

Chromosome numbers of plants collected during Iter Mediterraneum II in Israel

Zoila Díaz Lifante, Teresa Luque & Consuelo Santa Bárbara

Introduction

The second OPTIMA expedition, Iter Mediterraneum II (Israel, March-April, 1989) resulted in the collection of over 2.000 numbers of vascular plants. The authors germinated a good number of seeds sampled from the duplicates of this collection, now housed in the Herbarium of the Department of Plant Biology and Ecology (formerly Department of Botany), University of Sevilla (SEV). They succeeded in studying karyologically 110 of the taxa collected, belonging to 23 families and 68 genera. The results which constitute a contribution to the karyological knowledge of Eastern Mediterranean plants are summarized here.

Material and methods

Seed samples obtained from herbarium specimens collected all over Israel were germinated in Petri dishes in autumn 1989. The plants from which seeds were taken are considered as voucher specimens, and are indicated in the text by the collecting number given during the expedition.

Somatic chromosome numbers were counted on root tips taken from the seedlings, pre-treated with 0.002 M 8-hydroxyquinoline for 3-3.5 hours, fixed in Farmer's fluid (Löve & Löve 1975) for 24 hours and preserved in 70 % ethanol at 4 ± 2 °C. The material was stained in alcoholic hydrochloric acid carmine solution (Snow 1963) for 24-48 h, squashed and then mounted in 45 % acetic acid.

Results

The chromosome numbers found are indicated below. The species are arranged alphabetically within families. For each species, the correct name is given, as adopted in the preceding check-list of plants collected during the second OPTIMA expedition.

The diploid chromosome number is indicated for each species, followed by the locality or localities where the plants were collected, date of collection and, in parentheses, the collecting numbers. Photographs were taken from metaphasic plates of most studied species, but only some of the more characteristic ones are reproduced in this paper (Fig. 1-48).

*Asteraceae**Anvillea garcinii* (Burm. fil.) DC.

$2n=14$. Dead Sea Valley: near Mizpe Dragot, 15 km of En Gedi. 22.3.1989 (06.063, Fig. 1).

Calendula arvensis L. s.l.

$2n=44$. Negev Highlands: 6 km SW of Dimona. 27.3.1989. (22.044).

$2n=44$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (05.066).

$2n=44$. Judean Foothills: near Sedot Micha. 21.3.1989 (09.001).

Calendula tripterocarpa Rupr.

$2n=30$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.027).

$2n=30$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.010, Fig. 4).

Carduus getulus Pomel

$2n=26$. Northern Negev: sands of Nahal Sekher, 15 km S of Beer Sheva. 26.3.1989 (16.018, Fig. 3).

Carduus pycnocephalus L.

$2n=60$. Bet-Shean Valley: 6 km SSW of Bet-Shean. 2.4.1989 (38.016).

Lasiopogon muscoides (Desf.) DC.

$2n=14$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.019).

Launea nudicaulis (L.) Hooker fil.

$2n=18$. Negev Highlands: Makhtesh Hazera (Makhtesh Katan). 30.3.1989 (35.003).

Pulicaria incisa (Lam.) DC.

$2n=12$. Negev Highlands: Makhtesh Ramon, Karnei Ramon. 26.3.1989 (19.010, Fig. 2).

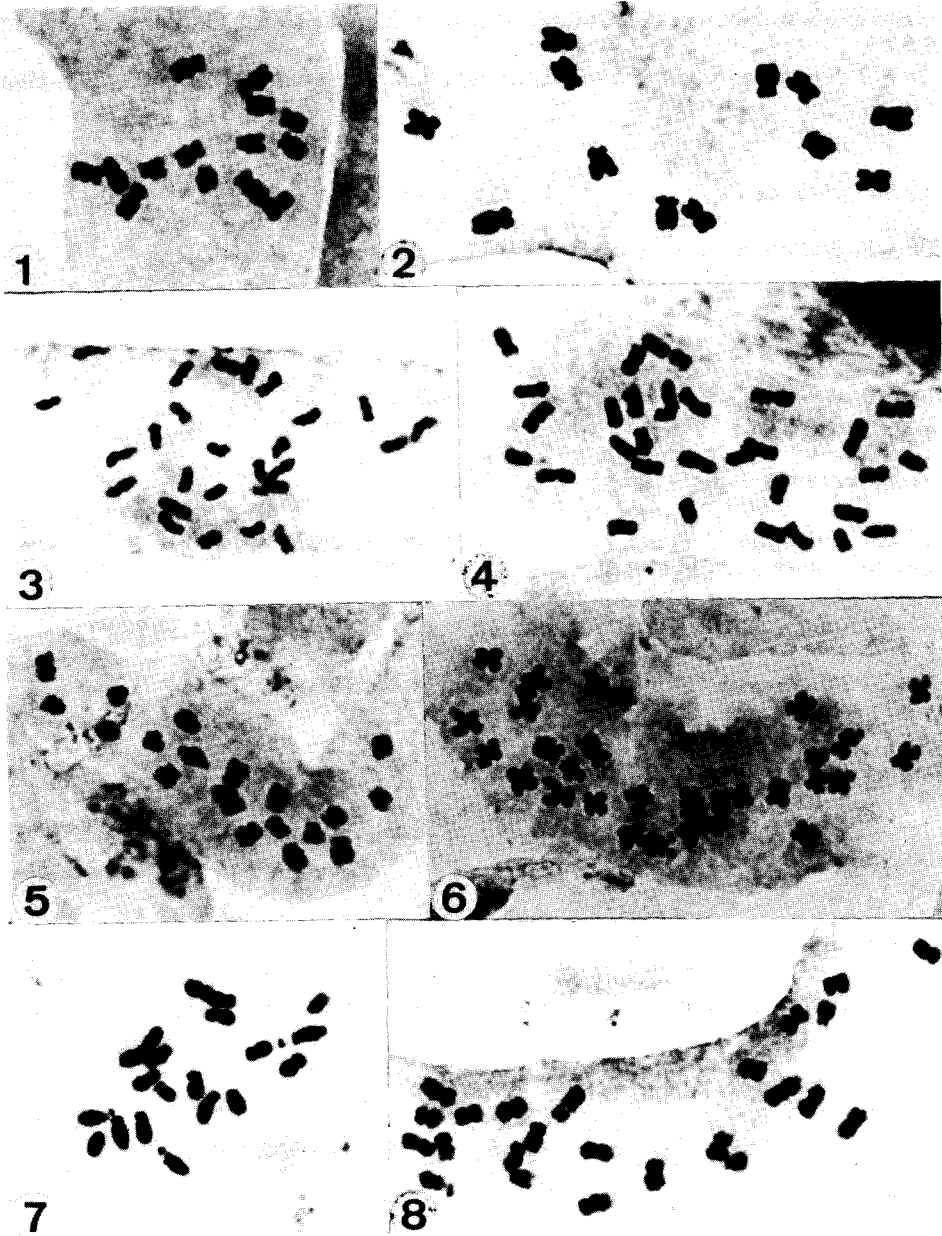


Fig. 1-8. Somatic metaphases. 1: *Anvillea garcinii* (06.063), $2n=14$. 2: *Pulicaria incisa* (19.010), $2n=12$. 3: *Carduus getulus* (16.018), $2n=26$. 4: *Calendula tripterocarpa* (26.010), $2n=30$. 5: *Senecio joppensis* (58.011), $2n=20$. 6: *Sonchus microcephalus* (09.019), $2n=30$. 7: *Senecio vernalis* (14.028), $2n=20$. 8: *Taraxacum cyprium* (48.024), $2n=24$.

Senecio flavus (Decaisne) Schultz-Bip.

$2n=40$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.046).

$2n=40$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.038).

Senecio glaucus L.

$2n=18$. Philistean Plain: 1 km S of Ashdod. 21.3.1989 (04.046).

Senecio joppensis Dinsmore

$2n=20$. Coastal Carmel: Atlit. 5.4.1989 (58.011, Fig. 5).

Senecio vernalis Waldst. & Kit.

$2n=20$. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.007).

$2n=20$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.013).

$2n=20$. Judean Mts.: Kiryat Anavim, 10 km W of Jerusalem. 24.3.1989 (14.028, Fig. 7).

$2n=20$. Mt. Hermon: 1 km E of Qalaát Namrud. 4.4.1989 (51.006).

Sonchus microcephalus Mejías

$2n=30$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.019, Fig. 6).

Sonchus oleraceus L.

$2n=32$. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.008).

Taraxacum cyprium Lindb. fil.

$2n=24$. Golan: Odem Forest, near Masaáda. 4.4.1989 (48.024, Fig. 8).

Thrinacia tuberosa (L.) DC.

$2n=8$. Judean Foothills: near Sedot Micha. 21.3.1989 (02.005).

$2n=8$. Golan: Natur Reserve (Bajuria). 3.4.1989 (43.017).

Boraginaceae***Anchusa aegyptiaca* (L.) DC.**

2n=16. Kinnrot Valley (Upper Jordan Valley): near En Sheva Tabkha. 3.4.1989 (40.005, Fig. 9).

***Anchusa milleri* Sprengel**

2n=16. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.024).

***Anchusa strigosa* Banks & Solander**

2n=32. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.083, Fig. 11).

Brassicaceae***Alyssum linifolium* Willd.**

2n=16. Negev Highlands: Makhtesh Ramon, Karnei Ramon. 26.3.1989 (19.024).

***Alyssum strigosum* Banks & Solander**

2n=16. Golan: Har Shipon. 4.4.1989 (46.002, Fig. 10).

***Anastatica hierochuntica* L.**

2n=22. Southern Negev: near Kibbutz Shizafon. 29.3.1989 (29.001, Fig. 13).

***Cardamine hirsuta* L.**

2n=16. Golan: Odem Forest, near Masaáda. 4.4.1989 (48.010).

***Carrichtera annua* (L.) DC.**

2n=16. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.030, Fig. 12).

***Diplotaxis acris* (Forsskål) Boiss.**

2n=22. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.055).

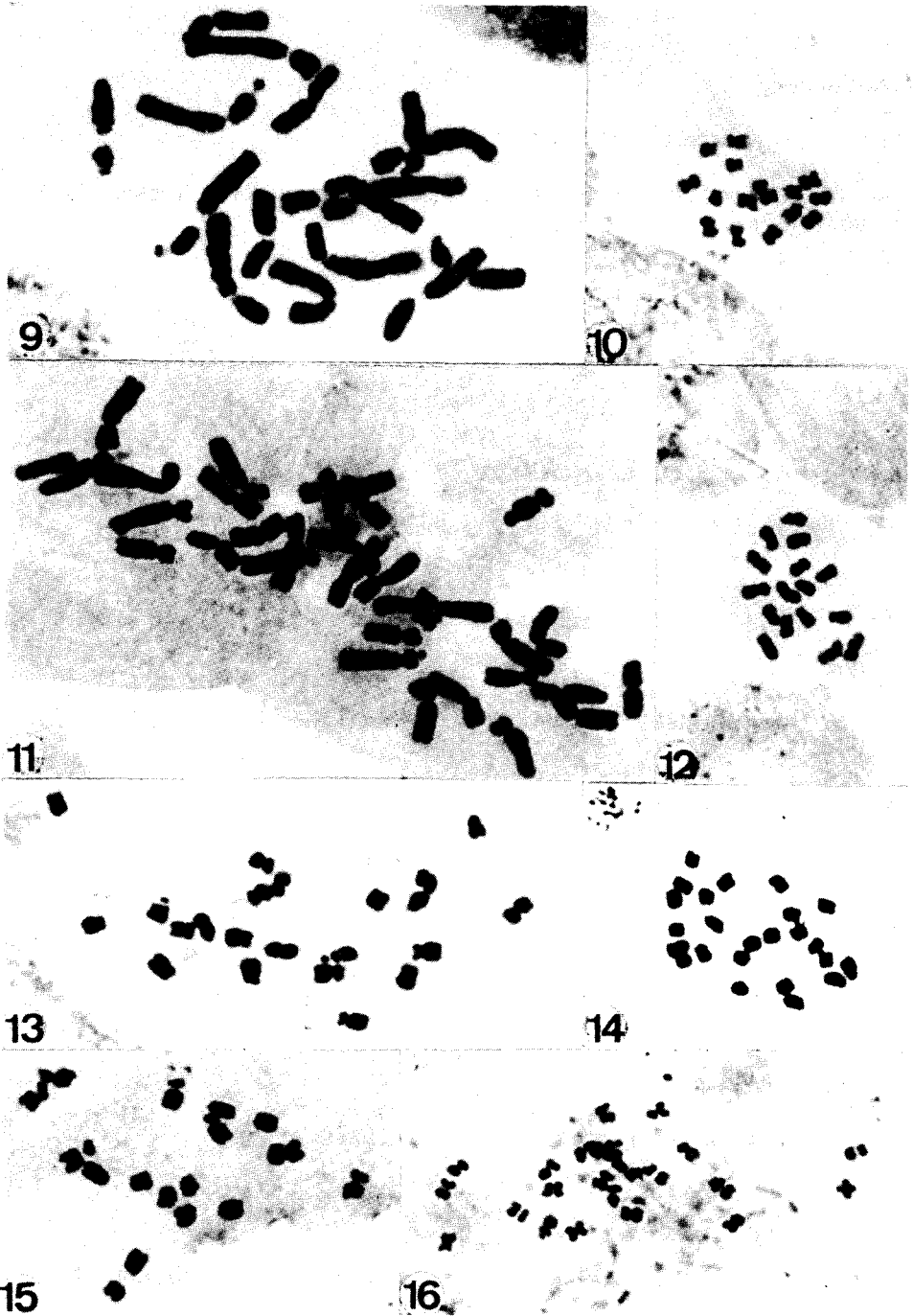


Fig. 9-16. Somatic metaphases. 9: *Anchusa aegyptiaca* (40.005), $2n=16$. 10: *Alyssum strigosum* (46.002), $2n=16$. 11: *Anchusa strigosa* (03.083), $2n=32$. 12: *Carrichtera annua* (03.030), $2n=14$. 13: *Anastatica hierochuntica* (29.001), $2n=22$. 14: *Silene nocturna* (39.044), $2n=24$. 15: *Matthiola aspera* (07.008), $2n=14$. 16: *Silene palaestina* (08.037), $2n=24$.

$2n=22$. Negev Highlands: Makhtesh Hazera (Makhtesh Katan). 30.3.1989 (35.029).

Erophila verna (L.) Chevall.

$2n=34$. Golan: Odem Forest, near Masaáda. 4.4.1989 (48.008).

Eruca sativa Miller subsp. *longirostris* (Uechtr.) Jahandiez & Maire

$2n=22$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.034).

$2n=22$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.003).

Hymenolobus procumbens (L.) Nutt.

$2n=12$. Lower Jordan Valley: 2,5 km SSE of Pzael, 16 km N of Jericho. 23.3.1989 (10.002).

Isatis microcarpa Boiss.

$2n=14$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.002).

Matthiola aspera Boiss.

$2n=14$. Dead Sea Valley: near Ormat's solar ponds, 2 km of the Dead Sea northern coast. 22.3.1989 (07.008, Fig. 15).

Notoceras bicornis (Aiton) Amo

$2n=22$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.032).

Sisymbrium erysimoides Desf.

$2n=14$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.028).

Sisymbrium irio L.

$2n=14$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.002).

$2n=14$. Negev Highlands: Mizpe Ramon, 27.3.1989 (18.006).

Teesdalia coronopifolia (J. P. Bergeret) Thell.

$2n=36$. Golan: Odem Forest, near Masaáda. 4.4.1989 (48.032).

Thlaspi perfoliatum L.

$2n=14$. Judean Mts.: Kiryat Anavim, 10 km W of Jerusalem. 4.3.1989 (14.009).

*Caryophyllaceae**Cerastium glomeratum* Thuill.

$2n=72$. Upper Galilee: near Sasa. 5.4.1989 (52.007).

Pteranthus dichotomus Forsskål

$2n=32$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.008).

**Silene aegyptiaca* (L.) L. fil.

$2n=24$. Mt. Hermon: 1 km E of Qalaát Namrud. 4.4.1989 (51.004).

**Silene alexandrina* (Ascherson) Danin

$2n=24$. Negev Highlands: 2 km NW of Yerokham. 26.3.1989 (17.016).

Silene colorata Poiret

$2n=24$. Coastal Carmel: Atlit. 5.4.1989 (58.041).

**Silene decipiens* Barceló

$2n=24$. Northern Negev: 5 km N of Beer Sheva. 26.3.1989 (15.060).

$2n=24$. Negev Highlands: 6 km SW of Dimona. 27.3.1989 (22.005).

$2n=24$. Negev Highlands: 8 km of SW Yerokham. 27.3.1989 (24.029).

Silene nocturna L.

2n=24. Judean Desert: near Mishor Adumim. 22.3.1989 (05.035).

2n=24. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.044, Fig. 14).

**Silene palaestina* Boiss.

2n=24. Samaritan Desert. near Ma'ale Michmash. 23.3.1989 (08.037, Fig. 16).

Spergularia salina J. Presl & C. Presl

2n=36. Coastal Galilee: Coast of Rosh Haniqra. 5.4.1989 (54.013, Fig. 17).

Stellaria pallida (Dumort.) Piré

2n=22. Philistine Plain: 1 km S of Ashdod. 21.3.1989 (04.002).

*Chenopodiaceae***Atriplex dimorphostegia* Kar. & Kir.

2n=36. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.004).

**Atriplex holocarpa* F. Mueller

2n=18. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.001).

*Cistaceae***Helianthemum aegyptiacum* (L.) Miller

2n=40. Judean Foothills: near Sedot Micha. 21.3.1989 (02.027).

**Helianthemum kahiricum* Delile

2n=20. Negev Highlands: 8 km SW of Yerokham. 27.3.1989 (24.004, Fig. 18).

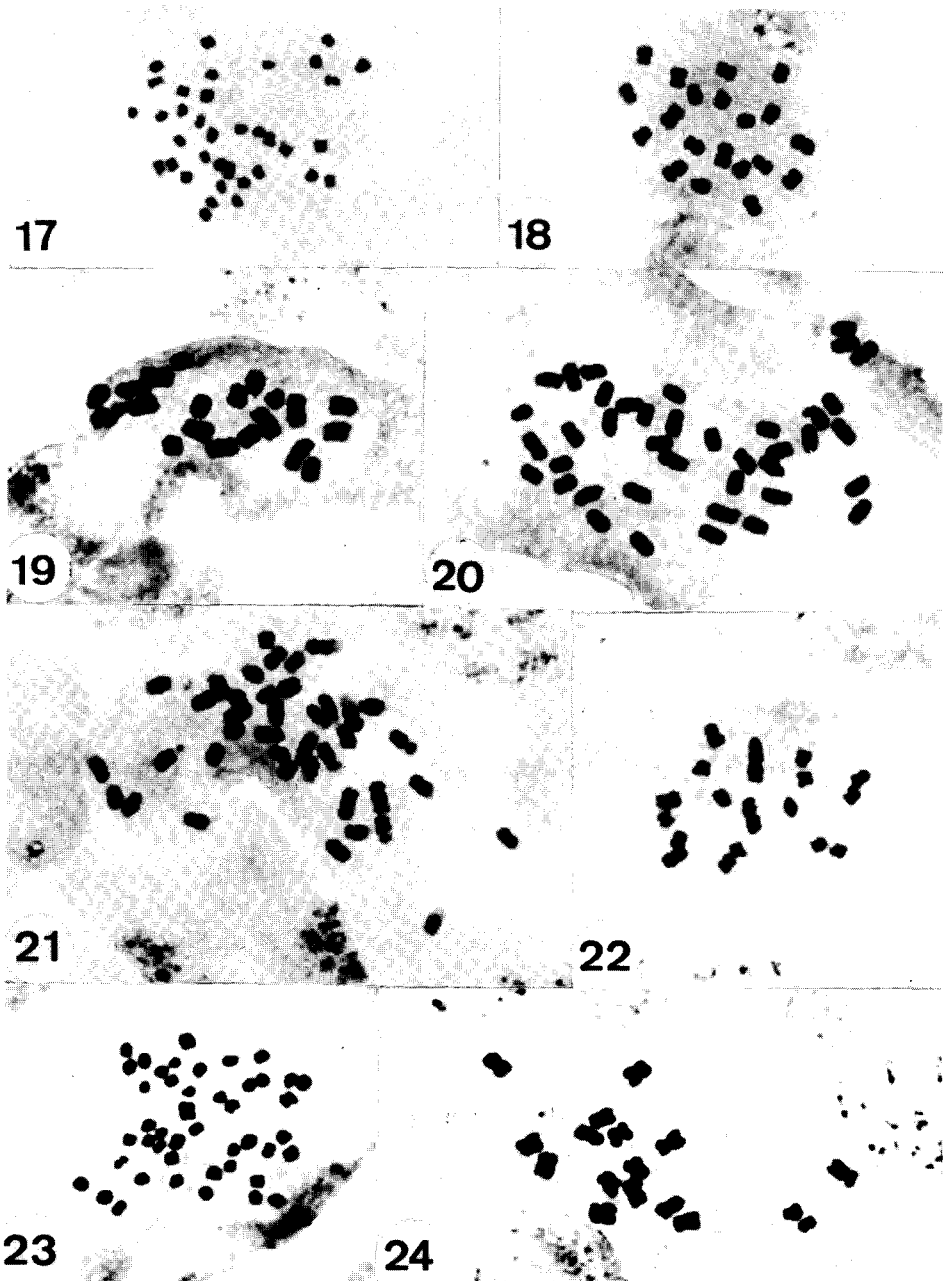


Fig. 17-24. Somatic metaphases. 17: *Spergularia salina* (54.013), $2n=36$. 18: *Helianthemum kahiricum* (24.004), $2n=20$. 19: *H. ledifolium* (21.036), $2n=20$. 20: *H. lasiocarpum* (40.006), $2n=40$. 21: *H. lasiocarpum* (39.033), $2n=40$. 22: *H. lippii* (31.009), $2n=20$. 23: *Convolvulus siculus* (39.056), $2n=44$. 24: *Astragalus callichrous* (39.070), $2n=16$.

$2n=20$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.004).

***Helianthemum lasiocarpum* Jacques & Héring**

$2n=40$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.033, Fig. 21).

$2n=40$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.006, Fig. 20).

***Helianthemum ledifolium* (L.) Miller**

$2n=20$. Negev Highlands: Makhtesh Ramon, Karnei Ramon. 26.3.1989 (19.031).

$2n=20$. Negev Highlands: Nahal Elot. 26.3.1989 (21.036, Fig. 19).

***Helianthemum lippii* (L.) Dum.-Courset**

$2n=20$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.068).

$2n=20$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.032 p. p.).

$2n=20$. Arava Valley: Yotvata. 29.3.1989 (31.009, Fig. 22).

Convolvulaceae

***Convolvulus siculus* L.**

$2n=44$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.056, Fig. 23).

Crassulaceae

***Crassula alata* (Viv.) A. Berger**

$2n=c.90$ (90.093). Coastal Carmel: Atlit. 5.4.1989 (58.019).

Dipsacaceae

***Pterocephalus brevis* Coulter**

$2n=16$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.022).

Euphorbiaceae***Euphorbia chamaepeplus* Boiss. & Gaill. var. *angustifolia* Danin**

$2n=16$. Northern Negev: 5 km N of Beer Sheva. 26.3.1989 (15.057).

Fabaceae***Astragalus callichrous* Boiss.**

$2n=16$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.070, Fig. 24).

***Astragalus hamosus* L.**

$2n=44$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.039).

***Hymenocarpus circinnatus* (L.) Savi**

$2n=16$. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.086).

***Lathyrus marmoratus* Boiss. & Blanche**

$2n=14$. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.098, Fig. 25).

***Lotus peregrinus* L.**

$2n=28$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.035, Fig. 26).

$2n=28$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.069).

***Medicago orbicularis* (L.) Bartal.**

$2n=16$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.035).

***Medicago polymorpha* L.**

$2n=16$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.019).

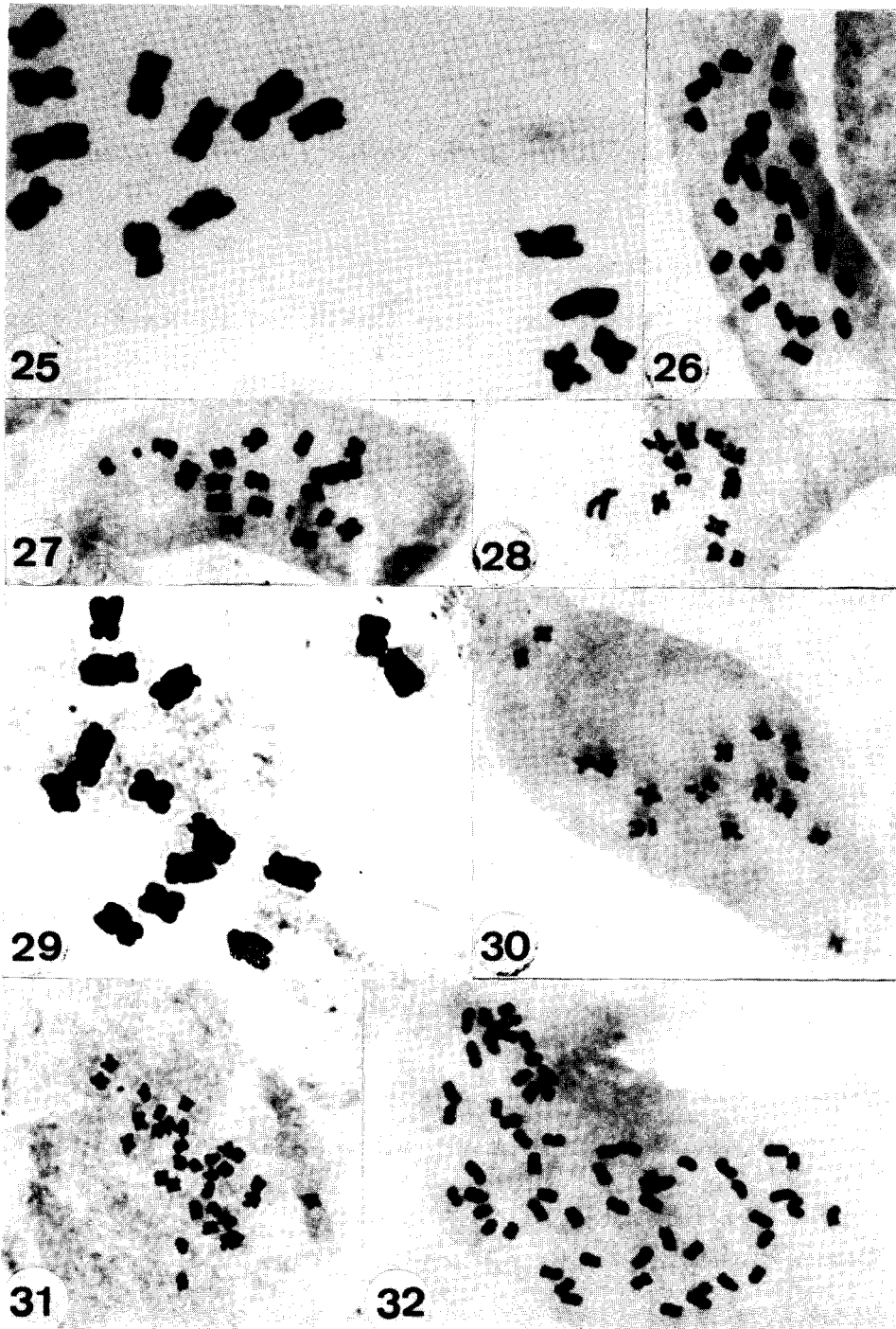


Fig. 25-32. Somatic metaphases. 25: *Lathyrus marmoratus* (03.098), $2n=14$. 26: *Lotus peregrinus* (06.035), $2n=28$. 27: *Medicago rotata* (39.073), $2n=16$. 28: *Trifolium scabrum* (39.077), $2n=10$. 29: *Pisum fulvum* (45.003), $2n=14$. 30: *Trigonella arabica* (09.026), $2n=16$. 31: *Ononis mollis* (09.032), $2n=32$. 32: *Erodium botrys* (39.012), $2n=60$.

Medicago rotata Boiss.

$2n=16$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.073, Fig. 27).

Onobrychis crista-galli (L.) Lam.

$2n=16$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.033).

Ononis mollis Savi

$2n=32$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.032, Fig. 31).

Ononis ornithopodioides L.

$2n=32$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.007).

Ononis sicula Guss.

$2n=32$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.028).

Pisum fulvum Sm.

$2n=14$. Golan. Yahudiya forest. 3.4.1989 (45.003, Fig. 29).

Trifolium scabrum L.

$2n=10$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.077, Fig. 28).

Trigonella arabica Delile

$2n=16$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.026, Fig. 30).

Geraniaceae***Erodium botrys* (Cav.) Bertol.**

2n=60. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon.
2.4.1989 (39.012, Fig. 32).

***Erodium ciconium* (L.) L'Hér.**

2n=18. Negev Highlands: 6 km SW of Dimona. 27.3.1989 (22.001).

Erodium laciniatum* (Cav.) Willd. subsp. *laciniatum

2n=20. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.006).

2n=20. Northern Negev: Nahal Sekher, 15 km S of Beer Sheva. 26.3.1989
(16.006).

***Erodium laciniatum* (Cav.) Willd.**

2n=20. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989
(27.008).

***Erodium malacoides* (L.) L'Hér.**

2n=40. Judean Desert: near Mishor Adumim. 22.3.1989 (05.026).

2n=40. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha).
3.4.1989 (40.002).

***Erodium oxyrhynchum* MB. subsp. *bryoniifolium* (Boiss.) Schönb.-Tem.**

2n=20. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989.
(26.001, Fig. 33).

***Geranium dissectum* L.**

2n=22. Bet-Shean Valley: 6 km SSW of Bet-Shean. 2.4.1989 (38.027).

Lamiaceae***Micromeria nervosa* (Desf.) Benth**

2n=30. Judean Foothills: near Sedot Micha. 21.3.1989 (02.059).

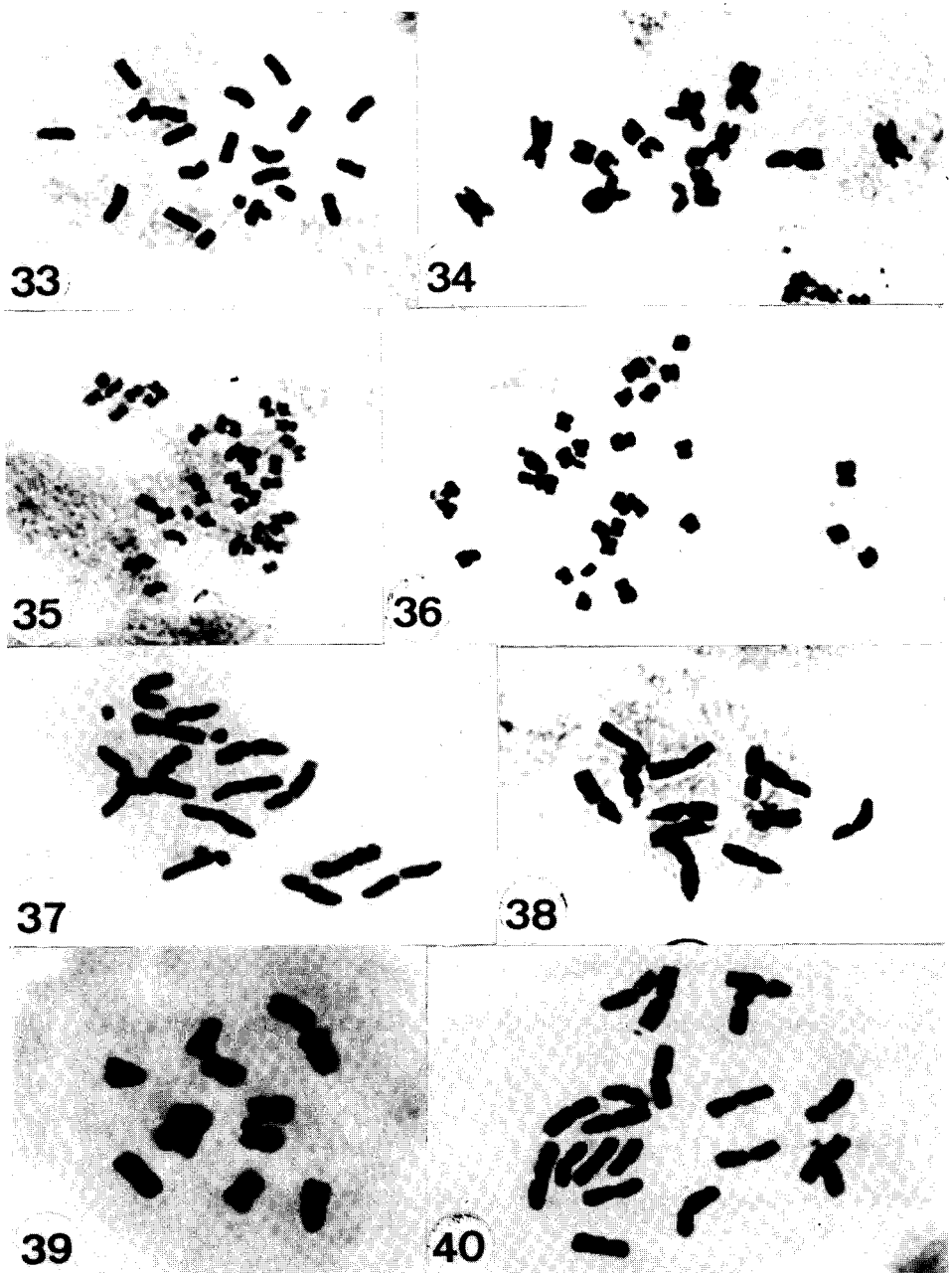


Fig. 33-40. Somatic metaphases. 33: *Erodium oxyrhynchum* subsp. *bryoniifolium* (26.001), $2n=20$. 34: *Salvia aegyptiaca* (26.033), $2n=12$. 35: *Salvia lanigera* (24.043), $2n=40$. 36: *Asphodelus tenuifolius* (04.047), $2n=28$. 37: *Hordeum glaucum* (09.046), $2n=14$. 38: *Plantago notata* (22.038), $2n=12$. 39: *Plantago afra* (05.039), $2n=12$. 40: *Rumex pictus* (04.011), $2n=20$.

Salvia aegyptiaca L.

$2n=12$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.033, Fig. 34).

Salvia lanigera Poiret

$2n=40$. Negev Highlands: 8 km SW of Yerokham. 27.3.1989 (24.043, Fig. 35).

*Liliaceae**Asphodelus tenuifolius* Cav.

$2n=28$. Philistean Plain: 1 km S of Ashdod. 21.3.1989 (04.047, Fig. 36).

$2n=28$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.059).

*Plantaginaceae**Plantago afra* L.

$2n=12$. Judean Desert: near Mishor Adumim. 22.3.1989 (05.039, Fig. 39).

Plantago lagopus L.

$2n=12$. Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). 3.4.1989 (40.016).

Plantago notata Lag.

$2n=12$. Negev Highlands: 6 km SW of Dimona. 27.3.1989 (22.038, Fig. 38).

Plantago ovata Forsskål

$2n=8$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.066).

$2n=8$. Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. 2.4.1989 (39.010).

*Poaceae**Alopecurus utriculatus* Banks & Solander

$2n=14$. Judean Foothills: near Sedot Micha. 21.3.1989 (02.085).

Avena barbata Link

$2n=28$. Philistean Plain: 11 km S of Ashkelon. 21.3.1989 (03.078).

Avena wiestii Steudel

$2n=14$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.018).

Hordeum glaucum Steudel

$2n=14$. Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. 23.3.1989 (09.046, Fig. 37).

$2n=14$. Lower Jordan Valley: 2,5 km SSE of Pzael, 16 km N of Jericho. 23.3.1989 (10.020).

Phalaris minor Retz.

$2n=28$. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.020).

Schismus arabicus Nees

$2n=12$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.031).

Sphenopus divaricatus (Gouan) Reichenb.

$2n=12$. Lower Jordan Valley: 2,5 km SSE of Pzael, 16 km N of Jericho. 23.3.1989 (10.018).

*Polygonaceae**Rumex cyprius* Murb.

$2n=18$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.004, Fig. 41).

$2n=18$. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.003).

Rumex pictus Forsskål

$2n=20$. Philistean Plain: 1 km S of Ashdod. 21.3.1989 (04.011, Fig. 40).

Rumex vesicarius L.

2n=18. Southern Negev: Nahal Paran junction with Ramon-Elat road. 29.3.1989 (27.009).

*Primulaceae**Asterolinon linum-stellatum* (L.) Duby

2n=20. Judean Foothills: near Sedot Micha. 21.3.1989 (02.015).

*Resedaceae**Reseda boissieri* Müller Arg.

2n=24. Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. 29.3.1989 (26.005).

*Rubiaceae**Galium ghilaicum* Stapf

2n=20. Golan: near Qazrin. 3.4.1989. (44.030, Fig. 42).

Galium judaicum Boiss.

2n=22. Golan: near Qazrin. 3.4.1989 (44.038).

Galium murale (L.) All.

2n=44. Coastal Carmel: Atlit. 5.4.1989 (58.005).

*Scrophulariaceae**Kickxia acerbiana* (Boiss.) Täckh. & Boulos

2n=18. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.062, Fig. 43).

Linaria albifrons (Sm.) Sprengel

2n=12. Negev Highlands: 6 km SW of Dimona. 27.3.1989 (22.042, Fig. 46).

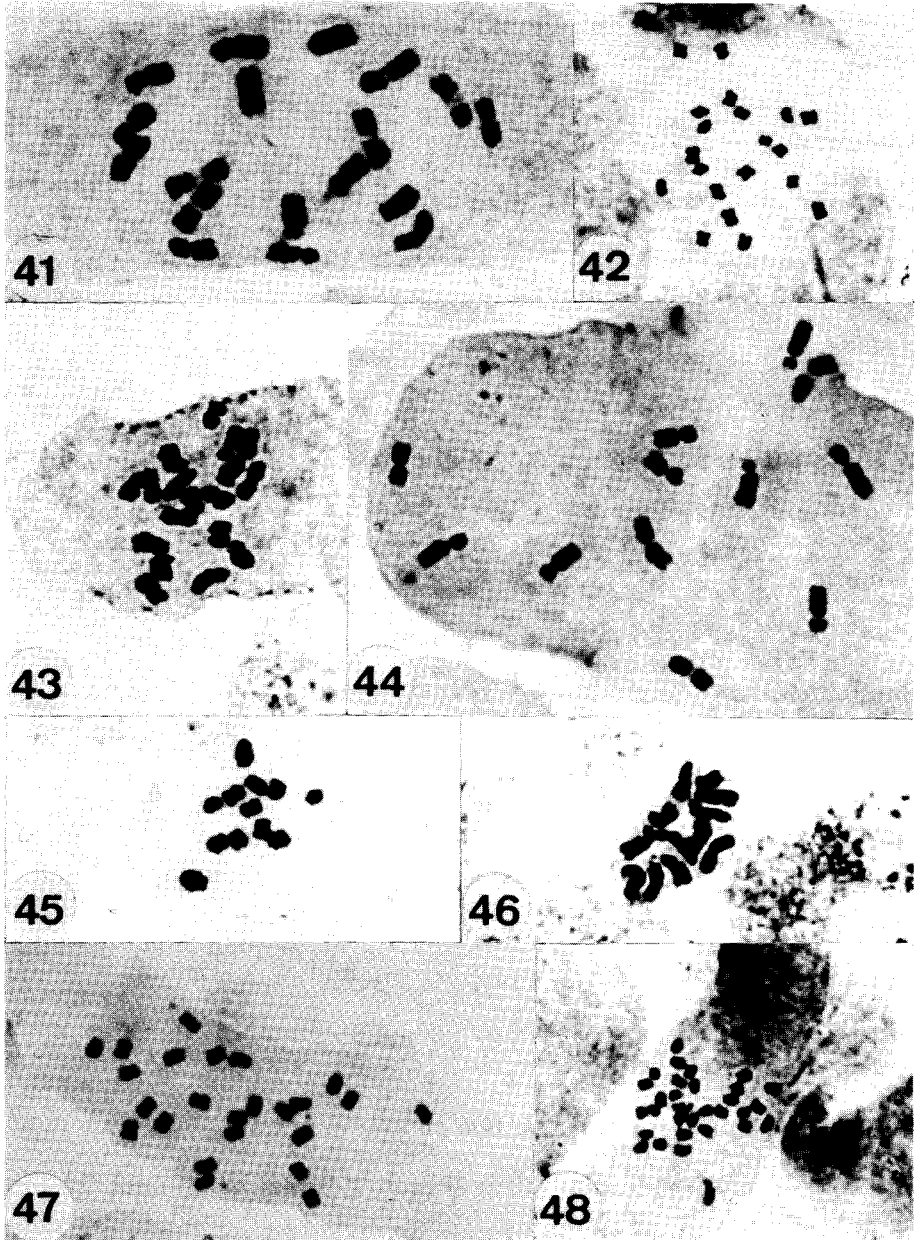


Fig. 41-48. Somatic metaphases. 41: *Rumex cyprius* (26.004), $2n=20$. 42: *Galium ghilaicum* (44.030), $2n=20$. 43: *Kickxia acerbiana* (6.062), $2n=18$. 44: *Linaria haelava* (6.058), $2n=12$. 45: *Linaria tenuis* (16.027), $2n=12$. 46: *Linaria albifrons* (22.042), $2n=12$. 47: *Theligionum cynocrambe* (02.011), $2n=24$. 48: *Valerianella szovitsiana* (19.009), $2n=32$.

Linaria haelava (Forsskål) Delile

$2n=12$. Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. 22.3.1989 (06.058, Fig. 44).

Linaria tenuis (Viv.) Sprengel

$2n=12$. Northern Negev: Nahal Sekher, 15 km S of Beer Sheva. 26.3.1989 (16.027, Fig. 45).

Parentucellia flaviflora (Boiss.) Nevski

$2n=48$. Judean Desert: near Mishor Adumim. 22.3.1989 (05.060).

Veronica polita Fries

$2n=14$. Judean Mts.: Jerusalem, near Ora. 24.3.1989 (12.035).

Veronica syriaca Roemer & Schultes

$2n=14$. Golan: Har Shipon. 4.4.1989 (46.026).

*Theligonaceae**Theligonum cynocrambe* L.

$2n=24$. Judean Foothills: near Sedot Micha. 21.3.1989 (02.011, Fig. 47).

*Valerianaceae**Valerianella szovitsiana* Fischer & C. A. Meyer

$2n=32$. Negev Highlands: Makhtesh Ramon, Karnei Ramon. 26..1989 (19.009, Fig. 48).

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References

Löve, Á. & Löve, D. 1975: Plant chromosomes.— Vaduz.

Snow, R. 1963: Alcoholic hydrochloric acid-carmines as a stain for chromosomes in squash preparations.— *Stain Technol.* **38**: 9-13.

Address of the authors:

Z. Díaz Lifante, T. Luque & C. Santa Bárbara, Departamento de Biología Vegetal y Ecología, Universidad de Sevilla, Apartado de Correos 1095, E-41080 Sevilla, Spain.