

CYTOTAXONOMY OF SPANISH PLANTS.  
IV. DICOTYLEDONS: CAESALPINIACEAE - ASTERACEAE

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**Resumen.** Este es el cuarto artículo de una serie de trabajos sobre citotaxonomía de plantas españolas, procedentes de regiones montañosas del sur y centro del país, principalmente. Se estudia el número cromosómico de 220 especies de dicotiledóneas, de las cuales son nuevos, o difieren de los conocidos previamente, los siguientes: *Ononis aragonensis* Asso,  $2n = 30$ ; *Lotus delortii* Timb.-Lagr.,  $2n = 24$ ; *Anthyllis vulneraria* L. subsp. *reuteri* Cullen,  $2n = 12$ ; *Anthyllis vulneraria* L. subsp. *maura* (G. Beck) Lindb.,  $2n = 12$ ; *Hippocrepis bourgaei* (Nyman) Hervier,  $2n = 28$ ; *Lavatera cretica* L.,  $2n = 126$ ; *Althaea hirsuta* L.,  $2n = 42$ ; *Hypericum caprifolium* Boiss.,  $2n = 16$ ; *Hypericum boeoticum* Boiss.,  $2n = 32$ ; *Helianthemum villosum* Thib.,  $2n = 20$ ; *Carum verticillatum* (L.) Koch,  $2n = 22$ ; *Vincetoxicum nigrum* (L.) Moench,  $2n = 22$ ; *Convolvulus meonanthus* Hoffmanns. & Link,  $2n = 24$ ; *Lithodora fruticosa* (L.) Griseb.,  $2n = 26$ ; *Cynoglossum nebrodense* Guss.,  $2n = 24$ ; *Marrubium supinum* L.,  $2n = 34$ ; *Stachys heraclea* All. var. *valentina* (Lag.) Pau,  $2n = 30$ ; *Satureja obovata* Lag.,  $2n = 30$ ; *Salvia lavandulifolia* Vahl,  $2n = 14$ ; *Anarrbinum laxiflorum* Boiss.,  $2n = 18$ ; *Antirrhinum pulverulentum* Láz.-Ibiza,  $2n = 16$ ; *Antirrhinum boissieri* Rothm.,  $2n = 16$ ; *Chaenorbinum villosum* (L.) Lange var. *granatense* (Willk.) Lange,  $2n = 14$ ; *Linaria birta* (L.) Moench,  $2n = 12$ ; *Linaria lilacina* Lange,  $2n = 12$ ; *Linaria micrantha* (Cav.) Hoffmanns. & Link,  $2n = 12$ ; *Pinguicula vallisnerifolia* Webb,  $2n = 32$ ; *Plantago stepposa* Kuprian.,  $2n = 12$ ; *Rubia peregrina* L.,  $2n = 88$ ; *Lonicera arborea* Boiss.,  $2n = 18$ ; *Scabiosa tomentosa* Cav.,  $2n = 16$ ; *Knautia subscaposa* Boiss. & Reuter,  $2n = 20$ ; *Valeriana locusta* (L.) Laterrade,  $2n = 16$ ; *Andryala ragusina* L.,  $2n = 18$ ; *Crepis haenseleri* (Boiss.) F. Schultz,  $2n = 16$ ; *Reichardia intermedia* (Schultz-Bip.) Hayek,  $2n = 14$ ; *Tragopogon sinuatus* Avé-Lall.,  $2n = 12$ ; *Carduus granatensis* Willk.,  $2n = 16$ ; *Silybum eburneum* Cosson & Durieu,  $2n = 34$ ; *Cyanus triumfetti* (All.) Dostal subsp. *lingulata* (Lag.) Löve &

Kjellqvist,  $2n = 22$ ; *Inula belenioides* DC.,  $2n = 16$ ; *Doronicum plantagineum* L.,  $2n = 120$ ; *Senecio duriaei* Gay,  $2n = 40$ ; *Anthemis triumfetti* (L.) DC.,  $2n = 18$ ; *Leucanthemum cuneatum* (Pau) Font Quer & Sennen,  $2n = 36$ ; *Leucanthemum macrotum* (Dur.) Heywood subsp. *chrysanthemoides* (Kunze) Heywood,  $2n = 18$ ; *Artemisia lanata* DC. subsp. *assoana* (Willk.) Löve & Kjellqvist,  $2n = 18$ .

Se amplía el área de distribución de los siguientes taxones: *Astragalus glaucus* L., *Lathyrus cicera* L., *Aegonychon purpureo-coeruleum* (L.) Holub, *Antirrhinum boissieri* Rothm., *Linaria micrantha* (Cav.) Hoffmanns. & Link, *Veronica serpyllifolia* L. subsp. *humifusa* (Dickson) Syme, *Plantago stepposa* Kuprian., *Sonchus asper* (L.) Hill subsp. *glaucescens* (Jord.) Arcangeli, *Tragopogon pratensis* L. subsp. *minor* (Miller) Hartman y *Silybum eburneum* Cosson & Durieu.

Se comenta la posición taxonómica de alguno de estos taxones, y se validan las siguientes nuevas combinaciones: *Cyanus triumfetti* (All.) Dostál subsp. *lingulata* (Lag.) Löve & Kjellqvist y *Artemisia lanata* DC. subsp. *assoana* (Willk.) Löve & Kjellqvist.

**Summary.** This is the fourth paper in a series on the cytotaxonomy of Spanish plants, mainly from two mountain regions in the southern and central parts of the country. It reports the chromosome numbers of 220 species of dicotyledons, of which the following are new or deviate from earlier reports: *Ononis aragonensis* Asso,  $2n = 30$ ; *Lotus delortii* Timb.-Lagr.,  $2n = 24$ ; *Anthyllis vulneraria* L. subsp. *reuteri* Cullen,  $2n = 12$ ; *Anthyllis vulneraria* L. subsp. *maura* (G. Beck) Lindb.,  $2n = 12$ ; *Hippocrepis bourgaei* (Nyman) Hervier,  $2n = 28$ ; *Lavatera cretica* L.,  $2n = 126$ ; *Althaea hirsuta* L.,  $2n = 42$ ; *Hypericum caprifolium* Boiss.,  $2n = 16$ ; *Hypericum boeoticum* Boiss.,  $2n = 32$ ; *Helianthemum villosum* Thib.,  $2n = 20$ ; *Carum verticillatum* (L.) Koch,  $2n = 22$ ; *Vincetoxicum nigrum* (L.) Moench,  $2n = 22$ ; *Convolvulus meonanthus* Hoffmanns. & Link,  $2n = 24$ ; *Lithodora fruticosa* (L.) Griseb.,  $2n = 26$ ; *Cynoglossum nebrodense* Guss.,  $2n = 24$ ; *Marrubium supinum* L.,  $2n = 34$ ; *Stachys heraclea* All. var. *valentina* (Lag.) Pau,  $2n = 30$ ; *Satureja obovata* Lag.,  $2n = 30$ ; *Salvia lavandulifolia* Vahl,  $2n = 14$ ; *Anarrhinum laxiflorum* Boiss.,  $2n = 18$ ; *Antirrhinum pulverulentum* Láz.-Ibiza,  $2n = 16$ ; *Antirrhinum boissieri* Rothm.,  $2n = 16$ ; *Chaenorhinum villosum* (L.) Lange var. *granatense* (Willk.) Lange,  $2n = 14$ ; *Linaria hirta* (L.) Moench,  $2n = 12$ ; *Linaria lilacina* Lange,  $2n = 12$ ; *Linaria micrantha* (Cav.) Hoffmanns. & Link,  $2n = 12$ ; *Pinguicula vallisnerifolia* Webb,  $2n = 32$ ; *Plantago stepposa* Kuprian.,  $2n = 12$ ; *Rubia peregrina* Cav.,  $2n = 88$ ; *Lonicera arborea* Boiss.,  $2n = 18$ ; *Scabiosa tomentosa* Cav.,  $2n = 16$ ; *Knautia subscaposa* Boiss. & Reuter,  $2n = 20$ ; *Valeriana locusta* (L.) Laterrade,  $2n = 16$ ; *Andryala ragusina* L.,  $2n = 18$ ; *Crepis haenseleri* (Boiss.) F. Shultz,  $2n = 16$ ; *Reichardia intermedia* (Shultz-Bip.) Hayek,  $2n = 14$ ; *Tragopogon sinuatus* Avé-Lall.,  $2n = 12$ ; *Carduus granatensis* Willk.,  $2n = 16$ ; *Silybum eburneum* Cosson & Durieu,  $2n = 34$ ; *Cyanus triumfetti* (All.) Dostál subsp. *lingulata* (Lag.) Löve & Kjellqvist,  $2n = 22$ ; *Inula belenioides* DC.,  $2n = 16$ ; *Doronicum plantagineum* L.,  $2n = 120$ ; *Senecio duriaei* Gay,  $2n = 40$ ; *Anthemis triumfetti* (L.) DC.,  $2n = 18$ ; *Leucanthemum cuneatum* (Pau) Font Quer & Sennen,  $2n = 36$ ; *Leucanthemum macrotum* (Dur.) Heywood subsp. *chrysanthemoides* (Kunze) Heywood,  $2n = 18$ ; *Artemisia lanata* DC. subsp. *assoana* (Willk.) Löve & Kjellqvist,  $2n = 18$ .

Considerable range extensions are mentioned for the following taxa: *Astragalus glaucus* L., *Lathyrus cicera* L., *Aegonychon purpureo-coeruleum* (L.) Holub, *Antirrhinum boissieri* Rothm., *Linaria micrantha* (Cav.) Hoffmanns. & Link, *Veronica serpyllifolia* L. subsp.

*humifusa* (Dickson) Syme, *Plantago stepposa* Kuprian., *Sonchus asper* (L.) Hill subsp. *glaucescens* (Jord.) Arcangeli, *Tragopogon pratensis* L. subsp. *minor* (Miller) Hartman and *Silybum eburneum* Cosson & Durieu.

The taxonomy of several of the taxa is discussed briefly, and the following new combinations are validated: *Cyanus triumfetti* (All.) Dostál subsp. *lingulata* (Lag.) Löve & Kjellqvist and *Artemisia lanata* DC. subsp. *assoana* (Willk.) Löve & Kjellqvist.

This is the fourth paper in a series on the cytotaxonomy of Spanish plants, supported by NATO Science Grant No. 69. We refer to the introduction to the first paper (LÖVE & KJELLQVIST, 1972) for basic information on techniques and other primary considerations and to the recently published reference works by MOORE (1973) and LÖVE & LÖVE (1974) for recent chromosome number information.

## CAESALPINIACEAE

### *Gleditschia triacanthos* L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Valley of Río Borosa; N. 081.  
 $2n = 28$ .

This plant of the nemoral forests of eastern North America is widely cultivated as an ornamental tree in the Jaén province. We found it also to be naturalized and subsponaneous in the region; our material came from such populations. The chromosome number is a confirmation of several previous counts, from native American as well as naturalized and cultivated European populations.

## FABACEAE

### *Teline linifolia* (L.) Webb & Berth.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0524.  
 $2n = 48$ .

This western Mediterranean shrub has previously been studied by FERNANDES & QUEIRÓS (1971a), who also found it to have  $2n = 42$  chromosomes.

**Genista pilosa** L.

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0480.  
 $2n = 24$ .

This is a confirmation of five previous reports for this western and central European species. Our number deviates from the recent report of  $2n = 22$  by FORISSIER (1973).

**Genista anglica** L.

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0482.  
 $2n = 42$ .

This chromosome count differs from earlier reports by SANTOS (1945) and GRAMUGLIO & ROSSO (1968), but confirms those by MAUDE (1940), GADELLA & KLIPHUIS (1966, 1967) and FORISSIER (1973), who found the number to be  $2n = 42$ .

**Erinacea anthyllis** Link

*Voucher:* Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 0112.  
 $2n = 28$ .

This is a confirmation of a chromosome number report by SAÑUDO (1973) for this high montane endemic of the eastern and southern parts of the Iberian peninsula.

**Ulex parviflorus** Pourret

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0386.  $2n = 32$ .

This morphologically rather variable shrub of southwestern Europe has been reported to include the chromosome numbers  $2n = 32$ , 64 and 96, by CASTRO (1941, 1943, 1945), whereas CHEKHOV (1931) counted  $2n = 96$  on cultivated material so identified. Our plants from a natural habitat, however, had only  $2n = 32$ .

**Robinia pseudacacia** L.

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Valley of Río Borosa; N. 080.  
 $2n = 22$ .

This tree of eastern North American nemoral forests is widely cultivated and completely naturalized in the temperate parts of Europe. Previous reports of  $2n = 20$  chromosomes in cultivated material from North America (WHITAKER, 1934), and Denmark (WANSCHER, 1934) are slightly lower than the number  $2n = 22$  reported from Russia (CHEKHOV, 1930) and Slovakia (VÁCHOVÁ & MURÍN in MÁJOVSKÝ & al., 1970b). Our result confirms the latter number.

***Astragalus hamosus* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0326.  $2n = 48$ .

This southern European species seems to be rare in the Jaén province (GALIANO & HEYWOOD, 1960). Our study confirms the hexaploid number  $2n = 48$  previously reported by FERNANDES & SANTOS (1971), whereas it differs from  $2n = 32$  counted by CHUKSANOVÁ (1967),  $2n = 32 + 2B$  determined by PODLECH & DIETERLE (1969),  $2n = 40$  determined by CHEKHOV (1930, 1935), KREUTER (1930) and WANSCHER (1934), and  $2n = 44$  counted by PRETEL MARTÍNEZ (in LÖVE, 1974b).

***Astragalus glaucus* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0383.  $2n = 16$ .

A southwest European species not known from the Jaén province by GALIANO & HEYWOOD (1960). Our count confirms a recent report from Portugal by FERNANDES & SANTOS (1971) and another from Granada by PRETEL MARTÍNEZ (in LÖVE, 1974b).

***Vicia tenuifolia* Roth**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0548.  
 $2n = 24$ .

This is a confirmation of a frequently reported number for this taxon of Mediterranean and western Asiatic origin. It has often, but erroneously (cf. METTIN & HANELT, 1964), been regarded as a race only of *V. cracca* L. from which it differs in general morphology and also in basic chromosome number ( $x = 6$  contra  $x = 7$ ).

**Vicia tenuissima** (Bieb.) Schinz & Thell.

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0555.  
 $2n = 14$ .

This is a confirmation of several previous reports of the chromosome number of this southern and western European species. Some authors still prefer to regard it as the subsp. *gracilis* (Loisel.) Hooker of *V. tetrasperma* (L.) Schreber; since both are characterized by the same chromosome number, only hybridization experiments could solve the question of their real relationship.

**Vicia pyrenaica** Pourret

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe; N. 0439.  $2n = 14$ .

This is an endemic of rather dry alpine habitats in Spain and southern France, for which the same number has been reported, from Botanical Garden material, by HERTZ (1931).

**Vicia pannonica** Crantz

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0324.  $2n = 12$ .

This confirms many reports of this chromosome number for this widespread European species.

**Vicia sativa** L.

*Vouchers:* Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0349. Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0495, N. 0550.  $2n = 12$ .

This is a confirmation of numerous earlier reports for this originally Mediterranean species in its strict sense (cf. METTIN & HANELT, 1964).

**Lathyrus montanus** Bernh.

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0483.  
 $2n = 14$ .

This confirms numerous previous reports for this widespread European taxon.

**Lathyrus cicera L.**

*Voucher:* Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0352.  $2n = 14$ .

This is a confirmation of some previous reports for this southern European and Mediterranean species, which apparently was not known from the Jaén province by GALIANO & HEYWOOD (1960).

**Lathyrus articulatus L.**

*Voucher:* Provincia de Málaga: 4 km W of Málaga; N. 09.  $2n = 14$ .

This is a confirmation of a dozen earlier reports from elsewhere for this southern European species, which we collected in crevices in a rock close to the sea.

**Lathyrus aphaca L.**

*Voucher:* Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0472.  $2n = 14$ .

This is a confirmation of previous reports for this Mediterranean and western Asiatic species.

**Ononis aragonensis Asso**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0295.  $2n = 30$ .

This is the first chromosome number report for this endemic submontane species of the Pyrenées and the mountains of eastern and southern Spain.

**Ononis pusilla L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0384.  $2n = 30$ .

This confirms reports, by BAKSAY (1956) and ZABORSKY (in MÁJOVSKY & al., 1970a), for this southern and central European and Mediterranean species.

**Medicago lupulina L.**

*Voucher:* Provincia de Jaén: Río Guadalquivir, near El Tranco; N. 0224.  $2n = 16$ .

This number has been reported numerous times for this originally Eurasiatic and North African species, which now has become a worldwide weed.

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

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0330.  $2n = 16$ .

This confirms previous reports from elsewhere for this Mediterranean and southwestern Asiatic plant.

**Medicago minima** (L.) Bartal.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0335.  $2n = 16$ .

This confirms many earlier reports for this originally Mediterranean and southwest Asiatic plant.

**Trifolium montanum** L.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0545.  $2n = 16$ .

This is a confirmation of several reports from elsewhere for this European and western Asiatic taxon.

**Trifolium tomentosum** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, roadside 1 km N of Cazorla; N. 0179.  $2n = 16$ .

This confirms earlier reports for this Mediterranean species.

**Trifolium campestre** Schreber

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0366.  $2n = 14$ .

This is a confirmation of earlier reports for this originally Mediterranean plant.

**Trifolium scabrum** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0325.  $2n = 10$ .



This confirms numerous earlier reports for this essentially Mediterranean taxon.

**Trifolium stellatum** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0263.  
 $2n = 14$ .

This confirms four recent reports for this Mediterranean species, which is at least mainly met with in ruderal situations in the region and so may not be indigenous.

**Trifolium subterraneum** L.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0573.  
 $2n = 16$ .

This is a confirmation of several previous reports for this Mediterranean species, some of which were based on Iberian material (cf. ANGULO, SÁNCHEZ DE RIVERA & GONZÁLEZ-BERNÁLDEZ, 1968).

**Lotus delortii** Timb.-Lagr.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0491.  
 $2n = 24$ .

This is the first chromosome report for this montane species of the Mediterranean region from northern Italy to eastern Spain. It is a taxon of the *Lotus corniculatus* group.

**Tetragonolobus maritimus** (L.) Roth

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Barranco del río Guadalentín; N. 064.  $2n = 14$ .

This is a confirmation of a frequently reported number for this originally Mediterranean species. Our material came from a valley with a *Populus* plantation and seemed to be ruderal.

**Anthyllis vulneraria** L. subsp. **reuteri** Cullen

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0380.  $2n = 12$ .

This is apparently the first report of the chromosome number of this endemic race of southern and eastern Spain, the same number as known for several other races of the species.

***Anthyllis vulneraria* L. subsp. *maura* (G. Beck) H. Lindb.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores; N. 028.  $2n = 12$ .

This is also the first chromosome number report for this western Mediterranean race. Some of our specimens belong to the var. *font-queri* (Rothm.) Cullen, which perhaps is better regarded as a hybrid between the subsp. *maura* and subsp. *reuteri*.

***Physanthyllis tetraphylla* (L.) Boiss.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0332.  $2n = 16$ .

This is a confirmation of three earlier chromosome reports for this Mediterranean species. Since it differs not only in morphology but also in basic chromosome number from other taxa included in the then unnatural genus *Anthyllis* by CULLEN (1968), we regard it as wiser to retain it in a genus of its own, as previously proposed by BOISSIER (1840: 162).

***Hippocrepis bourgaei* (Nyman) Hervier**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Casa Forestal; N. 0432.  $2n = 28$ .

According to BALL (1968a), the three endemic Spanish taxa *H. bourgaei* (Nyman) Hervier, *H. commutata* Pau, and *H. scabra* DC. belong to a single variable species for which he accepts the name *H. scabra*, without admitting the other two taxa as distinct at any level, because he notices that each population varies considerably and does not find the distinguishing characters to be satisfactory. Unfortunately, the typical *H. scabra* of southern Spain remains cytologically unknown, but since VALDÉS (1970c) found *H. commutata* of central and northern Spain to be a diploid with  $2n = 14$  chromosomes, and our material of the southeastern Spanish *H. bourgaei* is tetraploid with  $2n = 28$ , the conclusion by BALL (l. c.) is perhaps somewhat premature. Our material from the Sierra de Albarracín showed no signs of hybridization and fitted uniformly to the description of this taxon.

**Scorpiurus muricatus L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro and Pantano del Tranco; N. 0124, N. 0207.  $2n = 28$ .

This is a confirmation of earlier counts for this southern European species by COUTINHO & RIBEIRO (1945), FRAHM-LELIVELD (1957) and DOMÍNGUEZ & GALIANO (1974), whereas SENN (1938) reported both  $2n = 14$  and 28 from Botanical Garden material. We agree with BALL (1968b) that the two taxa sometimes identified as the distinct species *S. subvillosus* L. and *S. sulcatus* L. are not even worthy of varietal rank and so ought to be regarded as synonymous with *S. muricatus*, COUTINHO & RIBEIRO (1945) reported the same chromosome number for all three taxa. Our material could, with some imagination, be regarded as representing populations intermediate between *S. muricata* s. str. and *S. sulcatus*, with N. 0124 resembling the latter more closely in the majority of features.

## GERANIACEAE

**Geranium rotundifolium L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0175.  
 $2n = 26$ .

This is a confirmation of earlier reports for this almost cosmopolitan weed of Mediterranean origin.

**Geranium molle L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0157.  
 $2n = 26$ .

This confirms numerous earlier reports for this probably Mediterranean species, which has become a very widespread weed.

**Geranium dissectum L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, roadsides N of Cazorla; N. 0178.  $2n = 22$ .

This is a confirmation of numerous previous reports for this weedy species, which seems to have spread from the Mediterranean region.

**Geranium lucidum L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0268.  
 $2n = 20$ .

This confirms a previous report by WARBURG (1938) for this originally Mediterranean species.

**Geranium robertianum L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores;  
 N. 026.  $2n = 64$ .

This confirms numerous earlier reports for this widespread European species.

**Geranium purpureum Vill.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0229.  
 Pantano del Tranco; N. 0158.  $2n = 32$ .

This is a confirmation of several previous reports for this southern and western European species.

**Erodium malacoides (L.) L'Hér.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, El Chorro; roadsides 1 km  
 N of Cazorla; N. 0134, N. 0180.  $2n = 40$ .

This confirms three previous reports of the tetraploid number for this southern European species in its strict sense.

**Erodium cicutarium (L.) L'Hér.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco and  
 Nava de San Pedro; N. 0160, N. 0291.  $2n = 40$ .

This is a confirmation of numerous reports for this species in its strict sense, which originates from the Mediterranean region but has become an almost cosmopolitan weed.

**Erodium primulaecum (Lange) Welw. ex Lange**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0135.  $2n = 20$ .

This is a confirmation of a previous report of the diploid number, by GUITTONNEAU (1966), for this southwest European taxon, which was, in our opinion mistakenly, regarded as synonymous with *E. cicutarium* subsp. *cicutarium* by WEBB & CHATER (1968).

***Erodium moschatum* (L.) L'Hér.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0206.  
 $2n = 20$ .

This is a confirmation of several previous reports for this southern and western European species of cultivated grounds and waste places.

## LINACEAE

***Linum narbonense* L.**

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0464.  $2n = 28$ .

KIKUCHI (1929) reported only  $2n = 18$  chromosomes from Botanical Garden material identified as this western and central Mediterranean species, whereas OCKENDON & WALTERS (1968) list only the number  $2n = 30$ . However, we do not hesitate to regard both these numbers as wrong, since we could confirm, without the slightest difficulty, the number  $2n = 28$  previously reported by RAY (1944) and BARI & GODWARD (1970), though our number seems to be the first one counted on individuals belonging to a distinctly natural population.

## EUPHORBIACEAE

***Tithymalus helioscopia* (L.) Scop.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0168.  
 $2n = 42$ .

This is a confirmation of numerous previous reports for this European taxon.

**Tithymalus peplus** (L.) Gaertner

*Voucher*: Provincia de Jaén: Sierra de Cazorla, roadsides 1 km N of Cazorla; N. 0183.  $2n = 16$ .

This is a confirmation of several earlier reports for this Mediterranean and western Asiatic plant.

**Tithymalus characias** (L.) Hill

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Cueva de la Magdalena; N. 037.  $2n = 20$ .

Our material of this Mediterranean species, collected under moist limestone cliffs, agrees with several previous reports for the western Mediterranean race, subsp. *characias*, to which it belongs.

## CALLITRICHACEAE

**Callitriche brutia** Petagna

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0526.  $2n = 28$ .

This is a confirmation of previous reports for this western European species.

## RUTACEAE

**Dictamnus albus** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0270.  $2n = 36$ .

This is a confirmation of reports by BOWDEN (1940, 1945) based on Botanical Garden material and by LOVKA & al. (in LÖVE, 1971) from Yugoslavia. Our specimens, which are purple-flowered, could be identified with *D. hispanicus* Webb, but since our studies of the variations of the vegetative characters used to separate this taxon agree with the conclusion by TOWNSEND (1968) that they cannot be correlated with distribution, this taxon is apparently not even classifiable as a distinct variety. Therefore, the

southern European and Asiatic species is best regarded as an undivided polymorphic taxon.

#### POLYGALACEAE

##### ***Polygala monspeliaca* L.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0377.  $2n = 38$ .

This is a confirmation of the exact chromosome number for this Mediterranean species, previously reported as  $2n = c. 38$  by GLENDINNING (1960).

#### AQUIFOLIACEAE

##### ***Ilex aquifolium* L.**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Casa Forestal; N. 0431.  $2n = 40$ .

This is the same number as reported by some previous authors for this southern and western European and western Asiatic tree.

#### BUXACEAE

##### ***Buxus sempervirens* L.**

*Vouchers*: Provincia de Jaén: Valley of Río Borosa; N. 078. Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe; N. 0438.  $2n = 28$ .

This is a confirmation from natural populations of the tetraploid chromosome number previously reported for garden material of this southwest European and west Asiatic species, which was studied by SIMONET & MIEDZYRZECKI (1932).

#### MALVACEAE

##### ***Lavatera cretica* L.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0328.  $2n = 126$ .

The inexact chromosome number  $2n = c. 112$  was reported for this highly polyploid Mediterranean and western European species of waste places by SKOVSTED (1935), indicating that it might be 16-ploid. Although our counts did not always result in exactly the 18-ploid number  $2n = 126$ , they never went below 120 and were usually at least very close to 126 so we are confident that the correct number at least oscillates around this level.

***Althaea hirsuta* L.**

*Voucher:* Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0340.  $2n = 42$ .

This is a new number for this southern European species, lower than the  $2n = 50$  reported by DELAY (1969a) from France, and more in line with counts from other species of the genus.

THYMELAEACEAE

***Daphne laureola* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Nava de Paolo; N. 058.  $2n = 18$ .

The chromosome number of this evergreen shrub of southern and western Europe has previously been reported by FUCHS (1938) and ELAISE (1959) from cultivated material. Our specimens could be identified with the var. *latifolia* Cosson, the geographical significance of which seems to be limited or doubtful.

HYPERICACEAE

***Hypericum caprifolium* Boiss.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0148.  $2n = 16$ .

This is the first report of the chromosome number of this endemic species of southeastern Spain.



**Hypericum boeticum** Boiss.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0185.  
 $2n = 32$ .

This Iberian endemic species combines the characters of *H. tetrapterum* Fries and *H. undulatum* Schousboe. ROBSON (1968) included it in the latter as a variety *boeticum* (Boiss.) Lange, since he was in doubt as to its possible hybrid origin. Since *H. tetrapterum* is known to be diploid and *H. boeticum* is clearly a tetraploid, it may be assumed, also from the intermediate morphological characteristics of this plant, that it is an allopolyploid from this parentage so that *H. undulatum* may be expected to be a diploid. Therefore, *H. boeticum* is to be accepted as an endemic Iberian species in its own right.

**Hypericum perforatum** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 099.  
 $2n = 32$ .

This confirms several previous reports of the tetraploid chromosome number for this Eurosiberian species which seems to be at least predominantly agamospermous (cf. ROBSON, 1968).

## VIOLACEAE

**Viola riviniana** Reichenb.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 092.  
 $2n = 40$ .

This European species has been cytologically studied from numerous populations from elsewhere. It was apparently unknown from this region by GALIANO & HEYWOOD (1960).

**Viola canina** L.

*Voucher*: Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 04.  $2n = 40$ .

This confirms numerous reports from other regions for this Eurasiatic species, which was not included in the list from the Jaén province by GALIANO & HEYWOOD (1960).

**Viola arvensis** Murray

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0238.  
 $2n = 34$ .

This is a confirmation of numerous reports of the chromosome number for this very variable and widespread species of eastern Mediterranean origin, which seems to be rare in the Jaén province.

## CISTACEAE

**Cistus albidus** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0275.  $2n = 18$ .

**Cistus monspeliensis** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0277.  $2n = 18$ .

**Cistus salvifolius** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0276.  $2n = 18$ .

**Cistus populifolius** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0301.  
 $2n = 18$ .

**Cistus laurifolius** L.

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete;  
 N. 0462.  $2n = 18$ .

These chromosome counts have previously been published by LÖVE & KJELLQVIST (1964).

**Helianthemum villosum** Thib.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0381.  $2n = 20$ .

This seems to be the first report of the chromosome number for this southern Iberian endemic species.

**Helianthemum cinereum** (Cav.) Pers.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0385.  $2n = 20$ .

This is a confirmation of an earlier report (cf. PROCTOR & HEYWOOD, 1968) for this variable Mediterranean species. Our material may be referable to the subsp. *rubellum* (C. Presl) Maire, which PROCTOR & HEYWOOD (l. c.) prefer to include in the synonymy of the species since they are unable to sensibly divide the species into infraspecific taxa. With this we agree.

**Helianthemum croceum** (Desf.) Pers.

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores and El Chorro; N. 030, N. 0388.  $2n = 20$ .

**Helianthemum ledifolium** (L.) Miller

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Burrunchel and El Chorro; N. 084, N. 0372, N. 0374.  $2n = 20$ .

**Helianthemum salicifolium** (L.) Miller

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0371, N. 0373, N. 0375. Provincia de Teruel: 4 km SE of Bronchales; N. 0571.  $2n = 20$ .

These chromosome counts have been published previously by LÖVE & KJELLQVIST (1964).

**Fumana thymifolia** (L.) Spach

*Vouchers*: Provincia de Málaga: 4 km W of Málaga; N. 010. Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0364.  $2n = 32$ .

This count has been published previously by LÖVE & KJELLQVIST (1964).

## LYTHRACEAE

**Lythrum salicaria** L.

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco, N. 0177.  
 $2n = 60$ .

This confirms numerous reports from other regions for this Eurasian taxon.

**Lythrum junceum** Banks & Solander

*Voucher:* Provincia de Jaén: Roadsides between Cazorla and Peal de Bece-  
 rro; N. 0343.  $2n = 10$ .

This is a confirmation of a report from Israel by DULBERGER (1968) for this southwest European and Mediterranean species of wet places.

**Peplis portula** L.

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0527.  
 $2n = 10$ .

This confirms several previous reports from elsewhere for this European plant.

## ONAGRACEAE

**Epilobium parviflorum** Schereber

*Voucher:* Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0422.  
 $2n = 36$ .

This is a confirmation of numerous earlier reports from other areas for this widespread European species.

## ARALIACEAE

**Hedera helix** L.

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores;

N. 023; Pantano del Tranco; N. 0202, N. 0203; Nava de San Pedro; N. 0287.  $2n = 48$ .

This confirms several previous reports for this European and southwest Asiatic species.

## SANICULACEAE

### ***Sanicula europaea* L.**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe; N. 0453.  $2n = 16$ .

This is a confirmation of previous reports for this taxon of Europe and western Asia.

## APIACEAE

### ***Apium nodiflorum* (L.) Lag.**

*Vouchers*: Provincia de Jaén: Valley of Río Borosa, Quesada; N. 075, N. 0312. Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0423.  $2n = 22$ .

This is the same number as previously reported from elsewhere for this western European and Mediterranean species.

### ***Carum verticillatum* (L.) Koch**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe; N. 0441.  $2n = 22$ .

This number differs from an earlier report of  $2n = 20$  for this western European species by GARDÉ & MALHEIROS-GARDÉ (1954).

### ***Peucedanum hispanicum* (Boiss.) Endl.**

*Vouchers*: Provincia de Jaén: Barranco del Río Guadalentín; N. 065. Sierra de Cazorla, Quesada; N. 0313.  $2n = 22$ .

This confirms earlier reports for this Iberian endemic species from Bota-

nical Garden material, by GARDÉ & MALHEIROS-GARDÉ (1949) and HAKANSSON (1953).

## ERICACEAE

### ***Erica arborea* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0303.  
 $2n = 24$ .

The same number has been reported previously for this Mediterranean species, by HAGERUP (1928), who studied material cultivated in the Botanical Garden in Copenhagen.

### ***Arctostaphylos uva-ursi* (L.) Sprengel**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0479.  
 $2n = 52$ .

This is the chromosome number typical of this widespread circumpolar species in its strict sense as previously reported from both sides of the Atlantic (cf. LÖVE, LÖVE & KAPOOR, 1971).

## PRIMULACEAE

### ***Primula vulgaris* L.**

*Voucher:* Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 03.  $2n = 22$ .

This confirms numerous earlier reports for this western European and Mediterranean species.

### ***Primula veris* L.**

*Vouchers:* Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe and Sierra Alta; N. 0454, N. 0488.  $2n = 22$ .

This is a confirmation of many previous reports for this European plant.

### ***Lysimachia ephemerum* L.**

*Voucher:* Provincia de Jaén: Barranco del Río Guadalentín; N. 066.  $2n = 24$ .

This is a confirmation of a recent report for this species of southern Europe, by KREES (1969), who studied material of unknown origin cultivated in the Botanical Garden in Munich.

**Samolus valerandi L.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0150, N. 0152.  $2n = 26$ .

This is the number most frequently reported for this very widespread species, slightly deviating from the report of c. 24 by WULFF (1937) and  $2n = 24$  by LARSEN (1960).

**Coris monspeliensis L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0139.  $2n = 18$ .

This is a confirmation of four previous reports for this Mediterranean species. The number  $2n = 56$  mentioned by FERGUSON (1972) is probably based on some misinterpretation.

## OLEACEAE

**Jasminum fruticans L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Valley of Rio Borosa; N. 076.  $2n = 26$ .

This is a confirmation from wild specimens of previous reports for this Mediterranean species by SAX & ABBE (1932) and TAYLOR (1945) based on studies of Botanical Garden material of unknown origin.

**Ligustrum vulgare L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0196.  $2n = 46$ .

This number agrees with several earlier reports for this boreal and south European and western Asiatic species.

## ASCLEPIADACEAE

**Vincetoxicum nigrum** (L.) Moench

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco and Vaddillo; N. 0191, N. 0272.  $2n = 22$ .

This seems to be the first report of the exactly diploid chromosome number for this southwestern European species, which GIESZCZYKOWNA (1934) found to have  $2n = 24$  chromosomes, and PARDI (1934) reported as a tetraploid with  $2n = 44$ . Since our number conforms with several previous reports for other species of the genus, we suggest that  $2n = 24$  is either a too high estimate for 22 or an indication of the occurrence of B-chromosomes, whereas the number  $2n = 44$  probably has been determined for an endoploid cell, since endoploidy is known to be rather frequent in the meristems of other species of the genus.

## CONVOLVULACEAE

**Convolvulus meoanthus** Hoffmanns. & Link

*Voucher:* Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0133.  $2n = 24$ .

This is the first report of the chromosome number  $2n = 24$  for this western Mediterranean species, although SA'AD (1967) reported  $2n = 26$  from the Canary Islands. The taxon is closely related to *C. tricolor* L. and has sometimes been regarded as its subspecies. That species has been reported to have  $2n = 20$  chromosomes, by HEITZ (1926), KANO (1929), and SA'AD (1967), but in the light of the present report and also of the number here observed for the following taxon, this number is in need of a critical confirmation, as is also the basic number for the genus *Convolvulus*.

**Convolvulus arvensis** L.

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0199.  $2n = 48$ .

Although most observers have reported the chromosome number  $2n = 50$  for this originally south European and west Asiatic species (cf. LÖVE & LÖVE, 1974), the number  $2n = 48$  has previously been counted by KHOSHOO



& SACHDEVA (1961), KOUL & GOHIL (1973) and STACE (1973). The former number may be an inexact count of the usually crowded and small chromosomes, although in some cases additional B-chromosomes may have been involved. We are of the opinion that the basic number of the genus in its strict sense, excluding *Calystegia* R. Br., is  $x = 6$  and that some other species reported to have  $2n = 20$  or  $30$  chromosomes ought to be critically reinvestigated.

## BORAGINACEAE

### *Buglossoides arvensis* (L.) I. M. Johnston

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0252, N. 0523, N. 0524.  $2n = 28$ .

This is a confirmation of the tetraploid chromosome number for this southern European and western Asiatic species, previously reported by several authors under the name *Lithospermum arvense* L., whereas FERNANDES (1973) found Portuguese material to have the hexaploid number  $2n = 42$ , which perhaps could be suggested to be polytriploid.

### *Aegonychon purpureo-coeruleum* (L.) Holub

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0258.  $2n = 16$ .

This is a confirmation of the diploid number  $2n = 16$ , previously reported for this southern European and western Asiatic species by several authors using the generic name *Lithospermum* or *Buglossoides*. Although FERNANDES (1972a) correctly restricted the genus *Lithospermum*, she defined *Buglossoides* so widely that it also included the genus *Aegonychon*, which has a widely different basic chromosome number. We follow HOLUB (1973) in accepting these taxa as two distinct genera, although even that may not be sufficient to avoid some heterogeneity in the former. The species is not mentioned from the Jaén province by GALIANO & HEYWOOD (1960).

### *Lithodora fruticosa* (L.) Griseb.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0233.  $2n = 26$ .

This number differs slightly from  $2n = 28$  which was reported for this southwestern European species by LORENZO-ANDREU (1951), but agrees with the number  $2n = 26$  counted for *L. rosmarinifolia* (Ten.) I. M. Johnston by FÜRNKRANZ (1967). In light of this, it might seem reasonable to suggest the need for a reinvestigation of the numbers  $2n = 50$  and  $2n = 24$  mentioned for *L. nitida* (Ern) R. Fernandes and *L. diffusa* (Lag.) I. M. Johnston by FERNANDES (1972a), since morphological variability hardly indicates that several basic numbers could occur within this genus.

**Cerithe major L.**

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0358.  $2n = 16$ .

This is a confirmation of a previous report by BRITTON (1951) for this southwest European species.

**Nonea vesicaria (L.) Reichenb.**

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0357.  $2n = 30$ .

This number, which indicates that this Mediterranean species may have originated through allopolyploidy between taxa with  $x = 7$  and  $8$  of this still collective genus, is a confirmation of a recent report by FERNANDES & QUEIROÓS (1971a).

**Anchusa granatensis Boiss.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0163.  $2n = 16$ .

This is a confirmation of an earlier report by BRITTON (1951) based on Botanical Garden material of this endemic taxon of the mountains of the southern parts of the Iberian peninsula.

**Anchusa azurea Miller**

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0412.  $2n = 32$ .

This confirms a few previous reports for this Mediterranean and western Asiatic species.

**Myosotis ramosissima** Rochel

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0249.  
 $2n = 48$ .

This is a confirmation of previous reports for this European and south-west Asiatic plant.

**Cynoglossum creticum** Miller

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0100.  
 $2n = 24$ .

This is a confirmation of several previous reports for this species of the Mediterranean region and southwestern Asia.

**Cynoglossum nebrodense** Guss.

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0305.  
 $2n = 24$ .

This seems to be the first chromosome number report for this Mediterranean species, which is listed from the Jaén province by GALIANO & HEYWOOD (1960) under the synonym *C. pustulatum* Boiss.

## LAMIACEAE

**Marrubium supinum** L.

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 056.  
 Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete;  
 N. 0467.  $2n = 34$ .

This is apparently the first chromosome report for this endemic species of the mountains of central and southern Spain.

**Sideritis hirsuta** L.

*Voucher:* Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete;  
 N. 0465.  $2n = 28$ .

The same chromosome number has recently been reported for two races

of this southwestern European species by GÓMEZ-GARCÍA (1970a, 1970b).

**Phlomis lychnitis** L.

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0461.  $2n = 20$ .

This number has been reported previously for this Mediterranean species by several authors.

**Lamium purpureum** L.

*Voucher*: Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0564.  $2n = 18$ .

This confirms numerous previous reports for this European and western Asiatic species.

**Lamium amplexicaule** L.

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0250.  
Provincia de Teruel: Sierra de Albarracín, Casa Forestal; N. 0436.  
 $2n = 18$ .

This is a confirmation of numerous earlier reports for this Eurasiatic species.

**Stachys heraclea** All. var. *valentina* (Lag.) Pau

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0273.  $2n = 30$ .

This seems to be the first report of the chromosome number of this western Mediterranean endemic species. Our material is referable to the variety *valentina*, the only taxon listed for the area by GALIANO & HEYWOOD (1960).

**Prunella vulgaris** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 049.  $2n = 28$ .

This confirms numerous reports from elsewhere for this boreal circumpolar species.

**Satureja obovata** Lag.

*Voucher*: Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 0111.  $2n = 30$ .

The chromosome number of this southern and eastern Spanish endemic has not been reported previously. In the Jaén province, the species seems to be restricted to the Sierra del Pozo (cf. GALIANO & HEYWOOD, 1960).

**Acinos alpinus** (L.) Moench

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Casa Forestal; N. 0426.  
 $2n = 18$ .

This is a confirmation of numerous previous reports for this central and south European mountain plant.

**Acinos arvensis** (Lam.) Dandy

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0466.  $2n = 18$ .

This confirms several earlier reports for this originally Mediterranean species.

**Thymus zygis** L.

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0368.  $2n = 60$ .

This confirms an earlier report by JALAS & POHJO (1965) for this endemic Iberian plant.

**Lycopus europaeus** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0261.  
 $2n = 22$ .

This is a confirmation of numerous reports from elsewhere for this widespread but originally Eurasiatic taxon.

**Mentha longifolia** (L.) Hudson

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Valley of Rio Borosa and

Nava de San Pedro; N. 074, N. 0293. Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0418.  $2n = 24$ .

This confirms numerous earlier reports for this Eurasiatic species.

**Rosmarinus officinalis L.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Arroyo Maillar and Pantano del Tranco; N. 041, N. 0256.  $2n = 24$ .

This confirms some earlier reports for this Mediterranean species.

**Salvia lavandulifolia Vahl**

*Voucher:* Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0568.  $2n = 14$ .

This number differs from  $2n = 20$  reported by VALDÉS (1970c) for this taxon of C and SE Spain and S France, which sometimes is regarded as the subsp. *lavandulifolia* (Vahl) Cuatrecasas of the likewise diploid *S. officinalis* L. Cytogenetical experiments are needed to solve the question of its real status.

**Salvia sclarea L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0544.  $2n = 22$ .

This confirms several earlier reports for this Mediterranean species.

**Salvia aethiopsis L.**

*Voucher:* Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0565.  $2n = 22$ .

This is the same number as reported for this Mediterranean plant by YAKOVLEVA (1933) and by MARKOVA (in LÖVE, 1974a), or slightly lower than the number  $2n = 24$  counted by HRUBY (1934) and FELFÖLDY (1947).

**Salvia verbenaca L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Burrunchel; N. 083.  $2n = 54$ .

This very polymorphic Mediterranean taxon has been reported to include chromosome numbers as different as  $2n = 42, 54, 58, 60,$  and  $64$  by various

authors. The number determined in our material from Burrunchel agrees with that previously counted by BENOIST (1937) on plants of French origin.

## SOLANACEAE

### ***Solanum dulcamara* L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0542.  
 $2n = 24$ .

This confirms numerous previous reports for this Eurosiberian species.

## SCROPHULARIACEAE

### ***Scrophularia umbrosa* Dumort.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 098.  
 $2n = 52$ .

This is a confirmation of numerous earlier reports for this Eurosiberian species, frequently under the partially synonymous and confused name *S. aquatica* L.

### ***Scrophularia canina* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0294.  $2n = 26$ .

This confirms several earlier reports for this Mediterranean species in its strict sense.

### ***Anarrhinum laxiflorum* Boiss.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0205.  
 $2n = 18$ .

This is the first chromosome number report for this endemic species of the mountains of southern and eastern Spain.

### ***Antirrhinum pulverulentum* Láz.-Ibiza**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Cueva de la Magdalena; N. 038.  $2n = 16$ .

This seems to be the first report for this endemic of eastern Spain.

***Antirrhinum boissieri* Rothm.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0204.  
 $2n = 16$ .

This southeastern Spanish endemic taxon has not been studied cytologically before. It was not mentioned from the Jaén province by GALIANO & HEYWOOD (1960).

***Chaenorhinum villosum* (L.) Lange var. *granatense* (Willk.) Lange**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0310.  
 $2n = 14$ .

This is the first chromosome number report for this endemic species of rockwalls of the mountains of southwestern France and southern Spain (FERNANDES, 1972b). Our specimens belong to the variety *granatense* (Willk.) Lange, which perhaps might be more correctly placed as a subspecies, because of its morphological and geographical distinction.

***Linaria hirta* (L.) Moench**

*Voucher:* Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0350.  $2n = 12$ .

This is the first report of the chromosome number of this Iberian endemic species.

***Linaria viscosa* (L.) Dum.-Courset**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0390.  $2n = 12$ .

This chromosome number is a confirmation of a recent report by VALDÉS (1970b) for this southern European taxon.

***Linaria repens* (L.) Miller**

*Voucher:* Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0567.  
 $2n = 12$ .

This confirms numerous earlier reports for this western European species.



***Linaria lilacina* Lange**

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Quesada and El Chorro; N. 0323, N. 0387.  $2n = 12$ .

This is the first chromosome report for this endemic taxon of the Jaén and Albacete provinces (cf. VALDÉS, 1970a).

***Linaria aeruginea* (Gouan) Cav.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0389.  $2n = 12$ .

This chromosome number has previously been reported for this endemic species of Portugal, southern and eastern Spain, and the Balearic Islands, by HEITZ (1927) and KÜPFER (1969).

***Linaria arvensis* (L.) Desf.**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0554.  $2n = 12$ .

This confirms several earlier reports from elsewhere for this western and southern European taxon.

***Linaria micrantha* (Cav.) Hoffmanns. & Link**

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0369:  $2n = 12$ .

This is the first report of the chromosome number for this Mediterranean species of cultivated grounds and waste places. It is not included in the list from the Jaén province by GALIANO & HEYWOOD (1960).

***Digitalis obscura* L.**

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos and Pantano del Tranco; N. 0106, N. 0137, N. 0138.  $2n = 56$ .

The chromosome number  $2n = 56$  for this Iberian endemic species is a confirmation of an earlier report by ANGULO (1957).

***Veronica serpyllifolia* L. subsp. *humifusa* (Dickson) Syme**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0509.  $2n = 14$ .

This confirms numerous earlier reports for the typical lowland race, subsp. *serpyllifolia*, and for this arctic-alpine subspecies. Our material is an extension of the range shown by HULTÉN (1971), who knew it only south to the Pyrenées.

**Veronica officinalis L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0528.  
 $2n = 36$ .

This is a confirmation of numerous reports from elsewhere for this circumpolar boreal species.

**Veronica chamaedrys L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0481.  
 $2n = 32$ .

This number confirms several previous reports for this Eurasiatic plant, which in the Mediterranean region is restricted to the mountains.

**Veronica beccabunga L.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0292.  
Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0405, N. 0415.  $2n = 18$ .

This confirms numerous previous reports for this Eurasiatic and North African taxon.

**Veronica anagallis-aquatica L.**

*Vouchers:* Provincia de Jaén: Río Guadalquivir, near El Tranco, and roadsides between Cazorla and Peal de Becerro; N. 0226, N. 0365. Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0409.  $2n = 36$ .

This confirms numerous reports from elsewhere for this widespread species which is probably of Eurosiberian origin.

**Veronica arvensis L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0237.  
 $2n = 16$ .

This is the number most frequently observed for this widespread but originally Mediterranean species. The number  $2n = 14$  reported by LÖVE & LÖVE (1956) and AFANASIYEVA & MESHKOVA (1961) is apparently incorrect.

***Veronica sibthorpioides* Debeaux, Degen & Hervier**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0510.  
 $2n = 30$ .

This is a confirmation of a report by FISCHER (1967) of the chromosome number of this endemic species of southern Spain and Morocco, belonging to the *V. hederifolia* complex.

***Parentucellia latifolia* (L.) Caruel**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0240.  
 $2n = 48$ .

This confirms recent reports of the chromosome number of this southern European species.

## LENTIBULARIACEAE

***Pinguicula vallisneriifolia* Webb**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Cueva de la Magdalena; N. 035.  $2n = 32$ .

This seems to be the first report of the chromosome number of this endemic species of moist limestone cliffs in southeastern and south-central Spain.

***Pinguicula vulgaris* L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0513.  
 $2n = 64$ .

This is a confirmation of numerous earlier reports from all over the area of this widespread circumpolar boreal species.

## PLANTAGINACEAE

***Plantago lanceolata* L.**

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0190, N. 0211.  $2n = 12$ .

This is a confirmation of many previous reports for this originally Eurasiatic species which has become an almost cosmopolitan weed.

***Plantago stepposa* Kuprian.**

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco, and Torre del Vinagre; N. 0186, N. 0259. Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0499.  $2n = 12$ .

Our collections of the *Plantago media* complex from Spain differ from the northern and central European species in its strict sense in having relatively larger and longer leaves with long petioles, straight scapes which are densely hairy just below the spike, and a spike that is distinctly longer than that of the more northern populations. The flowers have longer sepals and petals and the fruits are larger with more seeds which, however, are smaller. In addition, these plants were found to be diploid as contrasted to the tetraploid chromosome number of the more northern plants (cf. LÖVE & LÖVE, 1974). The diploid number has previously been reported for Spanish plants of the complex and for plants from southern France, Hungary, Crna Gora in Yugoslavia, and the Soviet Union by RAHN (1954, 1957, and in LÖVE, 1966), BORHIDI (1968), BASSETT (in LÖVE, 1969) and GADELLA & KLIPHUIS (1972).

The morphological characteristics of our diploid material clearly show that it is identical with the plant originally described as the var. *urvilleana* Rapin from the Crimea, or as the subsp. *urvilleana* (Rapin) Hultén, and as the species *Plantago stepposa* Kupr. (cf. GRIGORYEV, 1956; HOLUB, 1961; PAUCA, 1961; HULTÉN, 1971; SOÓ, 1968). Our specimens compare well with the figure by GRIGORYEV (1956), and fit the description in all details. According to HULTÉN (1971), the taxon is a southern Eurasiatic plant reaching the eastern coasts of the Adriatic Sea; we have seen evidence to support the view that it is at least predominant in central and western Italy and on the French Rivièra, and it is evidently the only taxon of the complex met with in the Iberian peninsula. It is common in Spain, but known only from a single locality in Portugal (cf. HULTÉN, 1971). In our opinion, *P. step-*

*posa* is a well-defined species in its own right; we have seen no signs of hybridization in the material studied from regions where both the diploid and tetraploid species may occur together, but if such hybrids should occur, they certainly will be sterile because of the chromosome number difference.

***Plantago sempervirens* Crantz**

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0198.  
 Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe;  
 N. 0448.  $2n = 12$ .

This confirms four earlier reports from elsewhere for this southwest European species, which often is mistakenly identified with *P. cynops* L.

***Plantago indica* L.**

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0337.  $2n = 12$ .

This is a confirmation of several reports for this Eurasiatic species, frequently under the name *P. psyllium* L. with which it is only partially identical.

RUBIACEAE

***Sherardia arvensis* L.**

*Voucher*: Provincia de Jaén: Río Guadalquivir, near El Tranco; N. 0231.  
 $2n = 22$ .

This confirms numerous earlier reports for this almost cosmopolitan weed of Mediterranean origin.

***Cruciata laevipes* Opiz**

*Voucher*: Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0562.  
 $2n = 22$ .

This is a confirmation of several previous reports for this temperate Eurasiatic species.

**Galium palustre L.**

*Voucher:* Provincia de Cuenca: 30 km from Tragacete towards Cañete; N. 0475.  $2n = 24$ .

This is a confirmation of previous reports for this Eurasiatic species in its strict sense.

**Galium aparine L.**

*Voucher:* Provincia de Jaén: Roadsides 1 km N of Cazorla; N. 0182.  $2n = 66$ .

This is a confirmation of one of several chromosome numbers reported by various authors for this very variable collective species of Eurasiatic origin.

**Galium verrucosum Hudson**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0334.  $2n = 22$ .

This is a confirmation of some previous reports for this southern European and Mediterranean species, which is frequently named *G. saccharatum* All. or *G. valantia* Weber.

**Rubia peregrina L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 093.  $2n = 88$ .

This is a new number for this very collective western European and Mediterranean species, earlier reports being  $2n = 44$  reported by DAHLGREN, KARLSSON & LASSEN (1971) and NILSSON & LASSEN (1971) who studied material from the Balearic Islands,  $2n = 66$  reported by POUQUES (1948, 1949) who studied French material, and  $2n = c. 132$  reported by FAGERLIND (1934, 1937) from plants of unknown origin.

## CAPRIFOLIACEAE

**Lonicera splendida Boiss.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0284.  $2n = 18$ .

This is a confirmation of a previous report by JANAKI-AMMAL & SAUNDERS (1952) for this species from the western Mediterranean.

***Lonicera arborea* Boiss.**

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0236, N. 0285.  $2n = 18$ .

This seems to be the first report of the chromosome number for this Iberian species.

***Lonicera xylosteum* L.**

*Voucher:* Provincia de Teruel: Sierra de Albarracín, Cerro de San Felipe: N. 0449.  $2n = 18$ .

This confirms numerous earlier reports from elsewhere for this widely cultivated but originally Eurosiberian species.

## VALERIANACEAE

***Valerianella carinata* Lois.**

*Voucher:* Provincia de Jaén: Río Guadalquivir, near El Tranco; N. 0227.  $2n = 16$ .

Two chromosome numbers,  $2n = 16$  and  $18$ , have been reported for this species. Although both may be correct, we have the feeling from our material, in which the lower number was predominant but  $17$  and  $18$  also occurred, that this variation may be caused by the occurrence of B-chromosomes.

***Valerianella locusta* (L.) Laterrade**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0269.  $2n = 16$ .

This is the number most frequently reported for this southern European species, although two counts of  $2n = 14$  and one of  $2n = 18$  have been published. We found only  $2n = 16$  in our plants.

**Valeriana tuberosa** L.

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 054.  
 Provincia de Teruel: Sierra de Albarracín, Casa Forestal; N. 0428.  
 $2n = 16$ .

This southern European species of dry meadows has been studied previously by GUINOCHET & LOGEOIS (1962), who also found it to be diploid with  $2n = 16$  chromosomes.

## DIPSACACEAE

**Scabiosa tomentosa** Cav.

*Voucher:* Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 0117.  
 $2n = 16$ .

This seems to be the first chromosome number report for this Iberian endemic species.

**Dipsacus fullonum** L.

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0174.  
 $2n = 18$ .

Four previous authors have reported  $2n = 16$  for this originally Mediterranean species, and seven have found the number to be  $2n = 18$ . Our observation confirms the latter number for the Spanish material.

**Knautia subscaposa** Boiss. & Reuter

*Vouchers:* Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro and Guadahornillos; N. 0286, N. 0304.  $2n = 20$ .

This seems to be the first chromosome number report for this Iberian endemic species of the *Knautia arvensis* complex.



## CAMPANULACEAE

**Trachelium coeruleum** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0141.  
 $2n = 34$ .

This is a confirmation of an earlier report, by SUGIURA (1942), who studied material grown from seeds from a Botanical Garden. The number agrees with counts from several other taxa of this southern European genus.

**Roucela erinus** (L.) Dumort.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0336.  $2n = 28$ .

This number is a confirmation of several earlier reports for this taxon, which traditionally but illogically is classified in the genus *Campanula*, from which it differs not only in several morphological characteristics and in its being annual, but also in having the basic chromosome number  $x = 7$ , as contrasted to  $x = 17$  for *Campanula* s. str. The genus *Roucela* was described by DUMORTIER (1822) for this species and its relatives, and later the name *Erinia* was proposed for them by NOULET (1837). The genus is represented by two species only that are distributed from the Mediterranean to the Near East.

**Legousia hybrida** (L.) Delarbre

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0360.  $2n = 20$ .

This is a confirmation of several reports for this southern European species.

## CICHORIACEAE

**Catananche coerulea** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0200.  $2n = 18$ .

This confirms the observation by DELAY (1968a) for this southwest

European species. The slightly lower number,  $2n = 16$ , reported by MARCHAL (1920), is likely a mistake.

***Andryala ragusina* L.**

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0355.  $2n = 18$ .

This seems to be the first chromosome number report for this south-west European taxon; the same number has previously been reported for several other species of the genus.

***Crepis haenseleri* (Boiss.) F. Schultz**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0167.  $2n = 16$ .

This is one of the tetraploid taxa included in *C. vesicaria* L. by BABCOCK (1947) and other authors, accepting the Linnaean species as a collective species including both diploid and tetraploid taxa, some of which are clearly intersterile. It is evident that the classification of the collective species is in a need of a thorough revision, although it seems safe to conclude that the tetraploids of the western Mediterranean ought to be recognized as a species in its own right, including some minor races. Since the oldest valid name at the level of species for a tetraploid of this complex seems to be *C. haenseleri*, we advocate its reinstatement as the name for this taxon. The species was originally described from the neighbourhood of Granada.

***Sonchus maritimus* L.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0147.  $2n = 18$ .

This is a confirmation of previous reports of the diploid chromosome number for this taxon, frequently under the synonymous *S. aquatilis* Pourret (cf. BOULOS, 1972).

***Sonchus asper* (L.) Hill subsp. *glaucescens* (Jordan) Arcangeli**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0274.  $2n = 18$ .

This taxon was not included in the list of the plants of the Jaén pro-

vince by GALIANO & HEYWOOD (1960), and it may be very rare in the region. We found it to be a diploid plant, as did also ROUX & BOULOS (1972), thus confirming its subspecific status under the likewise diploid *S. asper*.

**Reichardia intermedia** (Schultz-Bip.) Hayek

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0171.  $2n = 14$ .

Two chromosome numbers have been reported for this species, i. e.  $2n = 14$ , by FERNANDES & QUEIRÓS (1971a), and  $2n = 16$ , by NAZAROVA (in BOLKHOVSKIKH & al., 1969). These two numbers and also  $2n = 18$  have been reported from other species of the genus. Since some of our specimens actually had 16 chromosomes, two of which could be interpreted as being B-chromosomes, we suggest that the basic number for the genus should be  $x = 7$  and that variations from the diploid number  $2n = 14$  have been caused by a rather high frequency of individuals with B-chromosomes.

**Taraxacum erythrospermum** Andrz.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0108.  $2n = 32$ .

This very collective species is known to consist of sexual and agamospermous taxa most of which have been given species names, and the chromosome numbers  $2n = 16, 22, 24, 25$ , and  $32$  have been reported for some of these (cf. LÖVE & LÖVE, 1974). Our collection is extremely uniform and seems to represent a strictly tetraploid agamospecies, which we have not tried to identify with any available epithet. The complex is not reported from the region by GALIANO & HEYWOOD (1960).

**Porcellites radicata** (L.) Cass.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0289.  $2n = 8$ .

This is a confirmation of several earlier reports of the chromosome number for this species, mostly under the synonym *Hypochoeris radicata* L. It is a widely distributed weed of western Mediterranean origin.

**Hedypnois rhagadioloides (L.) Willd.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0331.  $2n = 14$ .

For this collective and critical taxon all even and several uneven numbers between  $2n = 6$  and  $2n = 18$  have been reported (cf. LÖVE & LÖVE, 1974). We found only  $2n = 14$  in plants which we refrain from trying to identify as any of the critical races or species into which this very confused Mediterranean complex has been divided.

**Leontodon autumnalis L.**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0560.  
 $2n = 12$ .

This is a confirmation of numerous previous reports for this widespread species. Our collection seems to be referable to the taxon *L. reverchonii* Freyn, which may at the best be a variety with a southwest European distribution.

**Leontodon saxatilis Lam.**

*Vouchers*: Provincia de Málaga: 4 km W of Málaga; N. 012. Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre and El Chorro; N. 0266, N. 0382.  $2n = 8$ .

This chromosome number has been reported often for this western European and western Mediterranean species, which is included in the list by GALIANO & HEYWOOD (1960) under the synonymous *L. nudicaulis* (L.) Banks, but frequently also named *L. taraxacoides* (Vill.) Mérat. Although three of our collections seem to belong to the subsp. *saxatilis*, the plants from El Chorro are apparently annual and morphologically referable to the subsp. *rothii* auct., non (Ball) Schinz & Thell., a taxon probably more appropriately classified at the variety level.

**Leontodon tuberosus L.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0267.  
 $2n = 8$ .

This is a confirmation of three recent reports for this Mediterranean species. It was not included from the area by GALIANO & HEYWOOD (1960).

**Urospermum picroides** (L.) Desf.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0170.  $2n = 10$ .

This is a confirmation of several previous reports of the chromosome number of this species of the Mediterranean and southwestern Europe.

**Podospermum laciniatum** (L.) DC.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0131.  $2n = 14$ .

This is a confirmation of five previous reports for this Mediterranean species.

**Tragopogon pratensis** L. subsp. **minor** (Miller) C. J. Hartman

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0129.  $2n = 12$ .

This central and western European taxon was not known from the region by GALIANO & HEYWOOD (1960) and may be a recently introduced weed. The chromosome number confirms earlier reports.

**Tragopogon sinuatus** Avé-Lall.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0130.  $2n = 12$ .

This appears to be the first report of the chromosome number for this Mediterranean species.

## ASTERACEAE

**Carduus pycnocephalus** L.

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro and El Chorro; N. 0281, N. 0379.  $2n = 64$ .

This Mediterranean species has previously been studied cytologically by MOORE & FRANKTON (1962), who determined their count of  $2n = c. 54$  chromosomes on plants grown from seeds from Chile, where the taxon is met with as an introduced weed. PODLECH & DIETERLE (1969) confirmed this number for specimens from Afghanistan identified as *C. pycnocephalus* subsp. *albidus* (M.B.) Kazmi, which, according to TAMAMSHYAN (1963), is

the species *C. arabicus* Jacq. Later, DAHLGREN, KARLSSON & LASSEN (1971), and KRAMER, WESTRA, KLIPHUIS & GADELLA (1972) reported the number  $2n = 62-64$  from plants of *C. pycnocephalus* from the Balearic Islands and from the Maltese Islands respectively. This is the number observed in our material, and it is in conformity with other reports from *Carduus* L. s. str., which is typified by *C. nutans* L. (cf. HITCHCOCK & GREEN, in BIRQUET, 1935), and characterized by the basic number  $x = 8$ , indicating that *C. pycnocephalus* is an octoploid species.

***Carduus granatensis* Willk.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Barranco del Río Guadalentín; N. 067.  $2n = 16$ .

This is the first chromosome number report for this endemic species of calcareous mountain slopes in southern and southwestern Spain. It was listed as the subsp. *granatensis* (Willk.) Lange of *C. platypus* Lange from the Jaén province by GALIANO & HEYWOOD (1960), but we feel it is safer to regard it as distinct from *C. platypus* at least until cytological and experimental studies involving both have demonstrated this to be a mistake.

***Cirsium welwitschii* Cosson**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0149.  $2n = 34$ .

This is the same number as recently reported for this endemic species of Portugal and southeastern Spain by FERNANDES & QUEIRÓS (1971b).

***Silybum eburneum* Cosson & Durieu**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0321.  $2n = 34$ .

As far as we are aware, this is a first record of this North African species for this part of Spain, and also the first count of its chromosome number from a natural population, since former reports of the same number have been based on material from Botanical Gardens.

***Crupina vulgaris* Cass.**

*Voucher*: Provincia de Jaén: Sierra de Cazorla, roadsides N of Cazorla; N. 0181.  $2n = 30$ .

This is a confirmation of seven earlier reports from elsewhere for this southern European and western Asiatic species.

**Calcitrapa stellata** Lam.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0280.  
 $2n = 20$ .

This confirms several earlier reports of the chromosome number for this southern and western European and Mediterranean species, traditionally included in the then very collective genus *Centaurea*.

**Cyanus triumfetti** (All.) Dostál subsp. **lingulatus** (Lag.) Löve & Kjellqvist

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0297.  
 $2n = 22$ .

This seems to be the first chromosome number report for this Spanish endemic race of the very variable and widespread species *C. triumfetti* of central and south European mountains. The Spanish taxon is a rather distinct major geographical race worthy of subspecific recognition, for which we propose the name **Cyanus triumfetti** (All.) Dostál subsp. **lingulatus** (Lag.) Löve & Kjellqvist, stat. nov. (based on *Centaurea lingulata* Lag., *Gen. Sp. Nov.*: 32, 1816).

**Melanoloma pullatum** (L.) Cass.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Arroyo Maillar; N. 046.  
 $2n = 22$ .

This is a confirmation of reports by GUINOCHET (1957) and FERNANDES & QUEIRÓS (1971b) of the chromosome number of this southwest European endemic species, traditionally included in the collective genus *Centaurea*. Our collection was made in a dense *Pinus* forest with dominant *Pteridium herediae* on calcareous soil, although the species also is known to thrive in dry and open habitats.

**Gnaphalium luteo-album** L.

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0145, N. 0209.  $2n = 14$ .

This confirms numerous previous reports for this almost cosmopolitan weedy species.

**Phagnalon rupestre** (Desf.) DC.

*Voucher*: Provincia de Málaga: 4 km W of Málaga; N. 011.  $2n = 18$ .

This dwarf shrub of dry places in the western and central Mediterranean region was collected on rock crevices close to the sea. The chromosome number is a confirmation of some earlier reports.

**Inula montana** L.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0551.  
 $2n = 16$ .

This is a confirmation of a report by GUINOCHET & LOGEOIS (1962), who studied material from the maritime Alps, and DELAY (1968b), who studied plants from western France of this rather rare species of western and central Mediterranean and southwest European mountains.

**Inula salicina** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Vadillo; N. 0271.  $2n = 16$ .

This confirms numerous previous reports for this widespread Eurasian species.

**Inula helenioides** DC.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0195.  $2n = 16$ .

This seems to be the first report of the chromosome number of this species which is endemic to the Pyrenean and Iberian mountains. GALIANO & HEYWOOD (1960) knew it from only a single collection within the region.

**Tussilago farfara** L.

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0410.  
 $2n = 60$ .



This confirms numerous reports from other regions for this Eurasian species.

**Doronicum plantagineum** L.

*Vouchers*: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0126. Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0563.  $2n = 120$ .

This confirms a recent determination by FERNANDES & QUEIRÓS (1971b) for this western Mediterranean species from natural localities. LINDQUIST (1950) reported the number  $2n = c. 120$  from cultivated material, and ZHUKOVA (1964) gave only a number higher than 100 for her Botanical Garden plants.

**Senecio doria** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0194.  $2n = 40$ .

This confirms several previous reports for this Mediterranean species.

**Senecio duriaei** Gay

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0508.  $2n = 40$ .

This endemic tetraploid species of Spanish mountains does not seem to have been previously studied cytologically. It may be related to the diploid species *S. rupestris* Waldst. & Kit.

**Senecio gallicus** Chaix

*Voucher*: Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0569.  $2n = 20$ .

This is a confirmation of previous reports by AFZELIUS (1924) and FERNANDES & QUEIRÓS (1971b) for this western Mediterranean species, and by QUEIRÓS (1973) for the var. *difficilis*.

**Senecio vulgaris** L.

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0169.  $2n = 40$ .

This confirms several earlier reports from other regions of the chromosome number of this widespread weed, which probably originates from southern Europe.

***Solidago virgaurea* L.**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 094.  
 $2n = 18$ .

This is a confirmation of numerous reports from elsewhere for this variable European species.

***Bellis perennis* L.**

*Voucher:* Provincia de Jaén: Sierra del Pozo, Pico Cabañas; N. 02.  $2n = 18$ .

This count from plants from a limestone ravine confirms numerous reports from elsewhere for this widespread weed of Eurasiatic origin.

***Bellis silvestris* Cyrillo**

*Voucher:* Provincia de Jaén: Sierra de Cazorla, Arroyo Maillar; N. 039.  
 $2n = 36$ .

This number confirms earlier reports of  $2n = 36$  by NEGODI (1937) and DELAY (1969b), but differs from the number  $2n = 54$  observed by NEGODI (1937), BOLTON (in TISCHLER, 1935) and FERNANDES & QUEIRÓS (1971b).

***Anthemis cotula* L.**

*Voucher:* Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0342.  $2n = 18$ .

This is a confirmation of several earlier reports for this widespread Eurasiatic species, which as a weed is almost cosmopolitan.

***Anthemis triumphetti* (L.) DC.**

*Voucher:* Provincia de Teruel: 11 km S of Orihuela del Tremedal; N. 0566.  
 $2n = 18$ .

This seems to be the first chromosome report for this southern European species of woods and rocky places in mountains.

***Achillea odorata* L.**

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0463.  $2n = 18$ .

This is a confirmation of the diploid chromosome number for this southern European species of mountains, as previously reported by EHRENDORFER (1959). The number  $2n = 54$  given by CHUKSANOVA, SVESHNIKOVA & ALEKSANDROVA (1968) has probably been determined on plants belonging to another species.

***Achillea tomentosa* L.**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0501.  $2n = 18$ .

This confirms earlier reports for this southwest European species.

***Achillea ageratum* L.**

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, 10 km S of Tragacete; N. 0468.  $2n = 18$ .

This confirms a recent report from Portugal by FERNANDES & QUEIRÓS (1971b).

***Leucanthemum ircutianum* (Turcz.) DC.**

*Voucher*: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0416.  $2n = 36$ .

This is a confirmation of many previous reports for this widespread Eurasiatic species.

***Leucanthemum cuneatum* (Pau) Font Quer & Sennen**

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0489.  $2n = 36$ .

This seems to be the first chromosome number report for this Spanish endemic taxon.

**Leucanthemum macrotum** (Durieu) Heywood subsp. **chrysanthemoides** (Kunze) Heywood

*Voucher*: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0327.  $2n = 18$ .

This first report of the chromosome number of this subspecies of dry and stony habitats in Spanish mountains is also a confirmation of earlier reports for the species itself.

**Pyrethrum corymbosum** (L.) Scop.

*Voucher*: Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0549.  $2n = 36$ .

This is a confirmation of several previous reports of the chromosome number of this widespread taxon of southern and temperate Europe.

**Artemisia lanata** DC. subsp. **assoana** (Willk.) Löve & Kjellqvist

*Voucher*: Provincia de Teruel: 4 km SE of Bronchales; N. 0570.  $2n = 18$ .

This seems to be the first report of the chromosome number of this taxon, which frequently is accepted as a species in its own right. We believe it is more correctly regarded as an Iberian subspecies of a chain of major geographical races in the southern European mountains east to Caucasus of the species *A. lanata* DC. (cf. HESS, LANDOLT & HIRZEL, 1972), for which the following combination needs to be validated: **Artemisia lanata** DC. subsp. **assoana** (Willk.) Löve & Kjellqvist, stat. nov. (based on *Artemisia assoana* Willk., in Willk. & Lange, *Prodr. Fl. Hisp.*, 2: 69, 1865). We regard the Alpine taxon, *A. pedemontana* Balb., as being the typical race, subsp. *lanata*, but refrain from validating subspecific names for the Balcan and Caucasus races. The chromosome numbers  $2n = 16$  and  $18$  have been reported from Botanical Garden material of *A. lanata* by KAWATANI & OHNO (1964).

**Calendula arvensis** L.

*Voucher*: Provincia de Jaén: Roadsides between Cazorla and Peal de Becerro; N. 0339.  $2n = 42$ .

Although some reports of the chromosome number of this Mediterranean species based on Botanical Garden material give the number  $2n = 36$ , we

found our plants to have  $2n = 42$ , or slightly less than the number  $2n = 44$ , which has recently been reported by MEUSEL & OHLE (1966), DAHLGREN, KARLSSON & LASSEN (1971), FERNANDES & QUEIRÓS (1971a, 1971b) and QUEIRÓS (1973).

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#### CORRECTIONS

In the second paper in this series (*Lagascalía*, 3: 148, 1973), the number for *Potamogeton alpinus* is given as  $2n = 26$ , when it actually is  $2n = 52$ , and in the third paper (*Lagascalía*, 4: 6, 1974) the number for *Rumex obtusifolius* should be  $2n = 40$ , not  $2n = 20$ .