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Mediterranean plant karyological data – 34

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Mediterranean plant karyological data – 34/1

Contribution to the karyological knowledge of some representatives of the family *Asteraceae* in the Pyrenean flora, II

T. Garnatje, I. Pérez-Lorenzo, J. Vallès, S. Siljak-Yakovlev

Abstract

General distribution, localities, chromosome numbers, ploidy levels, and selected previous chromosome counts are provided for eight taxa belonging to the *Asteraceae* family growing in the Pyrenees.

Keywords: *Adenostyles*, *Carpesium*, *Centaurea*, chromosome number, distribution, *Lapsana*, *Leucanthemopsis*, *Pentanema*, ploidy level, *Senecio*, *Tanacetum*.

Introduction

When studying, as is the case in several current projects, the plants of the Alpine system, with particular emphasis on the Pyrenees, and one of the world's largest plant families, the *Asteraceae* or *Compositae*, acquiring information on chromosome numbers and ploidy levels is crucial. These data are fundamental for understanding the processes undergone by the species constituting the flora in these areas.

Following a paper published in this section last year (Garnatje & al. 2023), the aim of this study is to increase the current karyological datasets by providing additional information about chromosome numbers and ploidy levels of some taxa, some of them reported for the first time in populations of the Pyrenean area or, in one case, of all the Iberian Peninsula.

To verify previous or complementary counts, we have consulted the Chromosome counts database (https://taux.evolseq.net/CCDB_web/about, Rice & al. 2015), which includes the Index to chromosome numbers in *Asteraceae* database (https://togodb.biosciencedbc.jp/db/index_chr_num_asteraceae#en, Semple & Watanabe 2023), and the Chromosome database of the flora of the Catalan Countries (https://sites.google.com/view/cromocat/home?authuser=0, Simon & al. 2023). We checked all these databases on 22 November 2024.

All plants studied have been collected in the Catalan Pyrenees (Iberian Peninsula). Vouchers have been deposited in the herbarium BC, of the Botànical Institute of Barcelona. The information provided about their taxonomic status and general distribution area has been obtained in all cases from Plants of the World Online (POWO, https://powo.science.kew.org, accessed November 22, 2024) and Flora iberica (Devesa & al. 2014; Talavera & al. 2016; Benedí & al. 2019).

2032. ***Adenostyles alliariae*** (Gouan) Kern subsp. ***allariae*** — 2*n* = 2x = 38+1B (Fig. 1A).

Hs: Catalonia, Setcases, camí del refugi d'Ulldeter, alt. 2196 m, 42° 25' 11" N, 2° 15' 31" E, 19 Jul 2023, leg. *T. Garnatje (GR 823), P. Fernández & C. Atienza* (BC).

It is a perennial plant growing in Europe. In the Pyrenees, it grows between 800 and 2.300(-2.500) m a.s.l. This chromosome number found in a population on the south face of the mountain is in agreement with that of another Pyrenean Catalan population, located on the north face, and for which the presence of a B-chromosome was not reported (Garcia & al. 2013). It is also coincidental with all the other numerous counts performed in this taxon, two of which, from outside the Pyrenees, also indicate one B- chromosome (https://taux.evolseq.net/CCDB_web/home). This represents a diploid level based on a basic number, x = 19, which should be of polyploid origin. Contandriopoulos (1964) reported the same chromosome number for another mountain plant of the genus, *A. alpina* (L.) Bluff & Fingerh.

2033. ***Carpesium cernuum*** L. — 2*n* = 4x = 40 (Fig. 1B).

Hs: Catalonia, Rocabruna, Font de la Vila, alt. 947 m, 42° 20' 07.7" N, 2° 27' 08.5" E., 31 Aug 2023, leg. *T. Garnatje (GR 921b) & O. Hidalgo* (BC).

The range of this species extends from Europe to Japan and Borneo. It grows in the Pyrenees at altitudes of up to 1.000 m a.s.l.

All the counts reported for this species agree with the one here presented, and the number is the same, with very scarce deviations (2*n* = 36, 50, in addition to 40, in *C. abrotanoides* L., in practically all the genus (https://taux.evolseq.net/CCDB_web/ home). Only a putative record of the diploid level has been published for *C. nepalense* Less. (*n* = 10, Hsu 1970). According to the data consulted, this is the first report of the chromosome number of this species in the Pyrenees and in all the Iberian area.

2034. ***Centaurea nigra*** L. subsp. ***nigra*** — 2*n* = 2x = 22 (Fig. 1C).

Hs: Catalonia, Espinavell, pista de Setcases, alt. 1.547 m, 42° 23' 10.0" N, 2° 22' 02.0" E, 31 Aug 2023, leg. *T. Garnatje (GR 920d), O. Hidalgo & J. de Montaigne de Poncins* (BC).

It is a perennial species native from Europe, growing in the Pyrenees between 800 and 1.750(-2.225) m a.s.l.

The discoid capitula, bract morphology, and corolla size confirm the subspecies' status, ruling out a hybrid origin despite frequent crossbreeding with *C. jacea* L., a cohabiting species (Arnelas & al. 2018). Both 2*n* = 22 and 2*n* = 44 have been recorded as the chromosome number of *C. nigra* subsp. *nigra*, in some cases in the same area (Elkington &

Mitlefell 1972; Gardou 1972). This taxon had not received any chromosome count in the studied area to date (https://sites.google.com/view/ cromocat/home).

2035. ***Lapsana communis*** L. subsp. ***communis*** — 2*n* = 2x = 14 (Fig. 1D).

Hs: Catalonia, Llanars. La Bona Font, alt. 1.148 m, 42° 18' 30.3" N, 2° 20' 14.0" E, 17 Aug 2023, leg. *T. Garnatje (GR 884), O. Hidalgo, J. de Montaigne de Poncins & I. Pérez-Lorenzo* (BC).

It is an annual species native to Macaronesia, and to Europe, to Siberia and Iran. Only the typical subspecies is present in the Pyrenees up to 2.170 m a.s.l.

Three chromosome numbers have been reported for this taxon. In only one case, 2*n* = 12 (Pak & Bremer 1995), and in much more numerous cases, 2*n* = 14 and 2*n* = 16 (https://taux.evolseq.net/CCDB_web/home). The counts on Iberian material are divergent, with 2*n* = 16 (Luque & Díaz Lifante 1991), and *n* = 7 (Mejías 1986) and 2*n* = 14 (Fernandes & Queirós 1971), which could be added to 2*n* = 14 recorded in Southern France (Van Loon & al. 1971), all the latter ones agreeing with the present record. No reports from the studied area were available to date (https://sites.google.com/view/cromocat/home).

2036. ***Leucanthemopsis alpina*** (L.) Heywood subsp. ***alpina*** — 2*n* = 4x = 36 (Fig. 1E).

Hs: Catalonia, Setcases, camí del Costabona, alt. 2.215 m, 42° 24' 44.4" N, 2° 20' 31.3" E, 24 Aug 2023, leg. *T. Garnatje (GR 911) & J. Luque* (BC).

It is a perennial species growing in the alpine meadows of European's mountains. In the Pyrenees, it reaches 3.300 m a.s.l.

The material studied closely resembles the subspecies *alpina* (Tomasello & Oberprieler 2017), as the leaves exceed 20 mm and the green part of the involucre bracts shows some hairiness. However, the number of leaf segments range from 4 to 7, with noticeable hirsute leaves. A detailed analysis using nuclear markers is needed to determine if this accession represents a transition between *alpina* and *minima* subspecies, given the population's location in their contact zone.

Diploid, tetraploid and exaploidy levels (2*n* = 18, 36 and 54, respectively) have been detected in this taxon, (https://taux.evolseq.net/CCDB_web/home). According to Tomasello & Oberprieler (2017), diploid representatives of *L. alpina* are found in the western Alps, Corsica, the Carpathians, and the area surrounding the Dolomites. Tetraploids are present throughout the species range, except in Corsica and the Carpathians. In the western Alps, where the species is restricted to the Pennine and Cottian Alps, the tetraploid cytotype is almost entirely replaced by diploids. Hexaploids, meanwhile, are exclusively found in two populations within the Maladeta massif in the central Pyrenees.

2037. ***Pentanema squarrosum*** (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort. (syn.: *Inula conyza* DC.) — 2*n* = 4x = 32 (Fig. 1F).

Hs: Setcases, camí de Tregurà, alt. 1.298 m, 42° 22’ 18.7” N, 2° 17’ 48.8” E, 31 Aug 2023, leg. *T. Garnatje (GR 920b) & O. Hidalgo* (BC).

It is a biennial or perennial species. The native range of this species is Europe to Iran. In the Pyrenees it can be found up to 1.650 m a.s.l.

The present count, the first one in a Pyrenean population (https://sites.google.com/view/cromocat/home). agrees with all those recorded for this taxon, in many areas including the Iberian Peninsula (https://taux.evolseq.net/CCDB_web/home). This indicates a tetraploid level, with an x = 8-based chromosome number, as *Inula montana* L. (2*n* = 16, Löve & Kjellqvist 1974), as an example among others in the genus from which *Pentanema* was segregated and also present in the Pyrenees. Conversely, other *Pentanema* species, such as *P. indicum* (L.) Ling and *P. vestitum* (Wall.) Ling, exhibit x = 9-based chromosome numbers (Gupta & Gill 1989; Rajalakshmi & Jose 2002).

2038. *Senecio pyrenaicus* L. — 2*n* = 4x = 40 (Fig. 1G).

Hs: Setcases, Coll de la Marrana, alt. 2.375 m, 42° 25’ 12.8” N, 2°14’58.4” E, 18 Aug 2023, leg. *T. Garnatje (GR 891), O. Hidalgo, J. de Montaigne de Poncins & I. Pérez-Lorenzo* (BC).

It is a perennial species. The native range of this species is restricted to the Pyrenees and other mountain systems of the Iberian Peninsula, between 1.000 and 3.200 m a.s.l.

This count agrees with all those available for this species (https://taux.evolseq.net/CCDB_web/home). Favarger & Küpfer (1968) studied a population located in the Northern Pyrenean face (quoted as *Senecio tournefortii* Lap.), and the present one is the first report from the studied area, in the Southern face (https://sites.google.com/view/cromocat/home).

2039. *Tanacetum parthenium* (L.) Sch.Bip. — 2*n* = 2x = 18 (Fig. 1H).

Hs: Catalonia, Llanars, Espinalba, alt. 1134 m, 42° 18’ 34.9” N, 2° 20’ 14.7” E, 16 Jul 2023, leg. *T. Garnatje (GR 822), O. Hidalgo, J. de Montaigne de Poncins & L. Palazzesi* (BC).

It is a biennial or perennial species. The native range of this species is South Eastern Europe to Western Himalayas. In the Pyrenees it can be found exceptionally up to 2600 m a.s.l.

Most previous counts on this species coincide with the present count, the first one in the Pyrenean area, indicating a diploid level (https://sites.google.com/view/cromocat/home; https://taux.evolseq.net/ CCDB_web/home), whereas a few records suggest an also x = 9-based tetraploid one (2*n* = 36, Zhmyleva & Kondo 2006). It is worth mentioning that one report of a putative x = 8-based triploid level has been published (2*n* = 24, Davlianidze 1985).

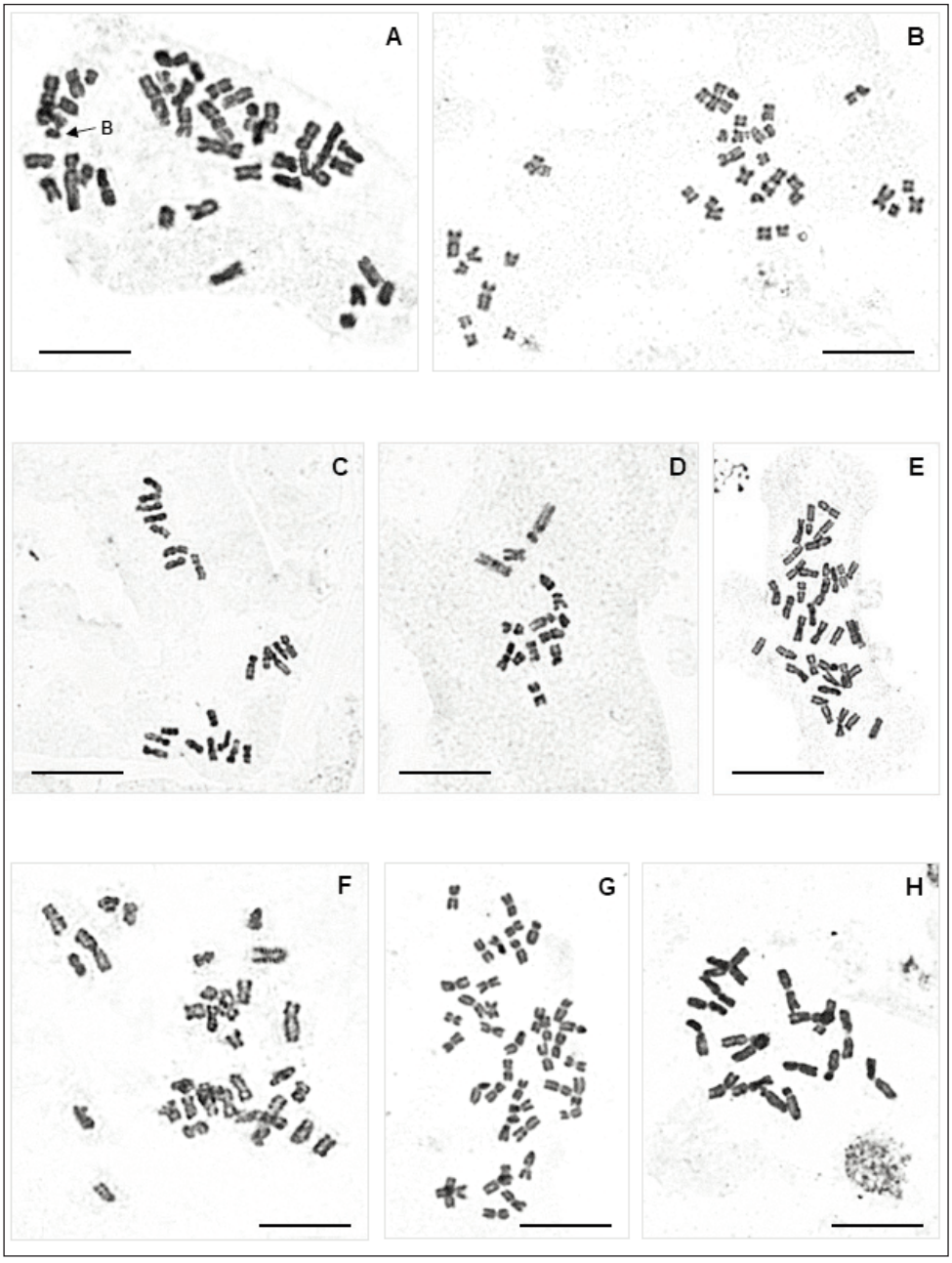

Fig. 1. Mitotic metaphase chromosome plates: **A,** *Adenostyles alliariae*, 2*n* = 38+1B; **B**, *Carpesium cernuum*, 2*n* = 40; **C,** *Centaurea nigra* subsp. *nigra*, 2*n* = 22; **D,** *Lapsana communis* subsp. *communis*, 2*n* = 14; **E,** *Leucanthemopsis alpina* subsp. *alpina* 2*n* = 36; **F,** *Pentanema squarrosum*, 2*n* = 32; **G,** *Senecio pyrenaicus*, 2*n* = 40; **H,** *Tanacetum parthenium*, 2*n* = 18. – Arrow indicates the B-chromosome; Scale bars = 10 μm.

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Mediterranean plant karyological data – 34/2

Contribution to the karyological knowledge of some geophytes from Sicily

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Abstract
Chromosome numbers, ploidy level, distribution, localities, and selected prior chromosome counts are detailed for six taxa collected in Sicily belonging to the *Amaryllidaceae*, *Asparagaceae* and *Liliaceae*.

Keywords: Chromosome number, *Muscari*, *Narcissus*, *Oncostema*, *Tulipa*, distribution, ploidy level.

Introduction

In the context of ongoing floristic and taxonomic investigations in Sicily, obtaining data on chromosome numbers and ploidy levels is essential for understanding the processes influencing the region's flora. Often, information on geophytes is derived from plants of unknown origin cultivated in botanical gardens. This study aims to enhance existing cytogenetic datasets by providing new data on chromosome numbers and ploidy levels, from plants collected in the wild with verified provenance and cultivated in the greenhouses of the Faculty of Agriculture, Food and Forest Sciences of the University of Palermo. All specimens analysed were collected in Sicily, Italy. Distribution data for these species were obtained from Plants of the World Online (POWO 2024).

2040. *Muscari commutatum* Guss. **—** 2*n* = 2x = 18 (Fig. 1a).

Si: Baia del Corallo, Sferracavallo (PA), 38°12'6.55" N 13°16'3.75" E, 20 m a.s.l., 14 March 2022, *G. Domina s.n.* (SAF100150).

Muscari commutatum Guss. (*Asparagaceae*) is a bulbous geophyte whose native distribution includes Italy, Sicily, the Balkans, the E-Aegean islands and Kriti (POWO 2024).

Comprehensive reports on the chromosome numbers known in *M. commutatum* are in Garbari (1968) and Karlén (1985). The basal chromosome number of *Muscari* is x = 9 (Karlén 1985) and the main chromosome number for *M. commutatum* is 2*n* = 2x = 18 (Garbari 1968; Karlén 1985). However, Karlén (1985) reports for two Greek populations from the Samos island also the triploid number 2*n* = 27, specifying that those triploids were unusually large with flowers 1-1/2 times the normal size. The number 2*n* = 45 counted by Delaunay (1927) must be regarded as dubious since this has not been confirmed by later authors (Karlén 1985).

The chromosome number 2*n* = 2x = 18 (Fig. 1a), found here on material from Segesta (Trapani Province, NW-Sicily) coincides with the diploid number of the species.

2041. ***Narcissus obsoletus*** (Haw.) Steud. — 2*n* = 2x = 20 and 2*n* = 3x = 30 (Fig. 1b, 1c).

Si: Mt. Cofano, 38° 6' 23" N, 12° 41' 12" E, 15 m a.s.l., 15 October 2023, *G. Domina & E. Di Gristina s.n.* (SAF100151).

Narcissus obsoletus (Haw.) Steud. (*Amaryllidaceae*) is a bulbous geophyte with a native range extending from Spain and Baleares, N-Africa, to Turkey and Israel and (POWO 2024, Euro+Med PlantBase 2024). It belongs to the subgenus *Hermione* (Haw.) Spach. and is an example of speciation by allopolyploidy, a frequent process in perennial herbs and which is particularly common in the Mediterranean area (Thompson 2005). According to Diaz Lifante & al. (2009) *N. obsoletus* represents an evolutionary link between *Narcissus* sect. *Hermione* and *Narcissus* sect. *Serotini* Parl.

The basal chromosome number of *Narcissus* subgenus *Hermione* is x = 10, 11 (Brandham & Kirton 1987). Two chromosome numbers were found in the same site of Mt. Cofano (Trapani Province, NW-Sicily) from bulbs of morphologically identical plants: 2*n* = 2x = 20 and 2*n* = 3x = 30 (Fig. 1b, 1c). Diaz Lifante & al. (2009) report for *N. serotinus* L. s.l. the counts of 2*n* =10, 20 and 30 published by different authors (e.g. Fernandes 1968; Garbari & al. 1973; Phitos & Kamari 1974) and distinguishes *N. obsoletus* (2*n* = 30) from *N. elegans* (2*n* = 20). On this basis Troìa & al. (2013) attribute 2*n* = 20 to *N. elegans* and 2*n* = 30 to *N. obsoletus* both collected in C.da Critazzo (Mazara del Vallo, TP).

2042. ***Narcissus tazetta*** subsp. ***italicus*** (Ker Gawl.) Baker — 2*n* = 2x = 22 (Fig. 1d).

Si: Lipari southern part of the island, 38° 26' 57" N, 14° 57' 2" E, 185 m a.s.l.,19 April 2022, *G. Domina & G. Barone s.n.* (PAL).

Narcissus tazetta subsp. *italicus* (Ker Gawl.) Baker (*Amaryllidaceae*) is a bulbous geophyte native to France, Corse, Italy, Sicily, Balkan Peninsula and Kriti (POWO 2024). In the past this taxon was considered as a hybrid between *N. tazetta* L. and *N. papyraceus* Ker. or *N. bertolonii* Parl. or *N. broussonetii* Lag. (Maugini 1953; Park & al. 2023). This taxon is known to us from meadows near the sea and presents much higher plants than *N. tazetta* subsp. *tazetta* which grows in the pastures of the interior.

This material was collected in Lipari (Aeolian Islands, Messina Province, NE-Sicily) in 2022 during the excursion of the group for Floristics, Systematics and Evolution of the Italian Botanical Society but the identification remained at the species level (Barone & al. 2023) because the individuals were in fruit at the time of collection. The bulbs were cultivated and the plants in flower were identified, the next year, as *N. tazetta* susbp. *italicus***.**

The chromosome number 2*n* = 2x = 22 (Fig. 1d) found here) agrees with the chromosome counts reported by Maugini (1953) from plants grown in pots in the Botanical Garden of Florence.

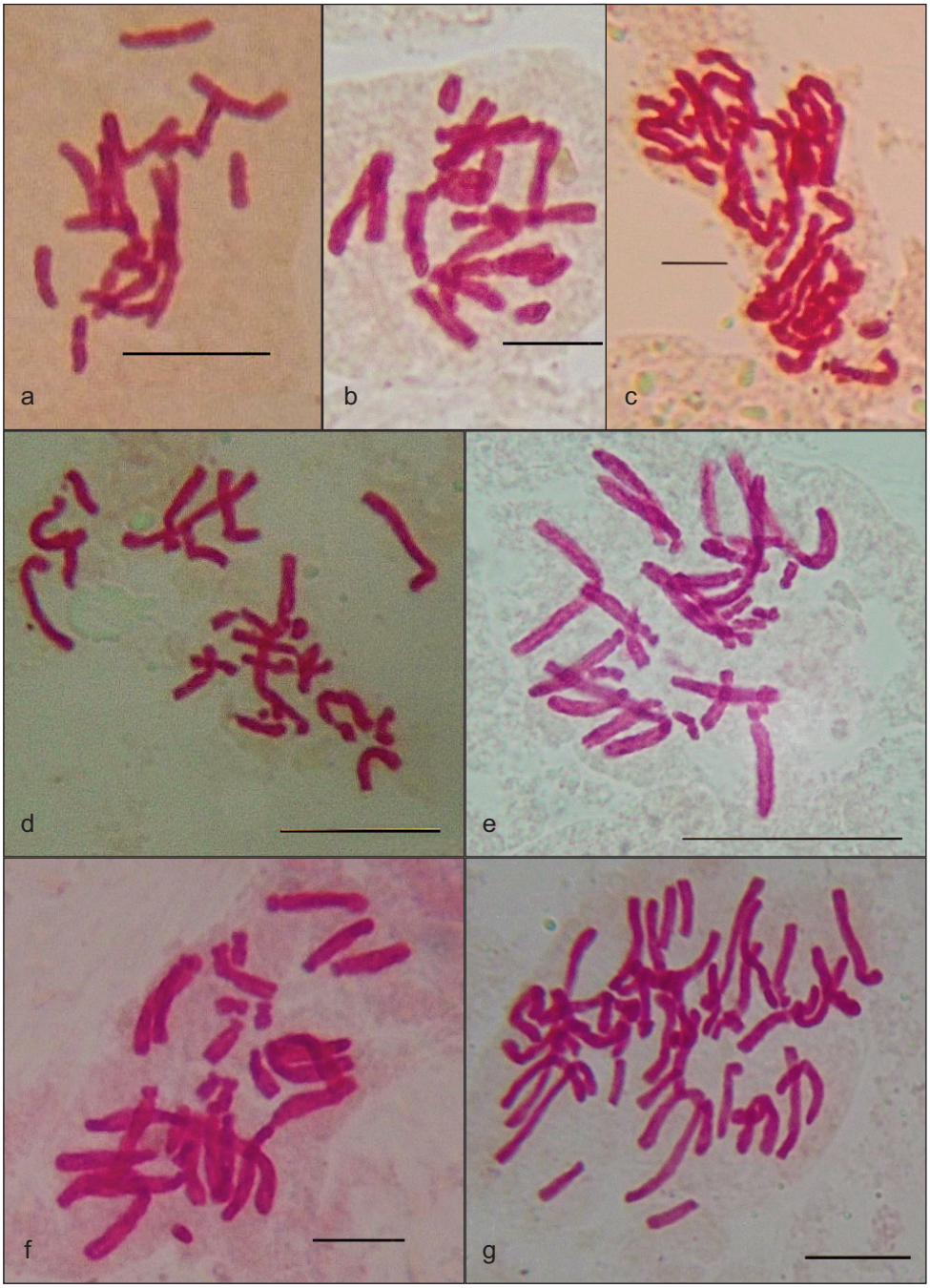

Fig. 1. Microphotographs of mitotic metaphase plates of: **a**, *Muscari commutatum*, 2*n* = 18; **b**, *Narcissus obsoletus*, 2*n* = 20; **c**, *N. obsoletus*, 2*n* = 30; **d**, *N. tazzetta* subsp. *italicus*, 2*n* = 22; **e**, *Oncostema dimartinoi*, 2*n* = 28; **f**, *O. siculum*, 2*n* = 28; **g**, *Tulipa raddii*, 2*n* = 36. – Scale bars = 10 μm.

2043. *Oncostema dimartinoi* (Brullo & Pavone) F. Conti & Soldano — $2n = 4x = 28$ (Fig. 1e).

Si: Lampedusa, Vallone dell'Acqua, 20 April 2017, *G. Domina s.n.* (SAF100152).

Oncostema dimartinoi (Brullo & Pavone) F. Conti & Soldano (*Asparagaceae*) is a bulbous geophyte endemic to Lampedusa (Pelagie Islands, Sicily) (POWO 2024). At present, its conservation status is Endagered (EN) but the increase in tourism over the years is a serious threat to the protection of the species (Di Gristina & al. 2022).

The basal chromosome number in the genus *Oncostema* is x = 7, 8, with diploid and tetraploid populations (Brullo & al. 2007). The chromosome number $2n = 4x = 28$ (Fig. 1e) found here on material from Vallone dell'Acqua (West side of Lampedusa, Agrigento Province) coincides with the number reported by Brullo & al. (1987) from Capo Grecale (East side of Lampedusa), the *locus classicus* of the species.

2044. *Oncostema siculum* (Tineo) Speta — $2n = 4x = 28$ (Fig. 1f).

Si: Mt. Formaggio (CL), 38° 26' 57" N, 14° 57' 3" E, 370 m a.s.l., 4 May 2023, *G. Domina & B. Di Gregorio s.n.* (SAF100153)

Oncostema siculum (Tineo) Speta (*Asparagaceae*) is a subendemic bulbous geophyte occurring in Sicily, Calabria, Basilicata and Malta (POWO 2024; Bartolucci & al. 2024). In Sicily the species grows in several scattered localities of NW and SE of the island (Mazzola & al. 2012).

The karyological data known in literature for this species concern material usually cultivated in Botanical Gardens and of not always documented origin (Bartolo & al. 1979; Ferrarella 1988).

The chromosome number $2n = 4x = 28$ (Fig. 1f) found here on material from Mt. Formaggio (Caltanissetta Province, C-Sicily) is included in the variability ($2n = 28$, $2n = 29$) reported for this species (Bartolo & al. 1979; Ferrarella 1988) and confirms the taxonomic independence of this taxon from the other *Oncostema* species belonging to this group which, instead, present $2n = 16$ (see e.g. Barone & al. 2021; Nassar & al. 2024)

2045. *Tulipa raddii* Reboul — $2n = 3x = 36$ (Fig. 1g).

Si: Castronovo di Sicilia (PA), 37°42'12.9" N 13°36'29.3" E, 735 m a.s.l., 14 April 2022, *G. Barone s.n.* (SAF100154).

Tulipa raddii Reboul (*Liliaceae*) is a bulbous geophyte whose native range extends from the E-Mediterranean to Jordan (POWO 2024). Due to its beauty and the precocity of the flowering (hence the common name 'Early Tulip'), the species has been introduced in much of southern Europe, including Italy, where it has also become naturalized (Spadaro & Raimondo 2001; Galasso & al. 2024).

The basal chromosome number in *Tulipa* is x = 12 and diploid, tetraploid, and hexaploid varieties and species occur (Newton 1926). The chromosome number $2n = 3x = 36$ (Fig. 1g) found here on material from Castronovo di Sicilia (Palermo Province, C-Sicily) agrees with the triploid number reported by Blakey & Vosa (1982) on cultivated material (sub *T. praecox* Ten.), but does not agree with the diploid number ($2n = 2x = 24$) reported by Bambacioni Mezzetti from Montughi (Florence Province, NC-Italy).

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Mediterranean plant karyological data – 34/3

Karyological study of selected Iridaceae taxa from Greece

P. Bareka, A. Tiniakou, E. Kriemadi, D. Phitos & G. Kamari

Abstract

The karyological diversity of the *Iridaceae* family provides critical insights into its systematics and evolutionary patterns, encompassing variations in chromosome numbers, ploidy levels, and karyotype morphology. This study documents the chromosomal data of five taxa within the Iridaceae, focusing on populations in Greece. The chromosome numbers and karyotypes are presented with accompanying microphotographs of metaphase plates, contributing to the ongoing updates of the PhytoKaryon database.

Keywords: Chromosome number, distribution, *Iris*, karyomorphology, *Moraea*, PhytoKaryon.

Introduction

The karyology of the *Iridaceae* exhibits remarkable diversity, playing a crucial role in understanding its systematics and evolutionary patterns. Basic chromosome numbers, ploidy levels, and karyotype morphology vary widely across the family (Goldblatt 1990, 1991). Ancestral chromosome numbers have been identified for many genera and significant chromosomal variations, including polyploidy and Robertsonian translocations, are revealed. Chromosomal variation patterns within and among closely related genera are becoming increasingly well-defined and understood (Goldblatt & Takei 2013).

In the process of updating the PhytoKaryon database (Kamari & al. 2017-onwards), focused on documenting the chromosomal diversity of Greek flora, populations of five *Iridaceae* taxa were studied providing chromosome numbers and karyotypes, complemented by microphotographs of metaphase plates.

2046. *Iris attica* Boiss. & Heldr. — $2n = 2x = 16$ (Fig. 1A).

Gr: Evvia island (WAe), Mount Prasino, northern slopes, south of the village of Prasino, 38° 20’ 45” N, 24° 05’ 35” E, leg. *Bareka & Kriemadi E54* (AUA).

Iris attica is a species native to Greece, North Macedonia and Turkey (POWO 2024), usually found on rocky limestones. The flowers of this species exhibit a variety of colours, ranging from yellow to bluish-purple, with both colours frequently appearing within the same population. Previously referred to as *Iris pumila* subsp. *attica* (Boiss. & Heldr.)

K.Richt., the name *Iris attica* has been reinstated following the recent typification of certain *Iris* species (Boltenkov & al. 2021).

The chromosome number of 2*n* = 16, has already been given in previous studies by Simonet (1932), Mitra (1956), Randolph & Mitra (1959), Lovka & al. (1971), Sauer & Leep (1979), Sauer & Stegmeier (1979), van Loon & Oudemans (1981) and Kriemadi & Bareka (2022). At least two chromosome pairs bear small spherical satellites. The karyotype formula is given as 2*n* = 2x = 2m/sm + 10st/t + 4st/t-SAT= 16 chromosomes, in accordance with the karyotype morphology given by Kriemadi & Bareka (2022). Chromosome size varies from 9.17 to 5.01 μm.

2047. *Moraea sisyrinchium* (L.) Ker Gawl. — 2*n* = 4x = 24 (Fig. 1B).

Gr: Kriti island (KK), Nomos Hanion, Prov. Kissamos, Falasarna village, 35° 30’ 00” N, 23° 34’ 46” E, alt. 15 m, 18 Apr 2022, leg. *E. Kriemadi & S. Athanasiou E36* (AUA).

The genus *Moraea* Mill., primarily native to South Africa, comprises of approximately 220 species, and has been extensively studied due to its remarkable variation in chromosome numbers and karyotype morphology, which closely correlate with its morphological diversity. Several related genera, including *Barnardiella* Goldblatt, *Galaxia* Thunb., *Gynandriris* Parl., *Hexaglottis* Vent., *Homeria* Vent., and *Roggeveldia* Goldblatt were synonymized with *Moraea* based on inferred morphological and, in some cases, cytological synapomorphies within specific species groups (Goldblatt 1998; Goldblatt & Manning 2013).

Moraea sisyrinchium is a common tuberous geophyte found in the Mediterranean region, extending eastwards to the Arabian Peninsula and the western Himalayas (POWO 2024). It grows in mediterranean phrygana and olive groves at altitudes ranging from 0 to 600 m.

Polyploidy is common in *Moraea* and contributes to both disploidy and recent speciation (Goldblatt & Manning 2013). Goldblatt (1980) reported tetraploid karyotypes of the two *Moraea* species found in Greece (*M. sisyrinchium* and *M. mediterranea*) with 2*n* = 4x = 24 chromosomes in populations from Attiki, based on a basic chromosome number of x = 6. The same chromosome number was reported for *M. mediterranea* by Bareka & al. (2018) in material from the Ionian Islands. This chromosome number has also been reported for *M. sisyrinchium* by Ruiz-Rejon (1974) (under *Iris sisyrinvhium* L.) and by Goldblatt (1980), Queiros (1980), Perez & Pastor (1994) and Snogerup (1995) (under *Gynandriris sisyrinchium* (L.) Parl.). Additionally, for *Gynandriris sisyrinchium*, Montmollin (1986) reported an octaploid population with 2*n* = 8x = 48 chromosomes from Kriti (Greece), while Vogt & Aparicio (1991) reported a decaploid population with 2*n* = 10x = 60 chromosomes from Cyprus.

The karyotype described here is tetraploid (2*n* = 4x = 24) consisting of four metacentric (m) chromosomes which are the largest in size, while the remaining chromosomes are submetacentric (sm) and acrocentric (st). The chromosome size ranges from 11.46 to 4.58 μm.

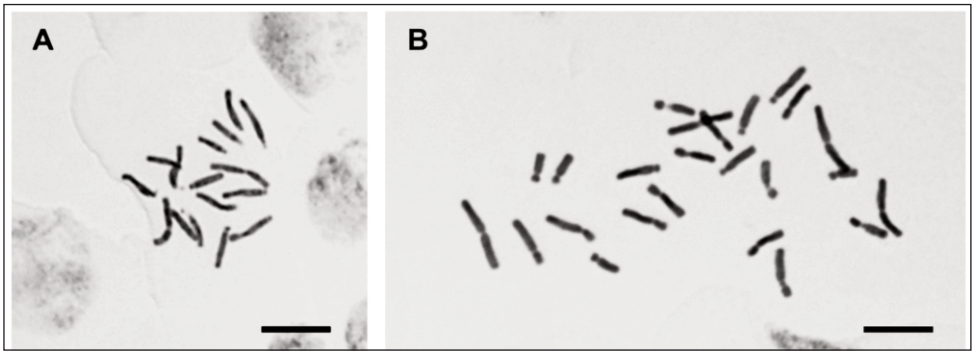

Fig. 1. Microphotographs of mitotic metaphase plates of: **A,** *Iris attica*, 2*n* = 2x = 16; **B,** *Moraea sisyrinchium* 2*n* = 4x = 24. – Scale bars = 10 μm.

Iris unguicularis Poir.

Iris unguicularis is a Mediterranean species found in rocky areas, riverbanks, hillsides, dry scrublands, or open coniferous woodlands. It is divided into five subspecies (POWO 2024). The typical subspecies is found in Northwest Africa (Morocco, Algeria, Tunisia), while the remaining subspecies are distributed across the eastern Mediterranean. *I. unguicularis* subsp. *carica* (Wern. Schulze) A. P. Davis & Jury is distributed in the East Aegen Islands and Turkey. *I. unguicularis* subsp. *syriaca* (Wern. Schulze) Güner it is occurred in Lebanon-Syria and Turkey, while the remaining two, e.g. subsp. *angustifolia* (Boiss. & Heldr.) Greuter and subsp. *cretensis* (Janka) A. P. Davis & Jury, are endemic to Greece.

Flowering from December to April (and sometimes later), all three taxa found in Greece grow in both phrygana and maquis vegetation and occupy a wide range of habitat types. They show a preference for limestone and neogene substrates (calcarenite, sand, silt, and marl), but can also grow on other rock types, such as flysch and schist, and occasionally on serpentine or acidic volcanic rocks. Despite their ability to grow on relatively poor soils, they are most commonly found in habitats with significant deposits of mixed clayey, silty, and sandy materials formed from the weathering of limestone and neogene geological formations.

Variation of chromosome number within *I. unguicularis* is known (Simonet 1928a & b, 1932, 1934, 1952; Sakai 1952; Schulze 1965; Sharma 1970) and previous counts from various authors are summarized by Davis & Jury (1990), most from unknown localities. The chromosome number 2*n* = 32 for *I. lazica* has also been found by the above authors who also reported 2*n* = 50 for *I. unguicularis* plants from Algeria and 2*n* = 40 from Parnassos and from Kriti. Older records for *I. unguicularis* variants with 2*n* = 38, 40 and 48/50, suggest the basic number for this group is x = 8 or 10 (Davis & Jury 1990).

2048. *Iris unguicularis* subsp. ***angustifolia*** (Boiss. & Heldr.) Greuter — 2*n* = 38 (Fig. 2A).

Gr: Peloponnisos (Pe), Nomos Arkadias, propre pagum Toubitsi, 37° 42’ 25” N, 21° 52’ 28.7” E, 29 Mar 1992, *leg. A. Tiniakou 1566* (UPA).

The material from Peloponnisos analyzed in this study exhibited a chromosome number of 2*n* = 38. Most chromosomes are submetacentric (sm), with some acrocentric (st) and metacentric (m) ones, and their sizes range from 1.30 to 3.65 μm. A different chromosome number, 2*n* = 40, has been reported for this taxon from Mt. Parnassos (Davis & Jury 1990).

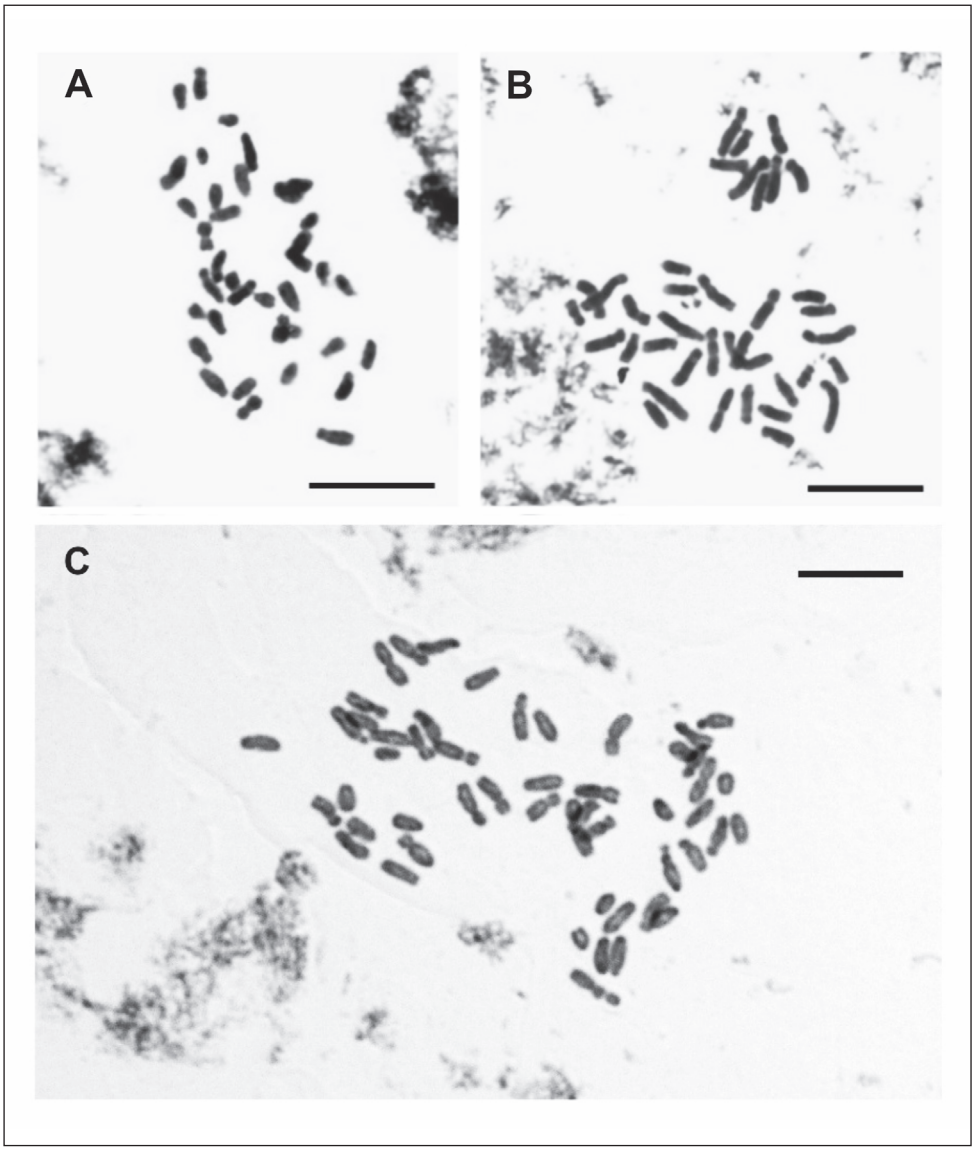

Fig. 2. Microphotographs of mitotic metaphase plates of *Iris unguicularis*: **A,** subsp. *angustifolia*, 2*n* = 38; **B.** subsp. *carica*, 2*n* = 38; **C,** subsp. *cretensis*, 2*n* = 52. – Scale bars = 10 μm.

2049. *Iris unguicularis* subsp. ***carica*** (Wern. Schulze) A. P. Davis & Jury — 2*n* = 38 (Fig. 2B).

Gr: Nomos Dodekanisou (EAe), Rodos island, city of Rodos, at a place called Rodini, 36° 25' 36,8" N, 28° 13' 15.8" E, alt. 1.100 m, 24 Mar 1991, *leg. A. Tiniakou 2184* (UPA).

Iris unguicularis subsp. *carica* is primarily distributed in Turkey, with its presence in Greece limited to the islands of Rodos and Kos (and possibly Kastellorizo). The population of subsp. *carica* studied from Rodos island exhibited a chromosome number of 2*n* = 38. Most chromosomes are submetacentric (sm), ranging in size from 2.43 to 4.87 μm, with one pair showing a satellite on the short arm. The heterochromatin regions observed in these karyotypes, along with secondary bands, render the chromosomes fragile. This fragility may partly explain the varying chromosome numbers reported for this group.

2050. *Iris unguicularis* subsp. ***cretensis*** (Janka) A. P. Davis & Jury — 2*n* = 52 (Fig. 2C).

Gr: Kriti (KK), Nomos Lasithiou, municipality of Agios Nikolaos, (municipal division of Kritsa), Katharo platau, 35° 09' 04.8" N, 25° 32' 57.0" E, alt. 1.100 m, 18 Apr 2022, *leg. E. Kriemadi & G. Afordakos E39* (AUA).

The population studied for this Greek endemic subspecies revealed the chromosome number 2*n* = 52. Other known counts for this taxon are 2*n* = 40 (Davis & Jury 1990) from two populations of Mt. Dikti (Kriti island), and 2*n* = 24 (Sz.-Borsos 1971) from an unknown location.

The karyotype is symmetrical consisting mostly of submetacentric (sm) and acrocentric (st) chromosomes. Two chromosome pairs bear distinct large satellites on their short arms, which are often detached due to the squashing technique, occasionally creating the impression that the chromosome number is 54 instead of 52. The size of the chromosomes ranges from 5.02 to 2.19 μm.

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