark* 4199.
— Dodecanisa. Sirina (SE of Astipalea), Ag. Ioannis Ormos, 36º 20' N, 26º 41' E, 2 May 1958, *H. Runemark & S. Snogerup* 7267.

1509. ***Medicago lupulina*** L. — 2*n* = 16.

Gr: Kiklades. Naxos, 2 km N of Apollona, 37º 10' N, 25º 33' E, 4 Jun 1957, *H. Runemark* 4001.
— Evvia. 3 km W-SW of Akr. Kafirevs, 38º 08' N, 24º 33' E, 22 Jun 1958, *H. Runemark & S. Snogerup* 11711.

1510. ***Medicago marina*** L. — 2*n* = 16.

Gr: Kiklades. Naxos, beach 2.5 km W of Mitria, 37º 07' N, 25º 24' E, 30 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1508.

1511. ***Medicago minima*** (L.) L. — 2*n* = 16.

Gr: Kiklades. Naxos, S of the town, 37º 06' N, 25º 23' E, 1 Aug 1958, *H. Runemark & S. Snogerup seeds*, *R* 1517.
— Evvia. 3 km W-SW of Akr. Kafirevs, 38º 08' N, 24º 33' E, 22 Jun 1958, *H. Runemark & S. Snogerup* 11770.

1512. ***Medicago orbicularis*** (L.) Bartal. — 2*n* = 16.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3332; Naxos, Stavros Keramotis, 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds*, *R* 85; Ano Koufonisi (S of Naxos), 36º 56' N, 25º 36' E, 14 Apr 1957, *H. Runemark* 1122.
— Dodecanisa. Sirina (SE of Astipalea), valley NW of the village, 36º 20' N, 26º 41' E, 2 May 1958, *H. Runemark & S. Snogerup* 7361.

1513. ***Medicago polymorpha*** L. — 2*n* = 14.

Gr: Kiklades. Naxos, 3 km SE of ag. Theodoro, 300 m, 37º 10' N, 25º 30' E, 20 May 1958, *H. Runemark & S. Snogerup* 9002; Naxos, N of the W peak of Koronos Oros, 37º 08' N, 25º 29' E, 2 Jun 1958, *H. Runemark & S. Snogerup* 10025; Naxos, 2 km W of Ormos Liona, 37º 08' N, 25º 34' E, 21 May 1958, *H. Runemark & S. Snogerup* 9117.

1514. ***Medicago praecox*** DC. — 2*n* = 14.

Gr: Kiklades. Naxos, Metri (N of Moni), 500 m, 37º 05' N, 25º 30' E, 20 May 1958, *H. Runemark & S. Snogerup* 9002.
— E Aegean islands. Ikaria, Avlaki, 37º 35' N, 26º 14' E, 22 Apr 1958, *H. Runemark & S. Snogerup* 6299; Ikaria, Ormos Ag. Nikolaos, 37º 32' N, 26º 03' E, 20 Apr 1958, *H. Runemark & S. Snogerup* 6039.

1515. ***Medicago rigidula*** (L.) All. — 2*n* = 16.

Gr: Kiklades. Naxos, 1 km E-NE of Moni, 37º 05' N, 25º 30' E, 30 May 1957, *H. Runemark* 3590.

1516. ***Medicago truncatula*** Gaertner — 2*n* = 16.

Gr: Kiklades. Naxos, Stavros Keramotis, 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds, H. Runemark* 83 *& H. Runemark* 115; Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3365a *& H. Runemark* 3365b; Amorgos,

SW of Katapola, 36º 50' N, 25º 52' E, 15 Apr 1957, *H. Runemark* 1229; Tinos, Kardiani, 37º 36' N, 25º 28' E, 27 May 1968, A. Hansen 37386.

1517. *Melilotus indicus* (L.) All. — 2*n* = 16.

Gr: Kiklades, 3 km SW of Axapsis, 37º 06' N, 25º 24' E, 31 May 1958, *H. Runemark & S. Snogerup* 9854; Naxos, Ormos Kalandou, 36º 56' N, 25º 28' E, 20 May 1958, *H. Runemark & S. Snogerup* 10174.

1518. *Melilotus siculus* (Turra) B. D. Jackson — 2*n* = 16.

Gr: Kiklades. Naxos, 3 km N of Mitria, 37º 08' N, 25º 26' E, 18 May 1957, *H. Runemark* 3089.

1519. *Melilotus spicatus* (S. & S.) Breitstr. — 2*n* = 16.

Gr: Kiklades. Naxos, valley 1 km SE of Ag. Theodoro, 37º 11' N, 25º 30' E, 20 May 1958, *H. Runemark & S. Snogerup* 8942.

1520. *Melilotus sulcatus* Desf. — 2*n* = 16.

Gr: Kiklades. Denousa (E of Naxos), 1 km S of Ormos Rousa, 37º 07' N, 25º 49' E, 23 May 1958, *H. Runemark & S. Snogerup* 9445.

1521. *Onobrychis aequidentata* (S. & S.) d'Urv. — 2*n* = 14.

Gr: Kiklades. Sifnos, 1 km NE of Akr. Kondropo, 350 m, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8636b.

1522. *Onobrychis caput-galli* (L.) Lam. — 2*n* = 14.

Gr: Kiklades. Naxos, Stavros Keramotis, 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds*, *R* 79; Denousa (E of Naxos), SW of Akr. Moskonar, 37º 07' N, 25º 50' E, 24 May 1958, *H. Runemark & S. Snogerup* 9533; Sifnos, Ormos Kondos, 36º 54' N, 24º 42' E, 13 May 1958, *H. Runemark & S. Snogerup* 8448; Sifnos, 1 km NE of Akr. Kondropo, 350 m, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8636a; Anafi, 1 km E of the monastery of Kalamos, 36º 21' N, 25º 51' E, 8 May 1958, *H. Runemark & S. Snogerup* 8124.

1523. *Ononis reclinata* L. — 2*n* = 30.

Gr: Kiklades. Between Stavros Keramotis and N part of Fanari Oros, 37º 06' N, 25º 31' E, 16 Jun 1957, *H. Runemark* 4442; Anidros (between Amorgos and Anafi), 36º 38' N, 25º 41' E, 9 May 1958, *H. Runemark & S. Snogerup* 8313; Denousa (E of Naxos), 1 km W of Ormos Rousa, 37º 07' N, 25º 49' E, 23 May 1958, *H. Runemark & S. Snogerup* 9606.
— Kriti. Lassiti. S of the town of Ag. Nikolaos, 35º 11' N, 25º 43' E, 14 May 1962, *H. Runemark & S. Snogerup* 17717.

1524. *Ononis variegata* L. — 2*n* = 16.

Gr: Kiklades. Iraklia (S of Naxos), S of the harbour, 36º 50' N, 25º 29' E, 7 Jun 1957, *H. Runemark* 4208.

1525. *Ononis viscosa* subsp. ***breviflora*** (DC.) Nyman — 2*n* = 32.

Gr: Kiklades. Naxos, 1 to 2 km W of Ormos Liona, 37º 08' N, 25º 34' E, 22 May 1958, *H. Runemark & S. Snogerup* 9273; Sifnos, E of Akr. Kondropo, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8549.

1526. *Ornithopus compressus* L. — 2*n* = 14.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3360.
— E Aegean islands. Samos, 1 to 3 km W of Marathokampos, 350 to 400 m, 37º 44' N, 26º 40' E, 23 May 1962, *H. Runemark & S. Snogerup* 18997.

1527. *Ornithopus pinnatus* (Miller) Druce — 2*n* = 14.

Gr: Kiklades. Naxos, between Chalki and Sangri, 37º 03' N, 25º 28' E, 5 May 1960, *H. Runemark & B. Nordenstam*13199; Serifos, Livadion, 37º 09' N, 24º 31' E, 24 Apr 1967, *H. Runemark & B. Bentzer* 27626.

1528. *Scorpiurus muricatus* L. — 2*n* = 28.

Gr: Kiklades. Naxos, Komiaki to Apollona, 400 m, 37º 10' N, 25º 33' E, 4 May 1957, *H. Runemark* 4023; Tinos, Mt. N of Ag. Stefani, 400 m, 37º 35' N, 25º 13' E, 24 May 1968, *H. Runemark & L. Engstrand* 37137; Mikonos, the island of Rinia, 37º 23' N, 25º 14' E, 18 May 1968, *H. Runemark & L. Engstrand* 36314.
— Dodecanisa, Kinaros (E of Amorgos), 36º 59' N, 26º 17' E, 2 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1240.

1529. *Securigera cretica* (L.) Lassen — 2*n* = 20.

Gr: Kiklades. Tinos, below Isternia, 37º 37' N, 25º 03' E, 26 May 1968, *H. Runemark & L. Engstrand* 37274.

1530. *Securigera securidaca* (L.) Degen & Doerfler — 2*n* = 12.

Gr: E Aegean islands. Ikaria, 4 to 5 km E of Ag. Kirikos, 37º 37' N, 26º 18' E, 13 Jul 1958, *H. Runemark & S. Snogerup seeds*, *R* 1425.

1531. *Trifolium andricum* Lassen — 2*n* = 16.

Gr: Kiklades. Tinos. SE of Steni, 300 m, 37º 34' N, 25º 12' E, 20 May 1968, *H. Runemark & L. Engstrand* 36547.

Only known from Andros and Tinos.

1532. *Trifolium angustifolium* L. — 2*n* = 16.

Gr: Kiklades. Koronos Oros, NW slope, c. 200 m, 37º 08' N, 25º 29' E, 2 Jun 1958, *H. Runemark & S. Snogerup* 9996.

1533. *Trifolium arvense* L. — 2*n* = 14.

Gr: Kiklades. Serifos, Pirgos, 37º 11' N, 24º 29' E, 5 Jun 1968, *H. Runemark & L. Engstrand* 38138.
— E Aegean islands. Ikaria, SW of Amala, 37º 32' N, 26º 00' E, 15 Jun 1958, *H. Runemark & S. Snogerup* 11113.

1534. *Trifolium boissieri* Boiss. — 2*n* = 16.

Gr: Kiklades. Serifos, Ormos Avelasos, 37º 10' N, 24º 26' E, 28 Apr 1967, *H. Runemark & B. Bentzer* 28028; Amorgos, between the villages NE of Oros Korax, 36º 48' N, 25º 48' E, 26 Apr 1969, *H. Runemark, A. Strid & M. Gustafsson* 41360.
— Kriti. Sitia, Mt. Spathi, below N exposed cliffs, 300 to 500 m, 35º 08' N, 25º 55' E, 17 May 1962, *H. Runemark & S. Snogerup* 18415.

1535. *Trifolium campestre* Schreber — 2*n* = 14.

Gr: Kiklades. Naxos, Stavros Keramotis, 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds, R* 73; Naxos, Faneromeni, 37º 09' N, 25º 29' E, 29 May 1957, *H.*

Runemark 3456; Naxos, Axapsis to Mitria, 37º 07' N, 25º 26' E, 3 Jun 1957, *H. Runemark* 3879.

1536. *Trifolium clypeatum* L. — 2*n* = 14.

Gr: E Aegean islands. Samos, the valley W of Leka, 200 to 400 m, 37º 46' N, 26º 41' E, 22 May 1962, *H. Runemark & S. Snogerup* 18973.

1537. *Trifolium fragiferum* L. — 2*n* = 16.

Gr: Kiklades. Paros, 1 km N of the peak of Mt. Prof. Elias, c. 550 m, 37º 03' N, 25º 12' E, 18 Jul 1958, *H. Runemark & S. Snogerup* 12703.

1538. *Trifolium globosum* L. — 2*n* = 16.

Gr: Kiklades. Mikonos, hill N of Ano Mera, 200 m, 37º 28' N, 25º 24' E, 12 may 1968, *H. Runemark & L. Engstrand* 35263; Tinos, above Kardiani, 300 to 400 m, 37º 36' N, 25º 05' E, 27 May 1968, *H. Runemark & L. Engstrand* 37368.

1539. *Trifolium glomeratum* L. — 2*n* = 16.

Gr: Kiklades. Naxos, Stavros Keramotis, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds, R* 113; Mikonos, N of Ano Mera, 50 to 100 m, 37º 27' N, 25º 24' E, 5 May 1968, *H. Runemark & L. Engstrand* 35206; Tinos, Mt. E of Kardiani, 400 to 600 m, 37º 36' N, 25º 06' E, 27 May 1968, *H. Runemark & L. Engstrand* 37350.

1540. *Trifolium infamia-ponertii* Greuter — 2*n* = 14.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3321; Iraklia (S of Naxos), NW of the village, 36º 50' N, 25º 28' E, 7 Jun 1957, *H. Runemark* 4272; Skinousa (S of Naxos), S of the village, 36º 52' N, 25º 31' E, 9 Jun 1957, *H. Runemark seeds*, *R* 99.

1541. *Trifolium lappaceum* L. — 2*n* = 16.

Gr: Kiklades. Naxos, Komiaki to Apollona, 100 m, 37º 10' N, 25º 33' E, 4 Jun 1957, *H. Runemark seeds, R* 756; Naxos, Psiliammos, 37º 01' N, 25º 34' E, 7 Jun 1958, *H. Runemark & S. Snogerup* 10644; Mikonos, N-NE of Ormos Ornos, 37º 25' N, 25º 20' E, 18 Jun 1960, *H. Runemark & B. Nordenstam*16121; Serifos, beach near harbour, 37º 09' N, 24º 31' E, 20 Jun 1967, *H. Runemark & B. Bentzer* 30047.

— Evvia. SE part, N of Ag. Dimitrios, 10 to 100 m, 38º 08' N, 24º 27' E, 23 Jun 1958, *H. Runemark & S. Snogerup* 11814.

1542. *Trifolium micranthum* Viv. — 2*n* = 16.

Gr: Kiklades. Mikonos, W Ag. Elias, W of the peak, 350 m, 37º 29' N, 25º 20' E, 13 May 1968, *H. Runemark & L. Engstrand* 35450.

1543. *Trifolium nigrescens* Viv. — 2*n* = 16.

Gr: Kiklades. Naxos, Faneromeni, 37º 09' N, 25º 29' E, 22 May 1957, *H. Runemark* 3337; Mikonos, NW of the town, 37º 27' N, 25º 20' E, 11 May 1968, *H. Runemark & L. Engstrand* 35099; Mikonos, the bay of Elia, 37º 25' N, 25º 22' E, 17 May 1968, *H. Runemark & L. Engstrand* 36272.

1544. *Trifolium physodes* Bieb. — 2*n* = 16.

Gr: Kiklades. Naxos, Stavros Keramotis, c. 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds, R* 48; Naxos, Koronos, 1 km S-SE of the village, 550 m, 37º 07' N, 25º 32' E, 17 May 1957, *H. Runemark* 2936; Naxos, 1 km NE of Moni, 500 m, 37º 05' N, 25º 30' E, 30 May 1957, *H. Runemark* 3593.
— Kriti. Sitia, SW of Chamaetula, 35º 03' N, 26º 11' E, 15 May 1962, *H. Runemark & S. Snogerup* 17631.

1545. *Trifolium pilulare* Boiss. — 2*n* = 16.

Gr: E Aegean islands. Samos, W slope Mt. Kerki, 350 to 450 m, 37º 43' N, 26º 39' E, 23 May 1962, *H. Runemark & S. Snogerup* 19243; Samos, W of Marathokampos, 300 to 400 m, 37º44'N, 26º 40' E, 23 May 1962, *H. Runemark & S. Snogerup* 18984 & 19055.
— Dodecanisa. Kalimnos, 2 km NW of the town, 100 to 200 m, 36º 58' N, 26º 58' E, 4 Apr 1966, *H. Runemark & P* 22200.

1546. *Trifolium purpureum* Loisel. — 2*n* = 14.

Gr: Kiklades. Naxos, near the chapel N of Oros Zeus, 600 m, 37º02'N, 25º20'E, 4 Aug 1958, *H. Runemark & S. Snogerup seeds*, *R* 1480.

1547. *Trifolium resupinatum* L. — 2*n* = 16.

Gr: Kiklades. Naxos, S of Kato Potamia, 200 m, 37º 04' N, 25º 26' E, 29 May 1957, *H. Runemark* 3426.

1548. *Trifolium scabrum* L. — 2*n* = 10.

Gr: Dodecanisa. Kamila (Chamili), 35º 52' N, 26º 14' E, 6 May 1958, *H. Runemark & S. Snogerup* 7902; Ounia Nisia, the E islet, 35º 50' N, 26º 28' E, 6 May 1967, *H. Runemark & B. Bentzer* 28290.

Both localities are situated on isolated islets between Astipalea, Karpathos and E Crete.

1549. *Trifolium spumosum* L. — 2*n* = 16.

Gr: Kiklades. Naxos, inside the beach S of the town, 50 to 100 m, 37º 06' N, 25º 23' E, 1 May 1960, *H. Runemark & B. Nordenstam*13029; Mikonos, N of Ano Mera, 37º 27' N, 25º 24' E, 12 May 1968, *H. Runemark & L. Engstrand* 35190.

1550. *Trifolium squamosum* L. — 2*n* = 16.

Gr: Kiklades. Mikonos, 1 to 2 km N-NW of Ano Mera, 37º 28' N, 25º 23' E, 12 May 1968, *H. Runemark & L. Engstrand* 35225.
— Kriti. Lassiti, 1 to 2 km N-NW of the town of Ag. Nikolaos, 0 to 20 m, 35º 11' N, 25º 42' E, 14 May 1962, *H. Runemark & S. Snogerup* 17533.

1551. *Trifolium stellatum* L. — 2*n* = 14.

Gr: Kiklades. Naxos, 1 km E-NE of Moni, 37º 05' N, 25º 30' E, 30 May 1957, *H. Runemark* 3594.

1552. *Trifolium suffocatum* L. — 2*n* = 16.

Gr: Kiklades. Kithnos, 2 km N of Mavro punta, 37º 20' N, 24º 22' E, 4 Jun 1968, *H. Runemark & L. Engstrand* 38039.

1553. *Trifolium subterraneum* L. — 2*n* = 16.

Gr: Kiklades. Naxos, 1 km NE Chalki, 300 to 400 m, 37º 04' N, 25º 29' E, 4 May 1960, *H. Runemark & B. Nordenstam*13168; Mikonos, W of the peak of Ag. Elias, 37º 29' N, 25º 20' E, 13 May 1968, *H. Runemark & L. Engstrand* 35442.
— Evvia. The bay 3 km W-SW of Akr. Kafirevs, 38º 08' N, 24º 33' E, 22 Jun 1958, *H. Runemark & S. Snogerup* 11752.

1554. ***Trifolium tomentosum*** L. — 2*n* = 16.

Gr: Kiklades. Naxos, 3 km W of Axapsis, 37º 07' N, 25º 24' E, 26 Mar 1957, *H. Runemark* 430; Naxos, 2 km E-NE of Skado, 400 m, 37º 08' N, 25º 33' E, 1 Jun 1957, *H. Runemark* 3777; Naxos, 4 km W of Psiliammos Bay, 260 m, 37º 01' N, 25º 31' E, 7 Jun 1958, *H. Runemark & S. Snogerup* 10700.
— Dodecanisa. Sirina (SE of Astipalea), central part, 200 m, 36º 21' N, 26º 41' E, 2 May 1958, *H. Runemark & S. Snogerup* 7435.

1555. ***Trifolium uniflorum*** L. — 2*n* = 32.

Gr: Kiklades. Kato Koufonisi (S of Naxos), 36º 55' N, 25º 34' E, 11 Jun 1960, *H. Runemark & B. Nordenstam*15833; Antiparos, the island of Despotiko, 36º 58' N, 25º 01' E, 16 May 1967, *H. Runemark & B. Bentzer* 28647.

1556. ***Trigonella balansae*** Boiss. & Reuter — 2*n* = 16.

Gr: Kiklades. Ios, N of the harbour, 36º 44' N, 25º 17' E, 5 May 1957, *H. Runemark* 2242.
— Dodecanisa. Rodos, the islet of Pendinisi (SW of Lindos), 36º 04' N, 28º 05' E, 7 Jul 1960, *H. Runemark & B. Nordenstamseeds*, *R* 3723.

1557. ***Trigonella rechingeri*** Sirj. — 2*n* = 16.

Gr: Dodecanisa. The islet of Laro (E of Kinaros), 36º 55' N, 26º 19' E, 2 Jul 1958, *H. Runemark & S. Snogerup* 12083.
— Kiklades. Naxos, 2 km N-NW of Ormos Liona, 37º 09' N, 25º 35' E, 21 May 1958, *H. Runemark & S. Snogerup* 9040 [Determination preliminary].
— Attiki. The islet of Vromousa (along the SW coast of the peninsula of Attiki), 37º 45' N, 23º 54' E, 18 May 1974, *H. Runemark & R. von Bothmer* 47526; the islets of Markello, the E islet (along the SW coast of the peninsula of Attiki), 37º 45' N, 23º 54' E, 18 May 1974, *H. Runemark & R. von Bothmer* 47518.
— Evvia. Below Ag. Dimitrios (NW of Akr. Kafirevs), sea shore, 38º 08' N, 24º 27' E, 23 Jun 1958, *H. Runemark & S. Snogerup* 11820.

The collection from Evvia was determined to *Trigonella euboica* Rech. fil. by Rechinger (1961: 353).

1558. ***Tripodium tetraphyllum*** (L.) Fourr. — 2*n* = 16.

Gr: Kiklades. Antiparos, 5 to 130 m, 36º 59' N, 25º 03' E, 16 May 1967, *H. Runemark & B. Bentzer* 28763.

1559. ***Vicia articulata*** Hornem. — 2*n* = 14.

Gr: Kiklades. Tinos, SE of Steni, 300 to 350 m, 37º 34' N, 25º 12' E, 20 May 1968, *H. Runemark & L. Engstrand* 36576; Sifnos, 1 km NE of Akr. Kondropo, 300 m, 36º 58' N, 24º 41' E, 14 May 1958, *H. Runemark & S. Snogerup* 8645.

1560. ***Vicia bithynica*** (L.) L. — 2*n* = 14.

Gr: Kiklades. Serifos, Ormos Avelasos, 37º 10' N, 24º 26' E, 28 Apr 1967, *H. Runemark & B. Bentzer* 28036.
— Kriti. Rethymni, 1 km NW of Akoumia, 35º 10' N, 24º 35'E, 1 Jun 1967, *S. Snogerup, A. Strid & R. von Bothmer* 20974.

1561. ***Vicia cretica*** Boiss. & Heldr. — 2*n* = 14.

Gr: Kiklades. Naxos, the bay 2 km N-NW of Liona, 37º 09' N, 25º 35' E, 21 May 1958, *H. Runemark & S. Snogerup* 9043; Iraklia (S of Naxos), S of the village, 36º 50' N, 25º 28' E, 8 Jul 1957, *H. Runemark* 4304; Denousa, SW of Ormos Rousa, 37º 07' N, 25º 49' E, 23 May 1958, *H. Runemark & S. Snogerup* 9447; Antimilos, central part, E slope, 450 m, 36º 48' N, 24º 14' E, 15 May 1958, *H. Runemark & S. Snogerup* 8765.
— Dodecanisa. Sirina (SE of Astipalea), N.E. slope, 50 to 150 m, 36º 21' N, 26º 42' E, 16 May 1960, *H. Runemark & B. Nordenstam*14433.

1562. ***Vicia cuspidata*** Boiss. — 2*n* = 12.

Gr: Kiklades. Naxos, 1 km E-NE of Moni, 500 m, 37 º 05' N, 25 º 30' E, 30 May 1957, *H. Runemark* 3612.

1563. ***Vicia hybrida*** L. — 2*n* = 12.

Gr: Kiklades. Siros, Mt. N of Finikas, 37 º 24' N, 24 º 54' E, 7 Apr 1969, *H. Runemark, A. Strid & M. Gustafsson* 40314a.

1564.*Vicia lathyroides* L. — 2*n* = 12.

Gr: Kiklades. Naxos, 2 km E of Apiranthos, 37º 05' N, 25º 32' E, 2 May 1957, *H. Runemark seeds, R* 141; Naxos, 3 km W of Axapsis, 37º 07' N, 25º 24' E, 1 May 1957, *H. Runemark seeds, R* 197; Mikonos, the island of Dilos, 37º 23' N, 25º 16' E, 25 Mar 1969, *H. Runemark, A. Strid & M. Gustafsson* 39375.

1565. ***Vicia lutea*** L. — 2*n* = 14.

Gr: Kiklades. Mikonos, Ormos Ornos, 37º 25' N, 25º 19' E, 14 May 1968, *H. Runemark & L. Engstrand* 35487.

1566. ***Vicia parviflora*** Cav. — 2*n* = 14.

Gr: E Aegean islands. Samos, the valley W-NW of Leka, 37º 46' N, 26º 41' E, 25 May 1962, *H. Runemark & S. Snogerup* 19419; Samos, Karlovassi, 37º 47' N, 26º 42' E, 26 May 1962, *H. Runemark & S. Snogerup* 19495.

1567. ***Vicia pubescens*** (DC.) Link — 2*n* = 14.

Gr: Kiklades. Naxos, below the W peak of Koronos Oros, 200 m, 37º 08' N, 25º 29' E, 2 Jun 1958, *H. Runemark & S. Snogerup* 10046.
— SW Aegean islands. Idhra, S of the town, 37º 20' N, 23º 28' E, 10 May 1974, *H. Runemark & R. von Bothmer* 46972.

1568. ***Vicia sativa*** subsp. ***nigra*** (L.) Ehrh. — 2*n* = 12.

Gr: Kiklades. Naxos, 1 km E-NE of Skado, 400 m, 37º 08' N, 25º 33' E, 1 Jun 1957, *H. Runemark* 3793*;* Mikonos, N-NW of the town, 37º 27' N, 25º 20' E, 11 May 1968, *H. Runemark & L. Engstrand* 35086.

1569. ***Vicia villosa*** subsp. ***eriocarpa*** (Hausskn.) P.W. Ball — 2*n* = 14.

Gr: Kiklades. Mikonos, 1 to 2 km N-NW of Ano Mera, 100 m, 37º 28' N, 25º 23' E, 12 May 1968, *H. Runemark & L. Engstrand* 35243.

1570. ***Vicia villosa*** subsp. ***microphylla*** (d'Urv.) P.W. Ball — 2*n* = 14.

Gr: Kiklades. Naxos, Stavros Keramotis, 600 m, 37º 06' N, 25º 32' E, 13 Jun 1957, *H. Runemark seeds, H. Runemark* 24*, R* 101*;* Naxos, 1 km E-NE of Skado, 400 m, 37º 08' N, 25º 33' E, 1 Jun 1957, *H. Runemark* 3790*;* Mikonos, 2 km N of Ag. Stefano, 37º 30' N, 25º 19' E, 17 May 1968, *H. Runemark & L. Engstrand* 36150.

1571. ***Vicia villosa*** subsp. ***varia*** (Host) Corb. — 2*n* = 14.

Gr: E Aegean islands. Ikaria, NW of Praia, 37º 34' N, 26º 09' E, 17 Jun 1958, *H. Runemark & S. Snogerup* 11356.

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Reports (1572-1583) by Valentina Goranova, Pepa Stanimirova & Minčo Ančev

1572. ***Acer campestre*** L. — 2*n* = 26 (Fig. 1).

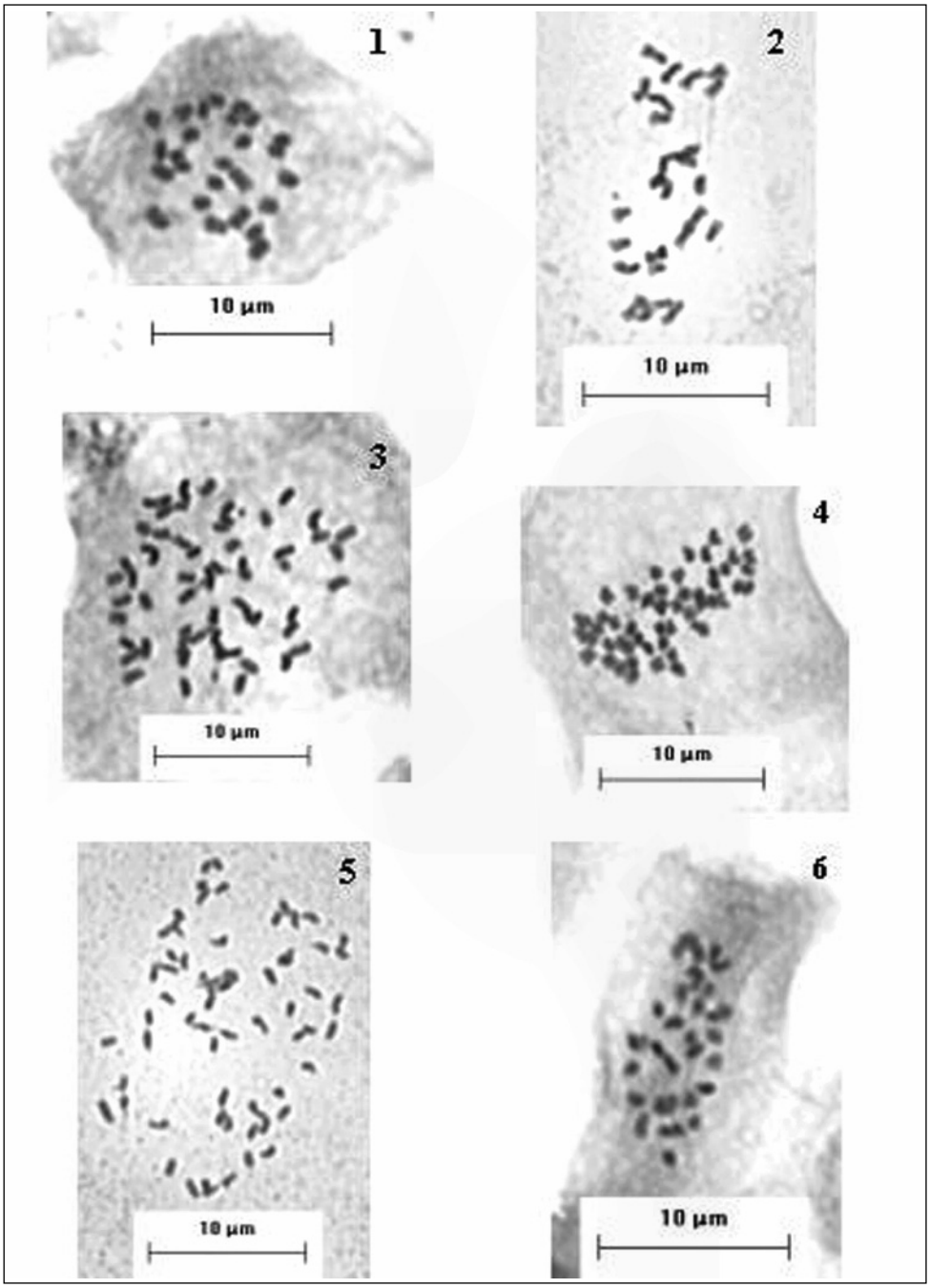
Bu: Eastern Rhodopes, Gaberovo village, Kardzhali distr., 41° 38’ N, 25° 55’ E, 18 May 2005, leg. *V. Goranova*, det. *S. Stoyanov*, VG 5905 (SOM 3919).

The diploid chromosome number 2*n* = 26 is the first report from Bulgarian population of *A. campestre* and confirms previous counts from Europe (see Fedorov 1969: 10; Goldblatt 1981: 28; Goldblatt & Johnson 1991: 26; 2000: 12 for references). The gametic chromosome number *n* = 13 was also reported (see Goldblatt & Johnson 1991: 26 for reference).

1573. ***Acer platanoides*** L. — 2*n* = 26 (Fig. 2).

Bu: Mt. Lyulin, between Malo Boučino village and “Sveti Kral” monastery, 42° 41’ N, 23° 10’ E, 26 May 2004, leg. V. *Goranova*, det. *D. Stoykov*, PS 1804 (SOM 3910).

This is the first count on Bulgarian material of *A. platanoides*. The chromosome number 2*n* = 26 agrees whit earlier reports (see Fedorov 1969: 10; Goldblatt 1981: 28; 1988: 21; Goldblatt & Johnson 1991: 26; 1994: 21; 2000: 12 for references). For this species chromosome numbers 2*n* = 39 was also known in the literature (Meurman 1933, after Fedorov 1969). We observed in some slides polyploid chromosome number 2*n* = 52, as a result of somatic doubling.



Figs 1-6. Microphotographs of mitotic metaphase plates of: **1**, *Acer campestre*, 2*n* = 26; **2**, *A. platanoides*, 2*n* = 26; **3**, *A. pseudoplatanus*, 2*n* = 52; **4**, *Corylus avellana*, 2*n* = 44; **5**, *Euonymus latifolius*, 2*n* = 64; **6**, *Eu. verrucosus*, 2*n* = 32. – Scale bars = 10 µm.

1574. ***Acer pseudoplatanus*** L. — 2*n* = 52 (Fig. 3).

Bu: Mt. Slavyanka, Parilski dol locality, near to Paril village, 41° 26' N, 23° 39' E, 19 Jun 2004, leg. *V. Goranova*, det. *S. Stoyanov*, VG 3004 (SOM 3916).

The tetraploid chromosome number 2*n* = 52 agrees with earlier reports from Europe (see Fedorov 1969: 10; Goldblatt 1981: 28-29; 1984: 33; Goldblatt & Johnson 1998: 12; 2000: 12 for references). A gametic chromosome number *n* = 26 was also counted in this species (see Goldblatt & Johnson 2000: 12 for references).

1575. ***Corylus avellana*** L. — 2*n* = 44 (Fig. 4).

Bu: Western Stara Planina, Rayanovtsi village, near to Arčar river, 43° 42' N, 22° 31' E, 24 Mar 2004, *P. Stanimirova*, VG 1404 (SOM 3920)

The polyploid chromosome number 2*n* = 44 is reported here for the first time for *C. avellana*. So far only diploid chromosome numbers 2*n* = 22 was known (see Fedorov 1969: 154; Goldblatt 1981: 145; 1984: 111; 1988: 68; Goldblatt & Johnson 1991: 26; 1996: 74; 2003: 76 for references). The chromosome number 2*n* = 28 was also found by different authors (see Fedorov 1969: 154). Sanchez Anta & al. (1987) gave the gametic chromosome number *n* = 11 in material from Spain.

1576. ***Euonymus latifolius*** (L.) Miller — 2*n* = 64 (Fig. 5).

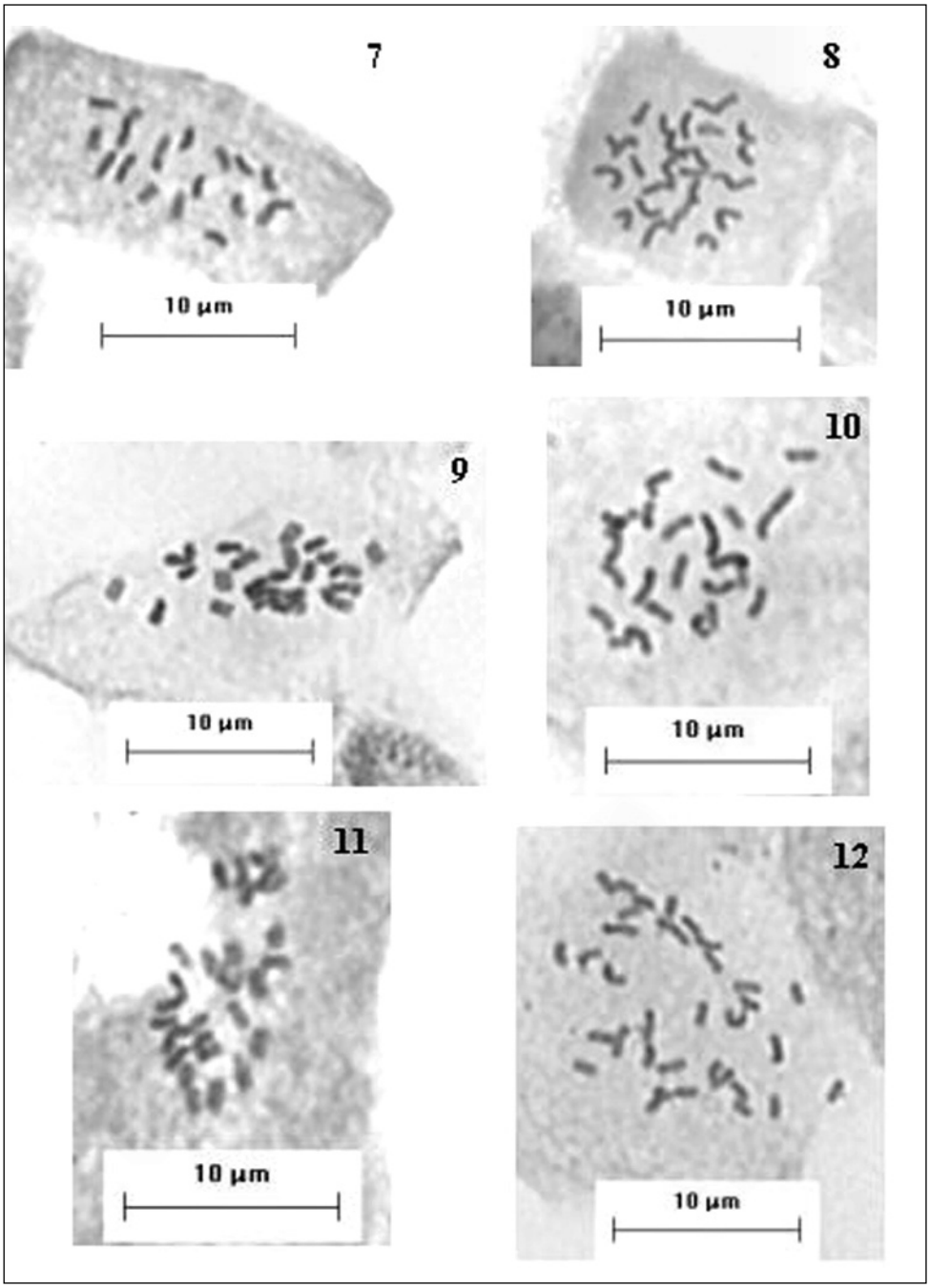
Bu: Rila Mts, along the trail between Kostenetski vodopad and Belmeken chalet, 42° 15' N, 23° 48' E, 29 Jul 2004, leg. *V. Goranova*, det. *S. Stoyanov,* VG 4904 (SOM 3915).

This is the first karyological results based on Bulgarian material of *E. latifolius*. The octoploid chromosome number 2*n* = 64 reported here confirms previous records from the Mediterranean region (see Goldblatt 1988: 85; Goldblatt & Johnson 1991: 84 for references).

1577. ***Euonymus verrucosus*** Scop. — 2*n* = 32 (Fig. 6).

Bu: Mt. Lyulin, between Malo Boučino village and "Sveti Kral" monastery, 42° 41' N, 23° 10' E, 26 May 2004, leg. V. *Goranova*, det. *D. Stoykov*, VG 1704 (SOM 3921).

The chromosome number 2*n* = 32 reported here for *E. verrucosus* is the first record from Bulgarian population. It agrees with the results reported from Europe (see Goldblatt 1981: 183; Goldblatt & Johnson 2000: 56 for references). A gametic chromosome number *n* = 16 was also reported (see Goldblatt & Johnson l.c.).



Figs 7-12. Microphotographs of mitotic metaphase plates of: **7,** *Ostrya carpinifolia*, 2*n* = 16; **8**, *Quercus cerris*, 2*n* = 24; **9**, *Q. dalechampii*, 2*n* = 24; **10**, *Q. frainetto*, 2*n* = 24; **11**, *Rubus hirtus*, 2*n* = 28; **12**, *Sorbus aucuparia*, 2*n* = 34. – Scale bars = 10 µm.

1578. *Ostrya carpinifolia* Scop. — 2*n* = 16 (Fig. 7).

Bu: Central Rhodopes, Trigrad Gorge, 41° 39'N, 24° 21' E, 29 May 2004, *S. Stoyanov*, VG 3304 (SOM 3913).

This is the first report from Bulgaria for this species. The diploid chromosome number 2*n* = 16 agrees with earlier reports (see Fedorov 1969: 154 for references).

1579. *Quercus cerris* L. — 2*n* = 24 (Fig. 8).

Bu: Western Stara Planina, at the footh of the Summit Baba, around "Čavdar" chalet, 42° 46' N, 23° 59' E, 22 Mar 2004, *P. Stanimirova*, VG 0704 (SOM 3918).

The chromosome number 2*n* = 24 is reported for first time for *Q. cerris* based on Bulgarian material. This result is in accordance with earlier countings most of them from Europe (see Fedorov 1969: 326; Goldblatt 1981: 271; Goldblatt & Johnson 1994: 106; 2000: 76 for references). The chromosome number 2*n* = 22 reported earlier (see Fedorov l.c. for references) was not confirmed in our study.

1580. *Quercus dalechampii* T. Ten. — 2*n* = 24 (Fig. 9).

Bu: Mt. Lyulin, between Malo Boučino village and "Sveti Kral" monastery, 42° 41' N, 23° 10' E, 26 May 2004, leg. V. *Goranova*, det. *D. Stoykov*, VG 2004 (SOM 3909).

The chromosome number 2*n* = 24 is the first report for Bulgarian Flora. Our record agrees with several previous counts (see Fedorov 1969: 326; Goldblatt 1981: 271; Goldblatt & Johnson 2000: 76 for references). However, this indication does not confirm the chromosome number 2*n* = 22 previously reported for this species (see Fedorov l.c. for references).

1581. *Quercus frainetto* Ten. — 2*n* = 24 (Fig. 10).

Bu: Central Rhodopes, Novakovo village, Assenovgrad distr., 41° 53' N, 25° 04' E, 16 Mar 2004, *P. Stanimirova*, VG 0104 (SOM 3917)

This is the first report for *Q. frainetto* from Bulgarian population. The chromosome number 2*n* = 24 has been known in the literature for the species (see Goldblatt & Johnson 2000: 76 for references).

1582. *Rubus hirtus* Waldst. & Kit. s.l. — 2*n* = 28 (Fig. 11).

Bu: Rila Mts, Parangalitsa forest Reserve, hills near the resort complex "Bedros", along

with Bistritsa river, 42° 03' N, 23° 11' E, 08 Aug 2004, leg. *V. Goranova*, det. *J. Zielinski*, VG 5204 (SOM 3914).

This is the first count for Bulgarian population of *R. hirtus*. The chromosome number $2n = 28$ confirms the results reported by different authors from Europe (see Fedorov 1969: 637; Goldblatt & Johnson 2003: 216 for references).

1583. *Sorbus aucuparia* L. — $2n = 34$ (Fig. 12).

Bu: Rila Mts, along the trail between Kostenetski vodopad and Belmeken chalet, 42° 15' N, 23° 48' E, 29 Jul 2004, leg. *V. Goranova*, det. *S. Stoyanov,* VG 5004 (SOM 3912).

The chromosome number $2n = 34$ reported here for *S. aucuparia* is the first report from Bulgaria. It agrees with several previous counts (see Goldblatt & Johnson 1994: 196; 1996: 641; 2000: 131 for references). Bolstad & Salvesen (1999) recordet $2n = 33, 34$. A gametic chromosome number $n = 17$ was also reported (see Goldblatt 1988: 197 for references).

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Reports (1584 - 1603) by Ana Petrova, Jerzy Zieliński & Rayna Natcheva

1584. ***Abies alba*** Mill. — 2*n* = 24 (Fig. 1).

Bu: Pirin Mt., around the Pogledets summit, near the Javorov chalet, 41° 49' N, 23° 22' E, 2040 m, 23 Jul 2004, *Mitrinska* 204469 (SOM).

Gagov (1973) reported the same chromosome number for this species from Bulgaria. Our count confirms the results of Seitz (1951), Moulalis & Illies (1975), Murín (1978), Libiaková & Gajdošová (1993), Druśković & Lovka (1995).

1585. ***Acer pseudoplatanus*** L. — 2*n* = 52 (Fig. 2).

Bu: Pirin Mt., near the Gotse Delchev chalet, 41° 47' N, 23° 23' E, 1219 m, 20 Jul 2004, *Mitrinska* 204451 (SOM).

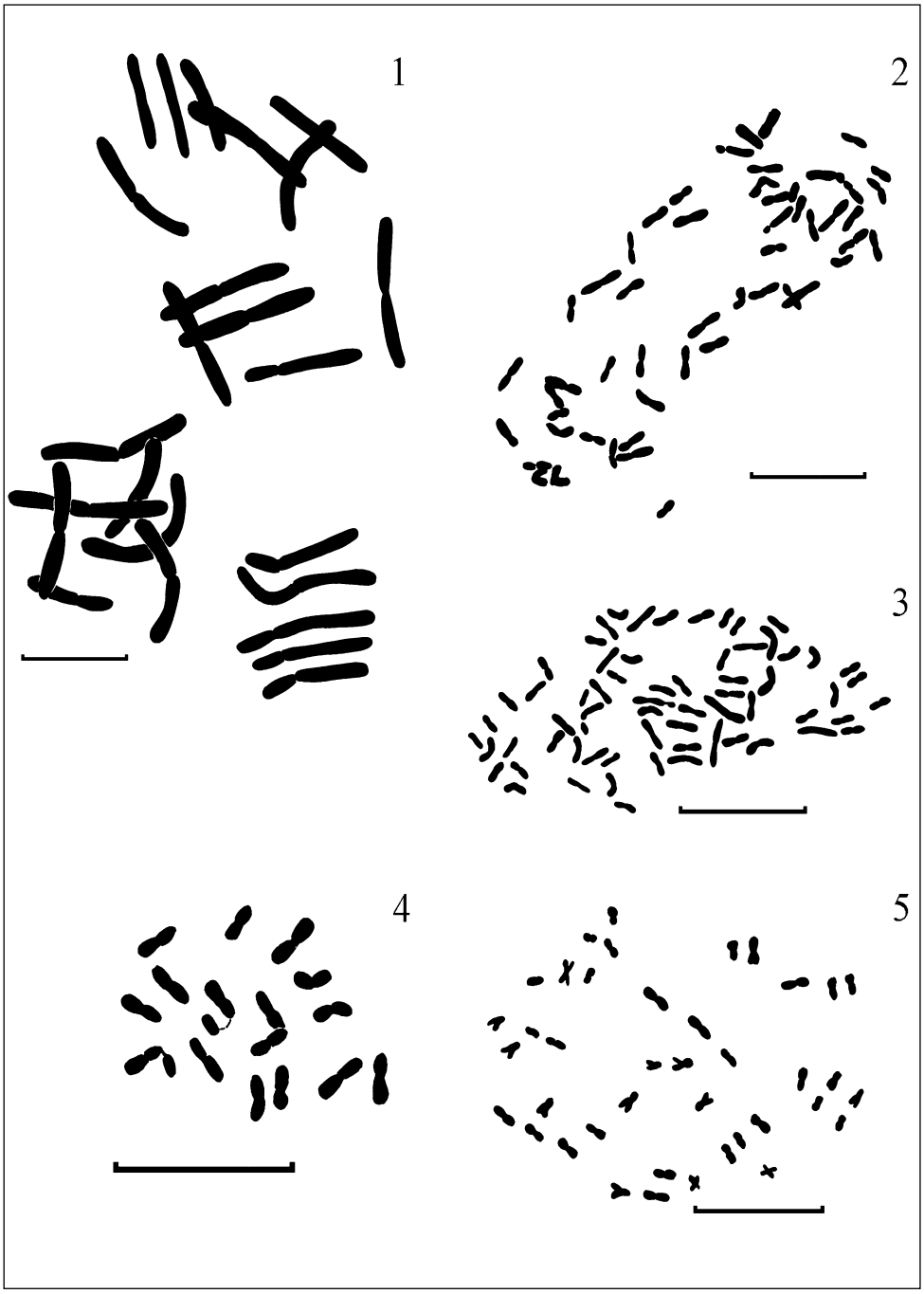
This report confirms earlier counts of Mehra (1976), Ferakova (1978), Pogan & al. (1980), Santamour (1988), Mesíček (1992), Druśković & Lovka (1995), Dobeš & al. (1997), and others (see Fedorov 1969). Ivanova & al. (2005) reported the same chromosome number from other parts of Bulgaria (Rhodopi Mts, Trigrad george).

1586. ***Carpinus betulus*** L. — 2*n* = 64 (Fig. 3).

Bu: Western Stara Planina Mt., around the village of Ogoya, Sofia district, 42° 55' N, 23° 31' E, 780 m, 20 Mar 2004, *Natcheva* 20408 (SOM).

This is the first record for the species from Bulgaria and it confirms previous counts of Magulaev (1976), Skalinska & al. (1976), Ferakova & Murin (1981), Mesíček (1992), Dobeš & al. (1997) and others (see Fedorov 1969).

It does not confirm the chromosome number 2*n* = 16 given by Wetzel (1928, 1929), Jaretzky (1930) and Tischler (1934).



Figs 1-5. Karyotypes of: **1**, *Abies alba,* 2*n* = 24; **2,** *Acer pseudoplatanus*, 2*n* = 52; **3**, *Carpinus betulus*, 2*n* = 64; **4**, *C. orientalis*, 2*n* = 16; **5**, *Celtis australis*, 2*n* = 40. – Scale bars = 10μm.

1587. *Carpinus orientalis* Mill. — 2*n* = 16 (Fig. 4).

Bu: Eastern Rhodopi Mts, along the Arda river, near the village of Madzharovo, Haskovo district, 41° 39' N, 25° 50' E, 175 m, 15 Sep 2003, *Zieliński* & *Petrova* 20307 (SOM).

This chromosome number is the first chromosome count for *C. orientalis* from Bulgaria. It is in agreement with counts reported by Woodworth (1930; 1931).

1588. *Celtis australis* L. — 2n = 40 (Fig. 5)

Bu: Northeastern Bulgaria, Shoumensko Plateau, 43° 16' N, 26° 54' E, 410 m, 06 Sep 2003, *Zahariev* 20371 (SOM).

Our result confirms the chromosome count reported by Bowden (1945), Mehra & Gill (1974), and Mehra (1976). Other authors recorded 2*n* = 10 (Bedi & al. 1981; Sanchez Anta & al. 1987; Sandhu & Mann 1988). No former record of a chromosome number for this species is known from Bulgaria.

1589. *Cornus sanguinea* subsp. ***australis*** (C. A. Mey.) Jav. — 2*n* = 22 (Fig. 6).

Bu: Znepole Region, around the village of Gulabovtsi, Sofia district, 42° 48' N, 23° 59' E, 18 Mar 2004, 380 m, *Petrova* & *Mitrinska* 20403 (SOM).

The chromosome number 2*n* = 22 reported here confirms the result of Čheshmedzhiev (1994) for *C. sanguinea* s.l. from Bulgaria (Central Rhodopes). It also coincides with the results of other authors (Skalinska & al. 1978; Natarajan 1981; Rossitto & al. 1983; Verlaque & al. 1987; González Zapatero & al. 1988; Javůrkova -Jarolímová 1992; Druśković & Lovka 1995; see also Fedorov 1969).

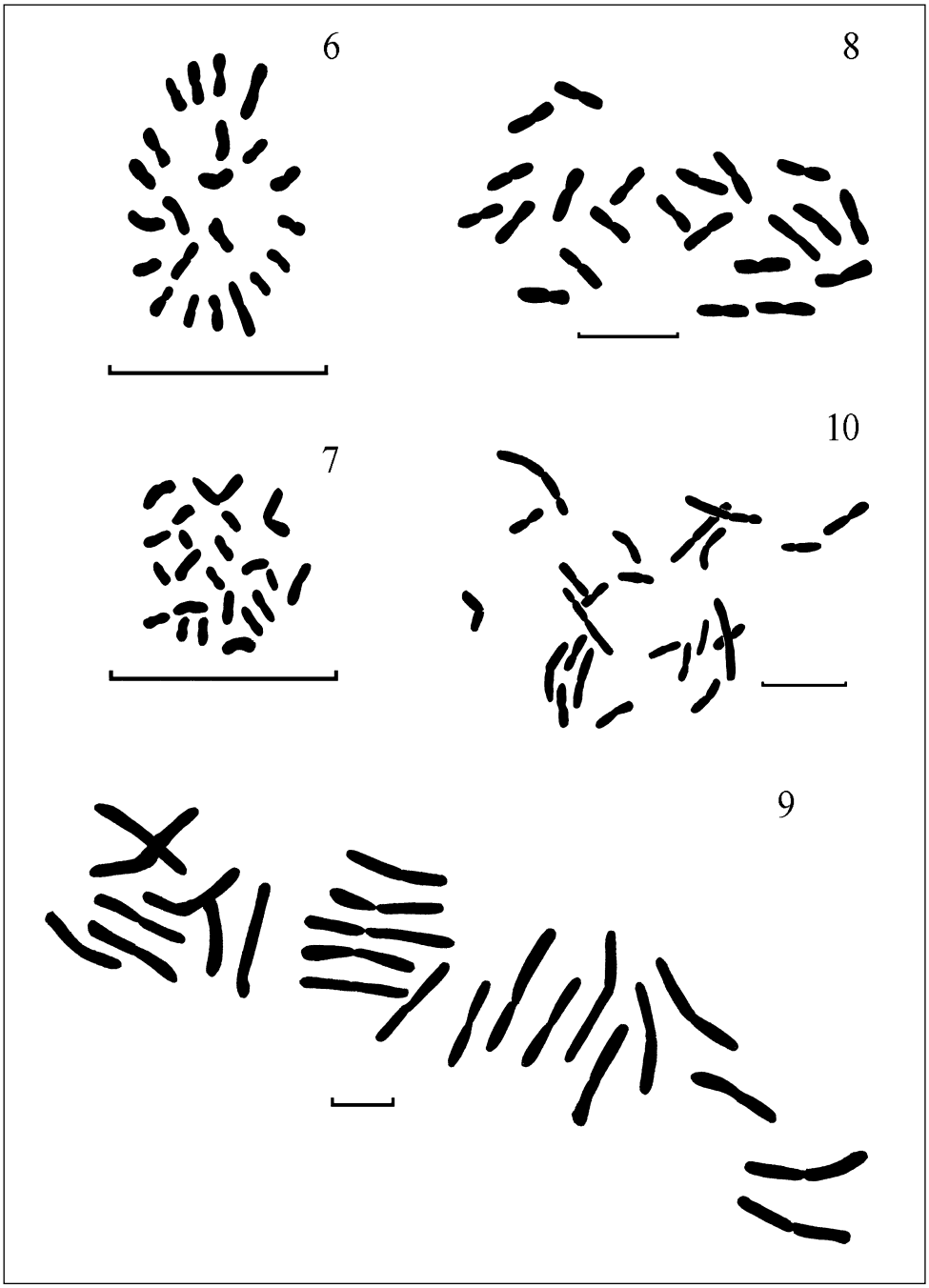
1590. *Corylus avellana* L. — 2*n* = 22 (Fig. 7).

Bu: Znepole Region around the village of Gulabovtsi, Sofia district, 42° 48' N, 23° 59' E, 18 Mar 2004, 380 m, *Petrova* & *Mitrinska* 20402 (SOM).

This is the first chromosome number of *C. avellana* from a Bulgarian accession. The same result reported Skalinska & al (1978), Ferakova & Murin (1981), Arohonka (1982), Hollingsworth & al. (1992), Mesíček (1992), Dobeš & al. (1997), Lövkvist & Hultgård (1999), and others (see Fedorov 1969).

1591. *Juniperus communis* subsp. ***nana*** (Willd.) Syme — 2*n* = 22 (Fig. 8).

Bu: Pirin Mt., around the Pogledets summit, near the Javorov chalet, 2040 m, 41° 49' N, 23° 22' E, 23 Jul 2004, *Mitrinska* 20471 (SOM).



Figs 6-10. Karyotypes of: **6,** *Cornus sanguinea* subsp. *australis*, 2*n* = 22; **7**, *Corylus avellana*, 2*n* = 22; **8**, *Juniperus communis* subsp. *nana*, 2*n* = 22; **9**, *Picea abies*, 2*n* = 24; **10**, *Pinus sylvestris*, 2*n* = 24. – Scale bars = 10μm.

This is the first report of the chromosome count of *J. communis* subsp. *nana* from Bulgaria. The same chromosome number for this taxon reported Uhrikova & al. (1980). Other authors published the same result for *J. communis* s.l. (Mehra 1988; Mesíček 1992; Druśković & Lovka 1995).

1592. *Picea abies* (L.) H. Karst. — 2*n* = 24 (Fig. 9).

Bu: Western Rhodopi Mts, Beglika loc., 42° 52' N, 24° 52' E, 1530 m, 20 Apr 2004, *Evstatieva* 20414 (SOM).

Our result is in agreement with the reports of Váchová (1974), Terasmaa (1975), Arohonka (1982), Pashuk (1987), Hizume & al. (1988), Müller & al. (1991), Druśković & Lovka (1995), Fuchs & al. (1995), Guttenberger & Müller (1996), Nkongolo (1999). Ivanova & al. (2005) reported the same counts from other parts of Bulgaria (Vitosha Mt.).

1593. *Pinus peuce* Griseb. — 2*n* = 24 (Fig. 11).

Bu: Pirin Mt., near the Javorov chalet, 41° 49' N, 23° 22' E, 2000 m., 23 Jul 2004, *Mitrinska* 204465 (SOM).

The chromosome number found by us confirms the previous record of Saylor (1983) and Hizume & al. (1988). This is the first chromosome count for *P. peuce* reported from Bulgaria.

1594. *Pinus sylvestris* L. — 2*n* = 24 (Fig. 10).

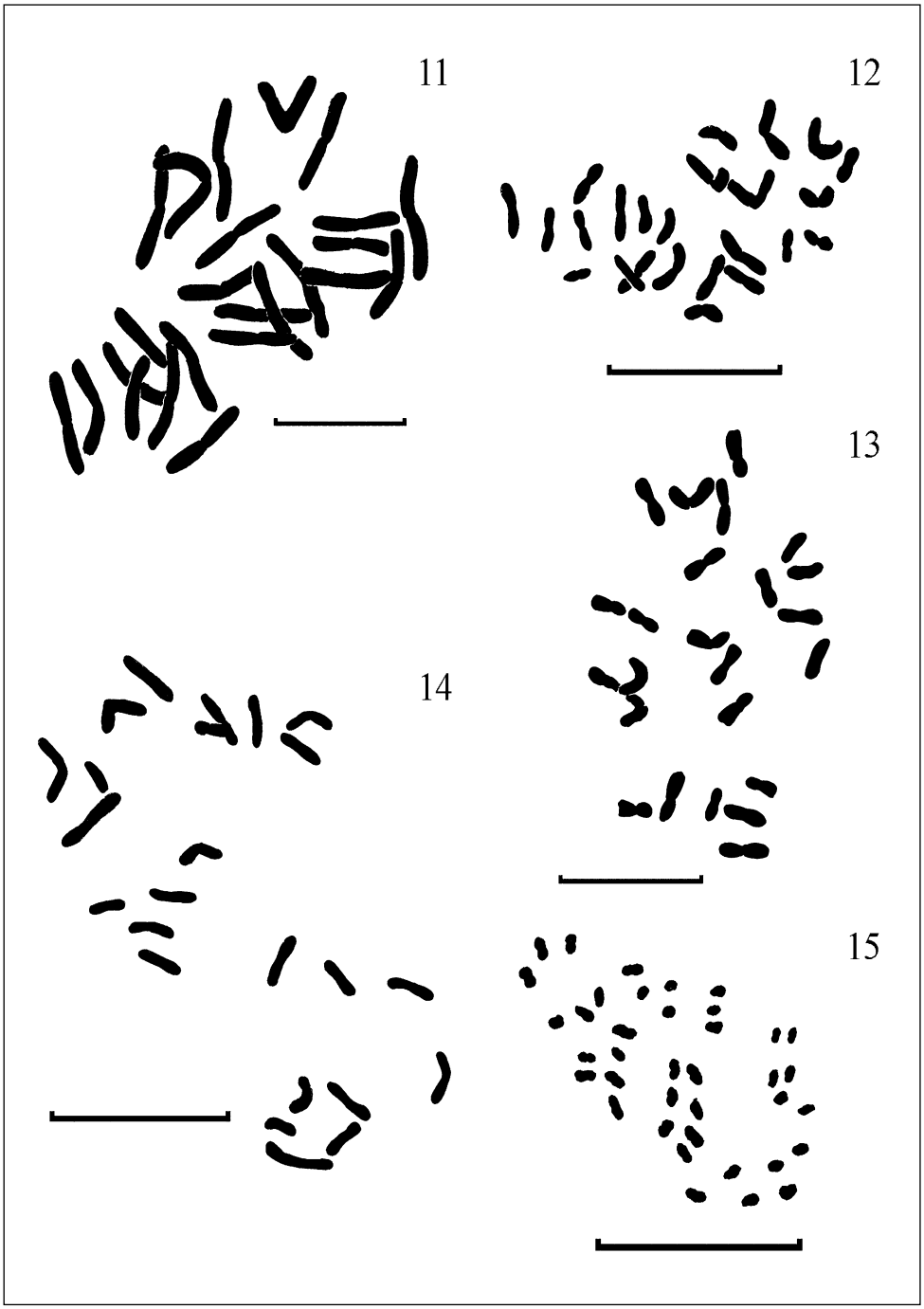
Bu: Western Stara Planina Mt., around the village of Ogoya, Sofia district, 42° 55' N, 23° 31' E, 780 m, 20 Mar 2004, *Natcheva* 20409 (SOM).

Our result agrees with the results of other authors (Uhrikova & Váchová 1974; Kormutak 1975; Styles & Khosla 1975; Baranec 1979; Arohonka 1982; Fuchs & al. 1995; Hizume & al. 1988; Muratova 1991). No previous chromosome count for this species is known from Bulgaria.

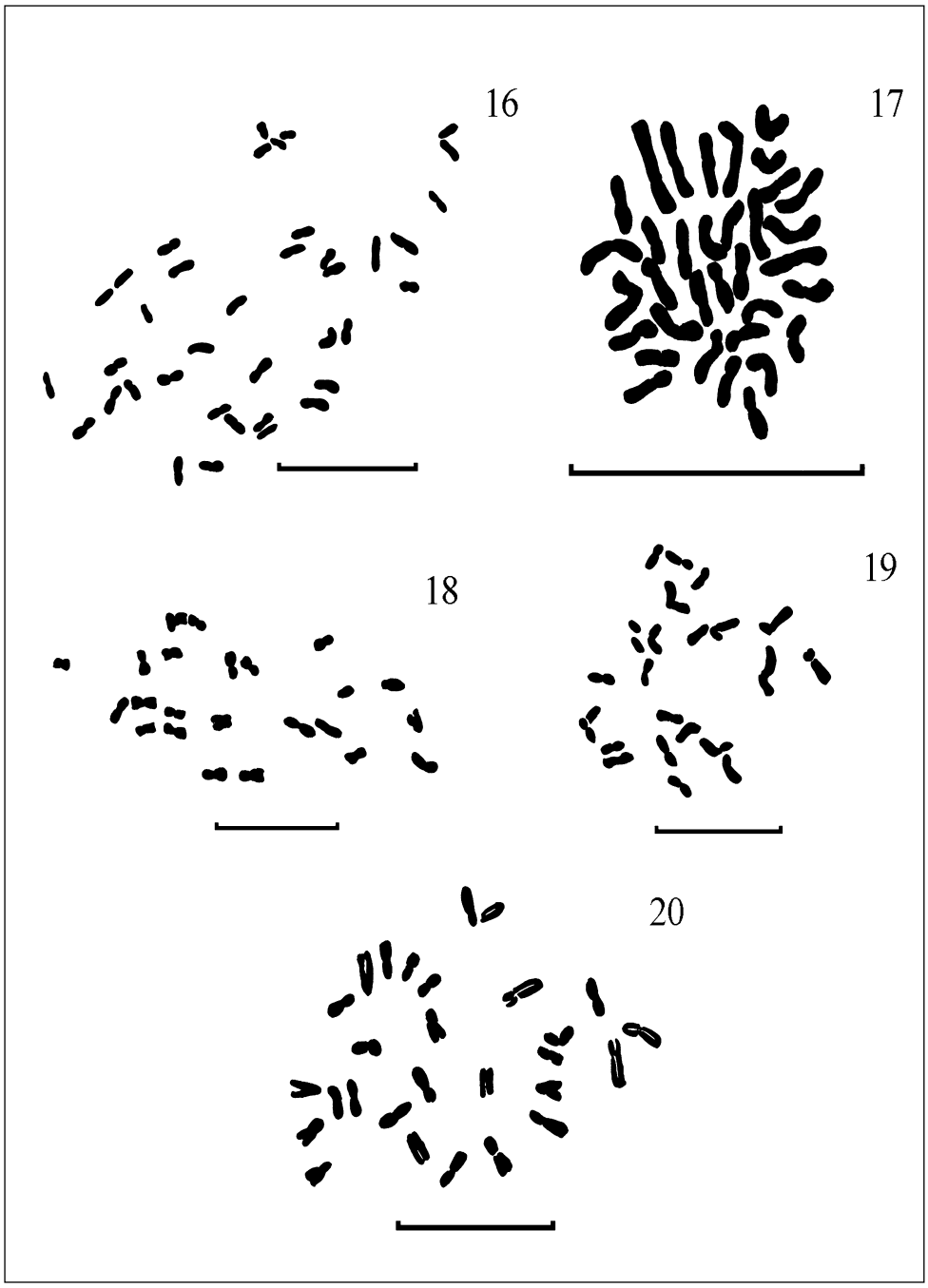
1595. *Quercus cerris* L. — 2*n* = 24 (Fig. 12).

Bu: Western Stara Planina Mt., around the village of Ogoya, Sofia district, 42° 55' N, 23° 31' E, 780 m, 20 Mar 2004, *Natcheva* 20406 (SOM).

The chromosome number found by us confirms the results of previous reports (Váchová 1976, 1978; Morawetz & Samuel 1989; Chen & al. 1992; D'Emerico 1995; see also Fedorov 1969). This is the first chromosome record for *Q. cerris* from Bulgaria.



Figs 11-15. Karyotypes of: **11**, *Pinus peuce*, 2*n* = 24; **12**, *Quercus cerris*, 2*n* = 24; **13**, *Q. petraea*, 2*n* = 24; **14**, *Q. pubescens*, 2*n* = 24; **15**, *Salix caprea*, 2*n* = 38. – Scale bars = 10μm.



Figs 16-20. Karyotypes of: **16**, *Salix waldsteiniana*, 2*n* = 38; **17**, *Sorbus aucuparia*, 2*n* = 34; **18**, *Tamarix ramosissima*, 2*n* = 22; **19**, *T. tetrandra*, 2*n* = 22; **20**, *Ulmus minor*, 2*n* = 22. – Scale bars = 10μm.

1596. *Quercus petraea* (Matt.) Liebl. — 2*n* = 24 (Fig. 13).

Bu: Vitosha Mt., along the path to Golemya Rid summit, 42° 29' N, 23° 15' E, 1223 m, 12 Jul 2004, *Natcheva & Mitrinska* 204109 (SOM).

The chromosome number reported here is the first record for *Q. petraea* from Bulgaria and it confirms the results of Jaretzky (1930), Natividade (1937), Hollingsworth & al. (1992), Ohri & Ahuja (1992), and others (see Fedorov 1969).

1597. *Quercus pubescens* Willd. — 2*n* = 24 (Fig. 14).

Bu: West Frontier Mts, around the village of Debochitsa, Blagoevgrad district, 41° 54' N, 22° 58' E, 730 m, 18 Jul 2004, *Zieliński & Petrova* 204222 (SOM).

Our count is the first record for *Q. pubescens* from Bulgaria and it is in agreemnet with the results published by Vignoli (1933), Váchová (1978), Chichiricco & al. (1979), Pogan & al. (1982), Verlaque & al. (1987), Javůrkova -Jarolímová (1992).

1598. *Salix caprea* L. — 2*n* = 38 (Fig. 15).

Bu: Eastern Rhodopi Mts, along the Vurbitsa river, near the village of Podkova, Kurdzhali district, 41° 23' N, 25° 24' E, 350 m, 14 Jul 2004, *Zieliński & Petrova* 204163 (SOM).

The chromosome number reported here confirms the results of Löve & Löve (1975), Javůrkova (1979), Druśković (1995), and others (see Fedorov 1969). The chromosome number for this species is the first count from Bulgaria.

1599. *Salix waldsteiniana* Willd. — 2*n* = 38 (Fig. 16).

Bu: Vitosha Mt, near the Aleko chalet, 42° 34' N, 23° 17' E, 300 m, 26 Oct 2003 *Petrova*, *Vladimirov & Ivanova* 20394 (SOM).

Our report is the first chromosome count for *S. waldsteiniana* from Bulgaria. It confirms the previous counts of Druśković (1995) and Dobeš & al. (1997).

1600. *Sorbus aucuparia* L. — 2*n* = 34 (Fig. 17).

Bu: Pitin Mts, along the road between the town Razlog and Javorov chalet, 41° 50' N, 23° 25' E, 1190 m, 23 Jul 2004, *Mitrinska* 204473 (SOM).

This chromosome number is in agreement with the counts published by Skalinska & al. (1974), Arohonka (1982), Löve & Löve (1982), Semerenko (1990), Mesíček (1992), Al-

Bermani & al. (1993), and others (see Fedorov 1969). It is the first report for *S. aucuparia* from Bulgaria.

1601. ***Tamarix ramosissima*** Ledeb. — 2*n* = 22 (Fig. 18).

Bu: Eastern Rhodopi Mts, along the Arda River, near the village of Madzharovo, Haskovo district, 41° 39' N, 25° 50' E, 175 m, 15 Sep 2003, *Zieliński* & *Petrova* 20304 (SOM).

Our count is the first for *T. ramosissima* from Bulgaria and confirms the result of Bochantseva (1972), Tarnavshi & Lungeanu (1982), Zhai & Li (1986).

1602. ***Tamarix tetrandra*** Pall. ex M. Bieb. — 2*n* = 22 (Fig. 19).

Bu: Eastern Rhodopi Mts, along the Arda River, near the village of Madzharovo, Haskovo district, 41° 39' N, 25° 50' E, 175 m, 15 Sep 2003, *Zieliński* & *Petrova* 20305 (SOM).

This is the first chromosome count for *T. tetrandra* from Bulgarian material. It confirms the earlier published result by Bochantseva (1972).

1603. ***Ulmus minor*** Mill. — 2*n* = 28 (Fig. 20).

Bu: West Frontier Mts, between the villages of Polena and Soushitsa, Blagoevgrad district, 41° 49' N, 25° 04' E, 671 m, 17 Jul 2004, *Zieliński* & *Petrova 204203* (SOM).

Sanchez Anta & al. (1987) reported the same chromosome number. Our record is the first count from Bulgaria.

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Reports (1604-1612) by Hikmat Tahiri, Paloma Cubas, Cristina Pardo & Ana Crespo

1604. ***Adenocarpus anagyrifolius*** Cosson & Balansa — 2*n* = 54 (Figs 1, 7).

Ma: Haut Atlas, between the coll of Tizi-n-Test and Tafinegoult, 1850 m, 30º 51' N, 8º 20' W, 16 Jun 2005, *Tahiri* 164808 (MAF).

Adenocarpus anagyrifolius is an endemic species growing in the Atlas Mts of Morocco. Molecular phylogeny (Percy & Cronk 2002) indicates that this species forms a predominantly montane group with *A. bacquei* (High and Middle Atlas Mts) and *A. decorticans* (montane region of southern Spain and north of Morocco).

The chromosome number 2*n* = 54 is counted in root mitosis. The only previous record indicated 2*n* = 52 (Parra & al. 1999). Our results shows that there is variation in the chromosome number in this species. Similar variation has been found in other *Adenocarpus* species, e.g. *A. complicatus*, 2*n* = 52 and 54 (Horjales 1972).

1605. ***Cytisus albidus*** DC. (syn. *Chamaecytisus mollis* (Cav.) Greuter & Burdet) — 2*n* = 50 (Figs 2, 8).

Ma: Anti Atlas, road from Taroudant to Ait Baha, 6 km before Ait Baha, 550 m, 29º 33' N, 8º 59' W, 18 Jun 2005, *Tahiri* 164809 (MAF).

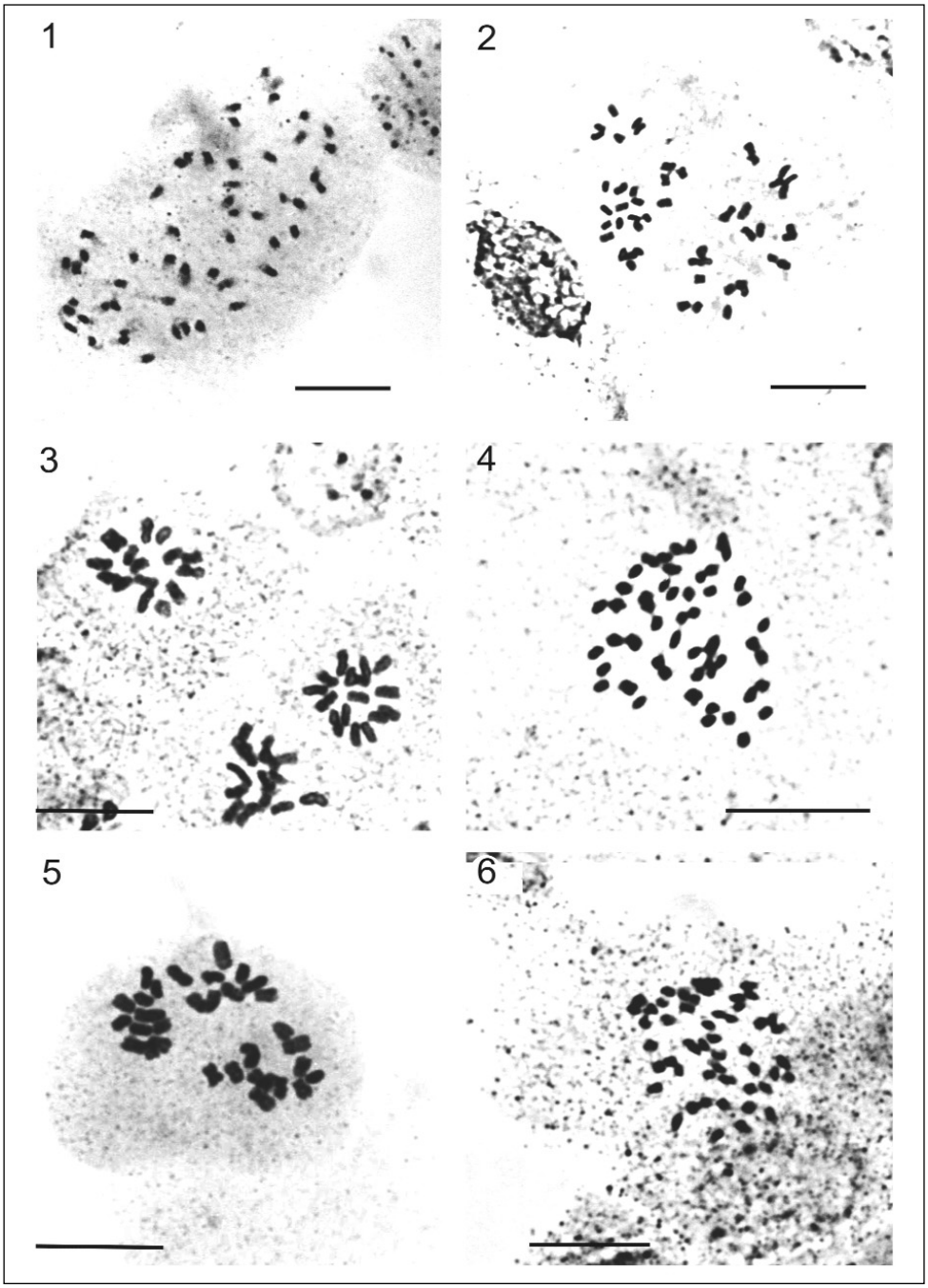
This species is an endemism restricted to centralwestern and southern Morocco. We have counted 2*n* = 50 chromosomes in plants from the southermost area, where *Cytisus albidus* usually grows associated with *Hesperolaburnum platycarpum* and *Argania spinosa*. This result confirms the only previous report obtained on material from central Morocco (Tahiri & Cubas 2000).

Based on morphological shared characters *Cytisus albidus* and other species of *Cytisus* were formerly transferred to a separated genus (*Chamaecytisus*). However, molecular phylogenetic data indicate that these species do not form a monophyletic group. On the contrary, they are nested in different clades with species of *Cytisus* (Käss & Wink 1997; Cubas & al. 2002). They also show high levels of variation in chromosome number and ploidy level, ranging from 2*n* = 24, ± 46, 48, 50, 96, 100 (data from several authors, in Cusma Velari & Feoli Chiapella 1994).

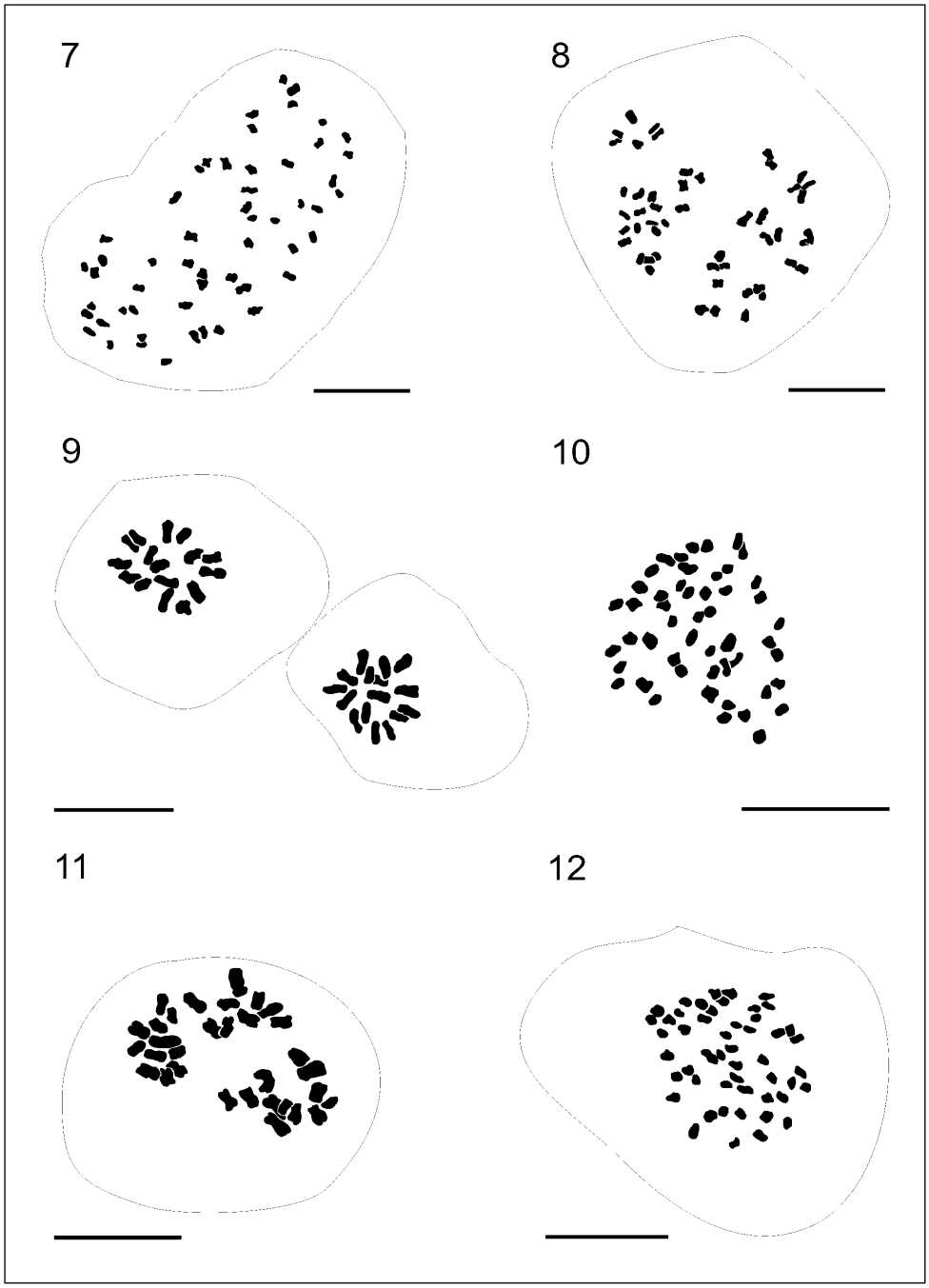
1606. ***Colutea atlantica*** Browicz — 2*n* = 16 (Figs 3, 9).

Ma: Haut Atlas, between Ijoukak and Tizi-n-Test, 1450 m, 30º 56' N, 8º 14' W, 16 Jun 2005, *Tahiri* 164805 (MAF).

According to Talavera & Arista (1998) and Valdés (2002) this species is restricted to northern Africa, along the Rif, High and Middle Atlas (Morocco), and in the Tell and Saharian Atlas (Algeria).



Figs 1-6. Microphotografs of mitotic metaphase plates of: **1**, *Adenocarpus anagyrifolius*, 2*n* = 54; **2**, *Cytisus albidus*, 2*n* = 50; **3**, *Colutea atlantica*, 2*n* = 16; **4**, *Genista tricuspidata*, 2*n* = 50; **5**, *Ulex africanus*, 2*n* = 32; **6**, *Hesperolaburnum platycarpum*, 2*n* = 50. – Scale bars = 10 μm.



Figs 7-12. Explanatory drowings of the Figs 1–6: **7**, *Adenocarpus anagyrifolius*, 2*n* = 54; **8**, *Cytisus albidus*, 2*n* = 50; **9**, *Colutea atlantica*, 2*n*= 16; **10**, *Genista tricuspidata*, 2*n* = 50; **11**, *Ulex africanus*, 2*n* = 32; **12**, *Hesperolaburnum platycarpum*, 2*n* = 50. – Scale bars = 10 μm.

We have counted $2n = 16$ chromosomes in root mitosis. No previous chromosome counts of this species have been reported. Fernández Casas & Ruiz Rejón (1974) reported $n = 8$ on material from Granada (S Spain) that they identified as *C. atlantica*. However, Talavera & Arista (1998) indicates that the southern Spain populations correspond to *C. hipanica*, a closely related species that differ by the indument of the ovary and twigs.

1607. *Genista tricuspidata* Desf. — $2n = 50$ (Figs 4, 10).

Ma: Littoral de la Méditerranée, jbel KerKer, 34º 52' N, 3º 05' W, 600 m, 29 May 2004, *Tahiri* (RAB65871).

Genista tricuspidata grows in Morocco, southeastern Spain, Balearic Islands, Algeria and Tunisia. We have counted $2n = 50$ chromosomes. Our result confirms previous reports of chromosome number variation in this taxon from Morocco, $2n = 50$, by Tahiri & al. (2004) and $2n = 48$ from Morocco and Baleares by Cusma Velari & al. (1999).

1608. *Genista tridens* (Cav.) DC. — $2n = 72$.

Ma: Maroc atlantique nord, Larache, forêt de Sahel, 35º 16' N, 6º 04' W, 23 Jun 2003, *Tahiri* 164810 (MAF).

This species is endemic to southern Spain and northwestern Morocco. The chromosome number $2n = 72$ is the first count on Moroccan material. Our result agrees with the number obtained on material from Cádiz, Spain (Sañudo 1972).

1609. *Retama raetam* (Forsskal) Webb subsp. ***raetam*** — $2n = 48$.

Ma: Maroc saharien, Tinerhir to Alnif, Tizi-n-Terferl, 950 m, 31º07'N, 5º11'W, 18 Jun 2005, *Tahiri* 164807(MAF).

Retama raetam is a Mediterranean shrub native to northern Africa (Morocco to Egypt), western Sahara, and the Middle East (Lebanon to Saudi Arabia). This species has become naturalised in several countries including Australia, USA and Great Britain. In Australia *R. raetam* is considered as a threat to biodiversity and it has been included in the 'Alert List for Environmental Weeds'.

We have counted $2n = 48$ chromosomes in the Moroccan plants. This result confirms the only previous record on plants from Libya (Bhattacharya & al. 1971).

1610. *Ulex africanus* Webb (*U. parviflorus* subsp. *africanus* (Webb) Greuter) — $2n = 32$ (Figs 5, 11).

Ma: Rif, on the road, Chefchaouen to Bab Taza, 2 km after the cross with the road to Ouezzane, 430 m, 23º 06' N, 5º 17' W, 25 May 2005, *Pardo & Tahiri* 164801 (MAF).

— Rif, road to Talembote, after crossing the oued Laou, 300 m, 35º 17' N, 5º 13' W, 25 May 2005, *Pardo & Tahiri* 164804 (MAF).

Ulex africanus is a north African species distributed from the western Rif mountains (Morocco) to Oran (Algeria). It is closely related to the southern Spain species *U. baeticus* and *U. scaber*. (Cubas & al. in press).

The count $2n = 32$ chromosomes in two westernmost populations, confirming previous reports (Castro 1943; Tahiri & al. 2005).

1611. *Stauracanthus boivinii* (Webb) Sampaio — $n = 48$.

Ma: Rif, Tanger, Melloussa, 170 m, 35º 43' N, 5º 38' W, 24 May 2005, *Pardo & Tahiri* 164803 (MAF).

Stauracanthus boivinii is distributed in the southwest of the Iberian Peninsula and northern Africa (Morocco and Algeria). We have found $n = 48$ bivalents at meiotic metaphase. Only plants with $n = 24$ and $2n = 48$ have been previously reported from Morocco (Moyen Atlas and Rif occidental; Talavera & Arista 1995, Tahiri & al. 2005). Our result is the first record of the existence of a second ploidy level on Morocco. On the contrary, plants with $2n = 96, \pm 128$ and 144 chromosomes have been reported in the Iberian Peninsula (Castro 1941; Cubas 1987).

1612. *Hesperolaburnum platycarpum* Maire — $2n = 50$ (Figs 6, 12).

Ma: Anti Atlas, road from Taroudant to Aït Baha, 8 km before Aït Baha, 500 m, 29º 33' N, 9º 00' W, 17 Jun 2005, *Tahiri* 164806 (MAF).

Hesperolaburnum platycarpum is endemic to southern Morocco (Anti Atlas and Souss region), where it grows in the *Argania* woodland on alluvium. *Hesperolaburnum* is a monotypic well-distinct genus, basally branching in the Cytisinae (Cristofolini & Conte 2002; Pardo & al. 2004; Polhill & Van Wyk 2005).

We have counted $2n = 50$ cromosomes in root mitosis. No previous information on the chromosome number of this taxon has been reported.

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Reports (1613-1614) by Tiziana Cusma Velari, Laura Feoli Chiapella & Vera Kosovel

1613. ***Genista lydia*** Boiss. — $2n = 48 + 0\text{-}2B$ (Fig. 1b).

Bu: E Rodhopi, Manastir, 41° 45' N, 24° 52' E, 1300 m, 2001, seeds obtained from Botanical Garden, Göteborg (s.n., s.coll., s.exsicc.).

The species is distributed in the eastern part of the Balkan Peninsula (Bulgaria, Macedonia, northeastern Greece, European Turkey), Asiatic Turkey, Syria and Lebanon (Hayek 1924-1927; Gibbs 1966, 1970; Mouterde 1978-1984; Strid 1986b; Greuter & al. 1989).

The chromosome number $2n = 48$ confirms the references reported by Krusheva (1986, for a Bulgarian population from Eastern Stara Planina) and by Strid (1986a, on a Greek population from Papikion Oros, Rodhopis). Chromosome size ranges between 0.99 μm and 2.31 μm.

Genista lydia belongs to the *G. tinctoria* aggr. of sect. *Genista,* with diversification centre in eastern Europe (Gibbs 1966; Greuter & al. 1989).

The allied taxon *Genista rumelica* Velen. [= *G. lydia* ssp. *rumelica* (Velen.) Ponert], distributed in the eastern Balkan Peninsula (Gibbs 1966; Strid 1986b; Greuter & al. 1989), presents the same number $2n = 48$ from various Bulgarian populations of Rila Mt., Central Rhodopy and Central Stara Planina (Kozuharov & al. 1972; Krusheva 1975; Kuzmanov 1978).

Various authors (Tschechow 1931; Forissier 1973; Krusheva 1975; Cusma Velari & Feoli Chiapella 1982; Cusma Velari & al. 2006) report $n = 24$, $2n = 48 + 0\text{-}2B$ for *Genista januensis* Viv. (= *G. triangularis* Willd.), an amphiadriatic species (Gibbs 1966; Greuter & al. 1989), from various populations from Italy (Liguria, Friuli-Venezia Giulia) and Bulgaria.

Various numbers were counted for *Genista depressa* Bieb. (Balkan Peninsula and Crimea), including some infraspecific taxa: $2n = 48$ (Papanicolau 1984; Krusheva 1986), $2n = 96$ (Krusheva 1975), $2n = 120$ (Strid & Franzén 1983) from some populations from Bulgaria and Greece.

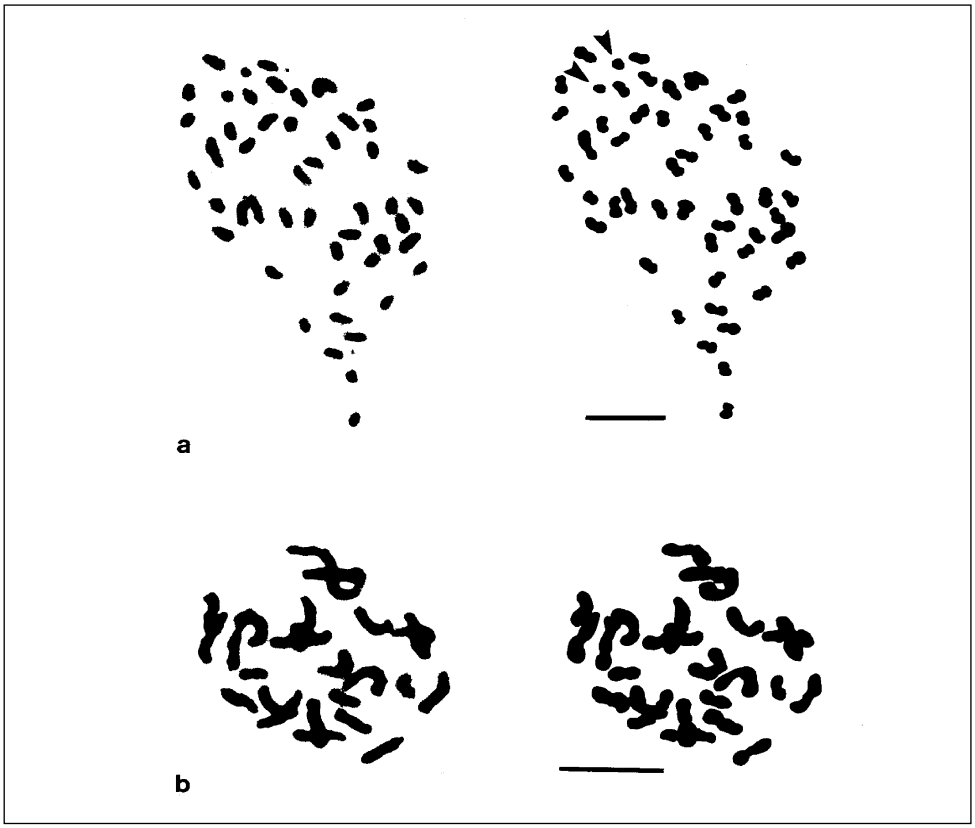

Fig. 1. Photomicrographs and relative drawings of somatic metaphase plates of: **a,** *Genista lydia,* 2*n* = 48 + 2B; **b,** *Genista hystrix,* 2*n* = 26. – Arrows indicate B-chromosomes. Scale bars = 5 µm.

Genista tinctoria L. s.l is the most widely distributed taxon within the section, occurring throughout most Europe and extending to Turkey and the Nearer East (Gibbs 1966). Several karyological data, concerning various infraspecific taxa as well, reported from populations of different European regions, correspond to *n* = 24, 2*n* = 48 and *n* = 48, 2*n* = 96 (for more detailed references, see Cusma Velari & al. 2006).

All species of sect. *Genista* present chromosome numbers which can be traced back to x = 12; they are mostly tetraploid (2*n* = 48), even though in *G. tintoria* s.l. and in *G. depressa* appear some cases of octoploidy (2*n* = 96) and, rarely, decaploidy (2*n* = 120).

1614. *Genista hystrix* Lange — 2*n* = 24 + 0-2B, 26 + 0-2B, 27 + 0-2B (Fig. 1b).

Lu: Bemposta, 41° 19’ N, 6° 29’ W, seeds obtained from Botanical Garden, Porto (s.n., s.coll., s.exsicc.).

Genista hystrix is endemic to northwestern Iberic Peninsula (Gibbs 1966; Talavera 1999).

Our counts, based on 16 metaphase plates, have shown in most cases the number $2n$ = 26 + 0-2B, less frequently $2n$ = 24 + 0-2B and $2n$ = 27 + 0-2B. The examined population is the first of Portugal karyologically studied.

The only references available for this species are all regarding Spanish populations: Sañudo (1971, 1973) reported $2n$ = 24 for El Barco, Pontevedra; the same number was counted by Gallego Martín & al. (1985) for Cereceda de la Sierra, Salamanca, while Sañudo, Ruiz Rejón & Fernandez Piqueras (after Sañudo 1979) found a different number: $2n$ = 26.

Chromosome size ranges between 0.99 µm and 3.19 µm.

Sañudo (1971, 1973) reports n = 12, $2n$ = 24 for a population (Sta. Elena, Jaén) of the allied species *Genista polyanthos* R. Roem. ex Willk., endemic to southwestern Iberic Peninsula (Gibbs 1966; Talavera 1999).

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Reports (1615-1616) by Tiziana Cusma Velari, Laura Feoli Chiapella & Ana Cristina Tavares

1615. *Genista triacanthos* Brot. subsp. ***triacanthos*** — 2*n* = 32 + 0-2B, 36 (Fig. 1a).

Lu: Figueira da Foz, 40° 9'N, 8°51'W, 17 Jun 2001, *A. C. Tavares*, seeds obtained from Botanical Garden, Coimbra (s.n., s.exsicc.).

— Sintra, 38° 48' N, 9° 23' W, seeds obtained from Botanical Garden, Lisboa (s.n., s.coll., s.exsicc.).

The taxon is distributed in the western part of the Iberic Peninsula and in northwestern Morocco (Gibbs 1966; Raynaud 1979; Maire 1987; Greuter & al. 1989; Talavera 1999).

Our counts, based on 10 metaphase plates, have shown in most cases the number 2*n* = 32 + 0-2B, more seldom 2*n* = 36, only in the population of Figueira da Foz.

Chromosome size ranges between 0.66 μm and 2.31 μm.

Our counting confirms both chromosome numbers already mentioned in literature. The numbers $n = 16$, $2n = 32$ were in fact reported by Sañudo (1972) for two Spanish populations of *Genista triacanthos* from Los Barrios and S. Roque, Cádiz (the former sub *G. scorpioides* Spach), by Forissier (1973) for material obtained from the Botanical Garden of Coimbra, by Fernandes & Santos (1975) for a Portuguese population from Azeitão. On the other hand Gallego Martin & al. (1984, 1985) counted $n = 18$, $2n = 36$ on Spanish material from Sotoserrano (Salamanca); Horjales (1974) mentions both numbers for a population from S. Sebastiào (Coimbra).

Humphries & al. (1978) report for *Genista triacanthos* subsp. *vepres* (Pomel) P. Gibbs $2n = 72$ (sub *G. vepres* Pomel) from a population (Essaouira – Saji) of western Morocco. The report is uncertain, as this taxon seems to be limited to Algeria (Maire 1987; Greuter & al. 1989).

1616. *Genista tournefortii* Spach subsp**. *tournefortii***— $2n = 32 + 0\text{-}2B$ (Fig. 1b).

Lu: Serra da Boa Viagem, 40° 11' N, 8°52'W, 17 Jun 2001, *A. C. Tavares*, seeds obtained from Botanical Garden, Coimbra (s.n., s.exsicc.).

Genista tournefortii subsp. *tournefortii* is distributed in the central and western part of the Iberic Peninsula (Talavera 1999).

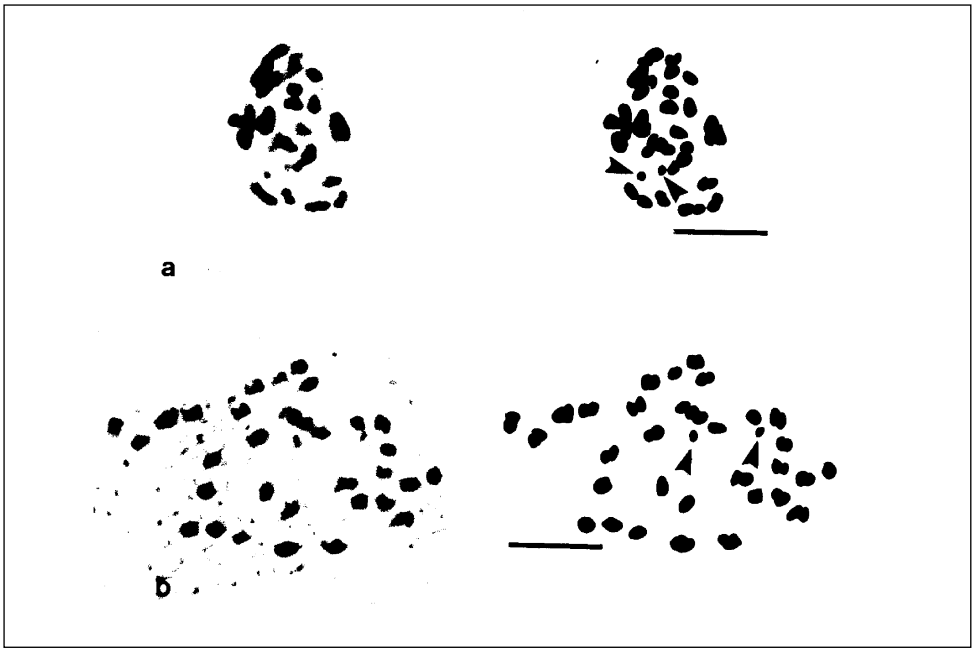

Fig. 1. Photomicrographs and relative drawings of somatic metaphase plates of: **a,** *Genista triacanthos* subsp. *triacanthos,* $2n = 32 + 2B$; **b,** *Genista tournefortii* subsp. *tournefortii,* $2n = 32 + 2B$. – Arrows indicate B-chromosomes. Scale bars = 5 μm.

The chromosome number $2n = 32$ confirms most data reported in literature. For *Genista tournefortii* subsp. *tournefortii,* in fact, $2n = 32$ was reported from a Portuguese population (Figueira da Foz) by Fernandes & Santos (1971), while for *G. tournefortii* s.l. $2n = 32$ was counted for another Portuguese population (Caneças) by Fernandes & al. (1977). Moreover, the number $2n = 32 + 2B$ was reported for *G. tournefortii* subsp. *jahandiezii* (Batt.) Talavera & P. E. Gibbs, endemic to Morocco (Raynaud, 1979; Maire, 1987; Talavera, 1999), from the population of Azrou, Middle Atlas, by Cusma Velari & al. (1999), as *G. tournefortii* var. *jahandiezii* (Batt.) Maire.

Other numbers were counted for this species: Cubas & al. (1998) reported $n = 32$ for a Spanish population (Navalperal de Tormes-La Angostura, Avila) of *Genista tournefortii* subsp. *tournefortii*; on the other hand Sañudo (1972) and Gallego Martín & al. (1984, 1985) reported $n = 15$, $2n = 30$ for two Spanish populations of *G. tournefortii* s.l., respectively from S.ta Elena (Jaén) and San Martín del Castañar (Salamanca).

Chromosome size ranges between 0.44 μm and 2.31 μm.

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