Mediterranean chromosome number reports – 10

edited by G. Kamari, F. Felber & F. Garbari

Abstract

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This is the tenth instalment of a series of reports of chromosome numbers from Mediterranean area, peri-Alpine communities and the Atlantic Islands, in French or English language. It comprises contributions on 120 taxa: *Bellevalia, Delphinium, Muscari* and *Allium* from Greece, by E. P. Bareka, M. Koutola & G. Kamari (Nos. 1106-1109); *Rosularia, Sedum, Umbilicus, Aethionema, Alyssum, Arabidopsis, Arabis, Aubrieta, Aurinia, Biscutella, Brassica, Bunias, Cakile, Calepina, Capsella, Cardamine, Cardaria, Carrichtera, Clypeola, Diplotaxis, Erophila, Eruca, Erysimum, Fibigia, Isatis, Lepidium, Lobularia, Lunaria, Matthiola, Raphanus, Rapistrum, Rorippa, Sinapis, Sisymbrium, Teesdalia, Thlaspi, Fumaria, Glaucium, Papaver, Clematis, Delphinium, Ranunculus, Reseda* and *Saxifraga* from Greece, by H. Runemark (Nos. 1110-1188); *Genista* from Sardinia and Portugal, by T. Cusma Velari, L. Feoli Chiapella & G. Bacchetta (Nos. 1189-1190); *Genista* from Morocco and Balearic Islands, by T. Cusma Velari, L. Feoli Chiapella & V. Kosovel (Nos. 1191-1192); *Anchusa, Pulmonaria* and *Lycopsis* from Italy, Greece and Turkey, by M. Bigazzi, G. Fiorini & F. Selvi (Nos. 1193-1200); *Argyrocytisus, Chamaecytisus, Cytisus* and *Genista* from Morocco, by H. Tahiri & P. Cubas (Nos. 1201-1207); *Ononis* and *Melilotus* from Bulgaria, by D. Pavlova & A. Tosheva (Nos. 1208-1212); *Carex, Cyperus, Eleocharis, Scirpus, Schoenus* and *Triglochin* from Bulgaria, by M. Stoeva (Nos. 1213-1226).

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Reports (1106-1109) by Eleftheria-Perdiko Bareka, Margarita Koutoula & Georgia Kamari

1106. ***Bellevalia dubia*** (Guss.) Roemer & Schultes — $2n = 8$ (Figs. 1a, b & 5a).

Gr: Ionian islands, Nomos Zakinthou, Zakinthos island, close to the village of Korithi, 37°54'N, 20°42'E, 13 Oct 1991, *Phitos & Kamari 26822* (UPA).

Bellevalia dubia is distributed in the C. and E. Mediterranean region.

The chromosome number $2n = 8$ reported here confirms previous records from Greece, on material from Idhra island (Bothmer & Benzer 1973), and Turkey (Özhatay et al. 1991). A triploid chromosome number of $2n = 12$ has also been reported for this taxon from Italy (Musano & Maggini 1976). The morphology of the chromosome complement is in accordance with the general "basic" *Bellevalia* type (Bothmer & Wendelbo 1972), which includes one pair of metacentric (m), two pairs of submetacentric (sm) and one pair of acrocentric (st) chromosomes. Satellites are found on the short arms of the metacentric and on the long arms of the submetacentric chromosomes. Microphotographs (Figs. 1a, b) and a karyogram (Fig. 5a) of the Ionian population studied are presented here. The karyotype formula consist of $2n$ = 2m-SAT + 4sm-SAT + 2st = 8 chromosomes, ranging in size from 12 to 6.7 µm.

1107. ***Delphinium staphisagria*** L. — $2n = 18$ (Figs. 2a, b).

Gr: Peloponnisos, Nomos Achaias, close to the village of Metochi, place named Strofilia with *Pinus pinea* forest, in phrygana, 38°07'N, 21°24'E, 10 m, 25 May 1998, *Phitos & Kamari cult. No B.15* (UPA).

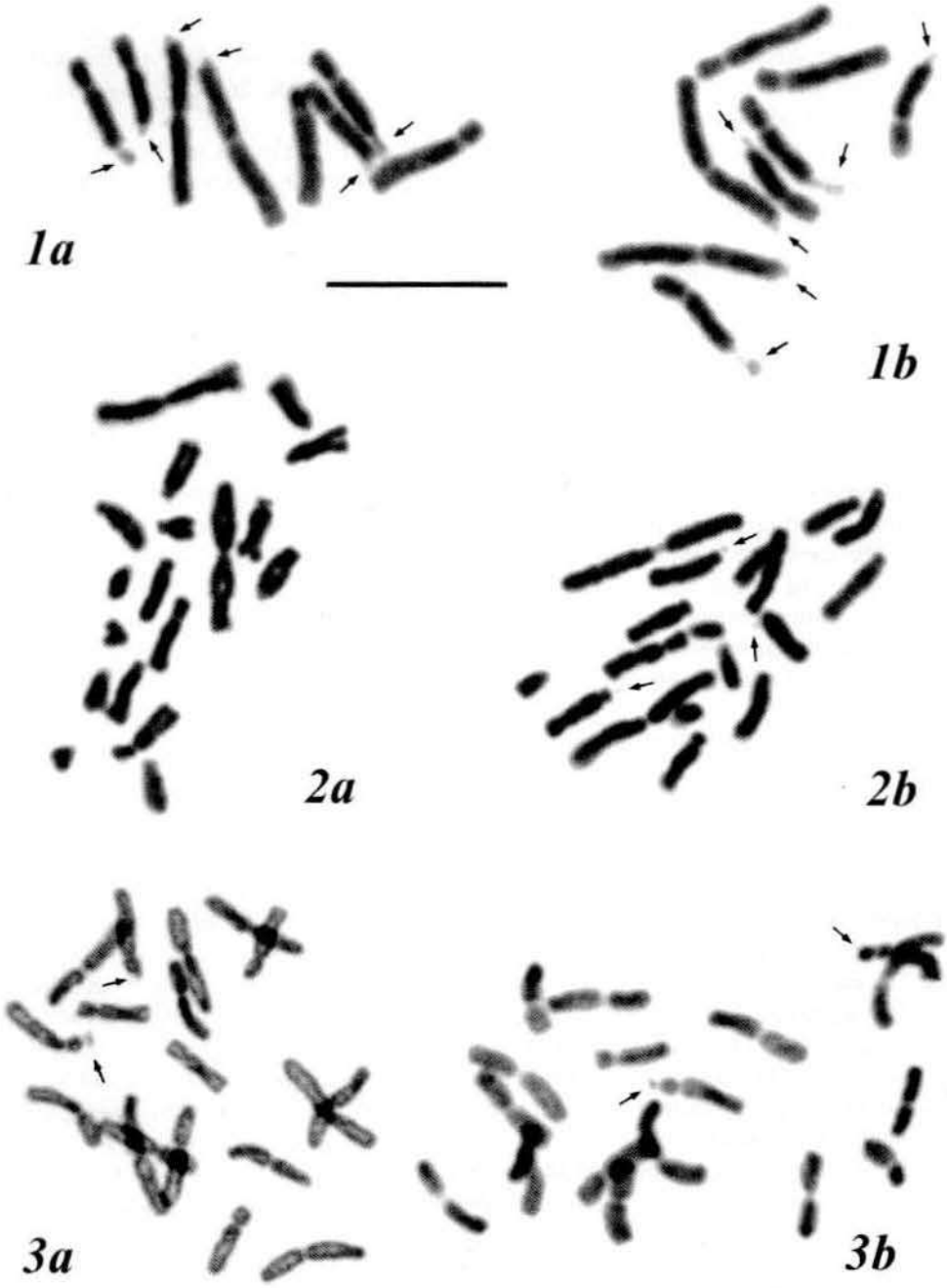
Delphinium staphisagria is mainly distributed in the Mediterranean region and is also found in the Canary Islands.

The chromosome number $2n = 18$ and the karyotype formula have been reported by Constantinidis & Kamari (1995, see for references) in material from Makedonia and Sterea Ellas and it is in accordance with our counts from Peloponnisos. Moreover, Simon et al. (1995) also reported the same chromosome number in material from Spain. The karyotype is asymmetrical having one long metacentric (m) chromosome pair and one submetacentric (sm) pair, while the rest are acrocentric (st) or subtelosentric (t) (Figs. 2a, b). The karyotype formula is $2n$ = 2m + 2sm + 10st + 4t-SAT = 18, with chromosomes varying in size between 16 and 2.7 µm.

1108. ***Muscari macrocarpum*** Sweet — $2n = 18$ (Figs. 3a, b & 5b).

Gr: East Aegean Islands (EAe), Nomos Samou, Isl. Samos, W. rocky slopes of Mt Kerkis, E. of the place known as Plaka, in margins of olive groves, scree and gravely places, on limestone, c. 450-650 m, 37°43'N, 26°35'E, 18 May 1999, *Christodoulakis & Constantinidis cult. no* K285 (UPA). - (Fig. 3b)

— East Aegean Islands (EAe), Nomos Samou, Isl. Samos, Mt Kerkis, ravine named



Figs. 1-3. Mitotic metaphase plates of: **1, a, b,** *Bellevalia dubia*, $2n = 8$; **2, a, b,** *Delphinium staphisagria*, 2n = 18; **3, a, b,** *Muscari macrocarpum*, $2n = 18$. — Arrows indicate SAT-chromosomes. Scale bar = 10 μm.

Kakoperato, ca 500 m, 37°43'N, 26°37'E, 9 May 1984, *Christodoulakis 96 & 186* (UPA). - (Fig. 3a)

— East Aegean Islands (EAe), Nomos Samou, Isl. Samos, close to the village Drakaioi, place named Misomisi, ca 400 m, 37°45'N, 26°36'E, 24 Apr 1976, *Christodoulakis 347* (UPA).

— East Aegean Islands (EAe), Nomos Samou, Isl. Samos, N. of Pythagorio, hill named Spiliani, rocky places, 150 m, 37°41'N, 26°56'E, 14 Apr 1999, *Andreadakis cult. no* K340 (UPA). - (Fig. 5b)

Muscari macrocarpum is an E. Mediterranean element. In Greece, it occurs in the East Aegean islands, Kiklades islands and Kriti. It has been confused until recently with the taxonomically related *Muscari moschatum* Willd., an endemic species of S. and W. Anatolia (Davis 1984), which also shares the same chromosome number (Stuart 1970, Özhatay & Johnson 1996).

The somatic number $2n = 18$ of this species has previously been reported by Montmollin (1986) in material from Kriti and by Özhatay & Johnson (1996) in material from Turkey. The same chromosome number $2n = 18$, microphotographs (Figs. 3a, b) and a karyogram (Fig. 5b) are presented here on material from Samos island.

The karyotype is symmetrical, consisting of $2n = 10m + 6sm + 2st\text{-}SAT = 18$ chromosomes. The chromosome size ranges from 7.9 to 2.7 µm. In population no K285 the satellites of the homologous chromosomes show heterozygosity (Fig. 3b); also in population no K340, the longest metacentric chromosome pair presents an heterozygosity in the size of the two homologous chromosomes (Fig. 5b).

1109. ***Allium callimischon*** Link subsp. ***callimischon*** — $2n = 16$ (Fig. 4).

Gr: Sterea Hellas, Nomos Etolias–Akarnanias, Mt Boumistos, W. of Koumboti village, 500 m, 38°45'N, 21°04'E, 10 Oct 1998, *Vlachos* 45/895 (UPA).

This Greek endemic species has been divided by Stearn (1978) into two subspecies. The typical subsp. *callimischon* is distributed in the mainland, while subsp. *haemostictum* Stearn is mostly known from the island of Kriti.

The chromosome number of $2n = 16$ and a similar karyotype morphology have previously been reported by Stearn (1978), Johnson (1982), and Iatrou (1986) in material from Peloponnisos, by Tzanoudakis (1983) in material from Peloponnisos and the Ionian islands, and by Tzanoudakis et al. (1991) in material from Ipiros, Peloponnisos and Kithira island. Our count originating from Sterea Hellas adds a new record in the cytogeographical study of this taxon.

The karyotype of the population studied is symmetrical, with mostly metacentric chromosomes. The karyotype formula is described as $2n = 12m + 2m/sm + 2sm = 16$, with chromosomes varying in size between 12,5 and 10,9 µm.

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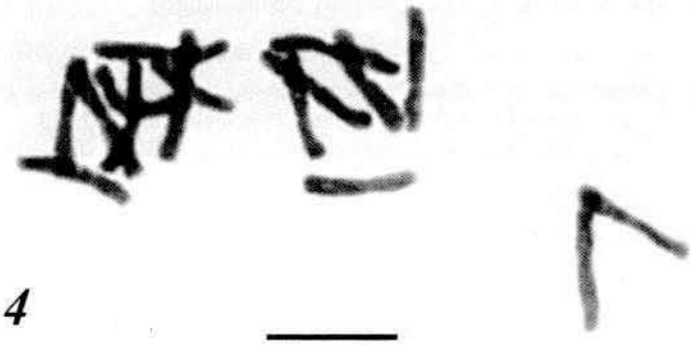

Fig. 4. Mitotic metaphase plate of *Allium callimischon* subsp. *callimischon*, $2n = 16$: — Scale bar = 10 μm.

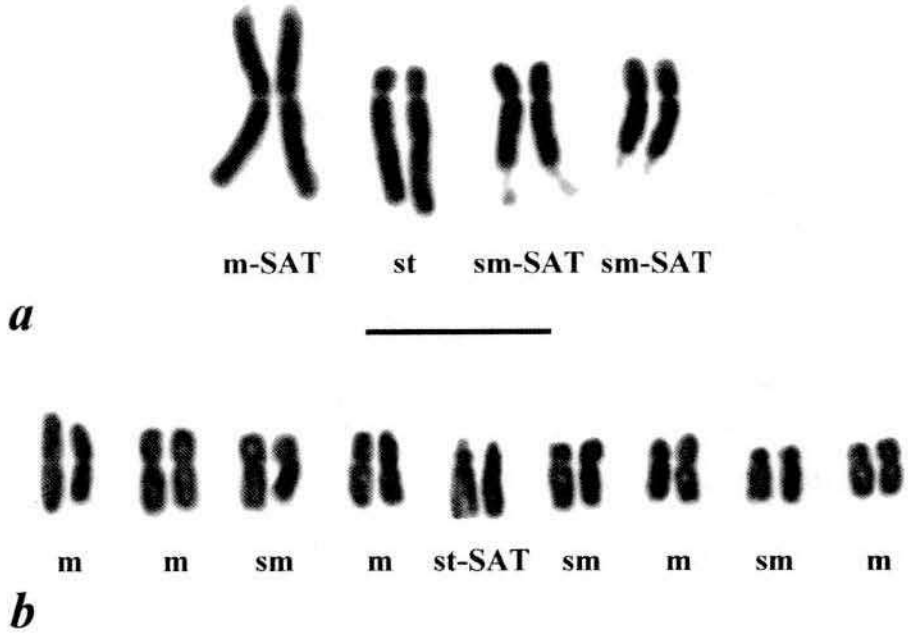

Fig. 5. Karyograms of: **a,** *Bellevalia dubia*, $2n = 8$; **b,** *Muscari macrocarpum*, $2n = 18$. — Scale bar = 10 μm.

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Reports (1110-1188) by Hans Runemark

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

In the locality lists the following abbreviations of collectors' names have been used:

Be (Bengt Bentzer), Bo (Roland von Bothmer), E (Lennart Engstrand), G (Mats Gustafsson), H (Alfred Hansen), N (Bertil Nordenstam), R (Hans Runemark), S (Sven

Snogerup), St (Arne Strid) and Sv (Linus Svensson).

References to previously published chromosome studies for taxa treated are usually not cited. For detailed information of published counts see Jalas et al., Atlas Fl. Eur.: vol. 8, 1989 (*Ranunculaceae*), vol. 9, 1991 (*Papaveraceae*), vol. 10, 1994 and vol. 11, 1996 (*Cruciferae*), and vol. 12, 1999 (*Resedaceae*, *Crassulaceae*, *Saxifragaceae*).

Crassulaceae

1110. ***Rosularia serrata*** (L.) A. Berger — $2n = 18$.

Gr: E. Aegean islands. Ikaria, 4-5 km E. of Ag. Kirikos, 37°40'N, 26°20'E, 13 Jul 1958, *R & S 12539*.

1111. ***Sedum hispanicum*** L. — $2n = 14$.

Gr: E. Aegean islands. Ikaria, 2 km W. of vil. Plagia, E. exposed cliffs, 37°34'N, 26°09'E, 14 Jul 1958, *R & S 12571*.

1112. ***Sedum litoreum*** Guss. subsp. ***litoreum*** — $2n$ = c. 60.

Gr: Dodecanisa. Astipalea, the island of Ofidousa, 36°33'N, 26°09'E, 12 May 1960, *R & N 13862*.

— Kiklades. Naxos, the N. islet at Akr. Pardenos, 37°02'N, 25°22'E, 2 Jul 1967, *R & Be 30737*.

1113. ***Sedum rubens*** L. subsp. ***rubens*** — $2n$ = c. 84.

Gr: Kiklades. Kato Koufonisi (S. of Naxos), 36°55'N, 25°34'E, 11 Jun 1960, *R & N 15854*.

1114. ***Sedum sediforme*** (Jacq.) Pau — $2n = 48$.

Gr: Kiklades. Ios, N. of the harbour, 36°44'N, 25°17'E, 5 May 1957, *R 2332*.

1115. ***Umbilicus chloranthus*** Boiss. — $2n = 48$.

Gr: Evvia. N. of Ag. Dimitrio, 38°08'N, 24°27'E, 23 Jun 1958, *R & S 11821*.

To my knowledge, the first chromosome report for the species.

1116. ***Umbilicus rupestris*** (Salisb.) Dandy — $2n = 48$.

Gr: Evvia. 3 km W.S.W. of Akr. Kafirefs, 38°08'N, 24°33'E, 22 Jun 1958, *R & S* seeds,

cult. R-1308.

Cruciferae

1117. ***Aethionema saxatile*** (L.) R. Br. subsp. ***creticum*** (Boiss. & Heldr.) I. A. Andersson et al. — $2n = 24$.

Gr: E. Aegean islands. Ikaria, Ag. Nikolaos (S. of Evthelo), 37°37'N, 26°09'E, 24 Apr 1958, *R & S 6809*.

— Kiklades. Donousa (E. of Naxos), innermost part of Ormos Rousa (Kalotaritissa), 37°07'N, 25°49'E, 23 May 1958, *R & S 9438*; d:o, 25 May 1958, *R & S 9605*; Naxos, Ammomaxis Oros, c. 800 m, 37°07'N, 25°33'E, 31 May 1958, *R & S 9927*, *R & S 9949*; Naxos, Fanari Oros, 700 m, 37°05'N, 25°30'E, 31 Jun 1958, *R & S* seeds, *cult.* R-1250; Naxos, 2 km N.N.W. of Ormos Leonis, 37°09'N, 25°35'E, 21 May 1958, *R & S 9070*; Naxos, Metri (N. of Moni), 37°05'N, 25°30'E, 20 May 1957, *R 3177*; Naxos, N. of Mitria (Engares), 37°06'N, 25°26'E, 26 Jul 1958, *R & S* seeds, *cult.* R-1289; Naxos, Stavros Keramotis, 37°06'N, 25°32'E, 11 Jun 1957, *R 4451*; Paros, mt. Prof. Elias, 700 m, 37°02'N, 25°12'E, 18 Jul 1958, *R & S* seeds, *cult.* R-1376.

1118. ***Alyssum foliosum*** Bory & Chaub. — $2n = 16$.

Gr: Attiki. Gerania Oros, E. of the peak area, c. 1000 m, 38°01'N, 23°09'E, 20 May 1982, *R & Sv 48929*.

1119. ***Alyssum simplex*** Rudolfi ("*A. campestre* subsp. *campestre*") — $2n = 16$.

Gr: Kiklades. Kea, N. of Ormos Kalogeros, 37°37'N, 24°17'E, 17 Apr 1969, *R, St, & G 40812*; Kea, E. of Ag. Theodoro, 37°34'N, 24°19'E, 15 Apr 1969, *R, St & G 40670*; Kithnos, the valley N.E. of Ag. Louka, 37°26'N, 24°23'E, 3 Jun 1968, *R & E 37913*.

1120. ***Alyssum simulans*** Runemark ined. — $2n = 32$.

Gr: Argolis. Arachnion Oros, the W. part and the peak area, 600-1200 m, 37°39'N, 22°58'E, 14 May 1982, *R & Sv 48661*.

— Attiki. Gerania Oros, E. of the peak area, c. 1000 m, 38°01'N, 23°09'E, 20 May 1982, *R & Sv 48925*; Gerania Oros, the peak area, 1300-1315 m, 38°01'N, 23°08'E, 20 May 1982, *R & Sv 48921a*.

A. simulans is in several respects intermediate between *A. foliosum* Bory & Chaub. (2n = 16) and *A. minutum* DC. (2n = 16) and may well be an allotetraploid based on these two

species. It is a montane Greek endemic known from Argolis, Sterea Ellas and Kriti. It will be formally described in the forthcoming vol. 2 of Flora Hellenica.

1121. ***Alyssum strigosum*** Banks & Solander — $2n = 16$.

Gr: Dodecanisa. Karpathos, the island of Saria, N. of Ormos Armiro, 35°50'N, 27°14'E, 4 May 1958, *R & S 7656*.

1122. ***Alyssum umbellatum*** Desv. — $2n = 16$.

Gr: E. Aegean islands. Ikaria, S.W. of "Kaka Rafija", 37°33'N, 26°09'E, 15 Jul 1958, *R & S* seeds, *cult.* R-1394.

— Kiklades. Ios, Ag. Theodotis, 36°47'N, 25°18'E, 22 Apr 1969, *R, St & G 41048*; Mikonos, Ormos Ftelia, 37°28'N, 25°23'E, 12 May 1968, *R & E 35331*; Mikonos, the valley S. of western mt. Ag. Elias, 37°28'N, 25°20'E, 13 May 1968, *R & E 35396*; Mikonos, the S. part of eastern mt. Ag. Elias, 37°27'N, 25°27'E, 17 May 1968, *R & E 36230*; Mikonos, the island of Dilos, C. part, 37°22'N, 25°16'E, 15 May 1968, *R & E 35758*; Kithnos, the valley N.E. of Ag. Louka, 37°26'N, 24°23'E, 3 Jun 1968, *R & E 37912*.

1123. ***Arabidopsis thaliana*** (L.) Heynh. — $2n = 10$.

Gr: E. Aegean islands. Ikaria, 1 km N. of western Ag. Nikolaos, 37°32'N, 26°04'E, 21 Apr 1958, *R & S 6153*.

— Kiklades. Mikonos, between Lino and Ano Mera, 37°27'N, 25°24'E, 27 Mar 1969, *R, St & G 39531*; Naxos, Faneromeni, 37°09'N, 25°29'E, 22 May 1957, *R 3394*; Naxos, 1 km E. of Stavros Keramotis, 37°06'N, 25°33'E, 31 Mar 1958, *R & S 4567*; Serifos, Livadia, 37°09'N, 24°31'E, 26 Apr 1967, *R & Be 27595*; Sifnos, S. of Kastro, 36°59'N, 24°45'E, 10 Apr 1969, *R, St & G 40426*.

1124. ***Arabis verna*** (L.) R. Br. — $2n = 32$.

Gr: Kiklades. Naxos, Metri (N. of Moni), 37°05'N, 25°30'E, 13 Jun 1957, *R 3213*; Naxos, Stavros Keramotis, 37°06'N, 25°32'E, 13 Jun 1957, *R* seeds, *cult.* R-153.

1125. ***Aubrieta deltoidea*** (L.) DC. — $2n = 16$.

Gr: E. Aegean islands. Samos, Mt Kerkis, 1200 m, 37°44'N, 26°37'E, 2 Aug 1960, *R & N 16925*.

1126. ***Aurinia saxatilis*** (L.) Desv. subsp. ***orientalis*** (Ard.) T. R. Dudley — $2n = 16$.

Gr: Arkadia. 3 km S. of Astros, 37°23'N, 22°45'E, 1 May 1969, *R & Be 41527*.

1127. ***Biscutella didyma*** L. — $2n = 16$.

Cr: Sitia. Above Dri, 450-700 m, 35°09'N, 26°07'E, 12 May, 1962, *R & S 17214*.

Gr: Attiki. 4 km S.E. of Markopoula, 37°52'N, 23°58'E, 12 May 1963, *S 20121*.

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1128. ***Brassica tournefortii*** Gouan — $2n = 20$.

Gr: Kiklades. Milos, Chivadolimni, 36°41'N, 24°27'E, 20 Apr 1967, *R & Be 27254*; Siros, Ialissas, 37°26'N, 24°53'E, 30 May 1968, *R & E 37692*.

1129. ***Bunias erucago*** L. — $2n = 14$.

Gr: E. Aegean islands. Ikaria, Kampos, 37°38'N, 26°10'E, 25 Apr 1958, *R & S 6948*.

— Kiklades. Naxos, 2 km N.E. of Sangri, 37°03'N, 25°28'E, 18 Apr 1958, *R & S 5856*; Naxos, between Moni and Sifones, 500-700 m, 37°05'N, 25°20'E, 10 May 1968, *R*

& E 35011; Serifos, Koutalas, 37°08'N, 24°27'E, 28 Apr 1967, *R & Be 27969*.

1130. ***Cakile maritima*** Scop. — $2n = 18$.

Gr: E. Aegean islands. Ikaria, Faros beach, 37°40'N, 26°21'E, 13 Jul 1958, *R & S 12503*.

— Kiklades. Antiparos, near the village, 37°02'N, 25°05'E, 17 May 1967, *R & Be 28837*; Ios, Ormos Tris Klisies, 36°40'N, 25°23'E, 26 Jul 1967, *R & Be 30178*; Milos, Aliki, 36°42'N, 24°28'E, 19 Jul 1967, *R & Be 29820*; Tinos, Platia Ammos, 37°33'N, 25°08'E, 18 May 1968, *R & E 36360*.

1131. ***Calepina irregularis*** (Asso) Thell. — $2n = 28$.

Gr: E. Aegean islands. Ikaria, N. of Kampos, 37°38'N, 26°10'E, 25 Apr 1958, *R & S 6926*.

1132. ***Capsella bursa-pastoris*** (L.) Medic. — $2n = 16$.

Gr: Kiklades. Ano Koufonisi (S. of Naxos), 36°56'N, 25°36'E, 14 Apr 1957, *R 1063*; Naxos, mt. W. of Axapsis, 37°07'N, 25°25'E, 27 Mar 1957, *R 488*.

For morphology and chromosome numbers see Svensson (1984).

1132a. ***Capsella bursa-pastoris*** (L.) Medic. — $2n = 32$.

Gr: Kiklades. Kimolos, between the town and the harbour, 36°48'N, 24°35'E, 17 Apr 1967, *R & Be 25855*.

1133. ***Cardamine hirsuta*** L. — $2n = 16$.

Gr: E. Aegean islands. Ikaria, above the western Ag. Nikolaos, 300-500 m, 37°32'N, 26°04'E, 21 Apr 1958, *R & S 6232*.

— Kiklades. Sifnos, 2 - 3 km S. of Akr. Khondropo, 36°57'N, 24°41'E, 12 Apr 1967, *R & Be 25280*.

1134. ***Cardamine graeca*** L. — $2n = 18$.

Gr: E. Aegean islands. Ikaria, above western Ag. Nikolaos, 37°32'N, 26°04'E, 21 Apr 1958, *R & S 6237*.

1135. ***Cardaria draba*** (L.) Desv. — $2n = 64$.

Gr: Kiklades. Milos, the bay N.N.E. of mt. Prof. Elias, 36°41'N, 24°23'E, 19 Jun 1967, *R & Be 29891*.

1136. ***Carrichtera annua*** (L.) DC. — $2n = 16$.

Gr: Attiki. The S. islet E. of Ipsili (N.E. of Egina), 37°48'N, 23°18'E, 17 May 1974, *R & Bo 47456 b*.

1137. ***Clypeola jonthlaspi*** L. subsp. ***jonthlaspi*** — $2n = 32$.

Gr: Kiklades. Amorgos, Ayiali to Tourlaria, 36°55'N, 25°59'E, 25 Apr 1969, *R, St & G 41289*; Ios, Psatis, 36°45'N, 25°22'E, 22 Apr 1969, *R, St & G 41090*; Naxos, Oros Zeus, 450-600 m, 37°03'N, 25°29'E, 6 Apr 1957, *R 791*; Paros, above Levka, 37°03'N, 25°12'E, 6 Apr 1967, *R & Be 24413*; Siros, Oros Kapari, 37°27'N, 24°56'E, 7 Apr 1958, *R & S 5245*; Siros, Kastri, 37°30'N, 24°56'E, 3 Apr 1969, *R, St & G 40044*.

— Lakonia. Mt Taygetos, N.W. of Arna, c. 1000 m, 36°53'N, 22°23'E, 21 May 1964, *R & S 20586*.

1137a. ***Clypeola jonthlaspi*** L. subsp. ***microcarpa*** (Moris) Archangeli — $2n = 16$.

Gr: E. Aegean islands. Ikaria, N. of western Ag. Nikolaos, c. 300 m, 37°32'N, 26°04'E, 21 Apr 1958, *R & S 6204*.

— Kiklades. Kea, N. of Ormos Kalogeros, 37°37'N, 24°17'E, 17 Apr 1969, *R, St & G 40809*; Naxos; the pass between Filoti and Apirantos, 37°03'N, 25°30'E, 19 Mar 1957, *R 200*; Naxos, N. of the monastery of Chrisostomos, 37°07'N, 25°24'E, 16 Mar 1957, *R 79*.

A report of $2n = 32$ from Iran by Ayravand (1975) needs confirmation.

1138. ***Diplotaxis viminea*** (L.) DC. — $2n = 20$.

Gr: Dodecanisa. The small island of Astakida (N. of Karpathos), 35°53'N, 26°50'E, 8 May 1967, *R & Be 28452*.

— Kiklades. Paros, the islet of Glaropounda, 36°59'N, 25°06'E, 17 May 1967, *R & Be 29004*.

1139. ***Erophila macrocarpa*** Boiss. — $2n = 24$.

Gr: Kiklades. Tinos, Koris Pirgos, 400 m, 37°38'N, 25°04'E, 2 Apr 1969, *R, St & G 39983*.

To my knowledge the first chromosome report for the species.

1140. ***Erophila verna*** (L.) Chevall. subsp. ***verna*** — $2n =$ c. 36.

Gr: Kiklades. Tinos, 1 km N.E. of Falatados, 37°36'N, 25°12'E, 29 Mar 1969, *R, St & G 39689.*

1140a. ***Erophila verna*** (L.) Chevall. subsp. ***praecox*** (Steven) Vollmann — $2n$ = c. 34.

Gr: Kiklades. Mikonos, western mt. Ag. Elias, 37°29'N, 25°20'E, 28 Mar 1969, *R, St & G 39592.*

1141. ***Eruca vesicaria*** (L.) Cav. — $2n$ = 22.

Gr: Kiklades. Siros, Ag. Varvaras, 37°28'N, 24°54'E, 30 May 1968, *R & Bo 37582*; Tinos, between Kolibitras and Komi, 37°37'N, 25°08'E, 23 May 1968, *R & E 37027.*

1142. ***Erysimum hayekii*** (Jav. & Rech. fil.) Polatschek — $2n$ = 14.

Gr: Kiklades. Naxos, Stavros Keramotis, 600 m, 37°06'N, 25°31'E, 13 May 1957, *R* seeds, *cult.* R-57.

1143. ***Erysimum rhodium*** Snogerup — $2n$ = 12.

Gr: Dodecanisa. Rodos, cliffs S.E. of Salakos, 300 m, 36°16'N, 27°57'E, 2 Jul 1967, *R & Be 29372*; Rodos, S.W. of Siana, cliffs 380 m, 36°08'N, 27°47'E, 2 Jul 1967, *R & Be 29395.*

Erysimum senoneri (Heldr. & Sart.) Snogerup subsp. ***amorginum*** Snogerup — $2n$ = 12.

Gr: Kiklades. Amorgos, the island of Nikouria, 36°53'N, 25°54'E, 30 Jul 1967, *R & Be 30580.*

1145. ***Fibigia lunarioides*** (Willd.) Sibth. & Sm. — $2n$ = 16.

Gr: Dodecanisa. Chalki (N. of Rodos), 4 km N.W. of the harbour village, 36°14'N, 27°35'E, 15 Jun 1966, *Bo 23000*; Kinaros (E. of Amorgos), N. exposed cliffs, 36°59'N, 26°17'E, 3 Jul 1958, *R & S 12111*; Mavronisi (islet between Kinaros and Levitha), 36°59'N, 26°20'E, 2 Jul 1958, *R & S 12070.*

— Kiklades. Folegandros, 2 km W. of Pelagia, 36°36'N, 24°56'E, 15 Jun 1967, *R & Be 29526*; Ios, Akr. Pirgari, 36°39'N, 25°23'E, 26 Jun 1967, *R & Be 30193*; Keros (S. of Naxos), the island of Antikeros, 36°57'N, 25°29'E, 6 Jul 1958, *R & S 12378.*

Endemic to the C. and S. Aegean areas and confined to coastal cliffs and ungrazed islets. To my knowledge, the first chromosome reports for the species.

1146. ***Isatis lusitanica*** L. — $2n = 14$.

Gr: Dodecanisa. Karpathos, E. of Vurgunda, 35°48'N, 27°11'E, 7 May 1967, *R & Be 28356.*

1147. ***Lepidium spinosum*** Ard. — $2n = 24$.

Gr: Kiklades. Mikonos, the bay of Elia, 37°28'N, 25°24'E, 12 May 1968, *R & E 35251*; Mikonos, N. of Ano Mera, 37°27'N, 25°24'E, 12 May 1968, *R & E 35177.*

To my knowledge the first chromosome reports for this species.

1148. ***Lobularia libyca*** (Viv.) Webb & Berth. — $2n = 22$.

Gr: Kiklades. Thira (Santorini), near the town, 36°25'N, 25°26'E, 16 Apr 1967, *H 26989*; d:o, 22 Apr 1967, *H 27250.*

Apparently an introduced and established weed on Thira (first collected in 1911).

1149. ***Lunaria annua*** L. subsp. ***pachyrhiza*** (Borbas) Hayek — $2n = 30$.

Gr: Ionian islands. Kefallinia, above Sami, 38°15'N, 20°39'E, 9 Jun 1966, *S 23612.*

1150. ***Matthiola sinuata*** (L.) R. Br. — $2n = 14$.

Gr: Dodecanisa. Karpathos, 3 km N. of Diafani, 35°46'N, 27°13'E, 15 Jul 1966, *Bo 23181.*

— E. Aegean islands. Ikaria, Praia P:t, 37°34'N, 26°09'E, 17 Jun 1958, *R & S 11347*; Ikaria, N.W. of Praia P:t, 37°34'N, 26°09'E, 17 Jun 1958, *R & S 11352.*

— Evvia. Petalides, the islet of Prassonisi, 38°02'N, 24°15'E, 21 Jun 1958, *R & S 11562.*

— Kiklades. Ios, Varvaronisi, the larger islet, 36°39'N, 25°23'E, 26 Jul 1967, *R & Be 30202*; Keros (S. of Naxos), the islet of Plaki, 36°52'N, 25°37'E, 10 Jun 1958, *R & S 10947*; Makares, the islet of Strongilo, 37°04'N, 25°42'E, 5 Jun 1958, *R & S 10343*; Milos, Akr. Romma, 36°42'N, 24°33'E, 16 Jun 1967, *R & Be 29621*; Milos, Ananes, the N.W. islet, 36°31'N, 24°08'E, 17 Jun 1967, *R & Be 29764*; Poliegos, the islet at the N. shore, 36°47'N, 24°37'E, 16 Jun 1967, *R & Be 29608*; Poliegos, the N. shore, 36°47'N, 24°37'E, 16 Jun 1967, *R & Be 29602.*

1151. ***Matthiola tricuspidata*** (L.) R. Br. — $2n = 14$.

Cr: Sitia. S.W. of Leopetra, 35°13'N, 26°01'E, 18 May 1962, *R & S 18491*.

Gr: E. Aegean islands. Ikaria, Faros, 37°40'N, 26°21'E, 13 Jul 1958, *R & S 12476*.

— Kiklades. Antiparos, the islet of Kavouras, 37°04'N, 25°05'E, 3 Jul 1967, *R & Be 30835*; Iraklia (S. of Naxos), S. of the harbour, 36°50'N, 25°29'E, 7 Jun 1957, *R 4205*; Kea, Ozia, 37°41'N, 24°21'E, 4 Jun 1968, *S & Bo 34231*; Kithnos, the valley N.E. of Ag. Louka, 37°26'N, 24°23'E, 3 Jun 1968, *R & E 37895*; Mikonos, Ormos Ornos, 37°25'N, 25°19'E, 14 May 1968, *R & E 35505*; Naxos, 3 km N. of Mitria (Engares), 37°08'N, 25°26'E, 18 May 1957, *R 3104*; Naxos, E. of Apollona, 37°11'N, 25°33'E, 5 Jun 1957, *R 4107*; Siros, the islet of Ampelos (S. of Vari), 37°23'N, 24°58'E, 3 Jun 1968, *S & Bo 33498*.

1152. *Raphanus raphanistrum* L. — $2n = 18$.

Gr: Kiklades. Mikonos, the bay of Elia, 37°25'N, 26°01'E, 17 May 1968, *R & E 36267*; Mikonos, the island of Rinia, central part, 37°25'N, 25°13'E, 25 Mar 1969, *R, St & G 39295*; Naxos the beach S. of the town, 37°06'N, 25°23'E, 4 May 1957, *R 2151*; Naxos, Stavros Keramotis, 500 m, 37°06'N, 25°31'E, 11 Jun 1957, *R 4461*.

1153. *Rapistrum rugosum* (L.) All. — $2n = 16$.

Gr: Dodecanisa. Sirina (S.S.E. of Astipalea), S. of the small village, 36°20'N, 26°41'E, 2 May 1958, *R & S 7309*; Levitha, "Porto di Levitha", 37°00'N, 26°26'E, 2 Jul 1958, *R & S 11993*.

— Kiklades. Sifnos, Ormos Kondos, 36°54'N, 24°43'E, 13 May 1958, *R & S 8508*; Naxos, N. of Ag. Sofia, 37°10'N, 25°29'E, 3 Apr 1958, *R & S 4985*.

1154. *Rorippa icarica* Rech. fil. — $2n = 16$.

Gr: E. Aegean islands. Ikaria, Mt Atheras, E. part, c. 800 m (locus classicus), 37°38'N, 26°16'E, 12 Jul 1958, *R & S 12441*; Ikaria, N. of western Ag. Nikolaos, 300-400 m, 37°32'N, 26°03'E, 16 Jun 1958, *R & S 11267*; Ikaria, Mt Melissa, c. 800 m, 37°32'N, 26°05'E, 15 Jul 1958, *R & S 12638*.

Endemic to the island of Ikaria. To my knowledge, the first chromosome reports for the species.

1155. *Rorippa nasturtium-aquaticum* (L.) Hayek — $2n = 32$.

Gr: Kiklades. Kithnos, Merixas, 37°22'N, 24°24'E, 2 Jun 1968, *R & E 38020*; Naxos, E. of Apollona, 37°11'N, 25°33'E, 4 Jun 1957, *R 3981*; Naxos, 1 km E.N.E. of Skado, 37°08'N, 25°33'E, 1 Jun 1957, *R 3832*; Serifos, the shore near the harbour, 37°09'N, 24°31'E, 20 Jun 1967, *R & Be 30062*.

1156. ***Sinapis alba*** L. subsp. ***mairei*** (H. Lindb.) Maire — $2n = 24$.

Gr: Kiklades. Makares (E. of Naxos), the islet of Strongilo, 37°04'N, 25°42'E, 5 Jun 1958, *R & S 10370*.

1157. ***Sisymbrium irio*** L. — $2n = 14$.

Gr: Kiklades. Siros, near the town, 37°27'N, 24°56'E, 30 Jun 1968, *H 37545*.

1158. ***Sisymbrium orientale*** L. — $2n = 14$.

Gr: Kiklades. Mikonos, N. of Ormos Ornos, 37°26'N, 25°19'E, 18 Jun 1960, *R & N 16102*; Siros, the islet of Strongilo (E. of Didimi), 37°26'N, 24°59'E, 27 May 1968, *S & Bo 33389*; Skinousa (S. of Naxos), between the village and the harbour, 36°52'N, 25°31'E, 9 Jun 1957, *R 4327*; Thira (Santorini), the island of Thirasia, between the harbour and Manolas, 36°26'N, 25°21'E, 27 Jun 1967, *R & Be 30332*; Tinos, S. of the town, 37°32'N, 25°10'E, 19 May 1968, *R & E 36507*.

1159. ***Sisymbrium polyceratium*** L. — $2n = 28$.

Cr: Sitia. S. of the town of Sitia, 35°11'N, 26°07'E, 15 May 1962, *R & S 17921*.

Gr: Kiklades. Siros, near the town, 37°27'N, 24°56'E, 30 May 1968, *H 37543*; Thira (Santorini), the island of Thirasia, between the harbour and Manolas, 36°26'N, 25°21'E, 27 May 1967, *R & Be 30312*; Tinos, below Isternia, 37°37'N, 25°03'E, 26 May 1968, *R & E 37243*.

1160. ***Teesdalia coronopifolia*** (J. P. Bergeret) Thell. — $2n = 36$.

Gr: Kiklades. Naxos, 3 km S. of Axapsis, 37°07'N, 25°24'E, 26 Mar 1957, *R 408*.

1161. ***Thlaspi bulbosum*** Boiss. — $2n = 14$.

Gr: E. Aegean islands. Ikaria, mt. Melissa, near the peak, 930 m, 37°32'N, 26°05'E, 12 Jul 1958, *R & S* seeds, *cult.* R-1228.

A very distinct, montane Greek endemic, related to *Thlaspi atlanticum* Batt. from Algeria. Known from a few localities in Sterea Ellas, Evvia, and the E. Aegean islands

(Ikaria and Chios). To my knowledge, the first chromosome report for the species.

1162. ***Thlaspi perfoliatum*** L. subsp. ***perfoliatum*** — $2n = 42$.

Gr: E. Aegean islands. Ikaria, N. of western Ag. Nikolaos, gorge 300-500 m, 37°32'N, 26°04'E, 21 Apr 1958, *R & S 6252*.

— Kiklades. Naxos, Oros Zeus, 900 m, 37°02'N, 25°05'E, 14 May 1957, *R* seeds, *cult.* R-178; Naxos, N.E. of Moni, 700 m, 37°05'N, 25°30'E, 31 Jun 1958, *R & S* seeds, *cult.* R-1317.

Papaveraceae

1163. ***Fumaria judaica*** Boiss. — $2n = 48$.

Gr: Kiklades. Anafi, Kalamos, 36°22'N, 25°50'E, 8 May 1958, *R & S 8097*; Mikonos, 2 km N. of Ag. Stefano, 37°30'N, 25°19'E, 17 May 1968, *R & E 36166*; Mikonos, 1-2 km N.N.W. of Ano Mera, 37°28'N, 25°23'E, 12 May 1968, *R & E 35247*; Naxos, 2 km N.N.W. of Kato Potamia, 37°05'N, 25°25'E, 2 Apr 1958, *R & S 4804*; Naxos, S. of the town, 37°06'N, 25°23'E, 15 Apr 1958, *R & S 5536*.

1164. ***Fumaria macrocarpa*** Parl. — $2n = 16$.

Gr: E. Aegean islands. Ikaria, western Ag. Nikolaos, 37°31'N, 26°03'E, 20 Apr 1958, *R & S 6071*.

— Kiklades. Naxos, Oros Zeus, W. slope, 400 m, 37°02'N, 25°29'E, 16 Apr 1958, *R & S 5743*; Tinos, between Mousoulo and Livadia, 37°35'N, 25°13'E, 22 May 1968, *R & E 37020*.

1165. ***Fumaria officinalis*** L. — $2n = 32$.

Gr: Kiklades. Naxos, W. of Mt Profitis Elias, 37°01'N, 25°28'E, 21 Mar 1957, *R 290*; Naxos 3 km W. of Axapsis, 37°07'N, 25°24'E, 26 Mar 1957, *R 389*.

1166. ***Fumaria petteri*** Reichenb. — $2n = 32$.

Gr: Kiklades. Naxos, Ormos Leonis, 37°09'N, 25°35'E, 21 May 1958, *R & S 9072*; Naxos, Oros Zeus, W. part, 400 m, 37°02'N, 25°29'E, 16 Apr 1958, *R & S 5619*; Naxos, N. of Ag. Sofia, 37°09'N, 25°28'E, 3 Apr 1958, *R & S 4956*.

1167. ***Glaucium flavum*** Crantz — $2n = 12$.

Gr: Kiklades. Kea, 1 km S.W. of the islet of Spanopoula, 37°41'N, 24°22'E, 4 Jun 1968, *S & Bo 34290.*

1168. *Papaver apulum* Ten. — $2n = 12$.

Gr: Kiklades. Kea, S.E. of the village of Kea, 400 m, 37°28'N, 24°21'E, 1 Jun 1968, *S, Bo & E 33957.*

1169. *Papaver argemone* L. subsp. ***nigrotinctum*** (Fedde) Kadereit — $2n = 42$.

Gr: Kiklades. Mikonos, Ormos Ornos, 37°25'N, 25°19'E, 17 Jul 1960, *R & N 16082*; Kithnos, the valley N.E. of Ag. Louka, 37°26'N, 24°23'E, 3 Jun 1968, *R & E 37909.*

The plants from both localities have been determined by Kadereit. Only $2n = 14$ has previously been reported for this subspecies.

1170. *Papaver dubium* L. subsp. ***dubium*** — $2n = 42$.

Gr: Kiklades. Naxos, Ammomaxis Oros, 1 km E.S.E. of Votri, 37°07'N, 25°33'E, 31 May 1958, *R & S 9895.*

1171. *Papaver hybridum* L. — $2n = 14$.

Gr: Kiklades. Naxos, 2 km S.W. of Axapsis, 37°08'N, 25°24'E, 30 Jul 1958, *R & S* seeds, *cult.* R-1537; Kato Koufonisi (S. of Naxos), E. part, 36°55'N, 25°34'E, 11 Jun 1960, *R & N 15866.*

1172. *Papaver purpureomarginatum* Kadereit — $2n = 28$.

Gr: Dodecanisa. The islet of Khamili (between Anafi and Karpathos), 35°52'N, 26°14'E, 4 May 1967, *R & Be 28148.*

1173. *Papaver rhoeas* L. — $2n = 14$.

Gr: Dodecanisa. Astipalea, between Maltesana and Vriseu Punda, 36°35'N, 26°25'E, 11 May 1960, *R & N 13474*; Astipalea, the island of Ofidousa, 36°33'N, 26°09'E, 12 May 1960, *R & N 13764.*

— E. Aegean islands. Ikaria, Ormos Praia, 37°34'N, 26°09'E, 17 Jun 1958, *R & S 11327*; Samos, Ag. Kiriaki, near the W. shore of the island, 37°42'N, 26°39'E, 27 May 1962, *R & S* seeds, *cult.* R-4466.

— Kiklades. Folegandros, the S.E. point, 36°36'N, 24°57'E, 23 May 1960, *R & N*

14634; Iraklia (S. of Naxos), S. of the harbour, 36°50'N, 25°29'E, 7 Jun 1957, *R 4233*; Mikonos, N.N.W. of the town, 37°27'N, 25°20'E, 11 May 1968, *R & E 35042*; Naxos, 1 km E.S.E. of Akr. Axapsis, 37°08'N, 25°25'E, 18 May 1957, *R 3128*; Sifnos, Ormos Kondos, 36°54'N, 24°42'E, 13 May 1958, *R & S 8493*; Skinousa (S. of Naxos), 36°52'N, 25°31'E, 9 Jun 1957, *R* seeds, *cult.* R-9.

Ranunculaceae

1174. ***Clematis cirrhosa*** L. — $2n = 16$.

Gr: Kiklades. Naxos, 2 km E.N.E. of Komiaki, 37°09'N, 25°32'E, 26 Apr 1957, *R 1704*.

1175. ***Delphinium peregrinum*** L. — $2n = 16$.

Gr: Kiklades. Naxos, the chapel N. of Oros Zeus, 37°02'N, 25°30'E, 4 Aug 1958, *R & S* seeds, *cult.* R-1483; Siros, W. of Finikas, 37°24'N, 24°53'E, 29 May 1968, *R & Bo 33783*.

1176. ***Delphinium staphysagria*** L. — $2n = 18$.

Gr: Kiklades. Naxos, 2 km S.S.W. of Filoti, 400 m, 37°02'N, 25°29'E, 8 Jun 1957, *R* seeds, *cult.* R-168.

1177. ***Ranunculus bulbosus*** L. subsp. ***neapolitanus*** (Ten.) H. Lindb. — $2n = 16$.

Gr: Evvia. 3 km W.S.W. of Akr. Kafirefs, 38°08'N, 24°33'E, 22 Jun 1958, *R & S 11695*; N. of Ag. Dimitriou, 38°08'N, 24°27'E, 23 Jun 1958, *R & S 11810*.

— Kiklades. Naxos, the W. peak of Koronos Oros, 900-1000 m, 37°08'N, 24°29'E, 2 Jun 1958, *R & S 10012*.

1178. ***Ranunculus chius*** DC. — $2n = 14$.

Gr: Kiklades. Ios, N.N.W. of the highest peak, 36°44'N, 25°20'E, 7 May 1957, *R 2554*; Naxos, 3 km E.N.E. of Mitria (Engares), 37°08'N, 25°28'E, 13 May 1957, *R 2569*.

1179. ***Ranunculus creticus*** L. — $2n = 16$.

Gr: Kiklades. Naxos, 2 km E. of Apiranthos, 400 m, 37°04'N, 25°32'E, 2 May 1957, *R 2055*; Naxos, the chapel N. of Oros Zeus, 600 m, 37°02'N, 25°30'E, 14 May 1957, *R* seeds, *cult.* R-1489.

1180. ***Ranunculus ficaria*** L. subsp. ***chrysocephala*** P. D. Sell — $2n = 32$.

Gr: Kiklades. Kithnos, Driopis, 37°23'N, 24°26'E, 12 Apr 1969, *R, St & G 40569*.

1181. ***Ranunculus marginatus*** Dum.Urv. — $2n = 16$.

Tu: Mugla. Göcik, N. of the town, 36°42'N, 29°06'E, 5 Jun 1967, *R & Be 29506*.

1182. ***Ranunculus muricatus*** L. — $2n = 32$.

Gr: E. Aegean islands. Ikaria, S. of Evthelo, 37°38'N, 26°11'E, 24 Apr 1958, *R & S 6713*.

— Kiklades. Naxos, the beach 3 km N. of Mitria (Engares), 37°08'N, 25°26'E, 18 May 1957, *R 3090*; Naxos, S. of Kato Potamia, 37°05'N, 25°26'E, 29 May 1957, *R 3467*.

1182a. ***Ranunculus muricatus*** L. — $2n = 48$.

Gr: Kiklades. Ios, N.W. of mt. Prof. Elias, 200 m, 36°44'N, 25°20'E, 6 May 1957, *R 2477*; Naxos, 3 km S. of Akr. Axapsis, 37°07'N, 25°25'E, 30 Apr 1957, *R 1931*; Naxos, Axapsis to Mitria (Engares), 37°07'N, 25°26'E, 3 Jun 1957, *R 3838*; Naxos, 2 km E. of Apiranthos, 500 m, 37°04'N, 25°32'E, 2 May 1957, *R 2133*.

The ripe achenes (including the beak) were 6-8 mm long in the hexaploids, while those of the tetraploids were 4-6 mm.

1183. ***Ranunculus sprunerianus*** Boiss. — $2n = 16$.

Gr: Evvia. 3 km W.S.W. of Akr. Kafirevs, 38°08'N, 24°33'E, 22 Jun 1958, *R & S 11695*.

— Kiklades. Iraklia (S. of Naxos), 1 km W. of Ormos Pegadi, 36°50'N, 25°28'E, 10 Apr 1958, *R & S 5423*; Naxos, Koronos Oros, the W. peak, 900-1000 m, 37°08'N, 25°31'E, 30 May 1958, *R & S 9727*; Paros, Mt Prof. Elias, 650 m, 37°02'N, 25°12'E, 18 Jul 1958, *R & S* seeds, *cult.* R-1377; Sifnos, Livadi, 36°56'N, 24°41'E, 9 Apr 1969, *R, St & G 40327*.

1184. ***Ranunculus thasius*** Halacsy — $2n = 16$.

Gr: E. Aegean islands. Ikaria, Mt Atheras, 800 m, 37°38'N, 26°12'E, 12 Jul 1958, *R & S* seeds, *cult.* R-1261.

Endemic to the N. and C. Aegean areas. To my knowledge, the first report for this species.

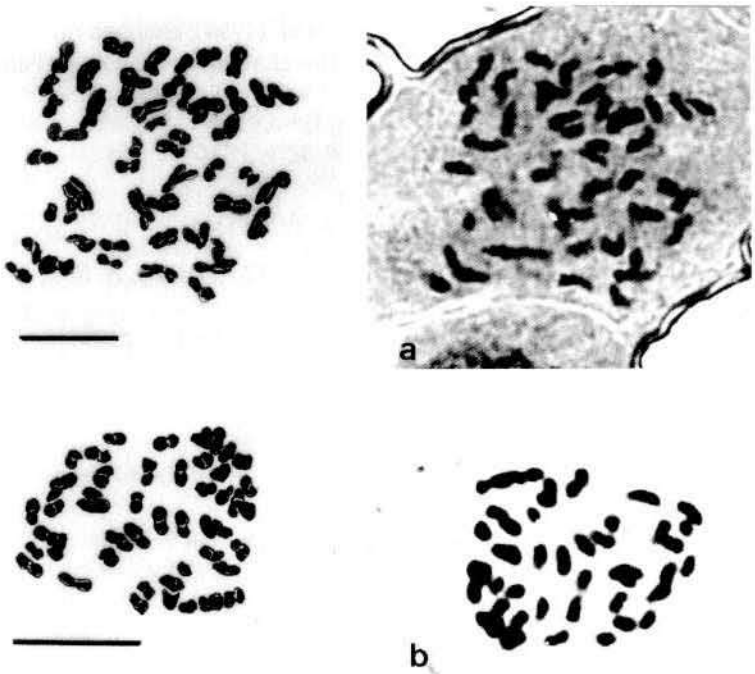

Fig. 1. A photomicrograph and a drawing of somatic metaphase plate of: **a**, *Genista monspessulana*, 2n = 48; **b**, *Genista corsica*, 2n = 48. — Scale bars = 5 µm.

Resedaceae

1185. ***Reseda lutea*** L. subsp. ***lutea*** — $2n = 48$.

Gr: Kiklades. Skinousa (5. of Naxos), 36°52'N, 25°31'E, 9 Jun 1957, *R 4329*.

Saxifragaceae

1186. ***Saxifraga graeca*** Boiss. — $2n$ = c. 50.

Gr: Kiklades. Naxos, E. of Stavros Keramotis, 650 m, 37°06'N, 25°32'E, 4 Apr 1957, *R 750*; Naxos, 2 km S. of Moni, 400 m, 37°04'N, 25°30'E, 1 Apr 1957, *R 624*; Naxos, Oros Zeus, 650 m, 37°03'N, 25°30'E, 23 Mar 1957, *R 336*.

The chromosome number n = 32 has been reported by Larsen & Laegaard (1971) from Sicily for *S.* cf. *graeca*, with the reservation that the leaf shape differs from Greek material available in Copenhagen (C). According to Pignatti (1982, p. 515) *S. graeca* does not

occur in Sicily but instead the closely related, W. Mediterranean *S. carpetana* Boiss. & Reuter. The count by Larsen and Laegaard has apparently by mistake been referred to *S. graeca* (as *S. carpetana* subsp. *graeca*) in Jalas et al. (1999), although the map (no. 3173) shows that *S. graeca* does not occur in Sicily. Therefore the present counts are apparently the first ones for *S. graeca*.

1187. *Saxifraga hederacea* L. — $2n = 36$.

Gr: Kiklades. Kea, 1-3 km S. of Chora, 300 m, 37°38'N, 24°20'E, 16 Apr 1969, *R, St & G 40755*; Kithnos, Kastro, 37°28'N, 24°24'E, 12 Apr 1969, *R, St & G 40534*.

To my knowledge this is the first chromosome reports for the species.

1188. *Saxifraga tridactylites* L. — $2n = 22$.

Gr: Kiklades. Kea, 1-3 km S. of Chora, 37°38'N, 24°20'E, 16 Apr 1969, *R, St & G 40754*.

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Reports (1189-1190) by Tiziana Cusma Velari, Laura Feoli Chiapella & Gianluigi Bacchetta

1189. *Genista monspessulana* (L.) L. Johnson [= *Teline monspessulana* (L.) C. Koch)] — $2n = 46, 48$ (Fig. 1a).

Sa: Mesu e Monte, Romana (Sassari), oligo-miocenic rhyolite, 40°29'N, 8°36'E, 180 m, 6 Oct 1997, *G. Bacchetta* (CAG), s.n.
Lu: Estrada de Loures (Pontes), 38°49'N, 9°10'W, Jul 1989, seeds obtained from Botanical Garden, Lisboa (s.n., s. coll., s. exsicc.).

Genista monspessulana is most frequent in the central Western part of the Mediterranean region and less frequent in the Eastern part; it is present also in Portugal and in the Açores. It grows in the "maquis" and open *Quercus ilex* woods (Gibbs 1968, Gibbs & Dingwall 1971, Pignatti 1982, Greuter & al. 1989).

Our chromosome count was $2n = 46, 48$. Chromosome size ranges between 0.67 and 2.85 µm. De Castro (1949) counted $2n = \pm 46$ and $2n = 48$, respectively sub *Cytisus monspessulanus* L. and *C. candicans* (L.) Lam., in cultivated material from the Botanical Garden of Coimbra. Sañudo (1973) reported $n = 23$ in populations from Los Barrios (Cádiz, Spain). On the other hand, Fernandes & Santos (1975) found $2n = 48$ in populations from Porto, Lordalo do Ouro (Portugal).

Some authors (Gibbs 1966, 1968, Gibbs & Dingwall 1971, Pignatti 1982, del Arco Aguilar, 1983) prefer to maintain the individuality of the genus *Teline* Medic. for the copresence of "*Genista*-characters" (upper lip of the calyx deeply bifid, keel oblong, leaf with three vascular traces at the node) and of "*Cytisus*-characters" (leaves trifoliolate, usually petiolate, seeds strophiolate). Others (Polhill 1976, Greuter & al. 1989) have chosen

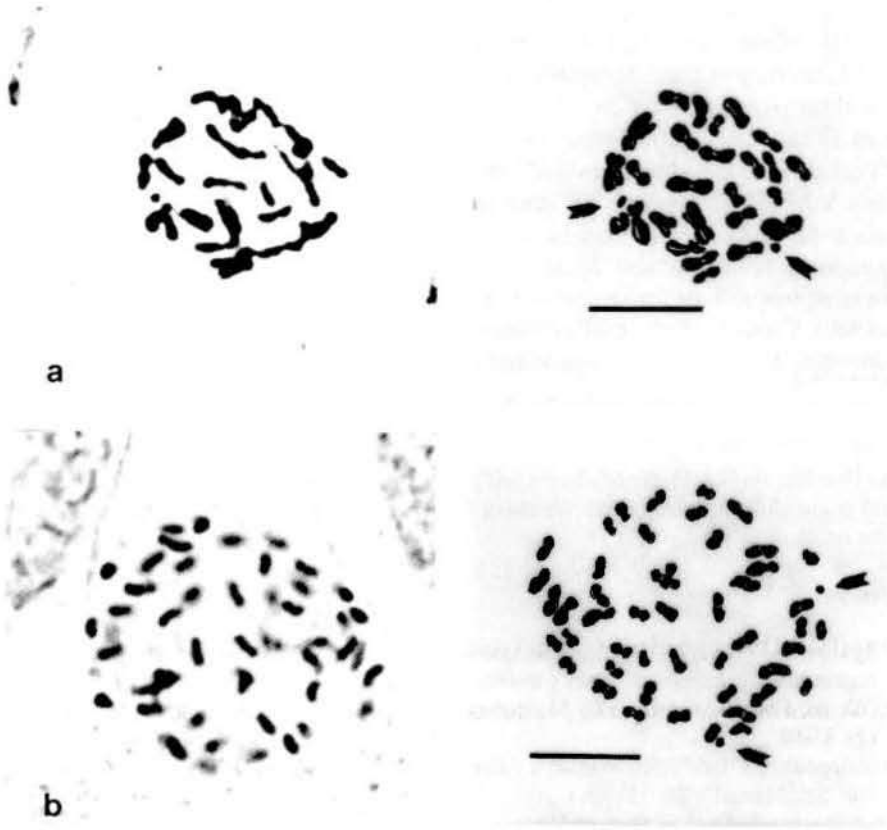

Fig. 1. A photomicrograph and a drawing of somatic metaphase plate of: **a**, *Genista cephalantha* subsp. *cephalantha*, 2n = 26 + 2B; **b**, *Genista tricuspidata*, 2n = 48 + 2B. —Arrows indicate B-chromosomes. Scale bars = 5 µm.

to include it in *Genista* L.

The centre of distribution of this group is in the Canary Islands, some species being present also in the Madera and Açores Islands, and in the Mediterranean region, particularly in the Western part. *Genista monspessulana* is the most widely distributed species, the only other species present in Europe, according to Gibbs (1968) and Gibbs & Dingwall (1971), being *Genista linifolia* L. [=*Teline linifolia* (L.) Webb et Berth.]. Talavera & Gibbs (1999) have recently added to the genus *Teline* also *T. patens* (DC.) Talavera & P.E. Gibbs and *T. tribracteolata* (Webb) Talavera & P.E. Gibbs, which are endemic to Eastern and Southern Spain respectively and were previously placed by Frodin & Heywood (1968) and Polhill (1976) in *Cytisus* Desf.

1190. *Genista corsica* (Loisel.) DC. — $2n = 48$ (Fig. 1b).

Sa: Pranedda, Pula (Cagliari), granite, 39°2'N, 8°50'E, 760 m, 1 Jul 1998, *G. Bacchetta* (CAG), s.n.

— Sassari, Baldedda, 40°44'N, 8°34'E, 225 m, 12 Jul 1989, *S. Diana Corrias*, s.n.

Genista corsica is endemic to Corsica and Sardinia, where it is widely distributed at various altitudes (Gibbs 1966, Valsecchi 1977).

The chromosome number $2n = 48$, based on 30 metaphase plates, confirms existing references. In fact, Contandriopoulos (1957, 1962) reports $2n = 48$ for plants originated from the "Fort génois, Col de Vizzavona", from the "Défilé de l'Inzecca" and from Zonza (Corse); Villa (1978) counted the same somatic number on samples from Cala Gonone, Codula di Sisine (Sardinia). Chromosome size ranges between 0.77 and 2.42 μm.

The species belongs to sect. *Scorpioides* Spach. The chromosome number $2n = 48$ is by far the most frequent for the species of this section: *Genista ferox* Poiret (Tschechow 1931, Villa 1980), *G. morisii* Colla (Villa & Sanna 1983), *G. cadasonensis* Valsecchi (Villa 1988) e *G. ifniensis* A. Caballero (Cusma Velari & al. 1999).

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Reports (1191-1192) by Tiziana Cusma Velari, Laura Feoli Chiapella & Vera Kosovel

1191. ***Genista cephalantha*** Spach subsp. ***cephalantha*** — $2n = 26 + 2B$ (Fig. 1a).

Ma: Nador-Melilla, clearing in a Mediterranean wood, 35°16'N, 2°58'W, 200 m, 25 Jul 1989, *L. Feoli Chiapella et E. Feoli* (TSB), s.n.

Genista cephalantha Spach subsp. *cephalantha* grows on the coastal ranges of Morocco and Western Algeria (Quezel & Santa 1962, Raynaud 1979, Maire 1987).

A chromosome number of $2n = 26 + 2B = 28$, based on 7 metaphase plates, was found;

chomosome size ranges between 0.66 and 2.64 µm, 0.33 – 0.44 µm for B chromosomes. There are no references to our knowledge regarding the caryological data of this taxon. This number may be considered a case of hyperaneuploidy (ascending aneuploidy), the basic number being x=12. There are no reports of $2n = 26$ for taxa of *Genista*. Very few cases have been found of $n = 26$, $2n = 52$, such as in *G. aetnensis* (Biv.) DC., in populations of both Sardinia and Sicily (Forissier 1973, Villa 1988, Cusma Velari & al. 1997).

Genista cephalantha Spach subsp. *cephalantha* belongs to sect. *Cephalospartum* Spach. The section has a Western Mediterranean distribution. It includes six species limited to Northern Africa, from Morocco to Libya (Greuter & al. 1989): *G. capitellata* Cosson, *G. cephalantha* Spach, *G. clavata* Poiret, *G. demnatensis* Murb. [= *G. cephalantha* subsp. *demnatensis* (Murb.) C. Raynaud], *G. microcephala* Cosson & Durieu, *G. quadriflora* Munby and *G. umbellata*, which is the only species present in Europe (Gibbs 1966). The latter is, so far, the only karyologically studied taxon within the section. The chromosome numbers $n = 23$, $2n = 46$ were counted by Sañudo (1973) and Cusma Velari & al. (1998), $2n = \pm 42$ by Santos (1944-45).

1192. *Genista tricuspidata* Desf. [= *Genista lucida* Camb., *G. tricuspidata* var. *lucida* (Camb.) O. Bolòs & Molin.] — $2n = 48 + (0\text{-}4B)$ (Fig. 1b).

BI: Mallorca, between Andratx and Sant Telm, clearing in a Pine wood, 39°33' N, 2°22' E, 100 m, 2 Aug 1999, *L. Feoli Chiapella et E. Feoli* (TSB), s.n.

— Mallorca, NE-Küste, Cabo Capdepera, 39°41'N, 3°26'E, *Royl*, seeds obtained from Botanical Garden, Berlin-Dahlem (s.n., s. exsicc.).

Genista lucida was considered as endemic to the island of Mallorca by Knoche (1922), Gibbs (1966), Bonafè Barceló (1978). Peris & Stübing (1985) indicate that the species also occurred in Southeastern continental Spain (Cabo Moraira, Alicante). Recently Talavera (1999) established the identity of *G. lucida* with *G. tricuspidata*, already suggested by Gibbs (1966) and Maire (1987) as endemic to Northwestern Africa (Morocco, Algeria and Tunisia).

A chromosome number of $2n = 48 + (0\text{-}4B)$, based on 22 metaphase plates, was counted; chromosome size ranges between 0.88 and 2.09 µm, 0.44 µm for B chromosomes. These are the first chromosome data obtained from material deriving from the European populations of the species; Cusma Velari & al. (1999) have counted $2n = 48$ for Moroccan populations (Beni-Snassen, Imi-n-Ifri).

Genista tricuspidata belongs to sect. *Voglera* (Gaertn., May. & Schreb.) Spach. The chromosome number $2n = 48$ was reported in several taxa of this section: *G. hirsuta* Vahl (Sañudo 1972, Gallego Martín & al. 1986), *G. aristata* C. Presl (Cusma Velari & Feoli Chiapella 1991), *G. cupanii* Guss. (Bartolo & al. 1977), *G. anatolica* Boiss. (Krusheva 1975), *G. carinalis* Griseb. (Kuzmanov 1975) and *G. germanica* L. [Reese 1952, Semerenko & Shvet 1989 (after Goldblatt & Johnson 1991)].

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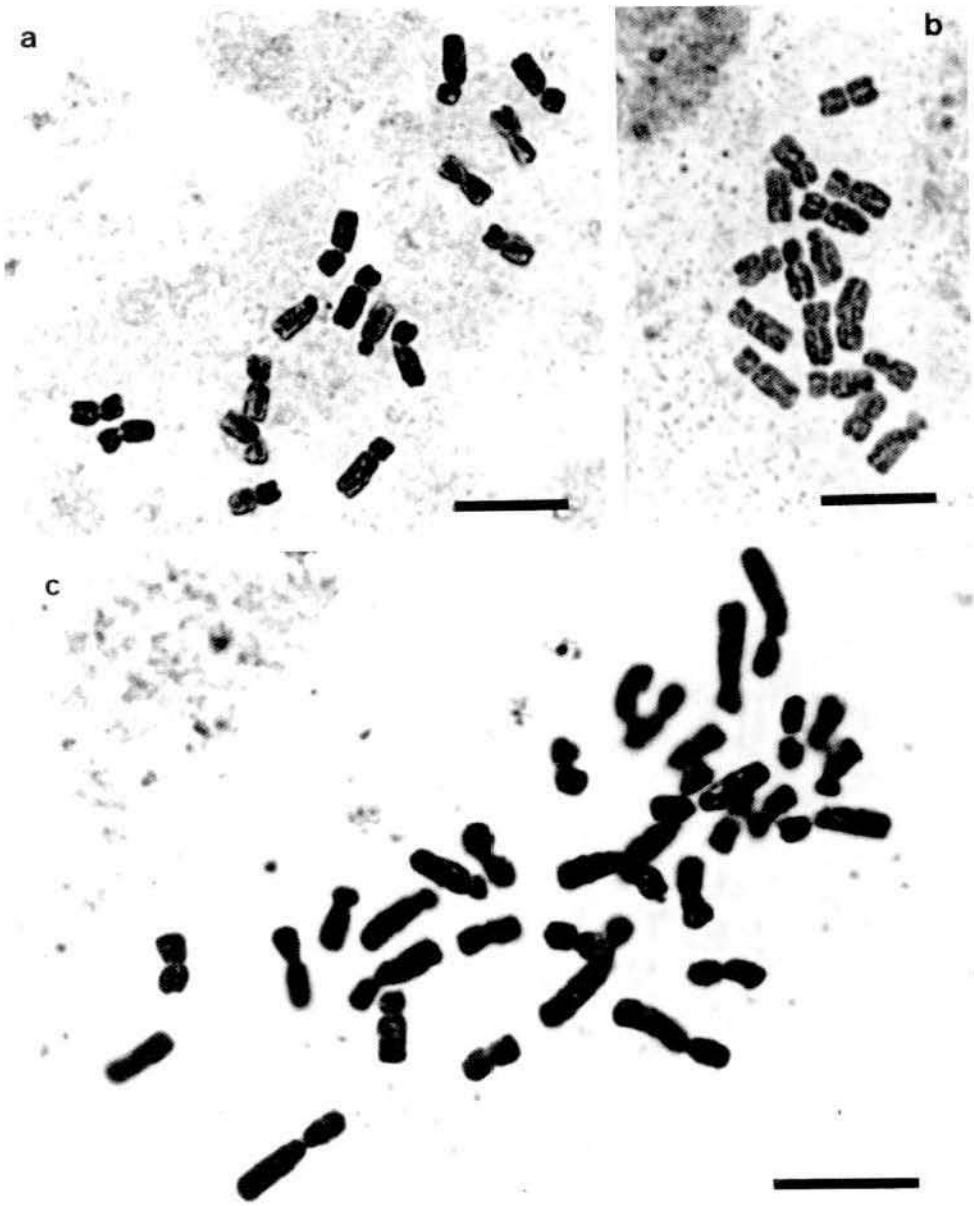

Fig. 1. Methaphase plates of: **a**, *Anchusa crispa* subsp. *crispa*, $2n = 16$; **b**. *Anchusa procera* , $2n = 16$; **c**, *Anchusa pusilla* , $2n = 32$. — Scale bars = 10 µm.

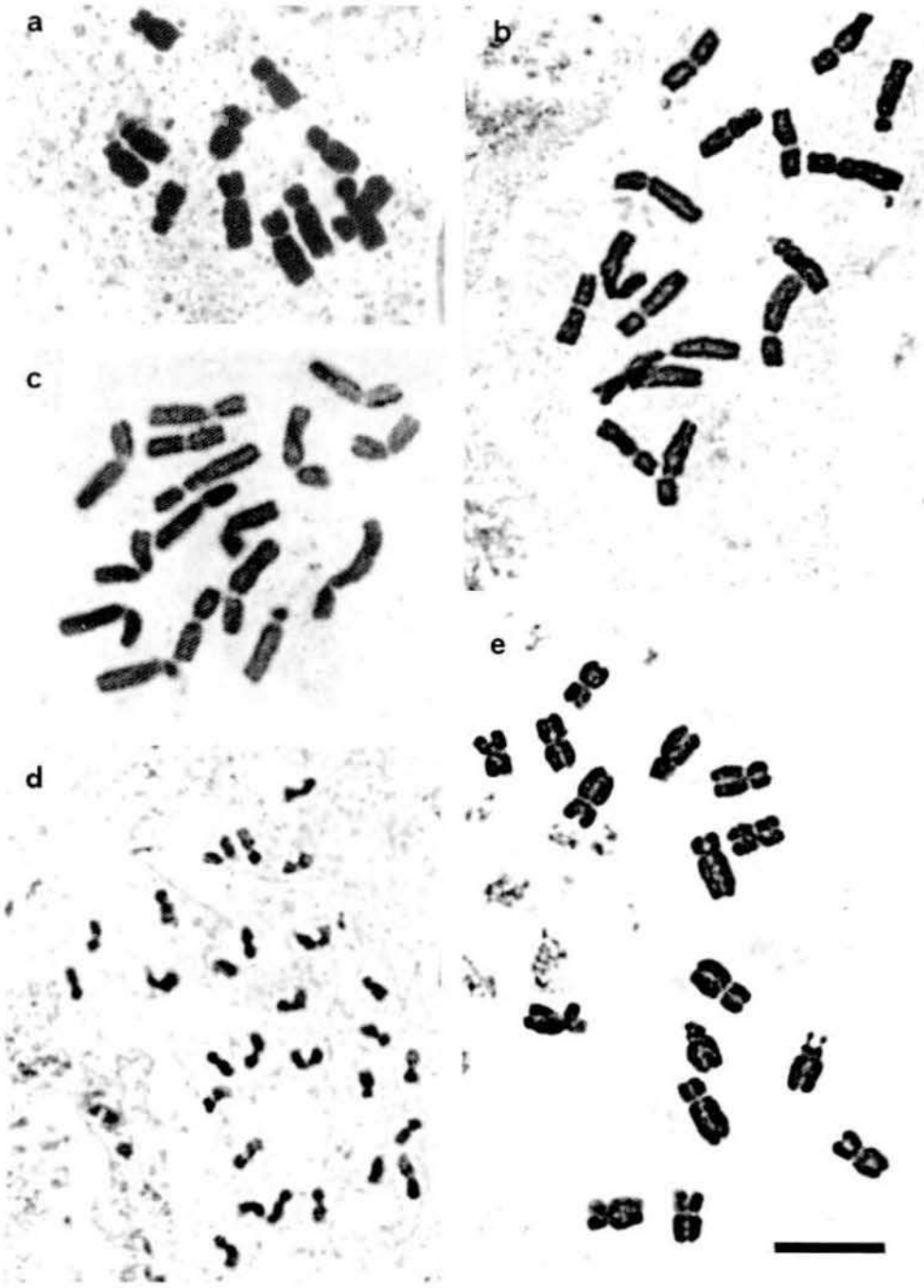

Fig. 2. Methaphase plates of: **a**, *Anchusa thessala*, $2n = 12$; **b**, *Anchusa undulata* subsp. *hybrida*, $2n = 16$; **c**, *Anchusa capellii*, $2n = 16$; **d**, *Pulmonaria rubra*, $2n = 28$; **e**, *Lycopsis orientalis*, $2n = 16$. — Scale bar = 10 µm.

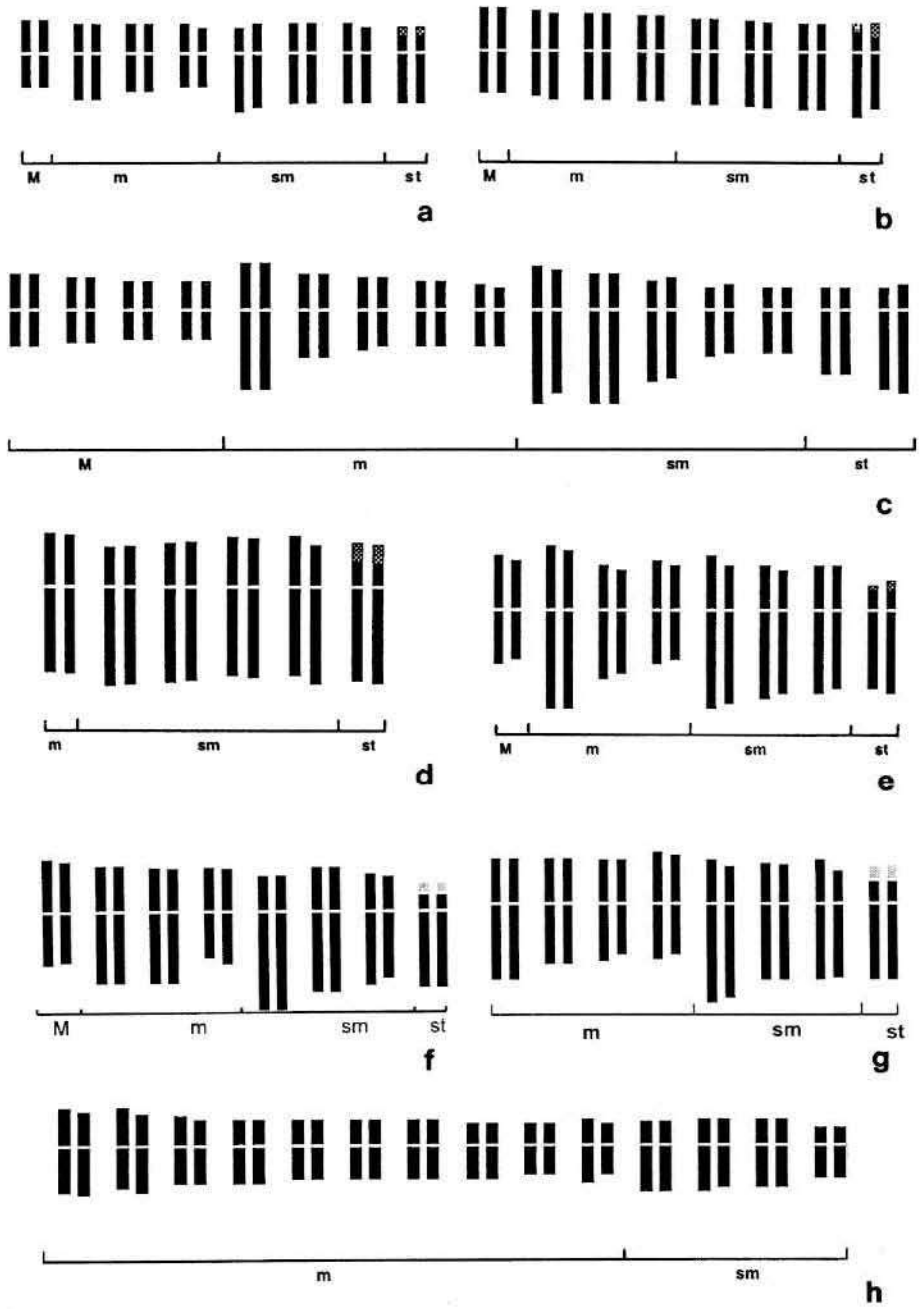

Fig. 3. Idiograms of: **a**, *Anchusa crispa* subsp. *crispa*; **b**, *Anchusa procera*; **c**, *Anchusa pusilla*; **d**, *Anchusa thessala*; **e**, *Anchusa undulata* subsp. *hybrida*; **f**, *Anchusa capellii*; **g**, *Lycopsis orientalis*; **h**, *Pulmonaria rubra*.

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Reports (1193-1200) by Massimo Bigazzi, Graziana Fiorini & Federico Selvi

1193. ***Anchusa crispa*** Viv. subsp. ***crispa*** — $2n = 16$ (Figs. 1a, 3a).

It: Sardinia, Gallura (SS), retrodunal areas of the beach "La Marinedda", Isola Rossa, 41°1'N, 8°53'E, 4 Jul 1998, *Selvi 98.001* (FI).

Karyotype formula: $2n = 2x = 2M + 6m + 6sm + 2st\text{-}SAT = 16$. This number matches previous findings on ssp. *crispa* from Sardinia and Corsica (Contandrioupolos 1962), and on ssp. *maritima* from Sardinia (Valsecchi 1976, Selvi & Bigazzi 1998). However, there are some differences in the chromosome morphology of this population in respect of the other examined provenances of the two above-mentioned subspecies. This karyotype polymorphism is consistent with the high degree of morphological variation shown by this Cyrno-Sardinian psammophytic endemic, which is still in active evolution.

1194. ***Anchusa procera*** Besser ex Link — $2n = 16$ (Figs. 1b, 3b).

Gr: Evros, Nom. Orestiadas, sandy fields along the river Ardas close to Rizia, ca. 80 m, 41°36'N, 26°22'E, 24 Jun 1999, *Bigazzi & Selvi 99.014* (FI).

Karyotype formula: $2n = 2x = 2M + 6m + 6sm + 2st\text{-}SAT = 16$. *A. procera* belongs to the group of *A. officinalis* L. ($2n = 16$), and is mainly distributed in SE Europe. This count confirms a previous report from NE Greece (Strid 1980).

1195. ***Anchusa pusilla*** Gu°ul. — $2n = 32$ (Figs. 1c, 3c).

Tu: B5 Nevsehir, fallow fields around Ürgüp, ca. 1100 m, 38°42'N, 35°56'E, 4 Jun 1997, *Bigazzi & Selvi 97.018* (FI).

Karyotype formula: $2n = 4x = 8M + 10m + 10sm + 4st = 32$. This is the first report for *A. pusilla*, an annual species stretching from European Turkey to central Anatolia. *A. pusilla* is related to the perennial *A. azurea* Mill. (*A. italica* Retz.), a widespread mediterranean species with a tetraploid complement of $2n = 32$ chromosomes (D'Amato & Trojani 1985). The complement of *A. pusilla* differs from that of *A. azurea* in the absence of SAT- chromosomes.

1196. ***Anchusa thessala*** Boiss. & Spruner — $2n = 12$ (Figs. 2a, 3d).

Tu: A1 Edirne, ruderal places along the road between Lüleburgaz and Babaeski, sandy soil, ca. 40 m, 41°25'N, 27°15'E, 11 Jun 1997, *Bigazzi & Selvi 97.022* (FI).

Karyotype formula: $2n = 2x = 2m + 8sm + 2st\text{-}SAT = 12$. This count confirms previ-

ous reports from Bulgaria (Markova 1983, Markova & Goranova 1995). However, tetraploid and hexaploid cytotypes with $2n = 24$ and 36 have been reported, respectively, in plants from Romania (Tarnavschi 1948) and Bulgaria (Markova 1983). All these findings confirm the base chromosome number $x = 6$, which is unique within the genus *Anchusa* s.l. and the lowest one in the Boraginaceae (Britton 1951).

1197. ***Anchusa undulata*** L. subsp. ***hybrida*** (Ten.) Bég. — $2n = 16$ (Figs. 2b, 3e).

Tu: B5 Yozgat, ruderal places along the road to Sorgun, ca. 1150 m, 39°11'N, 35°6'E, 4 Jun 1997, *Bigazzi & Selvi 97.010* (FI).

Karyotype formula: $2n = 2x = 2M + 6m + 6sm + 2$ st-SAT = 16. This report is the first one for Turkey and confirms previous counts from other Mediterranean countries (Smith 1932, Valsecchi 1976, Capineri & al. 1978, Strid 1991, Markova & Goranova 1995, Selvi & Bigazzi 1998). A high degree of karyotype stability occurs in this polymorphic and widespread Mediterranean taxon.

1198. ***Anchusa capellii*** Moris — $2n = 16$ (Figs. 2c, 3f).

It: Sardinia, Esterzili (NU), rock fissures and stony pastures on the summit of Monte Santa Vittoria, ca. 1200 m, 39°44'N, 9°18'E, 30 May 1999, *Bacchetta & Selvi* 99.002 (FI, CAG).

Karyotype formula: $2n = 2x = 2M + 6m + 6sm + 2$st-SAT = 16. A previous count from the same locality, which is the only one known for this endemic species, is here confirmed (Valsecchi 1976, Selvi 1998, Selvi & Bigazzi 1998). The complement here observed, however, differs from the previous one in the presence of 2 M and 8 (rather than 6) sm chromosomes.

1199. ***Pulmonaria rubra*** Schott — $2n = 28$ (Figs. 2d, 3h).

Gr: E. Makedonia, Dráma, Mt Rhodopi, montane woods near the village of Prasinadas (Paranésti), ca. 1350 m, 41°13'N, 24°31'E, 26 Jun 1999, *Bigazzi & Selvi 99.025* (FI, culta).

Karyotype formula: $2n = 4x = 20m + 8sm = 28$. This tetraploid complement does not match the diploid number $2n = 14$ reported for Bulgarian and Greek provenances. This taxonomically critical species mainly occurring in S.E. Europe (Markova & Ivanova 1970; Strid & Franzén 1983).

1200. ***Lycopsis orientalis*** L. — $2n = 16$ (Figs 2e, 3g).

Heterotypic synonym of this species is *Anchusa ovata* Lehm.; homotypic synonyms are *Anchusa arvensis* (L.) M.Bieb. subsp. *orientalis* (L.) Nordh., *A. orientalis* (L.) Reichenb. fil. and *Lycopsis arvensis* L. subsp. *orientalis* (L.) Kuzn.

Tu: A9 Kars, fallow fields around the eastern shores of the Cildir Gölu, igneous

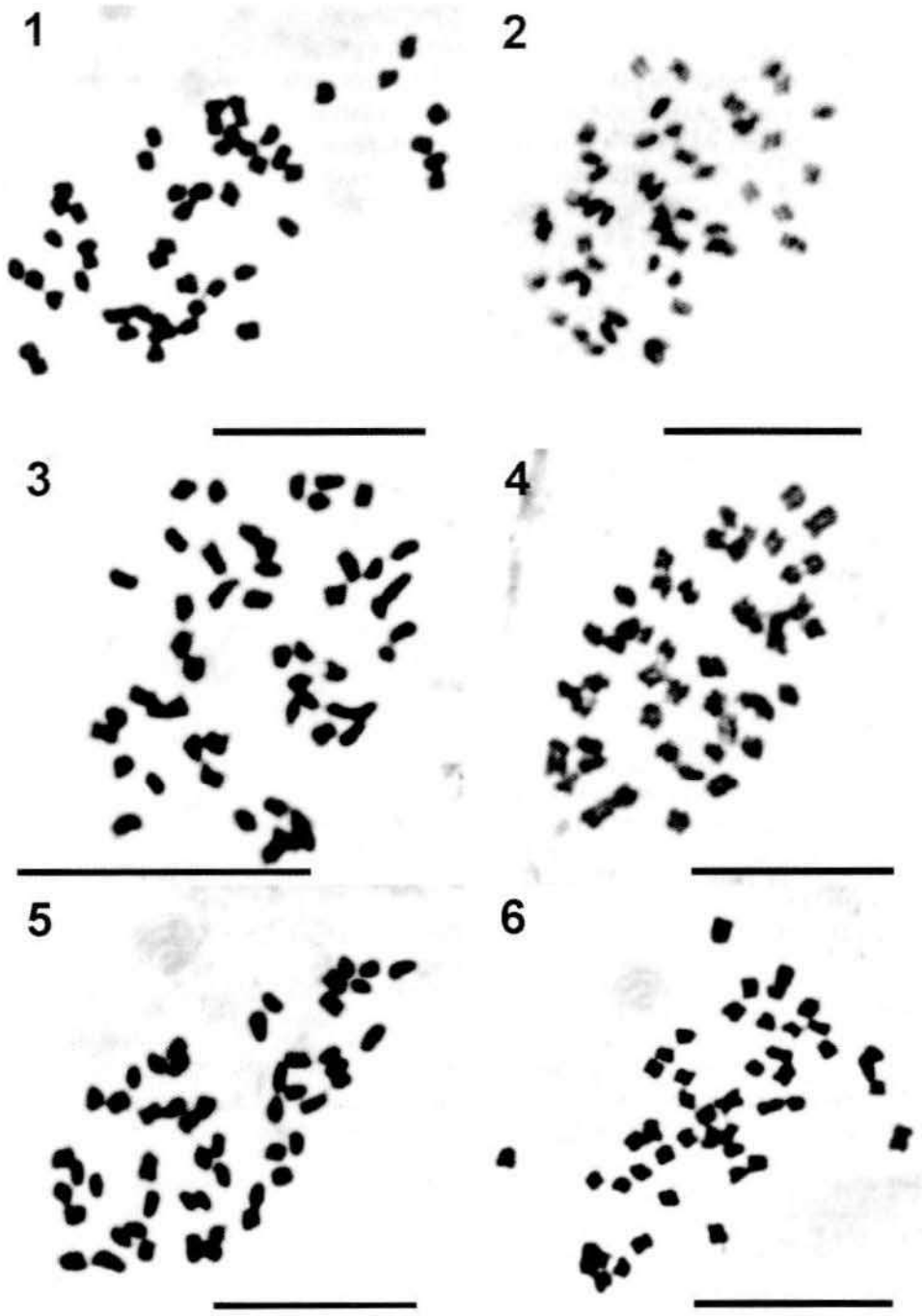

Fig. 1-6. Mitotic metaphase plates of : **1,** *Argyrocytisus battandieri*, 2*n* = 50; **2,** *Chamaecytisus mollis*, 2*n* = 50; **3,** *Cytisus fontanesii* subsp. *plumosus*, 2*n* = 50; **4,** *Cytisus grandiflorus* subsp. *barbarus*, 2*n* = 46; **5,** *Cytisus villosus*, 2*n* = 52; **6,** *Genista monspessulana*, 2n = 46. — Scale bars = 10 µm.

soil, ca. 1850 m, 41°4'N, 43°19'E, 27 May 2000, *Bigazzi & Selvi* 00.10 (FI).

Karyotype formula: $2n = 2x = 8m + 6sm + 2st\text{-}SAT = 16$. This count confirms a previous report from cultivated plants of unknown geographic origin (Strey 1931). The diploid number of this W. Asiatic species supports its separation, at the species rank, from the related *L. arvensis*, of which was considered as subspecies by several authors. *L. arvensis* has a Central-European distribution and an hexaploid chromosome complement of $2n = 6x = 48$ (Gadella & Kliphuis 1970, Bigazzi & al. 1997). In both taxa, karyotype morphology is very similar to most *Anchusa* species.

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Reports (1201-1207) by Hikmat Tahiri & Paloma Cubas

1201. ***Argyrocytisus battandieri*** (Maire) C. Raynaud — $2n = 50$ (Fig.1).

Ma: Moyen Atlas, sur la route entre Azrou et Timahdite, 33°20'N, 5°11'W, 1800 m, 20 Sep 1998, *Tahiri*, RAB62163. - (Fig. 1)
— Rif, jbel Tizirène, 35°01'N, 4°56'W, 1800 m, 14 Sep 1997, *Tahiri*, RAB62169.

The monotypic genus *Argyrocytisus* is an endemic of the Middle Atlas and the Rif Mountains of Morocco. We have counted $2n = 50$ chromosomes in root mitosis of both populations. These are the first data obtained from wild populations and agree with the only previous report (Castro 1949) on plants growing at the Hortus Bot. of Moorestwon.

1202. ***Chamaecytisus mollis*** (Cav.) Greuter & Burdet — $2n = 50$ (Fig. 2).

Ma: Maroc atlantique moyen, entre Bir Jdid et Souk el Tnine, 33°20'N, 8°06'W, 17 May 1998, *Tahiri*, RAB62153.

Is an endemic species of the southern and central-western Morocco. The occurrence of this species in the Canary Islands is doubtful (Francisco-Ortega & al. 1992). No previous data on the chromosome number of this taxon have been reported. We counted $2n = 50$ chromosomes in mitosis from root meristems.

1203. ***Cytisus arboreus*** (Desf.) DC. subsp. ***baeticus*** (Webb) Maire — $2n = 50$.

Ma: Rif, 18 Km avant Bab Berred en direction d'Issaguène, 34°59'N, 4°46'W, 6 Jul 1998, *Tahiri*, RAB62168.
— Maroc atlantique moyen, forêt de Benslimane, 33°36'N, 7°07'W, 21 May 1998, *Tahiri*, RAB62133.

C. arboreus is restricted to Morocco, Algeria, the Iberian Peninsula and France. In Morocco, populations growing in different regions have been recognised as different subspecies: subsp. *arboreus* (northeast), subsp. *catalaunicus* (Rif, High and Middle Atlas) and subsp. *baeticus* (more widely distributed). Our previous data from these three subspecies in Morocco, indicated $2n = 50$ (Cubas & al. in press). We report data from two new populations of subsp. *baeticus*, which also show $2n = 50$ in root mitosis. These data differ from the only previous report of this taxon ($2n = 48$, $n = 24$ bivalents) given by Sañudo 1973a, obtained from a Spanish sample.

1204. ***Cytisus fontanesii*** Ball subsp. ***plumosus*** (Boiss.) Nyman. — $2n = 50$. (Fig. 3).

Ma: Moyen Atlas, entre Imouzzer du Kandar et Ifrane, 33°48'N, 5°06'W, 1500 m, 27 Jul 1998, *Tahiri*, RAB62146.

C. fontanesii is restricted to Morocco, Algeria and the south and east of Spain. In Morocco, different taxa have been classified either at the varietal (Maire 1987) or subspecif-

ic rank based on the indument morphology. *C. fontanesii* subsp. *plumosus*, which shows long patent hairs, grows in the Middle Atlas and Rif Mountains. This is the first count of the chromosome number of the this taxon , and agrees with previous studies ($n = 25$ bivalents) given by Sañudo (1973b) carried out on plants from Spain which belong to the subsp. *fontanesii*.

1205. ***Cytisus grandiflorus*** (Brot.) DC. subsp. ***barbarus*** (Jahandiez & Maire) Maire — $2n = 46$ (Fig. 4).

Ma: Haut Atlas, jbel Oukaimeden, 31°13'N, 7°51'W, 2250 m, 8 Jul 1999, *Tahiri*, RAB62121.

C. grandiflorus is restricted to Morocco and the Iberian Peninsula. In Morocco, two subspecies are recognised (Maire 1987): subsp. *haplophyllus*, an endemic of the Eastern Rif (jbel Gourougou) and subsp. *barbarus*, widespread in the northwest of Morocco. We counted $2n = 46$ in root mitosis in a sample belonging to subsp. *barbarus*. Our report agrees with previous data for both subspecies from other Moroccan localities (Cubas & al. in press). However, these data differ from the reported chromosome numbers for susbp. *grandiflorus* in samples from Portugal and Spain, which indicated different chromosome numbers: $2n = 24$, $2n = 48$ or $n = 24$ (Castro 1949, Fernandes & Santos 1971, Sañudo 1973a, Horjales 1974, Fernandes & al. 1977, Fernandes & Queiros 1978, Talavera & Arista 1995). Only Gilot (1965) had previously found $2n = 46$.

1206. ***Cytisus villosus*** Pourret — $2n = 50, 52$ (Fig. 5).

Ma: Moyen Atlas, jbel Tazekka, 34°03'N, 4°09'W, 3 Jul 1999, *Tahiri*, RAB62155.
— Rif, entre Bab Taza et Bab Berred, 35°04'N, 5°03'W, 6 Jul 1998, *Tahiri*, RAB62157.

This species is distributed in the Mediterranean area, from the northwest of Africa, the northeast of the Iberian Peninsula, the south of France, Italy, and finally to the Balkan Peninsula and Turkey. The first sample shows 2n = 52 in root mitosis. Exceptionally, $2n = 50$ were found in cells from a single root. The second sample shows $2n = 50$ in all the studied roots.

Previous reports indicate two different chromosome numbers for this species. Sañudo (1973a) found $2n = 48$ in a sample from Spain, and the same number was obtained in samples from Sardinia (Cusma Velari & al. 1999). Forissier (1975) indicated $n = 25$ in a sample from Italy, and Troia & al (1997) 2n = ca. 48 in samples from Sicily (Italy).

Our results, the first obtained in material from Morocco, show variation in the chromosome number of *C. villosus* and add a third chromosome number to this taxon.

1207. ***Genista monspessulana*** (L.) L. Johnson — $2n = 44, 46$ & $n = 22$ (Fig. 6).
Ma: Rif, entre Bab Taza et Bab Berred, 34°59'N, 4°45'W, 6 Jul 1998, *Tahiri*, RAB62170.
— Maroc atlantique nord, forêt au sud de Larache, 35°38'N, 6°08'W, 29 May 1998, *Tahiri*, RAB62161.

This taxon is widely distributed in North Africa and the south and central Europe, extending also into Asia. No data are available for Moroccan plants. The only previous records of the chromosome number of this species are from the Iberian Peninsula ($2n = \pm 46$, by Castro 1949, sub *C. monspessulanus*; $2n = 48$ by Fernandes & Santos 1975; and $n = 23$ by Sañudo 1973c). We have found $2n = 46$ chromosomes in root mitosis of both samples. However, in the second population there are also plants which show $2n = 44$ chromosomes in root mitosis and $n = 22$ bivalents at meiotic metaphase.

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Reports (1208-1212) by Dolja Pavlova & Anita Tosheva

1208. ***Ononis pusilla*** L. — $2n = 30$ (Fig. 1).

Bu: Thracian plain, Besapara hills, calcareous terrains near to Ognjanovo village, 42°07' N, 24°28' E, 150 m a.s.l., 23 Jul 1998, *D. Pavlova*, (SO 97805).

The distribution range of this species covers South Europe, the Mediterranean, the Caucasus Mts. and Southwest Asia. This species is rarely distributed in Bulgaria up to 1000 m a.s.l..(Kuzmanov 1976, Kozuharov 1992).

The chromosome number $2n = 30$ studied here confirms previous data from Bulgaria (Kuzmanov & Markova 1973) and from Portugal (Fernandes & Queiros 1978). Other existing cytotypes (Majovsky 1970) give us reason to comprehend number $2n = 30$ as an aneuploid ($2n = 4x-2 = 30$). The arm index (R = L/S) shows chromosomes of metacentric and submetacentric types. The chromosome size is varied between 3.2 mm and 5.2 mm. The ratio X^{max} : X^{min} is 1.75:1. The karyotype is symmetrical consisting of $2n = 22m + 8sm$ chromosomes.

1209. ***Ononis adenotricha*** Boiss. — $2n = 16 + 2B$ (Fig. 2).

Bu: Thracian plain, Besapara hills, calcareous terrains near to Ognjanovo village, 42°07' N, 24°28' E, 150 m a.s.l., 23 Jul 1998, *D. Pavlova*, (SO 97804).

The distribution range of this species covers the Balkan peninsula, Turkey, Syria and Lebanon (Kuzmanov 1976). This plant is included in the Red Data Book of Bulgaria with category "rare" (Velchev 1984).

The chromosome number for this population is $2n = 2x = 16 + 2B$. A previous investigation of Kuzmanov & Markova (1973) yielded $2n = 16$.

The karyotype consists of $2n = 2x = 8m + 6sm + 2sm\text{-}SAT + 2B$. It differs from the

count $2n = 2x = 4m + 6sm + 4a + 2a\text{-SAT}$ of Kuzmanov & Markova (l.c.) who found acrocentric chromosomes.

The arm index shows chromosomes of metacentric and submetacentric types. The chromosome size is varied between 4.0 mm and 6.4 mm. The ratio $X^{max} : X^{min}$ is 1.6 : 1. In all metaphase plates a pair of submetacentric chromosome with satellites is found. The satellites are small, ball-shaped and connected to the short arm of the chromosome. A pair of B-chromosomes is also observed. This pair is distinguished from other chromosomes being much shorter and probably of submetacentric type.

1210. ***Ononis arvensis*** L. — $2n = 30$ (Fig. 3).

Bu: Rila Mts, Eleshnitza village, close to *Quercus cerris* forest, 42°08' N, 23°15' E, 650 m a.s.l., 23 Jul 1998, *A. Tosheva*, (SO 99785).

The distribution range of this species covers Europe, the Caucasus Mts, Central and Southwest Asia, and India. This species is widespread in the Bulgarian flora up to 1600 m a.s.l. (Kuzmanov 1976, Kozuharov 1992)

The chromosome number $2n = 30$ confirms the data of Moriset (1978) and Magulaev (1980) for populations from South Europe and Russia. The numbers $2n = 32$ and $2n = 24$ were reported by Chuksanova (1967) and Kuzmanov & Markova (1973).

The chromosomes are small and the position of the centromeres is not expressed in most of them. (Fig. 3) The chromosome size is between 2.4 mm and 4.8 mm. The ratio $X^{max} : X^{min}$ is 2 : 1. A typical division of the chromatides in some chromosomes is observed. Taking into account the basic chromosome number x = 8 the count $2n = 30$ is considered as a result of descending aneuploidy.

1211. ***Melilotus alba*** Med. — 2 = 16 (Fig. 4, 5).

Bu: Black Sea Coast, the town of Balcik, 43°22¢ N, 28°09¢ E, 31 Jul 1999, *A. Tosheva*, (SO 100288)

— Sofia region, western part of the city of Sofia, 42°28¢ N, 23°12¢ E, 500 m a.s.l., 28 Jul 1999, *A. Tosheva*, (SO 100 289).

This species is widespread in Europe, Bulgaria also included (Kozuharov 1976, 1992).

The chromosome number $2n = 16$ confirms previous investigations (see Fedorov 1969: 310, Shopova & Sekovski 1982a: 11, Goldblatt 1981: 247, 1984: 188, 1985: 97, 1988: 109, Goldblatt & Johnson 1990: 90, 1991: 106, 1994: 100, 1996: 117 for references). The numbers $2n = 24$ (Atwood 1936) and $2n = 32$ (Lesins 1952, Raghuvanshi & al. 1980) are polyploid variants on the basis of x=8.

The karyotypes of the two investigated populations are similar. They are symmetrical. The only difference is a pair of submetacentric chromosomes with satellites found in the population from Sofia (Fig. 5). The karyotypes consist of $2n = 2x = 10m + 4sm + 2\ sm\text{-SAT} = 16$ chromosomes (Sofia population) and $2n = 2x = 10m + 6sm = 16$ (Balcik population). The arm index (R=L/S) shows metacentric and submetacentric chromosomes. The chromosome size from Sofia population is ranged between 7.2 mm and 8.8 mm with

approximately minor differences in length between the longest and shortest chromosome (X^{max} : X^{min} is 1.2 : 1). This ratio is 1.6 : 1 for the population from Balcik.

1212. ***Melilotus officinalis*** (L.) Pall. — 2 = 16 (Fig. 6).

Bu: Black Sea Coast, the city of Varna, St. Konstantin resort, 43°12¢ N, 27°53¢ E, 27 Jul 1999, *A. Tosheva*, (SO 100300).

This species is widespread in Europe, the Caucasus Mts, the Mediterranean, Central and Southwest Asia. It is also common in Bulgaria (Kozuharov 1976, 1992).

The chromosome number $2n = 16$ is reported for the first time for population from Bulgaria.

This chromosome number confirms previous counts (see Fedorov 1969: 310, Goldblatt 1981: 248; 1988: 109, Goldblatt & Johnson 1990: 90, 1991: 106, 1994: 100, 1996: 117 for references). A tetraploid chromosome number ($2n = 32$) is reported by Lesins (1952).

The arm index (R = L/S) gives reasons to consider the chromosomes being of metacentric and submetacentric types. One of the submetacentric pairs has small ball-shaped satellites. Two pairs with loose centromeres are found in all metaphase plates. This is most probably the reason for the observed division of the chromosome arms. The karyotype is slightly asymmetrical. It consists of $2n = 2x = 10m + 4sm + 2sm\text{-}SAT = 16$ chromosomes. This karyotype differs mainly from the result of Shopova & Sekovski (1982b) by the smaller number of metacentric chromosomes (1 pair) and the higher number of submetacentric chromosomes (7 pairs). The chromosome sizes are between 4.8 mm and 8.8 mm. The ratio X^{max} : X^{min} is 1.8 : 1.

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Figs. 1-6. Mitotic metaphase plates of: **1**, *Carex ferruginea*, **a**, $2n = 38$; **b**, $2n = 40$; **2**, *C. firma*, $2n = 34$; **3**, *C. halleriana*, $2n = 50$; **4**, *C. hordeistichos*, $2n = 54$; **5**, *C. melanostachya*, $2n = 76$; **6**, *C. michelii*, $2n = 62$.

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Reports (1213-1226) by Milka Stoeva

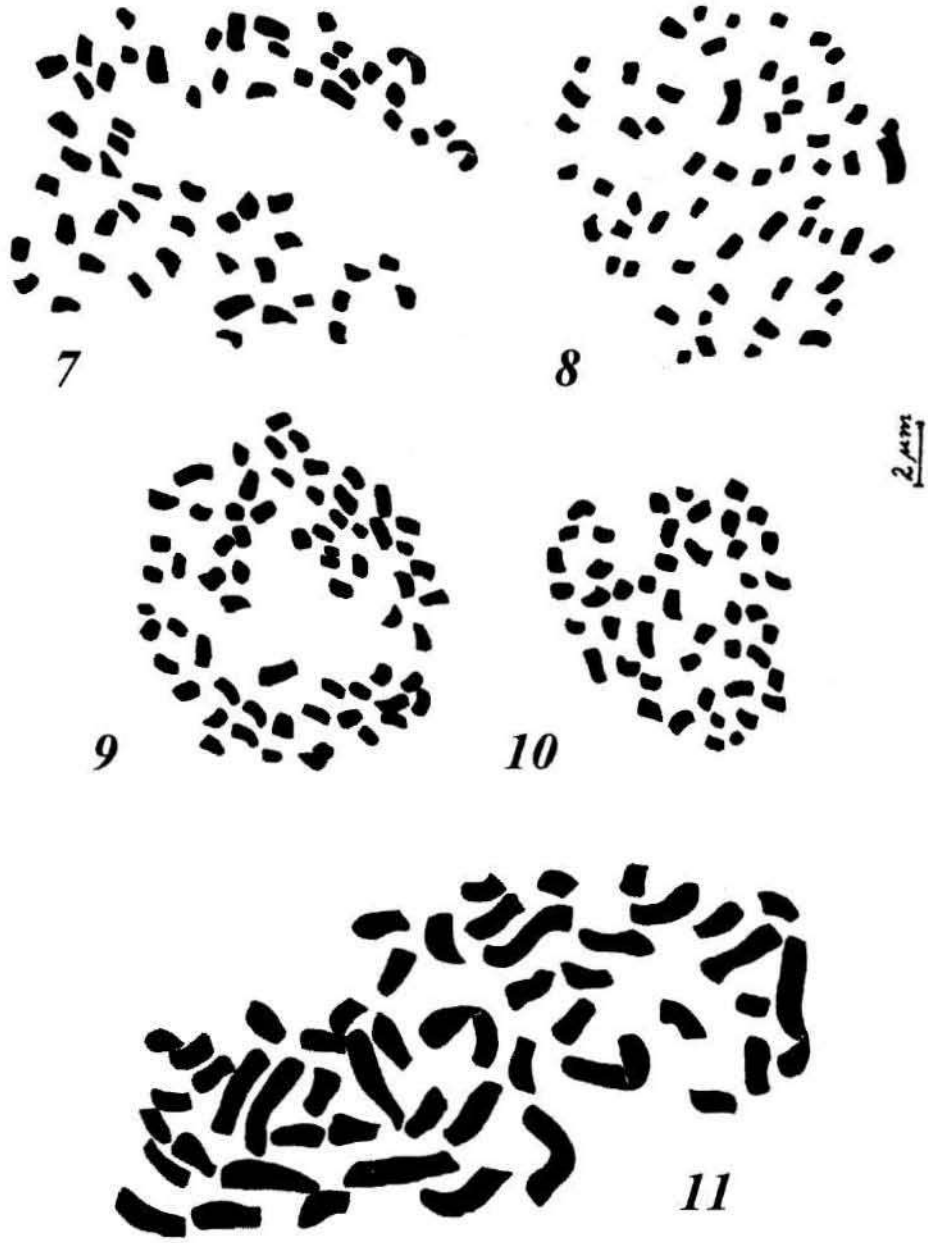
1213. ***Carex ferruginea*** Scop. — $2n = 38$, 40 (Figs. 1a, b).

Bu: Pirin mountain, Dalbokoto dere gully, between Banderica resthouse and Vihren resthouse, 41°45'N, 23°25'E, around running water of the gully, 2200 m, *Stoeva S* 1635 (SOM) — $2n = 38$.

— Pirin mountain, a gully under Vihren summit parallel with Dalbokoto dere gully, 41°45'N, 23°25'E, around running water of the gully, 2400-2500 m, *Stoeva S*1631 (SOM) — $2n = 40$.

This species is included in The Red Data Book of PR Bulgaria (Velchev 1984).

The chromosome numbers found and the karyotypes are like those reported by Dietrich (1967) — $2n = 38 = 6A + 2B + 30C$; $2n = 40 = 4A + 2B + 34C$. The chromosome number $2n = 58$ was also reported for the same species by Tanaka (1942, 1948), but it has not been confirmed by other authors.



Figs. 7-11. Mitotic metaphase plates of: **7,** *C. paniculata*, $2n = 60$; **8,** *C. pendula*, $2n = 58$; **9,** *C. pseudocyperus*, $2n = 66$; **10,** *Cyperus serotinus*, $2n = 46$; **11,** *Eleocharis quinqueflora*, $2n = 50$.

1214. ***Carex firma*** Host — $2n = 34$ (Fig. 2).

Po: Tatra mountains, Dolina Strazyska valley, slopes of Trzy kominy, limestone, 49°16'N, 19°56'E, 1000-1100 m, *Stoeva S*1404 (SOM).

The obtained result confirms the most literature data (see Dietrich 1967, Fedorov 1969, Murin & Paclova 1979, Pogan & Wcislo 1983, Druskevic 1982 cit. in Goldblatt & Johnson 1990). The last author reported $2n = 68$ for the same species too. The karyotype is similar to that described by Dietrich (1967) — $2n = 34 = 6A + 2B + 26C$.

1215. ***Carex halleriana*** Asso — $2n = 50$ (Fig. 3).

Bu: Black sea coast (northern), Natural Park "Zlatni pjasaci", 43°17'N, 28°03'E, oak-forest, dry places, 200 m, *Stoeva S*1626 (SOM).

The number agrees only with some results of Dietrich (1964, 1972) who counted $n = 25$ and $n = 26$ in material from Italy. Luceno in 1988 reported $n = 26$ and in 1992 — $n = 28$ from Spain. Kjellkvist & Löve (1963) and Löve & Kjellkvist (1973) published $2n = 54$ from Spain too.

1216 ***Carex hordeistichos*** Vill. — $2n = 54$ (Fig. 4).

Bu: Sofia region, Kazichene marsh locality, 42°39'N, 23°28'E, stamped places, 550 m, *Stoeva S*1626 (SOM); Aldomirovci marsh locality near the town Slivnica, 42°52'N, 23°01'E, stamped places around the marsh, 600 m, *Stoeva S*1323 (SOM).

— Sredna gora region, Losenska mountain, along the path from the Red Cross to the peak Polovrak, 42°33'N, 23°34'E, swamp habitats, 950 m, *Stoeva S*1256 (SOM).

— Black sea coast (northern), the village Izgrev district Varna, 43°15'N, 27°45'E, dry places on the South of the village, limestone, 350 m, *Stoeva S*1604 (SOM).

Different numbers have been reported for this species: Heliborn (1939) published $n = 27$; Tarnavschi (1948) — $n = 27$-30; Tanaka (1948) and Luceno (1992) — $n = 28$; Agapova & al. (1990 for references) — $2n = 56$.

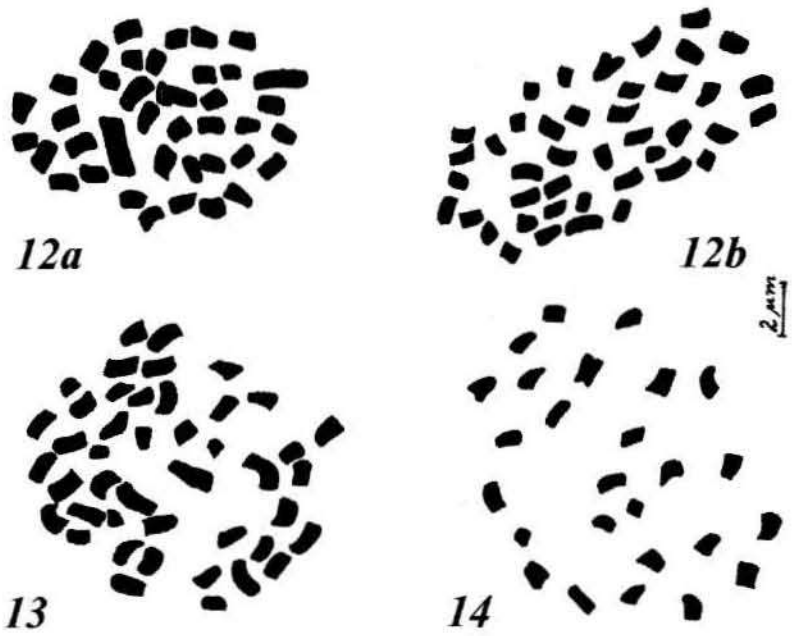
Two chromosomes of the karyotype are visible to be longer than the others.

1217. ***Carex melanostachya*** Bieb. ex Willd. (= *C. nutans* Host) — $2n = 76$ (Fig. 5).

Bu: Sofia region, Kazichene marsh locality, 42°39'N, 23°28'E, swamp habitats, 550 m, *Stoeva S*1019 (SOM).

— Thracian plain, the village Biser near the town Harmanli, 41°50'N, 25°58'E, damp meadows near the village, 80 m, *Stoeva S*1618 (SOM).

The number $2n = 76$ was unknown for this species until now, but it was not new one for sect. *Paludosae*. I counted the same number in C. *riparia* Curt. (Stoeva 1985) and in *C.*



Figs. 12-14. Mitotic metaphase plates of: **12,** *Scirpus lacustris*, **a**, $2n = 40$; **b**, $2n = 42$; **13,** *Schoenus nigricans*, $2n = 44$; **14,** *Triglochin palustris*, $2n = 26$.

acutiformis Ehrh. (unpubl. data). Three other chromosome numbers are known for *C. melanostachya*: Koyama (1962) counted $2n = 82$ in material from Japan, Chebbotar & al. 1977 (In Agapova & al. 1990) $2n = 48$ from Moldova and Nijalingappa & al. (1978) $2n = 58$ from India.

Two chromosomes of the karyotype are visible longer than the others.

1218. *Carex michelii* Host — $2n = 62$ (Fig. 6).

Bu: Black sea coast (Northern), the village Izgrev district Varna, 43°15'N, 27°45'E, dry shrubs above the village, 350 m, *Stoeva S*1603 (SOM).

— Sredna gora region, Lozenska mountain, bellow the peak Polovrak, 42°33'N, 23°33'E, shrubs of *Coryllus avellana*, 900-1000 m, *Stoeva S*1245 (SOM).

— Struma valley, Konjavska mountain, the village Garbino, 42°23'N, 22°44'E, dry shrubs near the village, 500 m, *Stoeva S*1195 (SOM).

The result found is in agreement with that of Druskevic (1982 cit. after Goldblatt & Johnson 1990) in material from Moldova. Toderash (1979) counted a less chromosome number — $2n = 40$ from Moldova too. Murin & Majovsky (1976) reported $2n = c. 70$ in material from Slovakia.

Four chromosomes of the karyotype are visible longer than the others.

1219. ***Carex paniculata*** L. — $2n = 60$ (Fig. 7).

Bu: Sofia region, Kazichene marsh locality near the village Kazichene, 42°39'N, 23°28'E, swamp habitats, 550 m, *Stoeva S*1639 (SOM).

— Toundzha hilly region, the village Alexandrovo, 42°35'N, 25°05'E, damp meadows near the village, 420 m, *Stoeva S*1271 (SOM).

The obtained chromosome number confirms the results of Murin & Majovsky (1978), Löve & Löve (1981). Dietrich (1972) reported $n = 31$. Chromosome numbers $2n = 62$ and $2n = 64$ were published for this species too (see Moore 1982 for references).

1220. ***Carex pendula*** Hudson — $2n = 58$ (Fig. 8).

Bu: Black sea coast (Northern), Natural Park "Zlatni pjasaci", 43°17'N, 28°03'E, damp shady places in the oakforest, 200 m, *Stoeva S*1629 (SOM).

— Sredna gora region, Lozenska mountain, along the route from the Red Cross to the Cloister, 42°33' N, 23°34' E, damp shady places among hornbeam wood, 850 m, *Stoeva S*1284 (SOM).

The chromosome number established is the same reported by Murin (see Moore 1982 for references) in material from Slovakia and Strid & Franzen (1981) in material from Greece. Ottonello & al. (1985 cit. after Goldblatt & Johnson 1990) published $2n = 60$ and Druskevic (1982 cit. after Goldblatt & Johnson 1990) — $2n = 62$. Chebbotar (1977 cit. after Agapova & al., 1990) counted $2n = 58$ and $2n = 62$ from Moldova.

Two chromosomes of the karyotype are much longer than the others.

1221. ***Carex pseudocyperus*** L. — $2n = 66$ (Fig. 9).

Bu: Sofia region, Kazichene marsh locality, 42°39'N, 23°28'N, on the side of a drain water, 550 m, *Stoeva S*1638 (SOM).

The chromosome number found agrees with the literature data for this species species (Koyama 1962, Löve & Löve 1981).

1222. ***Cyperus serotinus*** Rottb. (= *Pycreus serotinus* (Rottb.) Hayek) — $2n = 46$ (Fig.10)

Bu: Danube plain, on the north of the town Mizia, 43°38'N, 23°55'E, on the side of Skat river, 100 m, *Stoeva S*1645 (SOM).

To my knowledge, the first karyological study for this species.

1223. ***Eleocharis quinqueflora*** (F. X. Hartm.) O. Schwarz (= *E. pauciflora* Roemer & Schultes) — $2n = 50$ (Fig. 11).

Bu: Rila mountain, the village Mala Cherkva district Pernik, 42°13'N, 23°30'E, fen near the village, 1100 m, *Stoeva S*1655 (SOM).

— Pirin mountain, Todorini ezera lakes, below the peak Todorka, 41°44'N, 23°27'E, swamp habitats around the lake, 2500 m, *Stoeva S*1440 (SOM).

— Toundzha hilly region, the village Gabarevo near the town Kazanluk, 42°37'N, 25°09'E, swamps near the village, 430 m, *Stoeva S*1658 (SOM).

The chromosome number $2n = 50$ was unknown so far for this species. Davies (1956) counted $n = 10$. Some much greater numbers have been reported too: $2n = 80$-100 (see Fedorov 1969) and $2n = 132, 134, 136$ (see Moore 1982 for references). The number $2n = 50$ was reported for *E. palustris* by Tarnavschi (1948).

The karyotype of *E. quinqueflora* is very heterogeneous in relative length of the chromosomes and thus it is similar to the karyotype of *E. palustris* with $2n = 16$ chromosomes.

1224. *Scirpus lacustris* L. (= *Schoenoplectus lacustris* (L) Palla) — $2n = 40, 42$ (Figs. 12a, b).

Bu: Danube plain, the village Dekov near the town Svishtov, 43°36'N, 25°07'E, damp places near by Cernilica marsh, 50-100 m, *Stoeva S*760 (SOM) — 2n = 40.

— North eastern Bulgaria, Srebarna reserve, 44°06'N, 27°04'E, damp places near by the lake Srebarna, 50 m, *Stoeva S*783 (SOM) — 2n = 42.

The chromosome numbers counted agree with the literature data (see Fedorov 1969 and Löve & Löve 1974). The number $2n = 42$ was also reported by Vachova (see Moore 1982 and Löve & Löve 1981, for references).

Two chromosomes of the cytotype with $2n = 40$ are much longer than the others.

1225. *Schoenus nigricans* L. — $2n = 44$ (Fig. 13).

Bu: Toundzha hilly region, the village Gabarevo near the town Kazanluk, 42°37'N, 25°09'E, swamps near the village, 430 m, *Stoeva S*1657 (SOM).

This result agrees with the data of Davies (1956) for Great Britain, Labadie (1976) and Natarajan (1978) for France. The greater chromosome number — $2n = 54$ has been reported for the same species too (see Löve & Löve, 1974 and Moore 1982 for references).

1226. *Triglochin palustris* L. — $2n = 26$ (Fig. 14).

Bu : Sofia region, Kazichene marsh locality, 42°39'N, 23°28'E, swamp places, 550 m, *Stoeva S*1643 (SOM).

The most authors reported $2n = 24$ for this species (see Fedorov 1969, Löve & Löve

1974, Krasnikov 1991 and Hollingsworth & al. 1992). Sokolovskaya (1963 cit. after Fedorov 1969) found $2n = 24 - 26$.

The karyotype consists of holocentric short chromosomes.

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