

Chromosome numbers of North African phanerogams. VIII. More counts in Compositae

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ROBERT VOGT & CHRISTOPH OBERPRIELER

Chromosome numbers of North African phanerogams. VIII. More counts in *Compositae*

Abstract

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Chromosome numbers are reported for 86 taxa belonging to 42 genera of *Compositae*. 17 reported taxa have not previously been studied cytologically or have chromosome numbers differing from previous reports. Counts for 11 additional taxa are the first reports for North Africa.

Additional key words: *Asteraceae*, cytology, Morocco, Tunisia

Introduction

The eighth contribution in this series dealing with cytological investigations in the North African flora provides 161 counts in the family *Compositae*. For previous contributions see Vogt & Oberprieler (1993a); Oberprieler & Vogt (1993); Hellwig & al. (1994); Vogt & Oberprieler (1994); Kilian & al. (1995); Oberprieler & Vogt (1996) and Scholz & al. (1998).

Material and methods

The seed material used for this study was collected during field trips to Morocco and Tunisia organized by the Botanic Garden and Botanical Museum Berlin-Dahlem in 1993, 1994 and 1995. Some additional seed samples were acquired from the Botanic Gardens of the University of Reading, UK, the Real Jardín Botánico of Madrid, Spain, and the Department of Plant Biology and Ecology of the University of Sevilla, Spain. Chromosome numbers were obtained from somatic mitoses of root tips of seeds germinated in Petri dishes. Standard techniques described earlier (Vogt & Oberprieler 1993a) were used to stain chromosomes. Voucher specimens of the original collections are deposited in B. To assess the existence of published chromosome numbers in the taxa studied, the online databases Goldblatt & Johnson (1979+) and Watanabe (2002+) were consulted. The genera and species are listed in alphabetical order. Taxa marked with a single asterisk (*) have been counted for the first time. The chromosome number of taxa marked with a double asterisk (**) is deviating from previous reports.

Results and discussion

Aaronsohnia pubescens (Desf.) Bremer & Humphries subsp. *pubescens* [= *Matricaria pubescens* (Desf.) Sch. Bip. ≡ *Chlamydophora pubescens* (Desf.) Coss. & Durieu ≡ *Chamomilla pubescens* (Desf.) Alavi ≡ *Cotula pubescens* Desf.] – $2n = 18$

MOROCCO: Prov. d'Er-Rachidia, road P 32 between Er-Rachidia and Boudnib, c. 19.2 km E of junction to Erfoud, dry oued with *Ziziphus*, 1030 m, 31°55'N, 4°08'W, 30.4.1993, Vogt 10417 & Oberprieler 4865 (B); 23 km E of Tinerhir (Tingher), on main road to Er-Rachidia, 1140 m, stony desert plain, 31°27'N, 5°21'W, 25.3.1994, Jury 14583, Tahiri & Upson [RNG], cultivated at the Botanic Garden Berlin-Dahlem, 1996, Vogt & Oberprieler s.n. (B).

Our counts confirm the diploid chromosome number of this subspecies characterised by discoid capitula as reported by Reese (1957 sub *Matricaria pubescens*), Molero & Montserrat Martí (1986 sub *Matricaria pubescens*), Vogt & Oberprieler (1993a) and Strother & Watson (1997). The deviating count of $2n = 10$ given by Humphries & al. (1978) has therefore to be considered as erroneous. The radiate *A. pubescens* subsp. *maroccana* (Ball) Fennane & Ibn Tattou has not been studied cytologically yet.

Anacyclus radiatus Loisel. subsp. *radiatus* – $2n = 18$

MOROCCO: Prov. Agadir, road P 30 between Tiznit and Agadir, c. 14.3 km N Tiznit, road embankments, 180 m, 29°49'N, 9°39'W, 19.5.1993, Vogt 11912 & Oberprieler 6360 (B).

Our count confirms former reports cited by Vogt & Oberprieler (1993a) and indexed in Goldblatt & Johnson (1979+) and Watanabe (2002+).

Arctotheca calendula (L.) Levyns – $2n = 18$

MOROCCO: Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksares-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, Vogt 9931 & Oberprieler 4379 (B).

This native of the Cape area in southern Africa is now naturalized along the Moroccan shores of the Mediterranean Sea and Atlantic Ocean and in several disjunct areas in the world. Our count corroborates the only former report based on N African plant material by Oberprieler & Vogt (1993).

Asteriscus aquaticus (L.) Less. [= *Nauplius aquaticus* (L.) Cass. ≡ *Odontospermum aquaticum* (L.) Sch. Bip.] – $2n = 14$ (Fig. 1)

MOROCCO: Tangier Peninsula, road P 32 between Tangier and Tetouan, around the junction with road 8302 to Melloussa, field margins, 70 m, 35°40'N, 5°41'W, 21.4.1993, Vogt 9987 & Oberprieler 4435 (B).

Our count is the first based on N African material and is in accordance with former reports on material from the Canary Islands (Ruíz de Clavijo y Jiménez 1993) and Bulgaria, Cyprus, Greece and Italy cited in Vogt & Oberprieler (1993b sub *Nauplius aquaticus*).

Bellis annua L. – $2n = 18$ (Fig. 2)

TUNISIA: Gouvernorat de Jendouba, Kroumerie, Tabarka, sea shore rocks c. 4 km W Tabarka, 10 m, 36°57.656'N, 8°44.924'E, 20.5.1994, Vogt 13747 & Oberprieler 8052 (B).

Our count is the first based on plants from N Africa and agrees with reports by Ruíz de Clavijo y Jiménez (1988) for Spain, Pavone & al. (1981a) for Italy and Fernandes & Queirós (1971a, 1971b) for Portugal.

* *Bellis microcephala* Lange – $2n = 18$ (Fig. 3)

MOROCCO: Monte de Debdou, Dj. Flouch c. 10 km N of Debdou, heavily grazed mountain slopes, limestone rocks, 1100 m, 34°00'N, 3°06'W, 10.5.1993, Vogt 11680 & Oberprieler 6128 (B); Monte des Beni-Snassen, Taforalt, N-facing slopes of Jebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, Vogt 10749 & Oberprieler 5197 (B).

This is the first report of a chromosome number for this Ibero-Maghrebian species.

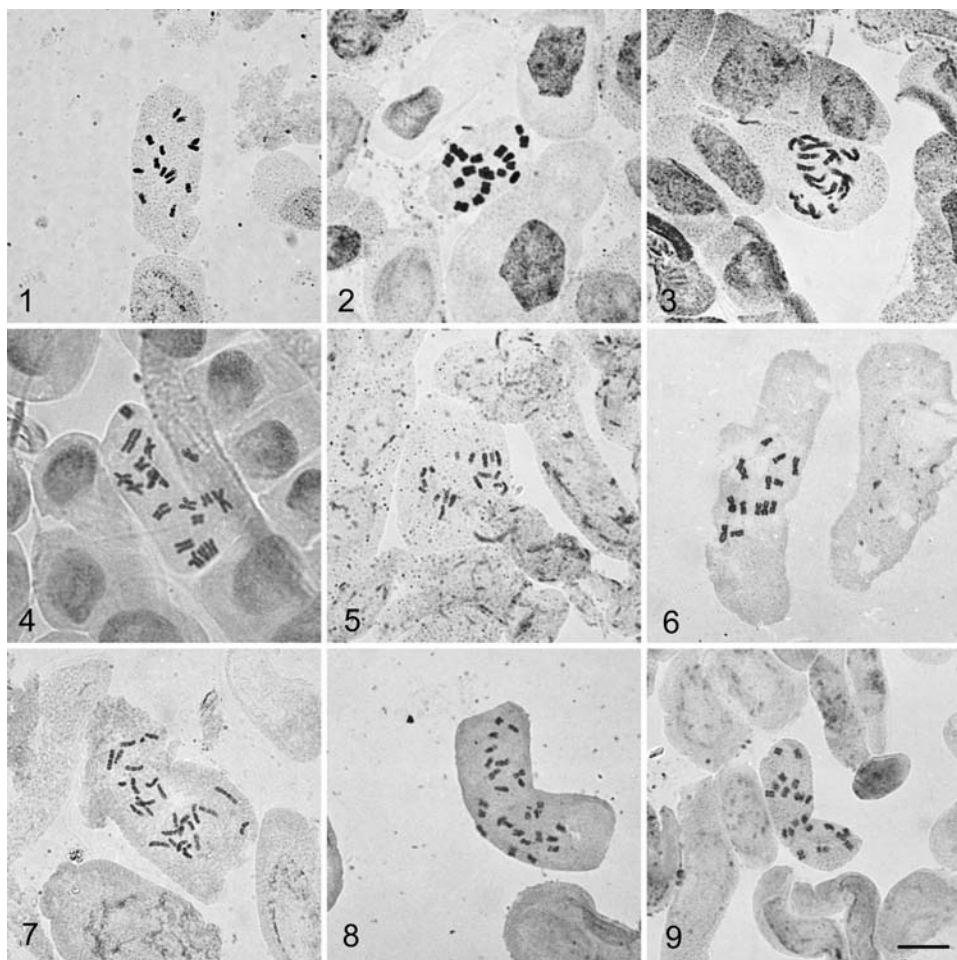


Fig. 1-9. Metaphases of root-tip mitoses – 1: *Asteriscus aquaticus*, $2n = 14$ (Vogt 9987 & Oberprieler 4435); 2: *Bellis annua*, $2n = 18$ (Vogt 13747 & Oberprieler 8052); 3: *Bellis microcephala*, $2n = 18$ (Vogt 11680 & Oberprieler 6128); 4: *Bellis rotundifolia*, $2n = 18$ (Vogt 15244 & Oberprieler 9553); 5: *Calendula eckerleinii*, $2n = 18$ (Vogt 10313 & Oberprieler 4761); 6: *Calendula stellata*, $2n = 14$ (Vogt 11267 & Oberprieler 5715); 7: *Carthamus fruticosus*, $2n = 24$ (Vogt 11716 & Oberprieler 6164); 8: *Carduus leptocladus*, $2n = 26$ (Vogt 11310 & Oberprieler 5758); 9: *Carduus myriacanthus*, $2n = 20$ (Vogt 10246 & Oberprieler 4694). – Scale bar: 10 μm .

* *Bellis rotundifolia* (Desf.) Boiss. & Reut. [$\equiv$ *Bellium rotundifolium* (Desf.) DC. $\equiv$ *Doronicum rotundifolium* Desf. $\equiv$ *Belliopsis rotundifolia* (Desf.) Pomel] – $2n = 18$ (Fig. 4)

MOROCCO: Prov. of Oujda, Monts des Beni-Snassen, summit of Djebel Foughal, c. 1.1 km SW of the Maison forestière Aïn-Almou, limestone cliffs, 1280 m, 34°50'N, 2°12'W, 16.5.1995, Vogt 15244 & Oberprieler 9553 (B).

This is the first count in this N African endemic distributed from NW Algeria (Djelfa) to NE Morocco (Beni Snassen), which has already been cited in Fiz & al. (2002).

Calendula arvensis (Vaill.) L. – $2n = 44$

MOROCCO: Tell Atlas, Col de Jerada on road P 19 between Aïn-Beni-Mathar and Oujda, c. 11.8 km N of pass and c. 8.5 km S Guenfouda, roadsides and field margins, and creek banks, 34°25'N, 2°02'W, 4.5.1993, Vogt 10727 & Oberprieler 5175 (B); Monts des Beni-Snassen, road

5311 between Mechrâ-Homadi and Berkane, c. 6 km as the crow flies NE Mechrâ-Homadi, field margins, 380 m, 34°47'N, 2°45'W, 7.5.1993, *Vogt 11121 & Oberprieler 5569* (B); Anti-Atlas, Col de Kerdous, mountain slopes E of hotel at Col du Kerdous, rocks, *Cupressus* plantations, 1200-1250 m, 29°35'N, 9°27'W, 17.5.1993, *Vogt 11842 & Oberprieler 6290* (B).

Our counts in three Moroccan populations of this widespread Mediterranean annual confirm the reports cited and discussed in Oberprieler & Vogt (1993) and Vogt & Aparicio (1999).

***Calendula eckerleinii* Ohle** – $2n = 18$ (Fig. 5)

MOROCCO: Middle Atlas, Aïn Leuh, road S 303 between Aïn Leuh and Source de l'Oum-er-Rbia, immediate S of Aïn Leuh, 1510 m, 33°17'N, 5°21'W, 28.5.1993, *Vogt 11999* (B); Middle Atlas, Massif du Kandar S Sefrou, road P 20 between Sefrou and Boulmane, limestone cliffs near the street c. 7.5 km S of Sefrou, 1150 m, 33°45'N, 4°51'W, 28.4.1993, *Vogt 10313 & Oberprieler 4761* (B).

Our findings in two populations of this endemic of Morocco and NW Algeria is in accordance with the only former count by Ohle (1975).

Calendula incana* Willd. subsp. *incana [= *Calendula suffruticosa* subsp. *tomentosa* Murb.] – $2n = 32$

MOROCCO: Tangier Peninsula, road 8303 from Souk-Tleta-Taghramet to Ceuta (Sebta), limestone rocks above Souk-Tleta-Taghramet and around quarry not far from the summit of the pass, 450-500 m, 35°48'N, 5°27'W, 17.4.1993, *Vogt 9872 & Oberprieler 4320* (B).

This is the first report of a chromosome number for N African plant material of this taxon confined to coastal rocks in S Spain and NW Morocco. It corroborates counts by Ohle (1974) and Ruíz de Clavijo y Jiménez (1990, sub *Calendula suffruticosa* subsp. *tomentosa*), on material of Spanish origin.

***Calendula stellata* Cav.** – $2n = 14$ (Fig. 6)

MOROCCO: Jebala, road S 603 between Chefchaouene and Ksar-el-Kebir, c. 1.7 km E Tatouft, roadside, field margins, and hedges, 220 m, 35°03'N, 5°46'W, 24.4.1993, *Vogt 10134 & Oberprieler 4582* (B); Tangier Peninsula, road P 32 between Tangier and Tetouan, around the junction with road 8302 to Melloussa, field margins, 70 m, 35°40'N, 5°41'W, 21.4.1993, *Vogt 9977 & Oberprieler 4425* (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Tanezzert, N-facing mountain slopes of Djebel Astar-ach-Chaib immediate below summit of pass, c. 2.5 km W Sidi-Yahia-Ben-Ahmed, *Tetraclinis articulata* woodland, 510-550 m, 34°48'N, 2°37'W, 8.5.1993, *Vogt 11267 & Oberprieler 5715* (B).

Our counts in three Moroccan populations agree with former reports for N African plant material by Aparicio (1989), Heyn & al. (1974), Meusel & Ohle (1966), Talavera & al. (1984), Ruíz de Clavijo y Jiménez (1991), Oberprieler & Vogt (1993) and Vogt & Oberprieler (1994). The deviating count of $2n = 44$ chromosomes given by Meusel & Ohle (1966 sub *C. algeriensis*) seems to be due to confusion with *C. arvensis*.

***Calendula suffruticosa* Vahl** – $2n = 32$

MOROCCO: Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, dry Oued, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, *Vogt 11039 & Oberprieler 5487* (B).

Our finding in a Moroccan population is in accordance with former reports by Talavera (1979 sub *Calendula suffruticosa* subsp. *suffruticosa* and subsp. *lusitanica*) and Ruíz de Clavijo y Jiménez (1990 sub *C. suffruticosa* subsp. *tomentosa*) from S Spain, and Aparicio (1989 sub *C. suffruticosa* subsp. *fulgida*), who studied plants of Algerian origin.

***Calendula tripterocarpa* Rupr.** – $2n = 30 + 0-2B$

MOROCCO: Prov. Figuig, road P 32 between Bouarfa and Figuig, north-facing slopes of Djebel Grouz c. 23 km W Figuig, mountains c. 6 km S of road P 32, rocks and stony slopes, 1100-1300 m, 32°08'N, 1°24'W, 1.5.1993, *Vogt 10544 & Oberprieler 4992* (B).

Our finding is in accordance with previous counts discussed by Oberprieler & Vogt (1993).

* *Carduus leptocladus* Durieu – $2n = 26$ (Fig. 8)

MOROCCO: Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Tanezzert, settlements around Tanezzert between Sidi-Yahia-Ben-Ahmed and Tagliat, roadsides, field margins, 450 m, 34°48'N, 2°36'W, 8.5.1993, *Vogt 11310 & Oberprieler 5758* (B).

This is the first report for this species endemic to Morocco and Algeria.

Carduus myriacanthus Salzm. ex DC. – $2n = 20$ (Fig. 9)

MOROCCO: Rharb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10246 & Oberprieler 4694* (B).

Our count of this taxon distributed in S Spain and NW Africa confirms the findings of Devesa (1981) and Talavera & al. (1984), who studied material from Cádiz province in Andalucía and Cabo Espartel W of Tangier, respectively.

Carduus tenuiflorus Curtis – $2n = 54$

MOROCCO: Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksares-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, *Vogt 9935 & Oberprieler 4383* (B); Monts des Beni-Snassen, Taforalt, N-facing slopes of Djebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, *Vogt 10801 & Oberprieler 5249* (B); Monts des Beni-Snassen, Gorges du Zegzel between the villages of Trashroute and Moulay Ahmed, slopes of the gorge below and above road, riverbed, 450-550 m, 34°49'N, 2°22'W, 10.5.1993, *Vogt 11579 & Oberprieler 6027* (B).

In the Mediterranean area this taxon has been previously studied by Loon & al. (1971) on material from France, by Fernandes & Queirós (1971a), Queirós (1973) and Devesa (1981) on material from Portugal and by Devesa (1981) and Pajarón Sotomayor (1982) on plants from Spain with the same result. Our counts in three populations are the first in material from N African.

Carthamus fruticosus Maire [= *Carduncellus fruticosus* (Maire) Hanelt = *Phonus fruticosus* (Maire) G. López, *Femeniasia fruticosa* (Maire) D. P. Petit] – $2n = 24$ (Fig. 7)

MOROCCO: Djebel Siroua, road P 32 between Ouarzazate and Tazenakht, c. 1 km NE of the junction with P 31 from Tizi-n-Tichka, rocks and roadsides, 1350 m, 30°58'N, 7°12'W, 12.5.1993, *Vogt 11716 & Oberprieler 6164* (B).

Our count for this species endemic to S Morocco agrees with former reports by Dumé (1976), Humphries & al. (1978) and López González (1990).

* *Centaurea bimorpha* Viv. – $2n = 22$ (Fig. 10)

TUNISIA: Gouvernorat de Tozeur, Chott Er Rahim, road P 16 between Chbika and Tozeur, c. 10 km SE Chbika, sand, 0 m, 34°14.973'N, 7°52.954'E, 10.5.1994, *Vogt 12789 & Oberprieler 7094* (B).

This seems to be the first report of a chromosome number for this N African endemic, which is distributed from Morocco to Egypt and the Sinai.

Centaurea furfuracea Coss. & Durieu – $2n = 20$ (Fig. 11)

TUNISIA: Gouvernorat de Tataouine, road P 19 between Tataouine and Remada, c. 4.5 km S Bir Thlethine, sandy plains and fields E of the road, 420 m, 32°39.549'N, 10°19.871'E, 13.5.1994, *Vogt 13021 & Oberprieler 7326* (B).

Our count agrees with former reports by Guinochet (1957) and Reese (1957), who studied plants from Tunisia and Algeria, respectively.

* *Centaurea gentilii* Braun-Blanq. & Maire – $2n = 44$ (Fig. 12)

MOROCCO: Prov. Agadir, road P 30 between Tiznit and Agadir, c. 14.3 km N Tiznit, road embankments, 180 m, 29°49'N, 9°39'W, 19.5.1993, *Vogt 11910 & Oberprieler 6358* (B).

This is the first count for this SW Moroccan endemic.

Centaurea melitensis L. – $2n = 24$

MOROCCO: Monts des Beni-Snassen, Gorges du Zegzel between the villages of Moulay Ahmed and Takerboust, riverbed and roadsides, 270-300 m, 34°50'N, 2°22'W, 10.5.1993, *Vogt 11647 & Oberprieler 6095* (B).

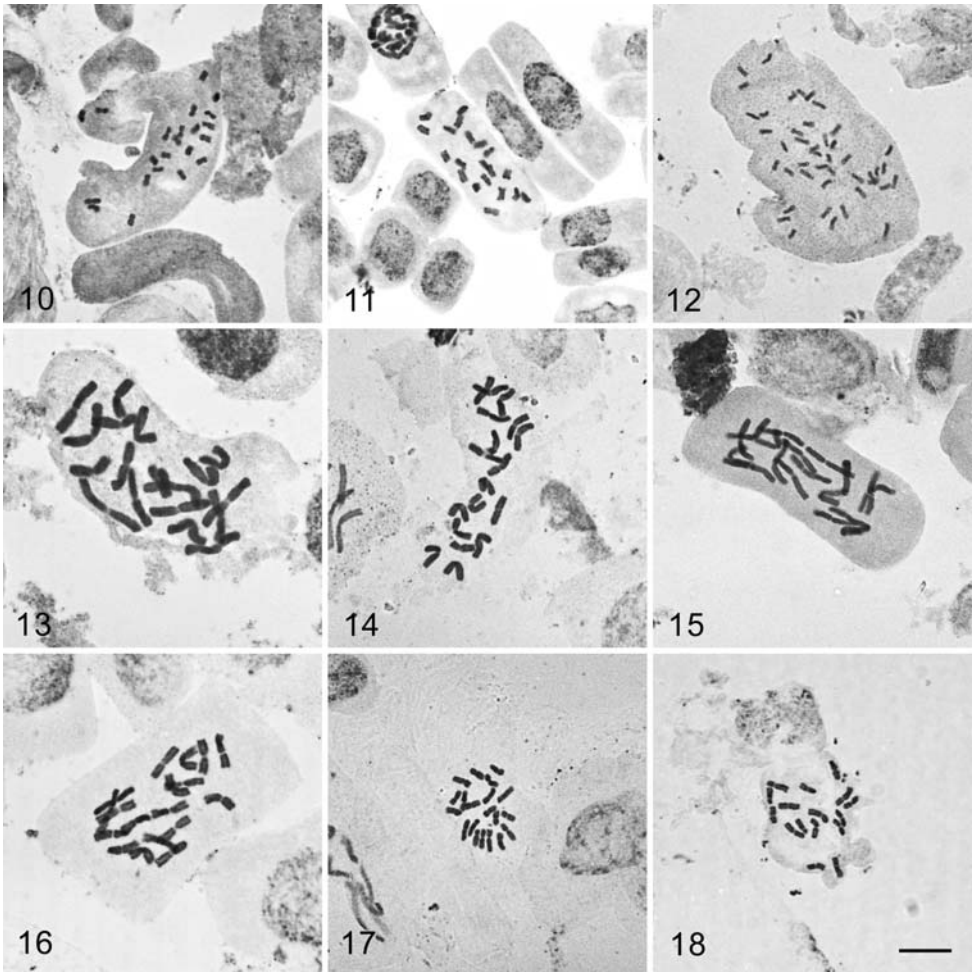


Fig. 10-18. Metaphases of root-tip mitoses – 10: *Centaurea bimorpha*, $2n = 22$ (Vogt 12789 & Oberprieler 7094); 11: *Centaurea furfuracea*, $2n = 20$ (Vogt 13021 & Oberprieler 7326); 12: *Centaurea gentilii*, $2n = 44$ (Vogt 11910 & Oberprieler 6358); 13: *Chrysanthoglossum deserticola*, $2n = 18$ (Vogt 13038 & Oberprieler 7343); 14: *Daveaua anthemoides*, $2n = 18$ (Vogt & Oberprieler s.n.); 15: *Glossopappus macrotus* var. *hesperius*, $2n = 18$ (Vogt 12302 & Oberprieler 6607); 16: *Glossopappus macrotus* var. *macrotus*, $2n = 18$ (Vogt & Oberprieler s.n.); 17: *Hertia cheirifolia*, $2n = 20$ (Vogt 12574 & Oberprieler 6879); 18: *Hyoseris radiata*, $2n = 16$ (Vogt 10818 & Oberprieler 5266). – Scale bar: 10 μm .

Our count corroborates the only former report from N Africa by Hellwig & al. (1994), who studied plant material from Er-Rachidia province. For further discussion see Hellwig & al. (1994).

***Centaurea pungens* Pomel – $2n = 22$**

MOROCCO: Prov. d'Er-Rachidia, Charis, road P 32 between Er-Rachidia and Goulmima, dry Oued c. 23 km E Goulmima, 1090 m, $31^{\circ}47'N$, $4^{\circ}50'W$, 12.5.1993, Vogt 11705 & Oberprieler 6153 (B).

This count confirms previous reports on this species restricted to NW Africa (Reese 1957, Hellwig & al. 1994).

Chamaemelum fuscatum (Brot.) Vasc. – $2n = 18$

MOROCCO: Tangier Peninsula, road S 601 between Ksar-es-Seghir and Tetouan, 1.6 km S of the junction with road 8303 to Souk-Tleta-Taghramet, garrigue, pastures, field margins and moist meadows, 170 m, 35°45'N, 5°30'W, 17.4.1993, *Vogt 9767 & Oberprieler 4215* (B); Tangier Peninsula, road 8303 between the road Ksar-es-Seghir, Tetouan (S 601) and Ceuta (Sebta), 1.2 km E of the junction with road S 601, maquis, limestone rocks, field margins and river banks, 170 m, 35°48'N, 5°28'W, 17.4.1993, *Vogt 9820 & Oberprieler 4268* (B); Rharrb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10916 & Oberprieler 5364* (B).

Our counts in plants from three NW Moroccan populations corroborate the only former count based on Moroccan plant material cited in Vogt & Oberprieler (1993).

* *Chrysanthoglossum deserticola* (Murb.) B. H. Wilcox & al. – $2n = 18$ (Fig. 13)

TUNISIA: Gouvernorat de Tataouine, road P 19 between Tataouine and Remada, c. 27 km NW Remada, road embankments and sandy plains, 450 m, 32°30.757'N, 10°16.204'E, 13.5.1994, *Vogt 13038 & Oberprieler 7343* (B).

This seems to be the first report for this species endemic to Algeria and Tunisia.

Coleostephus myconis (L.) Rechb. f. – $2n = 18$

TUNISIA: Gouvernorat de Jendouba, Kroumerie, road P 17 between Aïn Draham and Tabarka, road embankments and meadows c. 7 km S of Tabarka, 40 m, 36°52.709'N, 8°44.085'E, 20.5.1994, *Vogt 13719 & Oberprieler 8024* (B); Gouvernorat de Jendouba, Kroumerie, track between Ghardimaou and Aïn Soltane, c. 6 km N of turn-off from road P 6 between Jendouba and the Algerian border, *Olea* plantation, 250 m, 36°29.156'N, 8°22.698'E, 21.5.1994, *Vogt 13755 & Oberprieler 8060* (B).

This is the first record of a chromosome number from Tunisia for this common Mediterranean weed and agrees with previous counts on material from the Mediterranean area, i.e. from Italy (Marchi & Illuminati 1974; Pavone & al. 1981b; Scrugli 1974), Portugal (Nagl & Ehrendorfer 1974; Fernandes & Queirós 1971a), Spain (Lago & Castroviejo 1989; Pastor & al. 1990; Santa Bárbara & al. 1994) and Algeria (Humphries & al. 1978).

Crepis vesicaria subsp. *stellata* (Ball) Babç. – $2n = 8, 16$

MOROCCO: Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, *Vogt 11757 & Oberprieler 6205* (B) [$2n = 4x = 16$]; Anti-Atlas, NW-side of Djebel Lekst near the summit of pass Tizi-n-Tagounit on track 7056 between Tioulit and Tanalt, garrigue, rocks, 1600-1700 m, 29°48'N, 9°08'W, 15.5.1993, *Vogt 11784 & Oberprieler 6232* (B) [$2n = 8$].

Our reports agree with previous counts (see Vogt & Oberprieler 1994).

Crepis vesicaria subsp. *taraxacifolia* (Thuill.) Thell. – $2n = 8, 16$

MOROCCO: Monts des Beni-Snassen, Gorges du Zegzel between the villages of Trashroute and Moulay Ahmed, slopes of the gorge below and above road, riverbed, 450-550 m, 34°49'N, 2°22'W, 10.5.1993, *Vogt 11542 & Oberprieler 5990* (B) [$2n = 16$]; Prov. de Tetouan, Südufer des Barrage Ajras an der Straße von Tetouan nach Tanger (P 37), 35°34'N, 5°31'W, 22.6.1989, *Oberprieler 1783* [$2n = 8$].

Our reports agree with previous counts (see Vogt & Oberprieler 1994).

* *Daveaua anthemoides* Willk. ex Mariz – $2n = 18$ (Fig. 14)

MOROCCO: Chefchaouene, Monts de Jojuba, between Dardara and Ksar-él-Hehir, Akarate, 700 m, 31.5.1995, *Valdés 6317/95* (SEV), cultivated at the Botanic Garden Berlin-Dahlem, 1996, *Vogt & Oberprieler* (B).

This is the first report for this species distributed in the S Iberian Peninsula and NW Morocco.

***Glebionis segetum* (L.) Fourr. [= *Chrysanthemum segetum* L.]** – $2n = 18$

MOROCCO: Jebala, road S 603 between Chefchaouene and Ksar-el-Kebir, c. 1.7 km E Tatouft, roadside, field margins, and hedges, 220 m, 35°03'N, 5°46'W, 24.4.1993, *Vogt 10130 & Oberprieler 4578* (B).

Our count is in agreement with former counts based on N African plant material (sub *Chrysanthemum segetum*) of this common Mediterranean weed (Vogt & Oberprieler 1993a, 1994; Strother & Watson 1997).

* ***Glossopappus macrotus* var. *hesperius* Maire** – $2n = 18$ (Fig. 15)

MOROCCO: Middle Atlas, road 1811 from Demnate to Cascades d'Ouzoud, c. 9 km N of junction with road S 508 between Demnate and Azilal, 32°00'N, 6°45'W, 23.5.1993, *Vogt 11935* (B); Middle Atlas, road P 24 between Ifrane and Fès, c. 6 km N Immouzer du Kandar, field margins, 1090 m, 33°44'N, 5°01'W, 29.5.1993, *Vogt 12028* (B); Zaïane, road between Sidi-Bettache and Rommeni, c. 1.3 km W of the bridge across Oued Korifla, steep road embankment, 350 m, 33°32.927'N, 6°45.909'W, 12.5.1995, *Vogt 14815 & Oberprieler 9124* (B).

TUNISIA: Gouvernorat de Beja, Monts de TebourSouk, plateau of Djebel Goraa, pastures and field margins, 960 m, 36°29.045'N, 9°08.853'E, 3.5.1994, *Vogt 12302 & Oberprieler 6607* (B).

Our counts in four populations from Morocco and Tunisia – the first ones reported for this variety – are in accordance with all former reports for *Glossopappus macrotus* s.l. provided by Löve & Kjellqvist (1974, sub *Leucanthemum macrotum*), Ruíz de Clavijo y Jiménez & Uberta Jiménez (1982), Silvestre (1986), Luque & Mejías (1986) and Strother & Watson (1997), who studied plant material from Spain, and Oberprieler & Vogt (1993), who counted plants from Morocco.

Glossopappus macrotus* (Durieu) Briq. var. *macrotus – $2n = 18$ (Fig. 16)

MOROCCO: Rif, Bab Taza to Bab-Berret, 1.5 km E of Charafat, 1050 m, 2.7.1993, *S. L. Jury 11522* (RNG); cultivated at the Botanical Garden Berlin-Dahlem, 25.7.1996, *Vogt & Oberprieler* (B).

TUNISIA: Gouvernorat de El Kef, vallée de la Medjerdah, road P 17 between Nabeur and Jendouba, c. 10 km N Nabeur, *Olea* plantation, 320 m, 36°22.066'N, 8°46.048'E, 19.5.1994, *Vogt 13569 & Oberprieler 7874* (B).

Our counts in two populations from Morocco and Tunisia corroborate the report of Oberprieler & Vogt (1993), who studied Moroccan plants. Löve & Kjellqvist (1974, sub *Leucanthemum macrotum*), Ruíz de Clavijo y Jiménez & Uberta Jiménez (1982), Silvestre (1986), Luque & Mejías (1986) and Strother & Watson (1997) reported the same result for plants from Spain.

***Hedypnois arenaria* (Schousb.) DC.** – $2n = 6$

MOROCCO: Rharb, road S216 between Arbaoua and Moulay Bousselham, c. 3.4 km W of junction with road to Lalla-Rhano and Ksar-el-Kebir, ungrazed field margin, 10 m, 34°51'N, 6°10'W, 24.4.1993, *Vogt 10153 & Oberprieler 4601* (B); Rharb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10250 & Oberprieler 4698* (B)

This report agrees with several previous counts (for discussion see Oberprieler & Vogt 1993).

***Hedypnois rhagadioloides* (L.) F. W. Schmidt [= *Hedypnois cretica* (L.) Dum. Cours.]** – $2n = 13$, 13-14, 14, 15]

MOROCCO: Tangier Peninsula, road 8303 from Souk-Tleta-Taghramet to Ceuta (Sebta), limestone rocks above Souk-Tleta-Taghramet and around quarry not far from the summit of the pass, 450-500 m, 35°48'N, 5°27'W, 17.4.1993, *Vogt 9864 & Oberprieler 4312* (B) [$2n = 13-14$]; Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m, c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, *Vogt 11047 & Oberprieler 5495* (B) [$2n = 13-14$]; Middle Atlas, Mas-sif du Kandar S Sefrou, road P 20 between Sefrou and Boulmane, limestone cliffs near the street c. 7.5 km S of Sefrou, 1150 m, 33°45'N, 4°51'W, 28.4.1993, *Vogt 10311 & Oberprieler 4759* (B) [$2n = 13$]; Anti-Atlas, Col de Kerdous, mountain slopes E of hotel at Col du Kerdous, rocks,

Cupressus plantations, 1200-1250 m, 29°35'N, 9°27'W, 17.5.1993, *Vogt 11851 & Oberprieler*

6299 (B) [$2n = 13$]; Tangier Peninsula, road P 32 between Tangier and Tetouan, around the junction with road 8302 to Melloussa, field margins, 70 m, 35°40'N, 5°41'W, 21.4.1993, *Vogt 9996 & Oberprieler 4444* (B) [$2n = 14$]; Tell Atlas, Col de Jerada on road P 19 between Aïn-Beni-Mathar and Oujda, c. 11.8 km N of pass and c. 8.5 km S Guenfouda, roadsides and field margins, and creek banks, 34°25'N, 2°02'W, 4.5.1993, *Vogt 10738 & Oberprieler 5186* (B) [$2n = 15$]

The reports agree with previous counts (for discussion see Oberprieler & Vogt 1993).

***Helichrysum stoechas* (L.) Moench – $2n = 28$**

MOROCCO: Prov. de Marrakech, Hoher Atlas, 11 km S Imi-n-Ifri (Pont naturel) an der Piste nach Tofrine, 1600 m, 31°35'N, 6°57'W, 6.7.1989, *Oberprieler 3529* (B).

This first count based on N African plants is in accordance with previous reports by Natarajan (1978), D'Amato (1971), Amore & al. (1999), Löve & Löve (1982), Fernandes & Queirós (1971a), Queirós (1973) and Loon & Jong (1978), who studied plants from France, Italy and Portugal.

*** *Hertia cheirifolia* (L.) Kuntze – $2n = 20$ (Fig. 17)**

TUNISIA: Gouvernorat de El Kef, Djebel Dyr, 4.2 km NE El Kef, road from El Kef towards Djebel Dyr, stony slopes, limestone, 840 m, 36°11.787'N, 8°43.422'E, 5.5.1994, *Vogt 12437 Oberprieler 6742* (B); Gouvernorat de Kasserine, road P 17 between Thala and Kasserine, c. 15 km N Kasserine, road and field margins, 980 m, 35°23.091'N, 8°43.924'E, 7.5.1994, *Vogt 12574 & Oberprieler 6879* (B).

This is the first report of a chromosome number for this species restricted to Algeria and Tunisia.

***Heteranthemis viscidhirta* Schott – $2n = 18$**

MOROCCO: Rharrb, road 2301 between Nador and Kenitra, c. 6.4 km N Benmanssour, field margins, 20 m, 34°32'N, 6°28'W, 25.4.1993, *Vogt 10254 & Oberprieler 4702* (B).

The report agrees with previous counts (for discussion see Oberprieler & Vogt 1993).

***Hyoseris radiata* L. – $2n = 16$ (Fig. 18)**

MOROCCO: Tangier Peninsula, road 8303 from Souk-Tleta-Taghramet to Ceuta (Sebta), limestone rocks above Souk-Tleta-Taghramet and around quarry not far from the summit of the pass, 450-500 m, 35°48'N, 5°27'W, 17.4.1993, *Vogt 9874 & Oberprieler 4322* (B); Jebala, road S 603 between Chefchaouene and Ksar-el-Kebir, c. 1.7 km E Tatouft, roadside, field margins, and hedges, 220 m, 35°03'N, 5°46'W, 24.4.1993, *Vogt 10147 & Oberprieler 4595* (B); Monts des Beni-Snassen, Taforalt, N-facing slopes of Djebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, *Vogt 10818 & Oberprieler 5266* (B).

Our counts in three populations agree with previous counts (for discussion see Oberprieler & Vogt 1993).

***Hyoseris scabra* L. – $2n = 16$ (Fig. 19)**

MOROCCO: Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m, c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, *Vogt 11076 & Oberprieler 5524* (B); Monts des Beni-Snassen, Gorges du Oued Zegzel between Djebel Israne and Djebel Achouan E Taforalt, S-facing mountain slopes of Djebel Israne near the "Grotte des Pigeons", 690 m, 34°50'N, 2°24'W, 9.5.1993, *Vogt 11515 & Oberprieler 5963* (B).

Our counts in two Moroccan populations agree with findings of Klein & al. (1997), who studied plants from Algeria, while Talavera & al. (1984) counted the deviating number of $n = 6$ in a Moroccan population.

***Hypochaeris arachnoides* Poir. – $2n = 8$ (Fig. 20)**

MOROCCO: Tell Atlas, Col de Jerada on road P 19 between Aïn-Beni-Mathar and Oujda, c. 11.8 km N of pass and c. 8.5 km S Guenfouda, roadsides and field margins, and creek banks, 34°25'N, 2°2'W, 4.5.1993, *Vogt 10730 & Oberprieler 5178* (B); Monts des Beni-Snassen, road 5311 be-

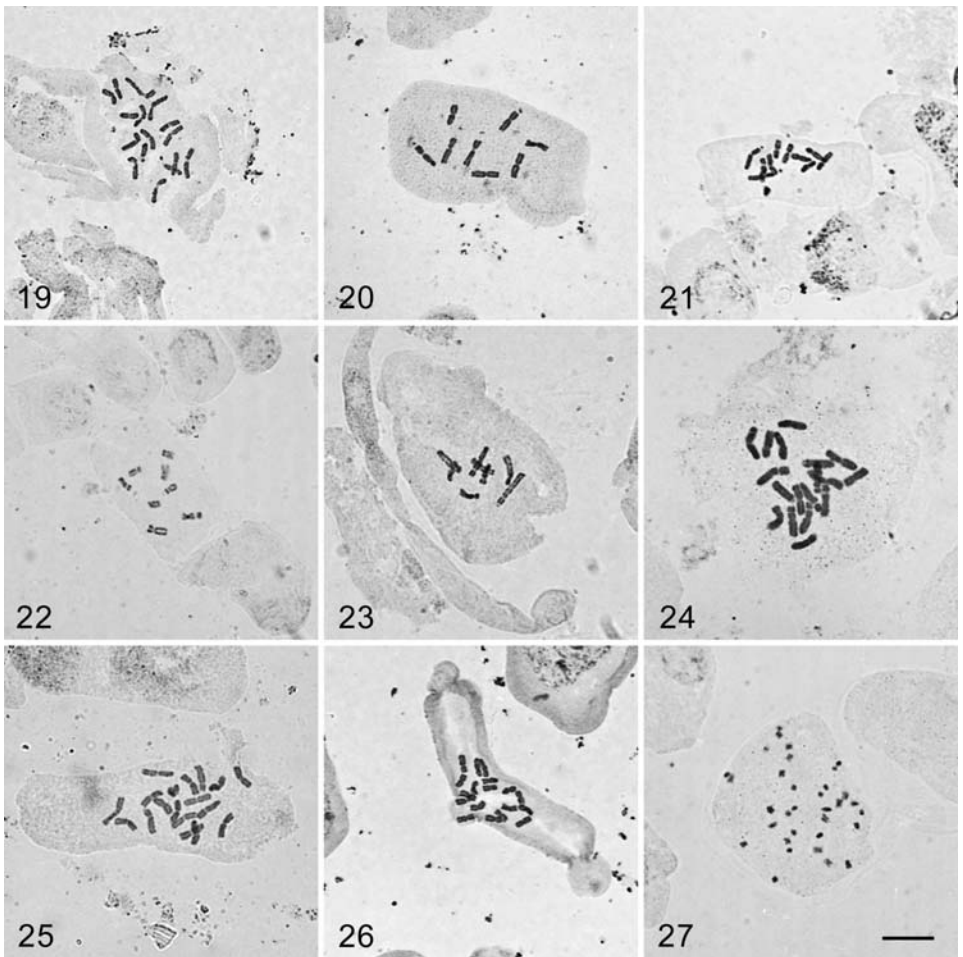


Fig. 19-27. Metaphases of root-tip mitoses – 19: *Hyoseric scabra*, $2n = 16$ (Vogt 11515 & Oberprieler 5963); 20: *Hypochaeris arachnoides*, $2n = 8$ (Vogt 10574 & Oberprieler 5022); 21: *Hypochaeris glabra*, $2n = 10$ (Vogt 10157 & Oberprieler 4605); 22: *Leontodon longirostris*, $2n = 8$ (Vogt 9964 & Oberprieler 4412); 23: *Leontodon tuberosus*, $2n = 8$ (Vogt 10080 & Oberprieler 4528); 24: *Lonas annua*, $2n = 18$ (Vogt 13868 & Oberprieler 8173); 25: *Mauranthemum decipiens*, $2n = 18$ (Vogt 10748 & Oberprieler 5196); 26: *Nolletia chrysocomoides*, $2n = 18$ (Vogt 10463 & Oberprieler 4911); 27: *Onopordum acaulon*, $2n = 34$ (Vogt 10514 & Oberprieler 4962). – Scale bar: 10 μm .

tween Mechrâ-Homadi and Berkane, slopes along the road c. 1 km E of the junction with road S 412 (Mechrâ-Homadi - El-Aioun), *Tetraclinis articulata* woodland, 200 m, 34°43'N, 2°48'W, 6.5.1993, Vogt 10948 & Oberprieler 5396 (B); Mediterranean coast NW Oujda, Ras-el-Ma, surroundings of lighthouse at Ras Kebdana, maritim sands, 40 m, 35°09'N, 2°25'W, 5.5.1993, Vogt 10929 & Oberprieler 5377 (B); Prov. Figuig, road P 32 between Bouarfa and Figuig, north-facing slopes of Djebel Grouz c. 23 km W Figuig, montains c. 6 km S of road P 32, rocks and stony slopes, 1100-1300 m, 32°08'N, 1°24'W, 1.5.1993, Vogt 10574 & Oberprieler 5022 (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Talezzert, mountain ridge between Djebel Astar-ach-Chaib and Oued Tlata-at-Talremt c. 3.5 km SE of the marabout "Sidi Boubker" in Beni Ammar, pastures and *Tetraclins* woodland, 340-370 m, 34°48'N, 2°38'W, 8.5.1993, Vogt 11252 & Oberprieler 5700 (B).

This species has been studied only once before by Oberprieler & Vogt (2002). The diploid chromosome number of $2n = 8$ is confirmed here in five populations from Morocco.

***Hypochaeris glabra* L. – $2n = 10$ (Fig. 21)**

MOROCCO: Rharb, road S216 between Arbaoua and Moulay Bousselham, c. 3.4 km W of junction with road to Lalla-Rhano and Ksar-el-Kebir, ungrazed field margin, 10 m, 34°51'N, 6°10'W, 24.4.1993, Vogt 10157 & Oberprieler 4605 (B).

This first count based on Moroccan plant material of this widespread weed agrees with previous reports from the Mediterranean area cited in standard indices by Goldblatt & Johnson (1979+) and Watanabe (2002+).

***Hypochaeris radicata* L. – $2n = 8$**

MOROCCO: Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, Vogt 11753 & Oberprieler 6201 (B).

The report agrees with previous counts (see Oberprieler & Vogt 1993).

***Leontodon longirostris* (Finch & P. D. Sell) Talavera [= *Leontodon saxatilis* subsp. *rothii* Maire] – $2n = 8$ (Fig. 22)**

MOROCCO: Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksar-es-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, Vogt 9917 & Oberprieler 4365 (B); Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksar-es-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, Vogt 9943 & Oberprieler 4391 (B); Tangier Peninsula, beach near S 309 c. 9 km NE Ksar-es-Seghir, sand, 5 m, 35°53'N, 5°30'W, 20.4.1993, Vogt 9964 & Oberprieler 4412 (B).

This number counted in three populations agrees with previous counts (for discussion see Vogt & Oberprieler 1993).

***Leontodon tuberosus* L. – $2n = 8$ (Fig. 23)**

MOROCCO: Jebala, Djebel Sougna near road S 603 between Chefchaouene and Ksar-el-Kebir, surroundings of the transmitting instalation on top of the mountain SE of Djebel Sougna, *Pinus* woodland, schistous rocks, 1000 m, 35°06'N, 5°22'W, 23.4.1993, Vogt 10080 & Oberprieler 4528 (B); Jebala, Djebel Sougna near road S 603 between Chefchaouene and Ksar-el-Kebir, pond E of village Doumse c. 17 km E Tanakoub, 850 m, 35°05'N, 5°24'W, 23.4.1993, Vogt 10091 & Oberprieler 4539 (B); Monts des Beni-Snassen, Taforalt, N-facing slopes of Djebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, Vogt 10852 & Oberprieler 5300 (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Talezzert, E-facing slopes of pass immediate W of Sidi-Yahia-Ben-Ahmed, *Tetraclins* woodland, pastures, roadsides, 450-520 m, 34°48'N, 2°37'W, 8.5.1993, Vogt 11288 & Oberprieler 5736 (B).

These are the first counts for this species based on Moroccan plant material and they are in agreement with previous reports from many Mediterranean countries cited in standard indices by Goldblatt & Johnson (1979+) and Watanabe (2002+).

***Leysera leyseroides* (Desf.) Maire – $2n = 16$**

MOROCCO: 4 km from Idni on road from Asni to Tizi-n-Test, 1991, Gardner, Jury & Ait-Lafkih. Cultivated at the Botanic Garden Berlin-Dahlem, 7.6.1993, Oberprieler & Vogt (B).

The count in this species distributed from S Spain to SW Asia is in accordance with the findings by Oberprieler & Vogt (1993), Blanca (1983) and Luque & Díaz Lifante (1991). The report of $2n = 14$ by Humphries & al. (1978) seems erroneous.

***Lonas annua* (L.) Vines & Druce – $2n = 18$ (Fig. 24)**

TUNISIA: Gouvernorat de Zaghuan, NW-facing slopes of Djebel Zaghuan, 500-700 m, 36°22.098'N, 10°7.325'E, 23.5.1994, Vogt 13868 & Oberprieler 8173 (B).

This is the first count for this species based on N African plant material. It corroborates the only former report based on plants from Italy by Bartolo & al. (1978).

***Mauranthemum decipiens* (Pomel) Vogt & Oberpr. – $2n = 18$ (Fig. 25)**

MOROCCO: Monts des Beni-Snassen, Taforalt, N-facing slopes of Djebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, *Vogt 10748* & *Oberprieler 5196* (B).

Our count is in agreement with former reports under *Leucanthemum decipiens* based on N African and Spanish plant material by Wilcox (1982), Talavera & al. (1984), García Martín & Silvestre (1985) and Vogt (1991).

***Nolletia chrysocomoides* (Desf.) Less. – $2n = 18$ (Fig. 26)**

MOROCCO: Prov. d'Er-Rachidia, road P 32 between Er-Rachidia and Boudnib, c. 10 km W of Boudnib, dry Oued with *Ziziphus*, 1030 m, 31°55'N, 4°08'W, 30.4.1993, *Vogt 10463* & *Oberprieler 4911* (B).

This count seems to be the second for this species and corroborates the former report by Reese (1957), who studied plant material from W Algeria.

***Onopordum acaulon* L. – $2n = 34$ (Fig. 27)**

MOROCCO: Prov. Figuig, road P 32 between Bouarfa and Figuig, *Pistacia atlantica* cluster c. 21.2 km E Bouarfa, 1130 m, 32°32'N, 1°50'W, 1.5.1993, *Vogt 10514* & *Oberprieler 4962* (B).

Our count agrees with the only two previous counts by Luque & Díaz Lifante (1991) and Fernández Casas & Pueche (1978) in plants from Spain.

*** *Phagnalon bicolor* Ball [*Phagnalon atlanticum* auct.] – $2n = 18$ (Fig. 28)**

MOROCCO: Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, *Vogt 11754* & *Oberprieler 6202* (B).

This is the first report of a chromosome number of this S Moroccan endemic.

***Phagnalon rupestre* (L.) DC. – $2n = 18$**

MOROCCO: Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, slopes along the road c. 1 km E of the junction with road S 412 (Mechrâ-Homadi - El-Aioun), *Tetraclinis articulata* woodland, 200 m, 34°43'N, 2°48'W, 6.5.1993, *Vogt 10952* & *Oberprieler 5400* (B); Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, dry Oued, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, *Vogt 11009* & *Oberprieler 5457* (B).

The report agrees with previous counts (for discussion see Oberprieler & Vogt 1993).

***Phagnalon saxatile* (L.) Cass. – $2n = 18$**

MOROCCO: Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksar-es-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, *Vogt 9913* & *Oberprieler 4361* (B); Prov. Figuig, road P 32 between Bouarfa and Figuig, north-facing slopes of Djebel Grouz c. 23 km W Figuig, mountains c. 6 km S of road P 32, rocks and stony slopes, 1100-1300 m, 32°08'N, 1°24'W, 1.5.1993, *Vogt 10568* & *Oberprieler 5016* (B); Monts des Beni-Snassen, Gorges du Zegzel between the villages of Trashroute and Moulay Ahmed, slopes of the gorge below and above road, riverbed, 450-550 m, 34°49'N, 2°22'W, 10.5.1993, *Vogt 11549* & *Oberprieler 5997* (B); Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, *Vogt 11755* & *Oberprieler 6203* (B); Anti-Atlas, Col de Kerdous, mountain slopes E of hotel at Col du Kerdous, rocks, *Cupressus* plantations, 1200-1250 m, 29°35'N, 9°27'W, 17.5.1993, *Vogt 11849* & *Oberprieler 6297* (B).

The counts in five populations agree with previous counts (see Oberprieler & Vogt 1993).

***Picris asplenioides* L. [= *P. coronopifolia* (Desf.) DC.] – $2n = 10$**

TUNISIA: Gouvernorat de Gabès, Tunisie du Sud, road P 1 between Gabès and Medenine, c. 2 km NW Kettana, road embankments and sandy plains, 100 m, 33°47.013'N, 10°10.895'E, 12.5.1994, *Vogt 12941 & Oberprieler 7246* (B); Gouvernorat de Tataouine, Tunisie du Sud, road P 19 between Medenine and Tataouine, c. 20 km N Tataouine, 5 km S Bir Lahmar, field margins, 260 m, 33°8.678'N, 10°28.239'E, 12.5.1994, *Vogt 12996 & Oberprieler 7301* (B).

Our counts in two populations agree with the only former report by Reese (1957, sub *P. coronopifolia*) on plants from Algeria.

***Picris cupuligera* (Durieu) Walp. – $2n = 10$**

MOROCCO: Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Talezzert, mountain ridge between Djebel Astar-ach-Chaib and Oued Tlata-at-Talremt c. 3.5 km SE of the marabout “Sidi Boubker” in Beni Ammar, pastures and *Tetraclins* woodland, 340–370 m, 34°48'N, 2°38'W, 8.5.1993, *Vogt 11244 & Oberprieler 5692* (B).

TUNISIA: Gouvernorat de El Kef, vallee de la Medjerdah, road P 17 between Nabeur and Jendouba, c. 10 km N Nabeur, *Olea* plantation, 320 m, 36°22.066'N, 8°46.048'E, 19.5.1994, *Vogt 13572 & Oberprieler 7877* (B).

Our counts in plants from two populations in Morocco and Tunisia agree with the only former report by Humphries & al. (1978), who studied plants from Erfoud in SE Morocco.

***Picris hispanica* (Willd.) P. D. Sell – $2n = 20$**

MOROCCO: Great Atlas, Gorges du Ziz between Rich and Er-Rachidia, surroundings of Tunnel du Legionnaires, road embankments, c. 2.5 km S of Tunnel du Legionnaires, 1260 m, 32°10'N, 4°23'W, 29.4.1993, *Vogt 10390 & Oberprieler 4838* (B).

The report agrees with previous counts (for discussion see Oberprieler & Vogt 1993).

***Picris saharae* (Coss. & Kralik) Hochr. [= *Picris asplenioides* subsp. *saharae* (Coss. & Kralik) Dobignard] – $2n = 10$**

MOROCCO: Prov. d'Er-Rachidia, road P 32 between Er-Rachidia and Boudnib, c. 19.2 km E of junction to Erfoud, dry Oued with *Ziziphus*, 1030 m, 31°55'N, 4°08'W, 30.4.1993, *Vogt 10441 & Oberprieler 4889* (B).

TUNISIA: Gouvernorat de Tataouine, road P 19 between Tataouine and Remada, c. 27 km NW Remada, road embankments and sandy plains, 450 m, 32°30.757'N, 10°16.204'E, 13.5.1994, *Vogt 13054 & Oberprieler 7359* (B); Gouvernorat de Tataouine, Monts de Matmata, road C 207 between Tataouine and Ghomrassen, c. 8 km S Ghomrassen, road embankments and stony slopes, 340 m, 32°59.952'N, 10°20.524'E, 14.5.1994, *Vogt 13130 & Oberprieler 7435* (B).

Our counts in three populations of Morocco of Tunisia agree with previous counts (see Oberprieler & Vogt 1993).

***Podospermum laciniatum* (L.) DC. [= *Scorzonera laciniata* L.] – $2n = 14$**

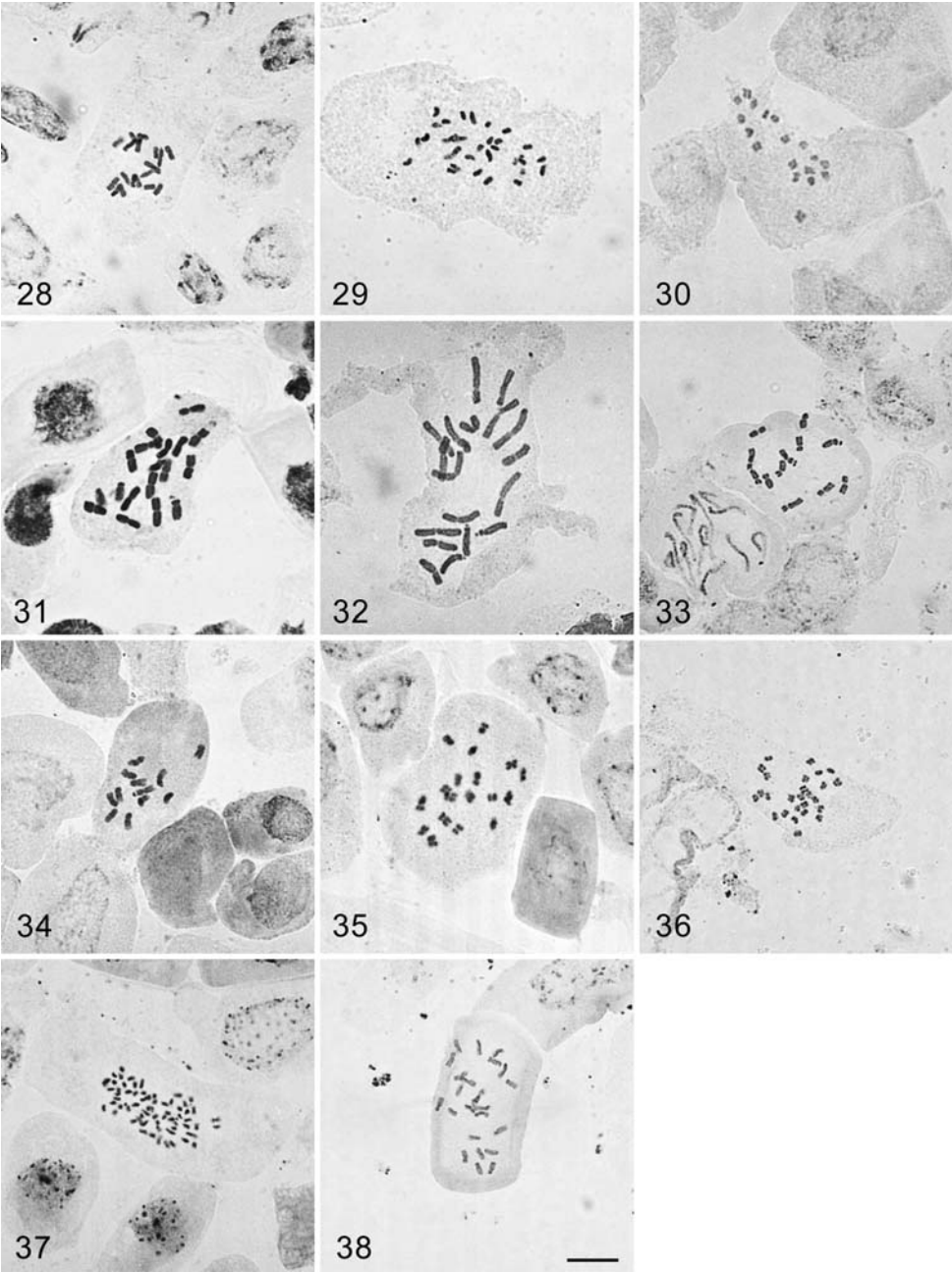
MOROCCO: Prov. Figuig, road P 19 between Bouarfa and Oujda, c. 5 km N Tendirara, roadsides in a *Pinus* plantation, 1300 m, 33°08'N, 1°59'W, 2.5.1993, *Vogt 10619 & Oberprieler 5067* (B); Rharrb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10924 & Oberprieler 5372* (B); Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, c. 2 km as the crow flies NE Mechrâ-Homadi, field margins, 380 m, 34°47'N, 2°45'W, 7.5.1993, *Vogt 11129 & Oberprieler 5577* (B).

The report agrees with previous counts (for discussion see Vogt & Oberprieler 1993).

*** *Ptilostemon dyricola* (Maire) Greuter – $2n = 32$ (Fig. 29)**

MOROCCO: Hoher Atlas, N-Auffahrt des Tizi-n-Test, Quellhang an der Straße bei c. 1800 m, 4.8.2000, *Vogt 15677* (B).

This is the first count of a chromosome number for this S Moroccan endemic.



***Pulicaria inuloides* (Poir.) DC. – $2n = 18$ (Fig. 30)**

MOROCCO: Prov. Agadir, Oued Massa, road P 30 between Agadir and Tiznit, c. 25 km N Tiznit, river banks and roadsides, 29°54'N, 9°38'W, 19.5.1993, *Vogt 11915 & Oberprieler 6363* (B).

Our count is in accordance with the only former report by Podlech (1986) on plants from Algeria.

***Reichardia gaditana* (Willk.) Samp. – $2n = 16$**

MOROCCO: Tangier Peninsula, beach near S 309, c. 9 km NE Ksar-es-Seghir, sand, 5 m, 35°53'N, 5°30'W, 20.4.1993, *Vogt 9962 & Oberprieler 4410* (B); Rharb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10231 & Oberprieler 4679* (B).

The report agrees with previous counts; for discussion see Oberprieler & Vogt (1993) and Mejías (1998).

***Reichardia intermedia* (Sch. Bip.) Samp. – $2n = 16$**

MOROCCO: Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, dry Oued, 200–250 m, 34°45'N, 2°47'W, 7.5.1993, *Vogt 11015 & Oberprieler 5463* (B); Monts des Beni Snassen, Gorges du Oued Zegzel between Djebel Israne and Djebel Achoun E Taforalt, S-facing mountain slopes of Djebel Israne near the “Grotte des Pigeons”, 690 m, 34°50'N, 2°24'W, 9.5.1993, *Vogt 11506 & Oberprieler 5954* (B).

TUNISIA: Gouvernorat de Siliana, Dorsale Tunisienne, track from Rouhia to Djebel Barbrou, c. 10 km E Rouhia, *Pinus* plantation, 810 m, 35°04.066'N, 9°08.112'E, 17.5.1994, *Vogt 13387 & Oberprieler 7692* (B); Gouvernorat de Jendouba, Kroumerie, road P 17 between Jendouba and Tabarka, c. 2 km N Fernana, road embankments and field margins, 270 m, 36°40.610'N, 8°40.801'E, 19.5.1994, *Vogt 13625 & Oberprieler 7930* (B).

Our counts in four populations from Morocco and Tunisia are in accordance with the reports by Gallego (1980), Mejías (1998) and Talavera & al. (1984), who studied plant material from Spain and Morocco respectively. For further discussion see Mejías (1998).

***Reichardia picroides* (L.) Roth – $2n = 14$**

MOROCCO: Tangier Peninsula, Ceuta (Sebta), Djebel Fahies (S Djebel Musa), maccie along road to Ben Yonnech (1.8 km NE of junction with road 8303 between Souk-Tleta-Taghramet and Ceuta), 370 m, 35°52'N, 5°24'W, 20.4.1993, *Vogt 9884 & Oberprieler 4332* (B).

TUNISIA: Gouvernorat de Zaghouan, road C 55 between Tebourba and Mateur, pass NW Chouigui, c. 21 km SE Mateur, limestone, *Eucalyptus* plantation, 200–250 m, 36°53.543'N, 9°45.911'E, 2.5.1994, *Vogt 12112 & Oberprieler 6417* (B); Gouvernorat de El Kef, Djebel Dyr, limestone cliffs and mountain pastures, 1000 m, 36°12.868'N, 8°44.637'E, 4.5.1994, *Vogt 12380 & Oberprieler 6685* (B).

The report agrees with previous counts (for discussion see Mejías 1998).

***Reichardia tingitana* (L.) Roth – $2n = 16$**

MOROCCO: Middle Atlas, Massif du Kandar S Sefrou, road P 20 between Sefrou and Boulmane, limestone cliffs near the street c. 7.5 km S of Sefrou, 1150 m, 33°45'N, 4°51'W, 28.4.1993, *Vogt 10307 & Oberprieler 4755* (B); Mediterranean coast W of Saidia, surroundings of the mouth of

Fig. 28–38. Metaphases of root-tip mitoses – 28: *Phagnalon bicolor*, $2n = 18$ (*Vogt 11754 & Oberprieler 6202*); 29: *Ptilostemon dyricola*, $2n = 32$ (*Vogt 15677*); 30: *Pulicaria inuloides*, $2n = 18$ (*Vogt 11915 & Oberprieler 6363*); 31: *Rhodanthemum depressum*, $2n = 18$ (*Vogt 11877 & Oberprieler 6325*); 32: *Rhodanthemum gayanum* subsp. *fallax*, $2n = 18$ (*Vogt 11824 & Oberprieler 6272*); 33: *Scorzoneroideis garnironii*, $2n = 12$ (*Vogt 11881 & Oberprieler 6329*); 34: *Scorzoneroideis muelleri*, $2n = 12$ (*Vogt 10341 & Oberprieler 4789*); 35: *Sonchus masguindalii* Pau & Font Quer, $2n = 18$ (*Vogt & Oberprieler s.n.*); 36: *Volutaria crupinoides*, $2n = 26$ (*Vogt 10536 & Oberprieler 4984*); 37: *Volutaria tubuliflora*, $2n = 64$ (*Vogt 14586 & Oberprieler 8895*); 38: *Volutaria muricata*, $2n = 24$ (*Vogt 11764 & Oberprieler 6212*). – Scale bar: 10 μ m.

Oued Moulouya c. 10 km W Saidia, dunes c. 1 km inland, 10 m, 35°07'N, 2°18'W, 5.5.1993, *Vogt 10889 & Oberprieler 5337* (B); Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, slopes along the road c. 1 km E of the junction with road S 412 (Mechrâ-Homadi - El-Aioun), *Tetraclinis articulata* woodland, 200 m, 34°43'N, 2°48'W, 6.5.1993, *Vogt 10987 & Oberprieler 5435* (B).

TUNISIA: Gouvernorat de Sidi-Bouzyd, road P 3 between Kairouan and Gafsa, c. 2 km NE junction with road P 3 E to Sbeitla, road embankments, 420 m, 35°20.500'N, 9°24.810'E, 17.5.1994, *Vogt 13373 & Oberprieler 7678* (B); Gouvernorat de Kasserine, P 15 between Feriana and Gafsa, track between Feriana and Ksar Sidi Aïch, stony slopes, 810 m, 35°51.067'N, 8°32.547'E, 8.5.1994, *Vogt 12629 & Oberprieler 6934* (B); Gouvernorat de Tataouine, Monts de Matmata, track C 207 between Ghomrassen and Beni Kheddache, c. 8 km N Ksar Hadada, stony slopes and rocks, 470 m, 33°8.407'N, 10°17.206'E, 14.5.1994, *Vogt 13153 & Oberprieler 7458* (B).

Our counts in six population from Morocco and Tunisia agree with previous counts; for discussion see Oberprieler & Vogt (1993) and Mejías (1998).

Rhodanthemum depressum (Ball) B. H. Wilcox & al. – $2n = 18$ (Fig. 31)

MOROCCO: Anti-Atlas, Col de Kerdous, rock faces immediate below hotel at Col du Kerdous, 1200 m, 29°35'N, 9°27'W, 17.5.1993, *Vogt 11877 & Oberprieler 6325* (B).

Our count in this S Moroccan endemic corroborates the only former reports (sub *Leucanthemum depressum*) by Galland (1990) and Wilcox (1982).

Rhodanthemum gayanum subsp. *demnatense* (Murb.) Vogt – $2n = 18$

MOROCCO: Jebel Touchka N Agadir, 1450 m, 30°42'39"N, 9°26'29"W, 19.6.1996, *Vitek 96-491* (B, W).

Our count is in accordance with the only former report by Wilcox (1982, sub *Leucanthemum gayanum* subsp. *demnatense*).

* ***Rhodanthemum gayanum*** subsp. *fallax* (Maire & Weiller) Vogt – $2n = 18$ (Fig. 32)

MOROCCO: Anti-Atlas, W-side of Djebel Lekst, c. 6.7 km W of pass Tizi-n-Tagounit on track 7056 between Tioulit and Tanalt, field margins, 1600 m, 29°46'N, 9°08'W, 16.5.1993, *Vogt 11824 & Oberprieler 6272* (B).

This seems to be the first report of a chromosome number for this S Moroccan endemic.

Rhodanthemum hosmariense (Ball) B. H. Wilcox & al. – $2n = 18$

MOROCCO: Tangier Peninsula, Monts de Beni Hosmar S Tetouan, road from Tetouan / Toretta to transmitting installation on Djebel Bou Zaitoune, above *Pinus* plantation, limestone cliffs, 600-750 m, 35°30'N, 5°20'W, 21.4.1993, *Vogt 10049* (B); Tangier peninsula, Ceuta (Sebta), Djebel Fahies (S Djebel Musa), southern slopes of Djebel Fahies above the track between the road between Souk-Tleta-Taghrament - Ceuta and Ben YOUNNECH, limestone rocks and screes, 550-600 m, 35°53'N, 5°24'W, 20.4.1993, *Vogt 9907 & Oberprieler 4355* (B).

Our counts are in accordance with the only former report based on material of known origin by Wilcox (1982, sub *Leucanthemum hosmariense*).

* ***Rhodanthemum kesticum*** Gómiz – $2n = 18$

MOROCCO: En roquedo silíceo vertical, Ladera N del Jbel Kest, unos 2 km al SW de Tizi-n-Tagounit (Antiatlas), 4.5.2000, 1700 m, 29°47'N, 9°06'W, 4.5.2000, *Fco. Gómiz* (MA), cultivated at the Botanical Garden Berlin-Dahlem, 8.8.2005, *Vogt* (B).

This is the first report of a chromosome number for this S Moroccan endemic.

** ***Scorzonera caespitosa*** Pomel [= *Scorzonera pseudopygmaea* Lipsch.] – $2n = 14$

MOROCCO: Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, *Vogt 11758 & Oberprieler 6206* (B).

Our count of $2n = 14$ chromosomes is in disaccordance with the only former report by Humphries & al. (1978, sub *Scorzonera pseudopygmaea*) who counted $2n = 12+1B$ chromosomes for this species distributed from Algeria to Morocco.

Scorzoneroides garnironii (Emb. & Maire) Greuter & Talavera [$\equiv$ *Leontodon garnironii* Emb. & Maire] – $2n = 12$ (Fig. 33)

MOROCCO: Anti-Atlas, Col de Kerdous, rock faces immediate below hotel at Col du Kerdous, 1200 m, 29°35'N, 9°27'W, 17.5.1993, *Vogt 11881 & Oberprieler 6329* (B).

Our count is in accordance with the only former report for this S Moroccan endemic by Izuzquiza (1998, sub *Leontodon garnironii*).

Scorzoneroides muelleri (Sch. Bip.) Greuter & Talavera [$\equiv$ *Leontodon muelleri* (Sch. Bip.) Fiori] – $2n = 12$ (Fig. 34)

MOROCCO: Great Atlas, road P 21 between Midelt and Er-Rachidia, c. 19 km N Rich, road embankments, 1500 m, 32°29'N, 4°31'W, 29.4.1993, *Vogt 10341 & Oberprieler 4789* (B).

This count appears to be the second for this species based on plant material of wild origin and corroborates the former report by Izuzquiza (1998, sub *Leontodon muelleri* subsp. *austromaroccanus*).

Senecio glaucus subsp. *coronopifolius* (Maire) C. Alexander – $2n = 20$

MOROCCO: Prov. Figuig, road P 32 between Bouarfa and Figuig, north-facing slopes of Djebel Grouz c. 23 km W Figuig, mountains c. 6 km S of road P 32, rocks and stony slopes, 1100-1300 m, 32°08'N, 1°24'W, 1.5.1993, *Vogt 10545 & Oberprieler 4993* (B); Prov. Agadir, Oued Massa, road P 30 between Agadir and Tiznit, c. 25 km N Tiznit, river banks and roadsides, 29°54'N, 9°38'W, 19.5.1993, *Vogt 11914 & Oberprieler 6362* (B).

The report agrees with previous counts (see Vogt & Oberprieler 1993).

Senecio leucanthemifolius Poirét var. *leucanthemifolius* – $2n = 20$

MOROCCO: Mediterranean coast W of Saidia, surroundings of the mouth of Oued Moulouya c. 10 km W Saidia, dunes c. 1 km inland, 10 m, 35°07'N, 2°18'W, 5.5.1993, *Vogt 10888 & Oberprieler 5336* (B).

Senecio leucanthemifolius var. *major* Ball – $2n = 20$

MOROCCO: Tangier Peninsula, Monts de Beni Hosmar S Tetouan, track from Tetouan / Toretta to transmitting installation on Djebel Bou Zaitoune, limestone cliffs, 1200 m, 35°30'N, 5°21'W, 21.4.1993, *Vogt 10025 & Oberprieler 4473* (B).

The chromosome number found in both varieties of *Senecio leucanthemifolius* is in agreement with previous reports for this species from many Mediterranean countries cited in the standard indices by Goldblatt & Johnson (1979+) and Watanaba (2002+).

Senecio lividus L. – $2n = 40$

MOROCCO: Tangier Peninsula, Cap Ras Ciress, surroundings of the lighthouse 9.7 km NE of Ksar-es-Seghir, costal rocks, moist places in *Pinus* woodland, 5-60 m, 35°55'N, 5°28'W, 20.4.1993, *Vogt 9933 & Oberprieler 4381* (B).

The report agrees with previous counts; for discussion see Vogt & Oberprieler (1993).

Senecio vulgaris L. – $2n = 40$

MOROCCO: Rharrb, Moulay Bousselham, lagune Merdja Zerga, moist meadows and marshes, 0-5 m, 34°53'N, 6°16'W, 25.4.1993, *Vogt 10220 & Oberprieler 4668* (B); Monts des Beni-Snassen, Taforalt, N-facing slopes of Djebel Achouan c. 1 km E Taforalt, stony slopes and limestone rocks, 850-900 m, 34°49'N, 2°24'W, 4.5.1993, *Vogt 10758 & Oberprieler 5206* (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Tanezzert, mountain slopes and limestone cliffs between the settlements Tagliat and Wawizaght E of Tanezzert, 450-550 m, 34°48'N, 2°34'W, 8.5.1993, *Vogt 11323 & Oberprieler 5771* (B); Monts des Beni-Snassen, Gorges du Zegzel be-

tween the villages of Trashroute and Moulay Ahmed, slopes of the gorge below and above road, riverbed, 450-550 m, 34°49'N, 2°22'W, 10.5.1993, *Vogt 11567 & Oberprieler 6015* (B).

Our counts in four Moroccan populations agree with most previous reports from many countries cited in the standard indices by Goldblatt & Johnson (1979+) and Watanabe (2002+).

***Sonchus aquatilis* Pourr. – $2n = 18$**

MOROCCO: Monts des Beni-Snassen, Gorges du Zegzel between the villages of Moulay Ahmed and Takerboust, riverbed and roadsides, 270-300 m, 34°50'N, 2°22'W, 10.5.1993, *Vogt 11652 & Oberprieler 6160* (B).

This is the first count for this taxon for Morocco. It is in accordance with former reports by Valdés Bermejo & Castroviejo (1977, sub *S. maritimus* subsp. *aquatilis*), Fernández Casas & Machín Santamaría (1978, sub *Sonchus maritimus* subsp. *aquatilis*), Luque (1983, sub *S. maritimus* subsp. *aquatilis*), and Mejías & Valdés (1988), who studied plant from Spain.

***Sonchus asper* (L.) Hill. – $2n = 18$**

MOROCCO: Rharrb, road S 216 between Arbaoua and Moulay Bousseham, c. 6.6 km SE Moulay Bousseham, field margins, 20 m, 34°52'N, 6°13'W, 25.4.1993, *Vogt 10225 & Oberprieler 4673* (B).

Our count agrees with the former reports by Talavera & al. (1984) and Vogt & Oberprieler (1993), who also studied Moroccan plant materials.

*** *Sonchus fragilis* Ball – $2n = 18$**

MOROCCO: Tangier Peninsula, Monts de Beni Hosmar S Tetouan, road from Tetouan / Toretta to transmitting installation on Djebel Bou Zaitoune, above *Pinus* plantation, limestone cliffs, 600-750 m, 35°30'N, 5°20'W, 21.4.1993, *Vogt 10044 & Oberprieler 4492* (B).

This seems to be the first report of a chromosome number for this Moroccan endemic.

*** *Sonchus masguindalii* Pau & Font Quer – $2n = 18$ (Fig. 35)**

MOROCCO: Targuist, N of Beni-Boufrah, Torres-de-Alcala, rock crevices just above beach, 5 m, 35.09°N, 4.02°W, 30.6.1993, *Jury 11327, Springate & Ait-Lafkih* [RNG]; Cultivated at the Botanical Garden Berlin-Dahlem, 17.8.1995, *Vogt & Oberprieler s.n.* (B).

This seems to be the first report of a chromosome number for this N Moroccan endemic.

***Sonchus oleraceus* L. – $2n = 32$**

MOROCCO: Tangier Peninsula, road S 601 between Ksar-es-Seghir and Tetouan, 1.6 km S of the junction with road 8303 to Souk-Tleta-Taghramet, garrigue, pastures, field margins and moist meadows, 170 m, 35°45'N, 5°30'W, 17.4.1993, *Vogt 9801 & Oberprieler 4249* (B); Tangier Peninsula, Ceuta (Sebta), Djebel Fahies (S Djebel Musa), southern slopes of Djebel Fahies above a track between the road Souk-Tleta-Taghramet - Ceuta and Ben Younnech, limestone rocks and limestone scree, 550-600 m, 35°53'N, 5°24'W, 20.4.1993, *Vogt 9892 & Oberprieler 4340* (B); Mediterranean coast W of Saidia, surroundings of the mouth of Oued Moulouya c. 10 km W Saidia, dunes c. 1 km inland, 10 m, 35°07'N, 2°18'W, 5.5.1993, *Vogt 10882 & Oberprieler 5330* (B).

Our counts in three Moroccan populations agree with reports on N African plant material, from Egypt by Roux & Boulos (1972), Nordenstam (1972) and Kamel (2004) and from Morocco by Oberprieler & Vogt (1993).

***Sonchus tenerrimus* L. – $2n = 14$**

MOROCCO: Rharrb, road 2301 between Nador and Kenitra, c. 10 km N Benmansoun, dunes with *Eucalyptus* plantation, 20 m, 34°40'N, 6°23'W, 25.4.1993, *Vogt 10251 & Oberprieler 4699* (B); Peninsula of Melilla, westcoast between Sammar and Aazanen, dunes around the mouth of a river NW Ihinatene, sand dunes, *Eucalyptus* plantation, field margins, 10-20 m, 35°15'N, 3°09'W, 5.5.1993, *Vogt 10913 & Oberprieler 5361* (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Tanezzert, settlements around Tanezzert between Sidi-Yahia-Ben-Ahmed and Tagliat, roadsides, field margins, 450 m, 34°48'N, 2°36'W, 8.5.1993, *Vogt 11311 & Oberprieler 5759* (B).

Our finding in three populations from N Morocco corroborates former counts on Moroccan plant material by Delay & Petit (1971) and Oberprieler & Vogt (1993).

Tragopogon porrifolius L. – $2n = 12$

MOROCCO: Middle Atlas, Tahout-ou-Fillali, road P 33 between Khenifra and Midelt, c. 2.5 km W pass, *Quercus* woodland, *Pinus* plantation, 1990 m, 32°47'N, 5°35'W, 26.5.1993, Vogt 11968 (B); Plaine du Sais, road P 1 between Meknès and Fés, fallow fields c. 2 km WSW of junction with track 4006 to Ain-Cheggag, 33°59'N, 5°01'W, 27.4.1993, Vogt 10266 & Oberprieler 4714 (B).

Our counts in two populations of this widespread species confirm the previous reports for Morocco by Humphries & al. (1978) and Vogt & Oberprieler (1993a, 1994).

Urospermum picroides (L.) Scop. ex F. W. Schmidt – $2n = 10$

MOROCCO: Jebala, road S 603 between Chefchaouene and Ksar-el-Kebir, c. 1.7 km E Tatouft, roadside, field margins, and hedges, 220 m, 35°03'N, 5°46'W, 24.4.1993, Vogt 10144 & Oberprieler 4592 (B); Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m, c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, dry Oued, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, Vogt 11022 & Oberprieler 5470 (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Talezzert, Oued Tlata-at-Talremt c. 2.5 km S of the marabout "Sidi Boubker", roadsides, limestone-cliffs, 220 m, 34°48'N, 2°39'W, 7.5.1993, Vogt 11179 & Oberprieler 5627 (B).

Our counts in three Moroccan populations appears to be the second report for plant material of Moroccan origin for this widespread weed and agree with the report by Valdés & al. (1998).

Voluntaria crupinoides (Desf.) Maire – $2n = 26$ (Fig. 36)

MOROCCO: Prov. Figuig, road P 32 between Bouarfâ and Figuig, north-facing slopes of Djebel Grouz, c. 23 km W Figuig, mountains c. 6 km S of road P 32, rocks and stony slopes, 1100-1300 m, 32°8'N, 1°24'W, 1.5.1993, Vogt 10536 & Oberprieler 4984 (B); Monts des Beni-Snassen, road 5311 between Mechrâ-Homadi and Berkane, valley SE point 351 m c. 2 km E Mechrâ-Homadi, *Tetraclinis articulata* woodland, limestone cliffs, dry Oued, 200-250 m, 34°45'N, 2°47'W, 7.5.1993, Vogt 11075 & Oberprieler 5523 (B); Monts des Beni-Snassen, track from Beni Ammar to Taforalt via Talezzert, mountain ridge between Djebel Astar-ach-Chaib and Oued Tlata-at-Talremt, c. 3.5 km SE of the marabout "Sidi Boubker" in Beni Ammar, pastures and *Tetraclins* woodland, 340-370 m, 34°48'N, 2°38'W, 8.5.1993, Vogt 11227 & Oberprieler 5675 (B).

Our counts in three Moroccan populations agree with the only former reports by Oberprieler & Vogt (1993) and Hellwig (1994).

Voluntaria muricata (L.) Maire – $2n = 24$ (Fig. 38)

MOROCCO: Anti-Atlas, track 7056 between Tioulit and Tanalt via Tizi-n-Tagounit, field margins in Aïn Iftene, c. 7 km SW Souk-Khemis-des-Ida-ou-Gnif, 1510 m, 29°50'N, 9°03'W, 14.5.1993, Vogt 11764 & Oberprieler 6212 (B); Province de Khénifra, Zaiane, road 2516 between Oulmès and Khénifra, c. 14 km NW Khénifra, stony slopes and field margins, 1000 m, 33°02.877'N, 5°44.552'W, 13.5.1995, Vogt 14891 & Oberprieler 9200 (B).

Our counts corroborate the only former reports by Talavera & al. (1984) and Hellwig (1994).

* *Voluntaria tubuliflora* (Murb.) Sennen – $2n = 64$ (Fig. 37)

MOROCCO: Province of Oujda, Taourirt, road S 410 between Taourirt and Debdou, c. 8.2 km S Taourirt, dry Oued W of the road, 460 m, 34°21.162'N, 2°54.344'W, 8.5.1995, Vogt 14586 & Oberprieler 8895 (B).

TUNISIA: Gouvernorat de Gabès, Gabès, oasis Ghannouche N Gabès, gardens and fields, 80 m, 33°37.151'N, 10°03.036'E, 16.5.1994, Vogt 13299 & Oberprieler 7604 (B).

Our counts in two populations from Morocco and Tunisia are the first indications of an octoploid chromosome number for this taxon in N Africa. According to Hellwig (1994) a former report of $2n = 64$ for *Voluntaria lippii* based on plant material of Sicilian origin (Brullo & al. 1978) has to be referred to *V. tubuliflora*.

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References

- Amore, I., Bedini, G. & Garbari, F. 1999: Reports (1066-70). – [In: Kamari, G., Felber, F. & Garbari, F. (ed.), Mediterranean chromosome number reports – 9.] – Fl. Medit. **9**: 359-361.
- Aparicio, A. 1989: Números cromosómicos de plantas occidentales, 487-507. – Anales Jard. Bot. Madrid **45**: 483-494.
- Bartolo, G., Brullo, S., Grillo, M., Pavone, P. & Zizza, A. 1978: Numeri cromosomici per la flora italiana: 382-397. – Inform. Bot. Ital. **10**: 64-80.
- Blanca, G. 1983: Consideraciones sobre la *Leysera leyseroides* (Desf.) Maire. – Trab. Dept. Bot. Univ. Granada **7**: 47-51.
- Brullo, S., Pavone, P. & Zizza, A. 1978: Numeri cromosomici per la flora italiana: 506-516. – Inform. Bot. Ital. **10**: 397-402.
- Delay, J. & Petit, D. 1971: Littoral atlantique du Maroc, Région de Rabat. – Inform. Annuelles Caryosyst. Cytogénét. **5**: 1-16.
- Devesa, J. A. 1981: Contribución al estudio cariológico del género *Carduus* en la Península Ibérica. – Lagasalia **10**: 65-80.
- D'Amato, G. 1971: Numeri cromosomici per la flora italiana: 67-80. – Inform. Bot. Ital. **3**: 138-147.
- Dumé, C. 1976: Reports. – [In: Löve, Á. (ed.), IOPB Chromosome number reports LIII]. – Taxon **25**: 484.
- Fernandes, A. & Queirós, M. 1971a: Contribution á la connaissance cytotonomique des Spermatophyta du Portugal. II. *Compositae*. – Bol. Soc. Brot., ser. 2, **45**: 5-122.
- & — 1971b: Sur la caryologie de quelques plantes récoltées pendant la IIIème réunion de botanique péninsulaire. – Mem. Soc. Brot. **21**: 343-385.
- Fernández Casas, F. J. & Pueche, J. 1978: Números cromosómicos para la flora española, 48-83. – Lagasalia **8**: 105-125.
- & Machín Santamaría, C. 1978: Números cromosómicos para la flora española, 30-31. – Lagasalia **7**: 206-207.
- Fiz, O., Valcárcel, V. & Vargas, P. 2002: Phylogenetic position of Mediterranean *Astereae* and character evolution of daisies (*Bellis*, *Asteraceae*) inferred from nrDNA IST sequences. – Molec. Phylogen. Evol. **25**: 157-171. [[CrossRef](#)]
- Galland, N. 1990 ["1988"]: Recherche sur l'origine de la flora orophile du Maroc: Etude caryologique et citogéographique. – Trav. Inst. Sci. Univ. Mohammed V, Sér. Bot. **35**: 1-168.
- Gallego, M. J. 1980: Estudio cariológico de las especies españolas del genero *Reichardia* Roth (*Compositae*). – Lagasalia **9**: 149-158.
- García Martín, F. & Silvestre, S. 1985: Números cromosómicos para la flora española, 409-421. – Lagasalia **13**: 313-318.
- Goldblatt, P. & Johnson, D. E. (ed.) 1979+: Index to plant chromosome numbers. – Published on the Internet at <http://mobot.mobot.org/w3T/Search/ipen.html>
- Guinochet, M. 1957: Contribution à l'étude caryologique du genre *Centaurea* L. sens. lat. – Bull. Soc. Hist. Nat. Afrique N. **48**: 283-300.
- Hellwig, F. H. 1994: Chromosomenzahlen aus der Tribus *Cardueae* (*Compositae*). – Willdenowia **24**: 219-248.
- , Oberprieler, C., Vogt, R. & Wagenitz, G. 1994: Chromosome numbers of North African phanerogams. III. Some counts in *Centaurea* (*Compositae*, *Cardueae*). – Willdenowia **24**: 249-254.
- Heyn, C. C., Dagan, O. & Nachman, B. 1974: The annual *Calendula* species: taxonomy and relationships. – Israel J. Bot. **23**: 169-201.

- Humphries, C. J., Murray, B. G., Bocquet, G. & Vasudevan, K. N. 1978: Chromosome numbers of phanerogams from Morocco and Algeria. – *Bot. Not.* **131**: 391-406.
- Izuzquiza, Á. 1998: Números cromosómicos de plantas occidentales, 777-779. – *Anales Jard. Bot. Madrid* **56**: 119.
- Kamel, E. A. 2004: Cytotaxonomical investigations of the Egyptian *Compositae* (*Asteraceae*). I *Cardueae* and *Cichorieae*. – *Compositae Newsl.* **41**: 9-28.
- Kilian, N., Oberprieler, C. & Vogt, R. 1995: Chromosome numbers of North African phanerogams. V. Some counts in *Launaea* (*Compositae*, *Lactuceae*). – *Willdenowia* **25**: 273-281.
- Klein, J. C., Sahnoune, M., Valles, J., Cerbah, M., Coulaud, J. & Siljak-Yakovlev, S. 1997: Analyse cytogenetique comparee de trois taxons du genre *Hyoseris* L. – *Lagascalia* **19**: 529-536.
- Lago, E. & Castroviejo, S. 1989: Estudio citotaxonomico de la flora de las Costas Gallegas. – *Cad. Area Ci. Biol.* **3**: 1-215.
- Löve, Á. & Kjellqvist, E. 1974: Cytotaxonomy of Spanish plants. IV. Dicotyledons: *Caesalpiniaceae-Asteraceae*. – *Lagascalia* **4**: 153-211.
- & Löve, D. 1982: Reports. – [In: Löve, Á. (ed.), IOPB Chromosome number reports LXXVII]. – *Taxon* **31**: 583-587
- Loon, J. C. van, Gadella, T. W. J. & Kliphuis, E. 1971: Cytological studies in some flowering plants from southern France. – *Acta Bot. Neerl.* **20**: 157-166.
- & Jong, H. de 1978: Reports. – [In: Löve, Á. (ed.), IOPB chromosome number reports LIX]. – *Taxon* **27**: 56-60.
- López González, G. 1990: Acerca de la clasificación natural del genero *Carthamus* L., s.l. – *Anales Jard. Bot. Madrid* **47**: 11-34.
- Luque, T. 1983: Números cromosómicos para la flora española, 284-289. – *Lagascalia* **12**: 128-130.
- & Díaz Lifante, Z. 1991: Chromosome number of plants collected during Iter Mediterraneum I in the SE of Spain. – *Bocconeana* **1**: 303-364.
- & Mejías, J. A. 1986: Números cromosómicos para la flora española, 491-496. – *Lagascalia* **14**: 301-304.
- Marchi, P. & Illuminati, O. 1974: Notizie e considerazioni su i *Leucanthemum* (*Compositae*) della flora d'Italia. – *Ann. Bot. (Roma)* **33**: 167-194.
- Mejías, J. A. 1998: Reports (936-940). – [In: Kamari, G., Felber, F. & Garbari, F. (ed.), Mediterranean chromosome number reports 8]. – *Fl. Medit.* **8**: 245-251.
- & Valdés, B. 1988: Karyological studies in *Sonchus* section *Maritimi* (*Asteraceae*) from the Iberian Peninsula. – *Bot. J. Linn. Soc.* **98**: 61-69. [\[CrossRef\]](#)
- Meusel, H. & Ohle, H. 1966: Zur Taxonomie und Cytologie der Gattung *Calendula*. – *Österr. Bot. Z.* **113**: 191-210. [\[CrossRef\]](#)
- Molero, J. & Montserrat Martí, J. M. 1986: Números cromosómicos de plantas marroquíes. – *Collect. Bot. (Barcelona)* **16**: 351-354.
- Nagl, W. & Ehrendorfer, F. 1974: DNA content, heterochromatin, mitotic index and growth in perennial and annual *Anthemideae* (*Asteraceae*). – *Pl. Syst. Evol.* **123**: 35-54. [\[CrossRef\]](#)
- Natarajan, G. 1978: Reports. – [In: Löve, Á. (ed.), IOPB Chromosome number reports LXII]. – *Taxon* **27**: 526-531.
- Nordenstam, B. 1972: Chromosome numbers of some *Compositae* from Egypt. – *Bot. Not.* **125**: 393-396.
- Oberprieler, C. & Vogt, R. 1993: Chromosome numbers of North African phanerogams. II. – *Willdenowia* **23**: 211-238.
- & Vogt, R. 1996: Chromosome numbers of North African phanerogams. VI. Some counts in *Leguminosae*. – *Willdenowia* **25**: 669-680.
- & Vogt, R. 2002: *Hypochaeris arachnoides* Poir., a hitherto neglected species in NW Africa. – *Willdenowia* **32**: 231-236.
- Ohle, H. 1974: Beiträge zur Taxonomie der Gattung *Calendula*. II. Taxonomische Revision der südeuropäischen perennierenden *Calendula*-Sippen. – *Feddes Rep.* **85**: 245-283.

- 1975: Beiträge zur Taxonomie der Gattung *Calendula* L. III. Revision der marokkanischen perennierenden Sippen unter Berücksichtigung einiger marokkanischer Annuellen. – Feddes Rep. **86**: 1-17.
- Pajarón Sotomayor, S. 1982: Números cromosómicos de plantas occidentales, 169-175. – *Anales Jard. Bot. Madrid* **38**: 519-522.
- Pastor, J., Diosdado, J. C., Santa Bárbara, C., Vioque, J. & Pérez, E. 1990: Números cromosómicos para la flora española, 556-591. – *Lagascalia* **15**: 269-282.
- Pavone, P., Terrasi, M. C. & Zizza, A. 1981a: Números cromosómicos de plantas occidentales, 113-128. – *Anales Jard. Bot. Madrid* **38**: 273-280.
- , — & — 1981b: Reports. – [In: Löve, Á. (ed.), IOPB chromosome number reports LXXII]. – *Taxon* **30**: 695-697.
- Podlech, D. 1986: Chromosomenstudien in Pflanzen des Saharo-Sindischen Trockengebietes. – *Mitt. Bot. Staatssamml. München* **22**: 5-20.
- Queirós, M. 1973: Contribuição para o conhecimento citotaxonómico das *Spermatophyta* de Portugal. II. *Compositae*, Supl. 1. – *Bol. Soc. Brot.*, ser. 2, **47**: 299-314.
- Reese, G. 1957: Über die Polyploidiespektren in den nordsaharischen Wüstenpflanzen. – *Flora* **144**: 598-634.
- Roux, J. & Boulos, L. 1972: Révision systématique du genre *Sonchus* L. s.l. II. Étude caryologique. – *Bot. Not.* **125**: 306-309.
- Ruíz de Clavijo y Jiménez, E. 1988: Números cromosómicos de plantas occidentales, 452-465. – *Anales Jard. Bot. Madrid* **45**: 259-266.
- 1990: Números cromosómicos de plantas occidentales, 619-630. – *Anales Jard. Bot. Madrid* **47**: 431-437.
- 1991: Notas cariológicas sobre algunas especies norteafricanas. – *Acta Bot. Malacitana* **16**: 449-454.
- 1993: Números cromosómicos para la flora española, 664-690. – *Lagascalia* **17**: 161-172.
- & Uberta Jiménez, J. L. 1982: Números cromosómicos de plantas occidentales, 177-185. – *Anales Jard. Bot. Madrid* **39**: 193-197.
- Santa Bárbara, C., Vioque, J., Juan, R., Pastor, J. & Diosdado, J. C. 1994: Números cromosómicos para la flora española, 720-747. – *Lagascalia* **17**: 367-379.
- Scholz, H., Oberprieler, C. & Vogt, R. 1998: Chromosome numbers of North African phanerogams. VII. Some notes on North African *Gramineae*. – *Lagascalia* **20**: 265-275.
- Scrugli, A. 1974: Numeri cromosomici per la flora italiana: 167-171. – *Inform. Bot. Ital.* **6**: 37-43.
- Silvestre, S. 1986: Números cromosómicos para la flora española, 435-455. – *Lagascalia* **14**: 273-281.
- Strother, J. L. & Watson, L. E. 1997: Documented chromosome numbers in *Compositae* from Morocco and Spain. – *Sida* **17**: 627-629.
- Talavera, S. 1979: Números cromosómicos para la flora española, 99-103. – *Lagascalia* **9**: 122-123.
- , Devesa, J. A. & Fernández-Galiano, E. 1984: Notas cariosistemáticas sobre plantas norteafricanas. I. *Compositae*. – *Candollea* **39**: 271-280.
- Valdés, B., Parra, R., Parrilla, R. & Reina, C. 1998: Números cromosómicos de plantas de Marruecos, II. – *Lagascalia* **20**: 223-230.
- Valdés Bermejo, E. & Castroviejo, S. 1977: Notas cariosistemáticas sobre flora española, II. – *Anales Inst. Bot. Cavanilles* **34**: 325-334.
- Vogt, R. 1991: Die Gattung *Leucanthemum* (*Compositae-Anthemideae*) auf der Iberischen Halbinsel. – *Ruizia* **10**: 1-261.
- & Aparicio, A. 1999: Chromosome numbers of plants collected during Iter Mediterraneum IV in Cyprus. – *Bocconeia* **11**: 117-169.
- & Oberprieler, C. 1993a: Chromosome numbers of North African phanerogams. I. – *Fl. Medit.* **3**: 187-210.
- & — 1993b: Reports (171-176). – [In: Kamari, G., Felber, F. & Garbari, F. (ed.), *Mediterranean chromosome number reports 3*]. – *Fl. Medit.* **3**: 338-340.

— & — 1994: Chromosome numbers of North African phanerogams. IV. – *Candollea* **49**: 549-570.

Watanabe, K. 2002+: Index to chromosome numbers in the *Asteraceae*. – Published on the Internet at <http://www.asteraceae.cla.kobe-u.ac.jp/index.html>

Wilcox, B. H. 1982: Cytological and hybridization studies in *Leucanthemum* (*Compositae-Anthemideae*) from North Africa. – *Pl. Syst. Evol.* **139**: 179-195. [\[CrossRef\]](#)

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