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CYTOTAXONOMY OF SPANISH PLANTS
II. MONOCOTYLEDONS

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Resumen. Se continúa con este segundo artículo una serie de trabajos sobre citotaxonomía de plantas españolas procedentes de regiones montañosas del sur y centro del país. Se estudia el número cromosómico de 91 taxones de monocotiledóneas, y se dan, al parecer por primera vez, los siguientes: *Melica minuta* L. subsp. *major* (Parl.) Trabut, 2n = 18; *Festuca paniculata* (L.) Schinz & Tell. var. *baetica* (Hackel) Maire & Weiller, 2n = 14; *Poa ligulata* Boiss. var. *paui* (Font-Quer) Maire, 2n = 14; *Helictotrichon filifolium* (Lag.) Henrard, 2n = 70; *Phalaris coerulescens* Desf., 2n = 42; *Carex divisa* Hudson, 2n = 62; *Aphyllanthes monspeliensis* L., 2n = 32; *Merendera bulbocodium*, 2n = 54 + 0 — 6 B; *Gagea villosa* (M. B.) Duby subsp. *hervieri* (Degen ex Hervier) Löve & Kjellqvist, 2n = 48; *Gagea foliosa* (J. & C. Presl) J. A. & J. H. Schultes, 2n = 36; *Scilla reverchonii* Degen & Hervier, 2n = 16; *Ornithogalum baeticum* Boiss., 2n = 18; *Muscari atlanticum* Boiss. & Reuter, 2n = 54; *Allium polyanthum* Roem. & Schult., 2n = 32; *Narcissus pallidulus* Graells, 2n = 14; *Romulea clusiana* (Lange) Nyman, 2n = 36; *Orchis morio* L. subsp. *picta* (Lois.) Ascherson & Graebner, 2n = 36; *Orchis patens* Desf. subsp. *spitzelii* (Sauter) Löve & Kjellqvist, 2n = 42.

Se comenta brevemente la posición taxonómica de alguno de estos taxones, y se validan las siguientes nuevas combinaciones: *Gagea villosa* (M. B.) Duby subsp. *hervieri* (Degen ex Hervier) Löve & Kjellqvist y *Orchis patens* Desf. subsp. *spitzelii* (Sauter) Löve & Kjellqvist.

Summary. This is the second in a series of papers dealing with the cytotaxonomy of Spanish plants, mainly from two mountainous regions in the southern and central parts of the country. The chromosome numbers of 91 taxa of monocotyledons are given, among which the following seem to be reported for the first time: *Melica minuta* L. subsp. *major* (Parl.) Trabut, 2n = 18; *Festuca paniculata* (L.) Schinz & Thell. var. *baetica* (Hackel) Maire & Weiller, 2n = 14; *Poa ligulata* Boiss. var. *paui* (Font-Quer) Maire, 2n = 14; *Helictotrichon filifolium* (Lag.) Henrard, 2n = 70; *Phalaris coerulescens* Desf., 2n = 42; *Carex divisa* Hudson, 2n = 62; *Aphyllanthes monspeliensis* L., 2n = 32; *Merendera bulbocodium*, 2n = 54 + 0 — 6 B; *Gagea villosa* (M. B.) Duby subsp. *hervieri* (Degen

ex Hervier) Löve & Kjellqvist, 2n = 48; *Gagea foliosa* (J. & C. Presl) J. A. & J. H. Schultes, 2n = 36; *Scilla reverchonii* Degen & Hervier, 2n = 16; *Ornithogalum baeticum* Boiss., 2n = 18; *Muscari atlanticum* Boiss. & Reuter, 2n = 54; *Allium polyanthum* Roem. & Schult., 2n = 32; *Narcissus pallidulus* Graells, 2n = 14; *Romulea clusiana* (Lange) Nyman, 2n = 36; *Orchis morio* L. subsp. *picta* (Lois.) Ascherson & Graebner, 2n = 36; *Orchis patens* Desf. subsp. *spitzelii* (Sauter) Löve & Kjellqvist, 2n = 42.

The taxonomy of several of the taxa is briefly discussed, and the following new combinations are validated: *Gagea villosa* (M. B.) Duby subsp. *hervieri* (Degen ex Hervier) Löve & Kjellqvist and *Orchis patens* Desf. subsp. *spitzelii* (Sauter) Löve & Kjellqvist.

This is the second 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.

TYPHACEAE

Typha angustifolia L. subsp. **australis** (Schum. & Thonn.) Graebner

Voucher: Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0221. *2n = 30.*

This southern European taxon (cf. LAÍNZ, 1968) seems to be rare in the area studied, where also *T. latifolia* L. is locally abundant (GALIANO & HEYWOOD, 1960). The chromosome number is a confirmation of earlier determinations from ten widely separated regions in Europe and North America for the typical subsp. *angustifolia,* whereas it is the first report for this subspecies.

POTAMOGETONACEAE

Potamogeton alpinus Balbis

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0512. *2n = 26.*

This is a confirmation of several previous reports from northern and central Europe for this diploid species.

ZANNICHELLIACEAE

Zannichellia peltata Bertol.

Voucher: Provincia de Jaén: Ditches near the road between Cazorla and Peal de Becerro; N. 0345. *2n = 12.*

This is the taxon of southern areas representing the genus *Zannichellia,* which most authors still prefer to regard as monotypic, though very variable, despite the fact that it is known to include several chromosome numbers in its Eurasiatic and Mediterranean populations, so far as investigated. It is possible that the numbers 2n = 28, 32 and 34 reported from northern and central Europe are inexact estimates of crowded metaphase plates, or, at least in the case of the number 2n = 32, actually determined on hybrids, whereas there can be no doubt as to the correctness of the numbers 2n = 12, 24 and 36 reported by several authors. The lowest number, which is typical of the Spanish plants, has also been reported from North Africa by REESE (1957) and from Bulgaria by KOZUHAROV & KUZMANOV (1964), whereas further north only the tetraploid and hexaploid taxa are indigenous. It has been observed by some of those studying their chromosome numbers that the tetraploid taxon seems to prefer brackish water and be a more slender plant than the hexaploid which is known mainly from fresh water streams and ditches.

In the past, several attempts to a division of the genus into distinct species have been made, but since it is difficult to grasp the apparently wide morphological variation and group it into major variants that may or may not include several minor variations, especially in the vegetative organs, none of these proposals have met with general approval so far. Also, the proposal by REESE (1963) for the subdivision of the taxa from northern Germany was confused by his ignoring the cytological information and emphasizing vegetative rather than reproductive variations.

We have made considerable efforts to coordinate the morphological observations of previous authors with the present knowledge of the polyploid series of the genus. We are in no doubt that the Linnaean species *Z. palustris* in its strict sense is identical with the hexaploid plant with 2n = 36 chromosomes, since it is a taxon of fresh water, with 2-6 achenes that are 2-3 mm. long with a persistent style which is 0,5-1,5 mm. long, and a small peltate and finely toothed stigma; the achene is subsessile or with a short stalk which may reach the length of about 1 mm. but is usually shorter.

We regard the tetraploid with 2n = 24 chromosomes as identical with

the species *Z. maritima* Nolte, a later synonym of which is *Z. pedicellata* Fries, since it is a more slender plant preferring but not necessarily confined to brackish water. It has usually 2-5 achenes that are 1,5-2,5 mm. long with a persistent style that is equally long as the achene itself, and the stigma is lingulate and finely toothed. The achenes are frequently on a common peduncle and they are distinctly stalked, and the stalk is usually 2-3 mm. long, but rarely shorter.

The diploid plant with 2n = 12 chromosomes is a taxon of southern or Mediterranean climates. We identify it with the species *Z. peltata* Bertol., since it is a very slender plant of at least mainly fresh waters, with 2-4 achenes that are 1,0-2,0 mm. long with a persistent style that is equally long or longer than the achene itself, and the stigma is large, peltate and circular and distinctly toothed. The achenes are on a stalk which is as long as or longer than the achenes themselves.

The Mediterranean diploid was originally described from Italy by BERTOLONI (1854) but has later been largely ignored. In gross morphology it is clearly distinct from the more northern polyploids, although some of its delicate characteristics are easily disturbed when dried.

POACEAE

Phragmites altissimus (Bentham) Mabille

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0173.
2n = 36.

The chromosome number information available for the collective species commonly named *P. communis* Trin., until CLAYTON (1968) demonstrated its identity with *P. australis* (Cav.) Trin., may look confusing at first sight (cf. LÖVE & LÖVE, 1961) since it includes several euploid numbers and some intermediate aneuploid ones likely caused by hybridization. Most authors from the boreal zone have found the chromosome number of the typical species to be 2n = 48, although BJÖRK (1963, 1967) observed that populations of the octoploid sometimes include some sterile clones with the dodecaploid number 2n = 72, a number also reported from Costa Rica by POHL & DAVIDSE (1971). The basic chromosome number of the genus is x = 6, but the polyploid species are old and seem to have developed into taxa so completely panalloploid that the apparently dodecaploid plants behave like polytriploids of the basic number x = 24 (cf. LÖVE, 1968). Some authors have

reported the number 2n = 36 from European populations of *P. australis,* but also from the tropical-subtropical *P. karka* (Retz.) Trin., whereas only a few report the numbers 2n = 50, 54 and 96 or the whole series 2n = 36, 44, 46, 48, 49, 50, 51, 54 and 96, as do GORENFLOT, RAICU, CARTIER, CIOBANU, STOIAN & STAICU (1972) from the Mediterranean and the Black Sea. The role of B-chromosomes in creating this variation has not been investigated, but it seems likely that the hexaploid, octoploid and hexdecaploid numbers represent natural taxa, the dodecaploid may be an occasional autotriploid of the octoploid, whereas the aneuploid numbers are likely to have derived from occasional hybridization or meiotic disturbances of various kind, surviving mainly because of the high degree of vegetative reproduction of the genus.

It seems evident that although a large number of species and varieties have been described from the genus *Phragmites* Adanson, most of these taxa are only local variations or modifications of little taxonomic significance, as pointed out by CLAYTON (1967). These names have been listed most recently by CONERT (1961). CLAYTON (1967) accepted only three species and two subspecies, i. e. *P. communis* Trin. subsp. *communis* and subsp. *maximus* (Forsskal) Clayton, *P. karka* (Retz.) Trin. and *P. mauritianus* Kunth, later (CLAYTON, 1968) changing the first into *P. australis* (Cav.) Trin. subsp. *australis* and subsp. *altissimus* (Bentham) Clayton. Although no chromosome information is available from Australian material of *Phragmites,* we follow CLAYTON's conclusion that the most common taxon of the genus actually is identical to the plant described from near Port Jackson in Australia by CAVANILLES in 1799 (cf. CLAYTON, 1968). However, we want to join issue with his subdivision of this species, since we regard it as doubtful that his (1967) subsp. *maximus* and (1968) subsp. *altissimus* are identical or even interfertile with each other and the subsp. *australis.* We are also convinced that the American race ought to have been accepted as a subspecies in its own right (cf. LÖVE & LÖVE, 1954), and an eastern Asiatic major race is also identifiable.

Our comparison between our plant from the Sierra de Cazorla and the coast of southern Spain and the description of *Arundo altissima* by BENTHAM (1826) has convinced us that these plants are identical and, thus, hexaploid. It is a grass with obtuse to tridenticulate narrowly elliptic-oblong upper glume and leaves that are generally 10-20 mm. wide and thus narrower than those of the octoploid taxon which has leaves 15-25 mm. wide. The tips of the leaves of the southern Spanish plants are distinctly attenuate, and it gives the impression of a somewhat lower growth when large populations

are being observed, and the panicle is shorter and less dense. On the French Riviera, North Africa, much of the eastern Mediterranean coasts and at least the western coasts of the Black Sea we have observed both the octoploid boreal species and the distinctly larger Mediterranean reed, which CHRTEK & HADAC (1970) reported also from Iraq. This is the plant that FORSSKAL (1775) named *Arundo maxima* and DELILE (1813) renamed *A. isiaca*. It is our impression that this taxon, which has leaves that are 15-30 mm. wide and has a tall culm and a panicle that frequently is more than 30 cm. long, is identical with the 96-chromosome *Phragmites*. Therefore, we want to disagree with CLAYTON (1968) when he claims the name *A. maxima* to be dubious and identifies the larger reed of FORSSKAL (1775) with the narrower reed of BENTHAM (1826).

Therefore, we are of the opinion that in the genus *Phragmites* at least five species ought to be recognized, i. e. the hexaploid *P. altissimus* (Bentham) Mabille, the octoploid *P. australis* (Cav.) Trin., the hexdecaploid *P. maximus* (Forsskal) Ciov. as well as the hexaploid subtropical-tropical Asiatic *P. karka* (Retz.) Trin. and the tropical African and Mascarene *P. mauritianus* Kunth.

Although we have counted only the hexaploid number in the material from the Sierra de Cazorla, which by a deplorable error was misidentified with *P. mauritianus* by LÖVE & LÖVE (1969), we have seen the octoploid plant from more northern parts of Spain and the hexdecaploid species from the coast of the Mediterranean close to France. When growing together or in adjacent areas, it is likely that all these species may be able to hybridize, as is perhaps documented by the occurrence of aneuploid chromosome numbers, but although such hybrids may survive thanks to vegetative reproduction, they are certainly highly sterile as is even the octoploid species in northern region (BJÖRK, 1967).

Molinia coerulea (L.) Moench

Voucher: Provincia de Jaén: Sierra de Cazorla; N. 0156. $2n = 36$.

A confirmation of eight previous reports from various parts of central and northern Europe (cf. LÖVE & LÖVE, 1961; BOLKHOVSKIKH & al., 1969).

Oryzopsis paradoxa (L.) Nutt.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 086, N. 0104. $2n = 24$.

A frequent grass in the region concerned. The chromosome number is a

confirmation of earlier reports from cultivated material by JOHNSON (1945) and from wild populations from southern France by LITARDIERE (1950).

Nardus stricta L.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0515. *2n = 26.*

This at least partially apomictic species (RYCHLEWSKI, 1967) is known to have occasionally somewhat variable chromosome numbers, although almost all authors have reported the exact number 2n = 26 from various parts of Europe and eastern North America.

Melica minuta L. subsp. **major** (Parl.) Trabut

Voucher: Provincia de Teruel: Sierra de Albarracín, San Felipe; N. 0447. *2n = 18.*

This is a first report of the chromosome number of this southwest European race of this Mediterranean species and confirms an earlier report for the subsp. *minuta* from southern France (DOULAT, 1943).

Glyceria plicata Fries

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0532. *2n = 40.*

A confirmation of several previous reports from Europe and America.

Glyceria declinata Bréb.

Voucher: Provincia de Cuenca: Tragacete; N. 0404. *2n = 20.*

A confirmation of numerous previous reports for this native western European species.

Sesleria argentea Savi

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0300. *2n = 28.*

A confirmation of previous reports, by AVDULOV (1931) and GUINOCHET & LOGEOIS (1962), of the tetraploid chromosome number typical of this western Mediterranean species. Although DEYL (1946) observed some differences from the typical race in his scanty Spanish material, these were perhaps

only modifications induced by very early flowering, since our plants seemed to be in no way different from the typical Italian populations which the senior author has observed in the field and herbarium from between Lucca and Pisa.

Festuca paniculata (L.) Schinz & Thell. var. **baetica** (Hackel) Maire & Weiller

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0429. $2n = 14$.

Apparently a first report of the chromosome number of this variety, confirming numerous previous reports for the typical race of this southern European grass.

Festuca uechtrichtziana Wiesb.

Voucher: Provincia de Jaén: Sierra de Cazorla; moist meadow near the river; N. 051. $2n = 28$.

A confirmation of several earlier reports for this temperate and southern European tetraploid representative of the collective taxon *F. elatior* L. The tetraploid is frequently confused with the hexaploid *F. arundinacea* Schreber of which is sometimes incorrectly grouped as a variety *glaucescens* Boiss., but very rarely with the diploid *F. pratensis* Hudson, which seems to be more northern in its distribution.

Lolium perenne L. subsp. **perenne**

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0208. $2n = 14$.

Lolium perenne L. subsp. **rigidum** (Gaudin) Löve, Löve & Sušnik

Voucher: Provincia de Cuenca: Serranía de Cuenca, 10 km. from Tragacete; N. 0459. $2n = 14$.

Numerous authors have reported the diploid chromosome number for these and other races of *L. perenne*. Several observers have also demonstrated the complete miscibility of these taxa, which therefore must be regarded as subspecific races only of the variable species *L. perenne* L. (Löve, Löve & Sušnik, 1974).

Poa annua L.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0500. $2n = 28$.

A confirmation of a count previously reported by more than two scores of authors on material from various parts of the world.

Poa ligulata Boiss. var. **paui** (Font-Quer) Maire

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0279. $2n = 14$.

This is the first report of the chromosome number of this Mediterranean grass species and also the first report for this rather weak Spanish race which does not seem to warrant a classification higher than that of a local race, or variety.

Poa trivialis L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Quesada; N. 0315. Provincia de Cuenca: Tragacete; N. 0417. $2n = 14$.

A confirmation of numerous previous reports from various places.

Dactylis glomerata L. subsp. **hispanica** (Roth) Nyman

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0193. $2n = 28$.

A confirmation of previous reports for this race of the widespread tetraploid Eurasiatic species.

Bromus tectorum L.

Voucher: Provincia de Jaén: Sierra de Cazorla; N. 0391. $2n = 14$.

A confirmation of numerous reports from other regions.

Bromus diandrus Roth

Voucher: Provincia de Jaén: roadsides between Cazorla and Peal de Becerro; N. 0346. $2n = 56$.

A confirmation of previous reports from elsewhere, frequently under the synonym *B. rigidus* Roth. subsp. *gussonei* (Parl.) Maire.

Bromus hordeaceus L. em. Hyl.

Voucher: Provincia de Jaén: roadsides between Cazorla and Peal de Becerro; N. 0348. *2n = 28.*

A confirmation of the tetraploid number for this widespread species as reported by numerous previous authors. According to HYLANDER (1945), the name here used is the one to be adopted for the synonymous *B. mollis* L.

Elymus repens (L.) Gould

Voucher: Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0223. *2n = 42.*

A confirmation of several previous reports for this weed at the margin of cultivated fields (GALIANO & HEYWOOD, 1960), formerly placed in the then very collective and unnatural genus *Agropyron.*

Helictotrichon filifolium (Lag.) Henrard

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0102. *2n = 70.*

This taxon, which is listed from the province of Jaén by GALIANO & HEYWOOD (1960) as *Avena filifolia* Lag., was transferred to the genus *Helictotrichon* Bess. by HENRARD (1940); it belongs to the subgenus *Helictotrichon,* which includes eight species according to HOLUB (1958, 1962). Our count of the decaploid number 2n = 70 differs from reports of the dodecaploid number 2n = 84 from one other Spanish locality by GERVAIS (1968, 1972, 1973). Our material is glabrous and, thus, referable to the var. *glabra* described by BOISSIER (1844) under *A. filifolia* Lag., which is of doubtful significance.

Holcus mollis L.

Voucher: Provincia de Jaén: roadsides between Cazorla and Peal de Becerro; N. 0347. *2n = 28.*

A confirmation of a frequently reported number. This species is rare in

the Cazorla area and was not included in the list by GALIANO & HEYWOOD (1960).

Polypogon semiverticillatum (Forsskal) Hyl.

Voucher: Provincia de Jaén: roadsides between Cazorla and Peal de Becerro; N. 0344. $2n = 28$.

A confirmation of previous reports of the tetraploid chromosome number of this species, which by GALIANO & HEYWOOD (1960) is listed from the Jaén province as *Agrostis semiverticillata* (Forsskal) C. Chr.

Alopecurus arundinaceus Poiret

Voucher: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0402. $2n = 28$.

A confirmation of the tetraploid number for this species, which by GALIANO & HEYWOOD (1960) is regarded as the subsp. *nigricans* (Hornem.) Hartman of *A. pratensis* L. According to HYLANDER (1953), it is mainly a maritime or coastal taxon in Scandinavia, whereas in these southern mountains it is a plant of moist pastures as it is also in North Africa.

Alopecurus myosuroides Hudson

Voucher: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0407. $2n = 14$.

A confirmation of a frequently reported number.

Phalaris coerulescens Desf.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0210. $2n = 42$.

This species belongs to the *P. paradoxa* L. complex, which is indigenous in the Mediterranean region but introduced as a weed in other parts of the world. Both taxa have been cytologically studied by several authors using Botanical Garden material, and most reports give the diploid number $2n = 14$ for both species. Since this report of the hexaploid number for plants that may have been introduced into the area shows a considerable deviation from previous reports, it ought to be accepted with the same caution as the diploid

number until a thorough and critical biosystematic study of the complex has been performed.

Anthoxanthum aristatum Boiss. & Reuter

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0246. *2n = 10.*

A confirmation of numerous reports of the diploid number for this annual southwest European and North African lowland species which is closely related to the perennial, diploid, arctic-alpine *A. nipponicum* Honda (Löve & Löve, 1968) and the perennial tetraploid *A. odoratum* L. (K. Jones, 1964).

CYPERACEAE

Schoenoplectus lacustris (L.) Palla subsp. **lacustris**

Voucher: Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0218. *2n = 42.*

A confirmation of several reports from northern and central Europe for the typical and other races of the species.

Eleocharis acicularis (L.) Roem. & Schult.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0528. *2n = 20.*

A confirmation of numerous reports from other parts of Eurasia and North America for this circumboreal species.

Schoenus nigricans L.

Voucher: Provincia de Jaén: Sierra de Cazorla; N. 079. *2n = 54.*

This is the same number as previously reported by Rodrigues (1953) from Portugal and Mori (1957) from Italy. It is likely that the number 2n = 44 given by Davies (1956a, 1956b) from Britain has been a too low estimate, since the chromosomes of this taxon tend to be much crowded at metaphase and so are difficult to count exactly in but the best preparations.

Carex hallerana Asso

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0433. *2n = 54.*

In addition to the number 2n = 54 for this species, first published by KJELLQVIST & LÖVE (1963), W. DIETRICH (1964, and in LÖVE, 1972) has reported 2n = 50 and 2n = 52 respectively from other parts of the southern European area of the taxon. It is apparent that this is one of the rather many *Carex* species in which minor variations in chromosome number occur regularly without any major morphological effect, as pointed out by FAULKNER (1972) and contrary to the claim of their rare occurrence by LÖVE, LÖVE & RAYMOND (1957). Only detailed and extensive investigations will, however, reveal if these numerical variations are met with at random in any population or if they are population differences with distinct areas of distribution.

Carex asturica Boiss.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0103. *2n = 46.*

A number previously published by KJELLQVIST & LÖVE (1963) for this apparently endemic Iberian taxon. Since this locality is far from the known area of the species, LAÍNZ (1964) has cautioned against the possibility of a misidentification.

Carex pendula Hudson

Voucher: Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0217. *2n = 58.*

The number 2n = 58 has previously been reported by HEILBORN (1939) and KJELLQVIST & LÖVE (1963) for this species, the latter based on the same collection as here listed, whereas TANAKA (1942b, 1948) reported 2n = 60, also from European material.

Carex distans L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0188. *2n = 74.*

This is the number previously reported by HEILBORN (1924), DAVIES (1956a, 1956b) and KJELLQVIST & LÖVE (1963). However, W. DIETRICH (in

LÖVE, 1972) counted the numbers 2n = 69, 70, 72, 73, thus indicating considerable variation of the chromosome number at least within some of the populations of the species.

Carex divulsa Stokes

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0247. Provincia de Teruel: Sierra de Albarracín, Sierra Alta; N. 0522. *2n = 58.*

Although most authors have reported the chromosome number 2n = 58 in material from various sources, STUDER (in HESS, LANDOLT & HIRZEL, 1967) found both 2n = 56 and 2n = 58 in Swiss material, and W. DIETRICH (in LÖVE, 1972) reported 2n = 56 in an Italian population.

Carex mairei Cosson & Germ.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0140. *2n = 68.*

The chromosome number 2n = 68 for this southwest European species has been reported previously by DAVIES (1955) and KJELLQVIST & LÖVE (1963) from Lumbreras and Vadillo, respectively, in southern Spain. The slightly higher number 2n = 70 counted by W. DIETRICH (in LÖVE, 1972) from Val Seborino in northern Italy may indicate that a small numerical variation also occurs in this taxon.

Carex nevadensis Boiss. & Reuter

Voucher: Provincia de Teruel: Sierra de Albarracín, San Felipe; N. 0440. *2n = 68.*

The first and only report of this chromosome number for this endemic Iberian taxon, as previously published by KJELLQVIST & LÖVE (1963).

Carex cuspidata Host

Voucher: Provincia de Cuenca: 10 km. south of Tragacete; N. 0460. *2n = 90.*

This number was reported by KJELLQVIST & LÖVE (1963) for the species *C. flacca* Schreb. for which several authors have determined 2n = 76. Later studies have revealed that our plants may be better referred to the species

C. cuspidata Host, which is frequently regarded as a subspecies only of *C. flacca,* distributed in southern Europe.

Carex hispida Willd.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 087; and Pantano del Tranco; N. 0142. *2n = 38.*

The first report of the chromosome number for this species was by KJELLQVIST & LÖVE (1963), who gave the number 2n = 42 based on the above collection from Guadahornillos. When the latter collection had revealed that this might have been a too high number, we restudied the material and found that both collections have 2n = 38. We believe that this is the correct number for this species, since it is exactly half the number reported for the closely related *C. flacca* Schreb. from at least ten different populations, and the same number as LANDOLT (in HESS, LANDOLT & HIRZEL, 1967) reported for an apparently exceptional individual of *C. flacca* from Switzerland.

Carex divisa Hudson

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0248. *2n = 60.* Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0189. *2n = 62.*

The former number was reported by KJELLQVIST & LÖVE (1963) whereas the latter indicates the occurrence of some variation in number within the species. These are the only reports so far published for the species, because we believe that the number 2n = 14 reported by TARNAVSCHI (1948) from seeds from Montpellier in France must have been counted on material which did not belong to this species and probably not even to the genus *Carex.*

Carex paniculata L.

Voucher: Provincia de Cuenca: 30 km. from Tragacete on the road towards Cañete; N. 0478. *2n = 60.*

As reviewed by KJELLQVIST & LÖVE (1963), other investigators have reported this number for this species but also 2n = 62 and 2n = 64. The number 2n = 62 has recently been reported also by W. DIETRICH (in LÖVE, 1972) from Germany, and there seems to be a reason to believe that all three numbers may be equally frequent in various populations of the species.

Carex cuprina (Sandor) Nendtvich

Voucher: Provincia de Jaén: Sierra de Cazorla, near El Tranco; N. 0220. *2n = 60.*

This number was reported under the name *C. lamprophysa* Sam. by KJELLQVIST & LÖVE (1963), confirming earlier reports by TANAKA (1942a, 1948), under the name *C. otrubae* Podp. The somewhat deviating number 2n = 58 has recently been published by W. DIETRICH (in LÖVE, 1972) from Italy. The nomenclature of this taxon was discussed and clarified by HOLUB (1963), and SOÓ (1972).

Carex leporina L.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0531. *2n = 64.*

Chromosome numbers between 2n = 64 and 68 have been observed by various students of populations of this species, as reviewed by KJELLQVIST & LÖVE (1963) and LÖVE & LÖVE (1961). The lowest number has later been reported by LÖVKVIST (in WEIMARCK, 1963) for plants from southern Sweden, and by W. DIETRICH (1964) for German populations of the var. *argyroglochin* (Hornem.) Koch.

Carex distachya Desf.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0216. *2n = 74.*

A rather rare species in humid meadows near lakes in the region, a plant of mainly western Mediterranean distribution belonging to the section *Schiedeanae* of the subgenus *Indocarex*. This observation has previously been reported by KJELLQVIST & LÖVE (1963).

ARACEAE

Arum alpinum Schott & Kotschy subsp. **danicum** (Prime) Terpó

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 053. *2n = 28.*

According to GALIANO & HEYWOOD (1960), the only species of the genus

Arum met with in the province of Jaén is *A. italicum* Miller. This Mediterranean and western European species is characterized by the stalk of the inflorescence always being shorter than or only half as long as the petioles of the leaves (RIEDL, 1967). It is a larger plant than other species of the *A. maculatum* L. group in western Europe, although this is a characteristic affected by climate and therefore doubtful when Mediterranean populations are considered, and so is also the wintergreen condition of the leaves and several other characteristics mentioned by PRIME (1961). In material studied by us from various places outside Spain there seems to be a certain weight in the relatively greater space occupied by the reproductive organs, and the ring of ovaries of typical *A. italicum* is always distinctly longer than broad, whereas in the other species of the complex it is either shorter or only as long as broad. The most significant biological characteristics of the species is, however, the fact that it is a dodecaploid taxon with 2n = 84 chromosomes, as thoroughly demonstrated by MAUDE (1940), LOVIS (1954), PRIME (1954), G. E. JONES (1957), BEURET (1971, 1972), MARCHI (1971) and BEDALOV (in LÖVE, 1973). We have reason to doubt the correctness of the taxonomical determination of the material from the Balearic Islands which was reported to have 2n = 28 chromosomes by DAHLGREN, KARLSSON & LASSEN (1971) and NILSSON & LASSEN (1971), and believe that their taxon must have been similar to ours collected in the Cazorla Sierras, which also did not fit the description of *A. italicum*.

When we collected *Arum* in the Nava de San Pedro in the Sierra de Cazorla in the spring of 1962, we were not aware of that only the species *A. italicum* had been reported from this region. Since ours plants had unspotted leaves, more than four rings of sterile flowers above the male flowers, and spatha that was only about 2,5 times as long as the spadix, we concluded that they must be identical to the taxon called *A. immaculatum* by LÖVE & LÖVE (1961) known to us from Denmark and Germany. This seemed to be confirmed later, when we found that they were tetraploid with 2n = 28 chromosomes, a number previously reported for this taxon from Denmark (HAGERUP, 1944, and in LÖVE & LÖVE, 1942), Hungary (TERPÓ, 1971, 1973), Italy (BEURET, 1971, 1972), Romania (DIHORU, 1970) and Poland (WCISLO, 1970). We believe that the Balearic plants mentioned above also ought to have been identified with this taxon, and that the number 2n = c. 32 given by SCHMUCKER (1925) from German material has been an inexact counting of the tetraploid number.

Although we are in no doubt that the plants from southern Spain are identical to the taxon *immaculatum*, a name which LÖVE & LÖVE (1961)

attributed to REICHENBACH (1830) on the authority of JANCHEN (1956-1960), it has been correctly pointed out by RIEDL (1967) that when the name was first published, it was meant to be that of a variety only. It was validated at the species level by SCHOTT (1860), but since the plant certainly is identical to the populations from Poland named *A. besserianum* by SCHOTT (1858), the latter antedates the former. It is, however, evident from studies on herbarium material that the plant in question and the taxon described as *A. alpinum* Schott & Kotschy in SCHOTT (1851) from the mountains of southeastern Europe must be interfertile and tetraploid and therefore only races of the same biological species. Therefore, the correct name of the tetraploid plant with unspotted leaves, more than four rings of staminodal flowers, and a spatha only about twice as long as the spadix, must be named *A. alpinum* Schott & Kotschy.

The typical race subsp. *alpinum* of *A. alpinum* is a plant of the Carpathians, eastern Alps and some of the central Yugoslavian mountains. The Spanish plants studied by us, however, belongs to the race of lowlands in Denmark, other parts of central Europe at least south to Croatia in the east and the Balearic Islands and southern Spain in the west. Though cytologically identical, the lowland plant differs from the typical race in that while the sterile flowers in the latter are in numerous rings, those of the lowland taxon form only four to six such rings, and the spatha of the alpine plant is usually only twice as long as the spadix and narrower than that of the lowland race. Therefore, we regard it as safe to conclude that the lowland taxon is a well-defined major geographical race and accept for it the subspecific name *A. alpinum* subsp. *danicum* (Prime) Terpó, as validated by TERPÓ (1973).

JUNCACEAE

Luzula campestris (L.) DC.

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 0245. Provincia de Teruel: Sierra de Albarracín; N. 0493. $2n = 12$.

A confirmation of numerous reports of this low diploid number for this species in its strict sense.

Luzula multiflora (Ehrh.) Lej.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0514. $2n = 36$.

A confirmation of a frequently reported number for this taxon in the restricted sense.

Luzula forsteri (Sm.) DC.

Voucher: Provincia de Teruel: Sierra de Albarracín, San Felipe; N. 0451. *2n = 24.*

A confirmation of earlier reports from other areas.

ASPHODELACEAE

Asphodelus cerasiferus J. Gay var. **marianus** Pau

Voucher: Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores, in a meadow; N. 029. *2n = 28.*

A confirmation of reports by LAMBERT (1969) and ZAKHARJEVA & MAKUSHENKO (in BOLKHOVSKIKH & al., 1969).

Asphodelus microcarpus Viv.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0553. *2n = 28.*

A confirmation of recent reports by DAHLGREN, KARLSSON & LASSEN (1971) and NILSSON & LASSEN (1971) of the tetraploid chromosome number of this Mediterranean species.

APHYLLANTHACEAE

Aphyllanthes monspeliensis L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Arroyo Maillar; N. 044. *2n = 32.*

This seems to be the first chromosome number report for this monotypic genus and family of the western Mediterranean region.

COLCHICACEAE

Merendera bulbocodium Ramond

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0122, and Guadahornillos; N. 0308. Provincia de Teruel: Sierra de Albarracín; N. 0547. $2n = 54 + 0 - 6$ *B*.

The only previous records of the chromosome number of this species seem to be 2n = 60 reported by MILLER (1930) from cultivated material and by FERNANDES (1950) from some localities in Portugal. Both had difficulties in counting the small and many chromosomes which in the fixations used seemed to tend to stick together. We also encountered some such difficulties, but observed that the chromosome number may vary slightly even within the same individual, apparently because of the occurrence of some small B-chromosomes or fragments. Although the lowest number counted was the exactly hexaploid 2n = 54, the additional chromosomes could vary between none and six.

LILIACEAE

Gagea villosa (M. B.) Duby subsp. **hervieri** (Degen ex Hervier) Löve & Kjellqvist

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0119. $2n = 48$.

The chromosome number of the typical race of *G. villosa* was reported as 2n = 48 by WESTERGAARD in a letter to TISCHLER (1938), but never formally published. It was probably determined on Danish material. The population studied by us from Cabañas was also found to have 2n = 48 chromosomes. It is referable to the Iberian race subsp. *hervieri* Degen listed only from Sierra de Segura by GALIANO & HEYWOOD (1960) under the synonymic species name *G. arvensis* (Pers.) Dumort. Under the older specific name *G. villosa,* its name ought to be subsp. *hervieri* (Degen ex Hervier) Löve & Kjellqvist, comb. nov., based on *G. arvensis* subsp. *hervieri* Degen ex Hervier, *Bull. Acad. Intern. Geogr. Bot.,* 1905: 163 (1905).

Gagea foliosa (J. & C. Presl) J. A. & J. H. Schultes

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0120, N. 0121. $2n = 36$.

The hexaploid chromosome number 2n = 36 seems to be the first report of a chromosome number of this southwestern European species.

Fritillaria hispanica Boiss. & Reuter

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0110. $2n = 24$.

A confirmation of a previous count from a cultivated plant by DARLINGTON (1936).

Tulipa australis Link

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 05. Provincia de Teruel: Sierra de Albarracín; N. 0535. $2n = 24$.

A confirmation of previous counts by several authors.

SCILLACEAE

Scilla reverchonii Degen & Hervier

Voucher: Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores; N. 027. $2n = 16$.

This very rare plant (cf. GALIANO & HEYWOOD, 1960) was collected in a meadow. Its chromosome number does not seem to have been reported previously.

Ornithogalum narbonense L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0262. $2n = 54$.

This plant seems to be very rare within this region (cf. GALIANO & HEYWOOD, 1960), although it was represented by a large population in this locality. It belongs to the *O. pyramidale* group, and has been reported to include not only taxa with 2n = 54 chromosomes, as we found to be cha-

racteristic of its typical race as did also CHIARUGI (1950) and NEVES (1952), but also 2n = 14 and 16 as reported from horticultural material by HEITZ (1926), SPRUMONT (1928), GEITLER (1929) and DELONE (1925, 1926). We believe it is safe to conclude that these diploid numbers have been determined on incorrectly classified material so they ought to be deleted from chromosome number references.

Ornithogalum baeticum Boiss.

Voucher: Provincia de Jaén: Sierra de Cazorla, Laguna de Valdeazores; N. 025. *2n = 18.*

This is a common plant in wet meadows in the area. Its diploid chromosome number has not been reported previously, although it is possible that earlier reports for *O. umbellatum* L. from the Mediterranean region actually have been based on this taxon. *O. umbellatum* s. str. seems to be a decaploid species with 2n = 90 chromosomes, as recently shown on Italian material by GARBARI & TORNADORE (1971).

Urginea maritima (L.) Baker

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0161. *2n = 40.*

This species of the Mediterranean region is apparently a collective unit in need of a critical taxonomical revision, since several authors studying mainly Italian material have found it to include taxa with chromosome numbers as different as 2n = 20, 40 and 60 and, more rarely, the apparently hybrid number 2n = 30. The tetraploid number 2n = 40 seems to be characteristic of the most widely distributed taxon since it has been reported from the Canary Islands in the west (LARSEN, 1960) to Israel in the east (WAISEL, 1962). This taxon seems also to be the species in its strict sense, since *Scilla maritima* of LINNAEUS (1753) could be typified by *Scilla hispanica* of CLUSIUS and is reported as growing in Spain, Sicily and Syria, all areas where the tetraploid taxon either has been observed or is likely to occur.

Muscari atlanticum Boiss. & Reuter

Voucher: Provincia de Jaén: Sierra de Cazorla, Nava de San Pedro; N. 062; and roadsides between Cazorla and Peal de Becerro; N. 0353. *2n = 54.*

This seems to be the first report of the chromosome number of this

southwest European species of the *M. racemosum* complex, although it is possible that the 54-chromosome plants named as the latter by WUNDERLICH (1936, 1937) and GUINOCHET & LOGEOIS (1962) actually belonged to *M. atlanticum*. The group, which is in a need of a thorough biosystematic revision, is represented only by this species in the province of Jaén (GALIANO & HEYWOOD, 1960).

Leopoldia comosa (L.) Parl.

Voucher: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0125. $2n = 18$.

This is a confirmation of almost a score of reports of the diploid chromosome number for this taxon, which until recently has been included in the then collective genus *Muscari* instead of in the restricted and more natural genus *Leopoldia* (cf. GALIANO & HEYWOOD, 1960; GARBARI, 1969).

Dipcadi serotinum (L.) Medik.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 090; and Pantano del Tranco; N. 0212. $2n = 8$.

Although RESENDE & FRANCA (1946) observed up to sixteen B-chromosomes in their material of this Mediterranean species, and FERNANDES, GARCIA & FERNANDES (1948) also observed B-chromosomes in the populations they studied, our two populations were free from additional chromosomes. The diploid number 2n = 8 is the same as reported by SATO (1942, 1943), LEVAN (1944), GADELLA, KLIPHUIS & MENNEGA (1966) and VALDÉS (1970), whereas the number 2n = 64-68 given for this species from Sahara by REESE (1957), and 2n = 16 and 32 mentioned by GADELLA, KLIPHUIS & MENNEGA (1966) from eastern Spain, must have been counted on endoploid cells or on material belonging to some other species.

ASPARAGACEAE

Polygonatum odoratum (Miller) Druce

Voucher: Provincia de Jaén: Sierra de Cazorla, Barranco del río Guadalentín, in a valley with a *Populus* plantation; N. 063; and at Guadahornillos; N. 096. Provincia de Teruel: Sierra de Albarracín; N. 0430. $2n = 20$.

A confirmation of a number reported by numerous authors studying populations from all parts of the distribution area of this species. It was not mentioned from the province of Jaén by GALIANO & HEYWOOD (1960).

SMILACEAE

Smilax aspera L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0164. *2n = 32.*

The tetraploid chromosome number 2n = 32 has previously been reported for this species by CARVALHO (1948) studying Portuguese material. We found it to be relatively abundant in association with *Quercus ilex* L., as mentioned by GALIANO & HEYWOOD (1960).

ALLIACEAE

Allium roseum L.

Voucher: Provincia de Jaén: Sierra de Cazorla, roadside about one km. north of Cazorla; N. 0184. *2n = 32.*

The tetraploid number 2n = 32 is a confirmation of reports by LEVAN (1931), CAPPELLETTI (1931), J. DIETRICH (1969), DELAY (1970) and DAHLGREN, KARLSSON & LASSEN (1971), whereas the number 2n = 28 reported by BORGEN (1969) from the Canary Islands needs verification. The species is very frequent in the area around Cazorla, especially in localities rich in ruderal vegetation, and it appears to be very variable in certain morphological characters. The population studied by us seems to belong to the var. *carneum* (Ten.) P. Coutinho, with an umbel of only a few flowers and some bulbils at the base and flower somewhat darker than the typical race, although other populations seen elsewhere in the area may belong to the typical var. *roseum*. This may perhaps indicate that we have to do with two or more introductions that have mixed after becoming established, although there may still be some doubt as to the geographical and evolutionary significance of the apparently western Mediterranean var. *roseum,* and its exact distribution remains obscure.

Allium ampeloprasum L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0213. *2n = 32.*

Despite of a recent revision of the Israeli populations of this species by KOLLMANN (1971a, 1971b) a satisfactory classification of the taxa with the chromosome numbers 2n = 16, 24, 32, 40 and 48 still has not been proposed. KOLLMANN (l. c.) accepts 2n = 32, 40 and 48 as characteristic for the subsp. *ampeloprasum* which, therefore, still is genetically heterogeneous. Our material from Pantano del Tranco included only the tetraploid number, but the population was genetically heterogeneous with red-flowered and white-flowered specimens. We are inclined to agree with KOLLMANN (1971a) that these variations in flower color are of no taxonomical importance in this species, although the white-flowered ones have been described as the variety *leucanthum* C. Koch, but their occurrence together in a population is a reliable indication of its genetical heterogeneity.

Allium polyanthum Roem. & Schult.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0296 & N. 0298. *2n = 32.*

This seems to be the first report of the chromosome number of this species, which in the locality of collection occurs mainly in somewhat moist pastures.

Allium moly L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 089. *2n = 14.*

A confirmation of several reports of the diploid chromosome number for this species, which is relatively frequent in the area.

AMARYLLIDACEAE

Narcissus bulbocodium L.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0517. *2n = 14.*

Although euploid and aneuploid chromosome numbers up to 2n = 45

have been reported for his taxon by several authors, frequently from garden material, it looks as if the diploid number 2n = 14 would be typical of the species in its strict sense.

Narcissus pallidulus Graells

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0530. *2n = 14.*

This is apparently the first chromosome report for this species, which is closely related to *N. triandrus* L. and perhaps only a race of it.

Narcissus rupicola Duf. subsp. **pedunculata** Laínz ex Meikle

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 06 & N. 0118; and Guadahornillos; N. 0307. *2n = 14.*

This is a confirmation of a recent report by FERNÁNDEZ-CASAS, LAÍNZ & RUÍZ REJÓN (1973) for this subespecies, under the name *N. cuatrecasii* Fernández-Casas, Laínz & Ruíz Rejón. The same diploid number has been reported for the subsp. *rupicola* by FERNANDES (1950 and earlier).

IRIDACEAE

Romulea clusiana (Lange) Nyman

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0114. *2n = 36.*

This is the first report of the chromosome number of this species, which seems to be rare in the area (GALIANO & HEYWOOD, 1960).

Gladiolus reuteri Boiss.

Voucher: Provincia de Jaén: Sierra de Cazorla, Torre del Vinagre; N. 0257. *2n = 120.*

Although GALIANO & HEYWOOD (1960) reported the widespread Mediterranean species *G. illyricus* C. Koch from the province of Jaén, our material belongs to the southern Iberian species *G. reuteri.* It has frequently been regarded as a variety only of the former, which in the strict sense has a more northern distribution in Spain and Portugal (COUTINHO, 1939). In addition

to several morphological distinctions, the two species differ in chromosome number, since *G. illyricus* is a tetraploid with 2n = 60 chromosomes, as shown by FERNANDES, GARCIA & FERNANDES (1948), FERNANDES (1950), and NILSSON & LASSEN (1971), whereas *G. reuteri* is an octoploid with 2n = 120, as first demonstrated by FERNANDES & QUEIRÓS (1971) and confirmed by us. Hybrids between the species are apparently met with, at least in cultivation, as shown by the report of 2n = 90 by BAMFORD (1941).

Iris germanica L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0215. *2n = 36.*

The chromosome number 2n = 36 of this introduced or subspontaneous taxon (GALIANO & HEYWOOD, 1960) is a confirmation of several earlier reports from populations suspected to be hybrid derivatives. The number for the species in its strict sense is probably 2n = 44.

Iris pseudacorus L.

Voucher: Provincia de Cuenca: Serranía de Cuenca, Tragacete; N. 0400. *2n = 34.*

Although some other chromosome numbers have been reported for possible hybrid populations identified as this taxon by various authors, most students agree that in its strict sense the species is characterized by the chromosome number 2n = 34, as we found to be typical of our Spanish material.

Iris xiphium L.

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 0306. *2n = 34.*

A confirmation of previous reports for this species by SIMONET (1953 and earlier), and FERNANDES, GARCIA & FERNANDES (1948). It is relatively frequent in humid situations in the region.

ORCHIDACEAE

Cephalanthera longifolia (L.) Fritsch

Voucher: Provincia de Jaén: Sierra de Cazorla, Guadahornillos; N. 095. *2n = 32.*

According to GALIANO & HEYWOOD (1960), this is a rare plant in the area, although our collection is at a new locality. We found it to have 2n = 32 chromosomes, which is the number previously reported from Scandinavia by AFZELIUS (1943) and HAGERUP (1947) and slightly lower than 2n = 34 counted by MEHRA & BAWA (1962) from the Himalayas of northern India.

Ophrys apifera Hudson

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0187. *2n = 36.*

Although GALIANO & HEYWOOD (1960) report five species of *Ophrys* from the province of Jaén, this is not one of them so we regard it as a new record. The chromosome number 2n = 36 is the same as previously reported by HEUSSER (1938), BARBER (1942), GADELLA & KLIPHUIS (1963) and KLIPHUIS (1963).

Ophrys lutea (Gouan) Cav.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0153. *2n = 36.*

This is a confirmation of a previous report by SHIMOYA & FERLAN (1952) from Portugal.

Vermeulenia papilionacea (L.) Löve & Löve

Voucher: Provincia de Jaén: Sierra de Cazorla, Valle de Valdeazores; N. 0306a. *2n = 32.*

A confirmation of the chromosome number 2n = 32 for this species, the generic segregation of which from *Orchis* was recently proposed by LÖVE & LÖVE (1972). The Spanish populations have been separated as the variety *grandiflora* described by BOISSIER (1842) under *Orchis papilionacea,* because of their somewhat larger flower, but since this characteristic varies also in other parts of the area that comprises the entire Mediterranean and

the Black Sea, we refrain from transferring the name until more has become known about the variability of the species as a whole.

Orchis coriophora L. subsp. **fragrans** (Poll.) G. Camus

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0165. *2n = 38.*

A confirmation of earlier reports of 2n = 38 for the subsp. *coriophora* from Denmark by HAGERUP (1938) and the Netherlands by VERMEULEN (1949). It is the first report of the chromosome number of the subsp. *fragans.*

Orchis mascula L.

Voucher: Provincia de Jaén: Sierra de Cazorla, El Chorro; N. 0127. Provincia de Teruel: Sierra de Albarracín; N. 0427. *2n = 42.*

This is a confirmation of numerous previous reports for the typical race from various parts of central and northern Europe.

Orchis morio L. subsp. **picta** (Lois.) Ascherson & Graebner

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0192. *2n = 36.*

Several authors have reported the number 2n = 36 for *O. morio* subsp. *morio,* and KLIPHUIS (1963) also observed the slightly deviating number 2n = 38. The subsp. *picta* has not been studied previously, although LÖVE & LÖVE (1961) refer to VERMEULEN (1949) in giving the number 2n = 36 also for this race. Actually, our specimens clearly belong to the variety *champagneuxii* (Barneoud) Guimar, which is the western race of the Mediterranean subspecies *picta,* characterized by a stiff habit and an inflorescence with a few pale flowers with a very short midlobe of the labellum.

Orchis ustulata L.

Voucher: Provincia de Teruel: Sierra de Albarracín; N. 0546. *2n = 42.*

This is a confirmation of reports from Denmark by HAGERUP (1938), from the Netherlands by VERMEULEN (1949), from Switzerland by HEUSSER (1938) and from Austria by DIANNELIDIS (1948, 1955).

Orchis patens Desf. subsp. **spitzelii** (Sauter) Löve & Kjellqvist

Voucher: Provincia de Jaén: Sierra de Cazorla, Pico Cabañas; N. 0113; and El Chorro; N. 0136. $2n = 42$.

This seems to be the first report of the chromosome number for any of the taxa of the subsection *Patentes* Nevski of the *Orchis* section *Platychilon* Nevski, which includes the variable and closely related taxa frequently named as the species *O. patens* Desf. and *O. spitzelii* Sauter. The Spanish alpine populations have long been known under the name *O. patens* Desf. var. *brevicornis* Reichenb. (cf. GALIANO & HEYWOOD, 1960), but PETTERSSON (1940) demonstrated that they are better regarded as short-spurred representatives of *O. spitzelii,* an observation confirmed more recently by NIESCHALK & NIESCHALK (1970), who found this taxon to be widespread in Spanish mountains.

Both the major taxa mentioned are morphologically variable and have been split up into geographically isolated races each of which distinguishable by aid of a cluster of minor characteristics. Since there is a reason to believe that all these races of the entire complex are interfertile, there seems to be a good deal to be said for the treatment of them all as varieties of a single species only, as done by Soó (1932). It is, however, relatively easy to group the complex into two major clusters which then may be classified into smaller groups that have been recognized at various levels in the past. Therefore, it is our opinion that the biological relationships of the collective taxon is best represented by the acceptance of a single species, *O. patens* Desf., with two subspecies, subsp. *patens* and subsp. *spitzelii* (Sauter) Löve & Kjellqvist, stat. nov., based on *Orchis spitzelii* Sauter, in Koch, *Synopsis*: 686 (1837). Both these subspecies include some local races the recognition of which as varieties is a matter of convenience.

Dactylorhiza traunsteineri (Sauter) Soó

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0143. $2n = 80$.

It is with some hesitation that we name this octoploid taxon as the species *D. traunsteineri,* since we are not aware of that it has been previously reported from Spain. However, it is not infrequent in other Mediterranean countries, and may well be the var. *maximum* Cuatr. of *D. incarnata* (L.) Soó mentioned by GALIANO & HEYWOOD (1960), because our first determination

was *D. incarnata* s. l. The chromosome number 2n = 80 is a confirmation of several previous reports from more northerly regions.

Aceras anthropophorum (L.) Aiton fil.

Voucher: Provincia de Jaén: Sierra de Cazorla, Pantano del Tranco; N. 0214. *2n = 42.*

A confirmation of the chromosome number 2n = 42 previously reported by some authors from other parts of Europe. This is apparently a rare species in the province of Jaén, since it was not observed by GALIANO & HEYWOOD (1960).

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