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Abstract

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Reports (1737-1743) by S. Bolourian, A. Tavassoli & M. Pakravan

1737. *Alyssum contemptum* Schott & Kotschy — $2n = 16$ (Fig. 1).

Ir: Kan, Tehran, $35^\circ 56’ 02”$ N, $50^\circ 57’ 03”$ E, gravelly slope, 2116 m, 2008, *Keshavarzi 5045* (ALUH = Alzahra University Herbarium).

Our cytological results confirm the previous count of this species taken from Turkey (Contandriopoulos & Afzal-Rafii 1973).

1738. *Alyssum dasycarpum* Stephan ex Willd. — $2n = 32$ (Fig. 2).

Ir: Mahdasht to Eshtehard road, 26 km before Eshtehard, Tehran, steppe, 1090 m, 18 Apr 2008, *Falaturi 5049* (ALUH).

Chromosome number in the studied specimens was $2n = 32$, while a previous report showed a diploid count of $2n = 16$ (Podlech 1986).

1739. *Alyssum desertorum* Stapf — $2n = 24$ (Figs 3-5).


— Qom road to Arak, After Imamzadeh Jafar, Qom, steppe, 1740 m, 22 April 2008, *Bolourian 5016* (ALUH).

In *Alyssum desertorum* the chromosome number $2n = 24$ was counted, while one plate had $2n = 32$ chromosomes. Maasoumi (1980) reported $2n \approx 29-32$ from Iran. Other reports, including Iljinskaya (1986) and Murín & al. (1999), published $2n = 32$. Although only one plate had a different number of chromosomes in this study, a similar observation has been reported in *A. contemptum* with $2n = 18$ from Turkey (Contandriopoulos & Afzal-Rafii 1973).

1740. *Alyssum linifolium* Stephan ex Willd. — $2n = 24$ / $2n \approx 32$ (Figs 6-9).


In this species, most cells showed $2n = 24$ chromosomes, but some specimens had $2n \approx 32$ chromosomes per cell and the number of chromosomes counted in one specimen was $2n \approx 40$. Although all specimens were gathered from one area, there is a possibility of the plant originally coming from other sites unknown to the authors because of being collected from a manmade grove. Previous chromosome counts for *A. linifolium* are $2n = 14$ (Iljinskaya 1986; Ilyinska 1972) and $2n = 16$ (Ilyinskaya 1989).
1741. *Alyssum marginatum* Steud. ex Boiss. — 2n = 32 (Fig. 10).

Ir: Tehran to Qom motorway, 80 km before Qom, steppe, 1160 m, 22 April 2008, *Bolourian 5013* (ALUH).

Chromosome counts showed 2n = 32 chromosomes in *Alyssum marginatum* which was a tetraploid compared to a previous counting of 2n = 16 (Aryavand 1996) mentioned from his earlier work, which was not accessible by the current authors.

1742. *Alyssum minus* var. *micranthum* (C. A. Mey.) T. R. Dudley — 2n = 32 / 2n ≈ 36 (Fig. 11).


In the population 5031 ALUH were counted 2n ≈ 36, while in the other two 5028 and 5032 ALUH were observed 2n = 32 chromosomes. Previous studies have reported 2n = 16 for *Alyssum minus* (L.) Rothm. (including Maasoumi 1980 and Persson 1971). Aryavand (1996) has used a previous counting of 2n = 16 for *A. minus* var. *micranthum* in a numerical taxonomic study.

1743. *Alyssum szovitsianum* Fisch. & C. A. Mey. — 2n = 14 (Fig 12).

Ir: Tehran to Qom road, before Hassan abad village, steppe, 1260 m, 22 April 2008, *Bolourian 5012* (ALUH).

Aryavand (1996) reported a count of 2n = 16 which shows difference in comparison with the present number of 2n = 14, but we also counted 2n = 16 chromosomes in one cell. Lack of more evidence made it impossible to have a better evaluation. However, Contandriopoulos & Afzal-Rafii (1973) noted a similar difference in chromosome numbers in *A. contemptum*.

References


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Reports (1744-1748) by T. Cusma Velari, L. Feoli Chiapella & G. Bacchetta

**1744. Genista desoleana** Vals. — 2n = 18+0-4B (Fig. 1a, b, c).


The species is distributed in the Northern Apennines (Liguria, Toscana), Elba, Corse and Central Western Sardinia (particularly in the mountains of Montiferru and Marghine) (Valsecchi 1986a).

The chromosome number 2n = 18+0-4B was counted on the basis of 20 metaphase plates. Chromosome size ranges from 1.39 to 3.98 μm and from 0.40 to 0.52 μm for B chromosomes. Our counting confirms the only reference reported by Villa (1988) for a population from Cuglieri, Badde Urbara.

The species grows on different siliceous substrata (basalts, granites and metaquartzites) at altitudes between 600 and 1200 m; its bioclimate is mainly temperate submediterranean pluviseasonal-oceanic; the thermotype ranges between upper mesosubmediterranean and lower suprasubmediterranean, the ombrotype between lower subhumid...

1745. *Genista toluensis* Vals. — $2n = 18+0-2B$ (Fig. 1d).

**Sa:** Nuoro, Lula, Monte Albo, Punta su Mutrucone, mesozoic limestone, 40° 31’ N, 9° 34’ E, 915 m a.s.l., 6 Jun 2004, C. Angiolini, G. Bacchetta & U. Gamper (CAG, TSB).

*Genista toluensis* is endemic to Central Eastern Sardinia (Mt. Tolui, Mt. Albo and Mt. Tuttavista) (Valsecchi 1984).

The chromosome number $2n = 18+0-2B$ was counted on the basis of 5 metaphase plates. Our counts confirm the only reference reported by Villa (1988) for a population from Mt. Tolui, Dorgali.

The species grows on different limestone substrata at altitudes between 600 and 1000 m; its bioclimate is mainly mediterranean pluviseasonal-oceanic; the thermotype ranges between upper mesomediterranean and lower supramediterranean, the ombrotype between lower subhumid and upper subhumid (after Rivas-Martínez & al. 2002). *Genista toluensis* is characteristic of scrub and garrigue, in coenoses of class *Cisto-Lavanduletea* Br.-Bl. in Br.-Bl., Molinier & Wagner 1940.

1746. *Genista salzmannii* DC. var. *salzmannii* — $2n = 18+0-2B$ (Fig. 2a).

**Sa:** Sassari, Tempio Pausania, Mt. Limbara, hercynian granites, 40° 51’ N, 9° 08’ E, 1100-1200 m a.s.l., 16 Jul 2003, L. Feoli Chiapella & L. Feoli (TSB).

*Genista salzmannii* var. *salzmannii* is endemic to Corse and Northern Eastern Sardinia (Mt. Limbara) (Valsecchi 1993).

The chromosome number $2n = 18+0-2B$ was counted on the basis of 11 metaphase plates. Chromosome size ranges from 1.76 to 5.23 μm (0.20 μm for B chromosomes). Villa (1988) reported $2n = 36$ and $2n = 18$ respectively for populations from Mt. Limbara and Valle della Restonica, Corte (Corse); Cusma Velari & Feoli Chiapella (1982) observed $2n = 18$ on material from Calvi (Corse).

The species grows on granite and metamorphyte substrata at altitudes between 300 and 1200 m; its bioclimate is mainly mediterranean pluviseasonal-oceanic; the thermotype ranges between lower mesomediterranean and lower supramediterranean, the ombrotype between lower subhumid and lower humid (after Rivas-Martínez & al. 2002). *Genista salzmannii* var. *salzmannii* is characteristic of scrub and garrigue, in coenoses of class *Cisto-Lavanduletea* Br.-Bl. in Br.-Bl., Molinier & Wagner 1940.
Fig. 1. Photomicrographs and relative drawings of somatic metaphase plates of: a, *Genista desoleana* (Badde Salighes), 2n = 18+2B; b, *Genista desoleana* (Badde Urbara), 2n = 18+2B; drawings of somatic metaphase plates of c, *Genista desoleana* (Val d’Aveto), 2n = 18; d, *Genista toluensis* (Mt. Albo), 2n = 18+2B. − Arrows indicate B-chromosomes. Scale bars = 5 µm.
1747. *Genista salzmannii* DC. var. *lobelioides* (Gamisans) Gamisans & Jeanmonod (= *G. lobelii* DC. var. *lobelioides* Gamisans) — $2n = 18$ (Fig. 2b).


*Genista salzmannii* var. *lobelioides* (Gamisans) Gamisans & Jeanmonod is endemic to Corse (Gamisans & Jeanmonod 1993). The chromosome number $2n = 18$ was counted on the basis of 5 metaphase plates. Chromosome size ranges from 1.70 to 3.70 μm. No previous karyological data are known for this taxon.

The species grows on different siliceous substrata at altitudes between 1400 and 1900 m; its bioclimate is mainly temperate submediterranean pluviseasonal-oceanic; the thermotype ranges between upper suprasubmediterranean and lower orosubmediterranean, the ombrotypes between lower subhumid and lower humid (after Rivas-Martínez & al. 2002). *Genista salzmannii* var. *lobelioides* is characteristic of dwarf-scrub, in coenoses of class *Carici-Genistetea lobelii* Klein 1972.

1748. *Genista pichisermolliana* Vals. — $2n = 18+0-2B$ (Fig. 2c).


*Genista pichisermolliana* is endemic to Central and Eastern Sardinia (Mountains of Gennargentu, Barbagia di Belvi) (Valsecchi 1993).

The chromosome number $2n = 18+0-2B$ was counted on the basis of 16 metaphase plates. Chromosome size ranges from 1.65 to 4.88 μm (0.18-0.22 μm for B-chromosomes).

Villa (1988) reported $2n = 18$ for a population from Mt. Scova, Aritzo (sub *G. salzmannii*).

The species grows on different siliceous substrata at altitudes between 1200 and 1700 m; its bioclimate is mainly temperate submediterranean pluviseasonal-oceanic; the thermotype ranges between lower suprasubmediterranean and upper suprasubmediterranean, the ombrotypes between lower subhumid and lower humid (after Rivas-Martínez & al. 2002). *Genista pichisermolliana* is characteristic of dwarf-scrub, in coenoses of class *Carici-Genistetea lobelii* Klein 1972.

*Genista desoleana*, *G. toluensis*, *G. pichisermolliana*, *G. salzmannii* var. *salzmannii* and var. *lobelioides* belong to sect. *Erinacoides* Spach (Valsecchi 1993). In the Sardinian-Corsican district other two species of the section are present: *G. sulcitana* Vals. (endemic to the mountains of Iglesiente and mining dump of Montevecchio) and *G. arbusensis* Vals. (psammophilous species, endemic to a restricted area on the coast of Arbis in Southwestern Sardinia) (Valsecchi 1984, 1986b). For both species Villa (1988) counted the number $2n = 18$, while Cusma Velari & al. (2001) reported $2n = 18+(0-2B)$ and, more rarely, $2n = 27+(0-2B)$. All these taxa present the basic chromosome number $x = 9$, by far the most frequent in sect. *Erinacoides* (Sañudo 1971; Talavera 1999; Cusma Velari & al.
Fig. 2. Photomicrographs and relative drawings of somatic metaphase plates of: a, *Genista salzmannii* var. *salzmannii* (Mt. Limbara), $2n = 18+2B$; b, *Genista salzmannii* var. *lobelioides* (Haute Asco), $2n = 18$; c, *Genista pichisermolliana* (Bruncu Spina), $2n = 18+2B$. — Arrows indicate B-chromosomes. Scale bars = 5 µm.
1998, 2001, 2010). All Sardinian endemic taxa are diploids, as well as *G. salzmannii* var. *lobelooides*, of Corse, and *G. desoleana*, the only species that reaches the Italian Peninsula. *G. salzmannii* var. *salzmannii* has diploid populations in Corse, diploid and tetraploid in Sardinia.


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**References**


— 1974: Reports. [In Löve, Á. (ed.), IOPB chromosome number reports XLVI]. − Taxon 23(5-6): 801-812.


Reports (1749-1750) by Tiziana Cusma Velari & Laura Feoli Chiapella

1749. *Genista fasselata* Decne. subsp. *fasselata* — 2n = 48+0-6B (Fig. 1a, b, c, d).

**Cr:** Dodekánissa, Kárpathos, Piles, 35° 53’ N, 27° 13’ E, 360 m a.s.l., 10 Aug 1997, *L. Feoli Chiapella* (TSB).

**IJ:** Israel, Mt. Carmel, 32° 59’ N, 35° 04’ E, 420 m a.s.l., 10 Sept 2000, *M. Livneh* (s.n., s.exsiccat).


The chromosome number 2n = 48 was constantly counted in the populations from Kárpathos on the basis of 17 metaphase plates. Moreover, the numbers 2n = 48+0-6B and, more rarely, 2n = 96 were found in the population of Mt. Carmel on the basis of 15 metaphase plates. Chromosome size ranges from 0.57 to 2.97 μm (0.25-0.40 μm for B-chromosomes). No previous karyological data are known for this taxon.
Fig. 1. Photomicrographs and relative drawings of somatic metaphase plates of *Genista fassalata* subsp. *fassalata* from: a, Profitis Ilias, $2n = 48$; b, Mt. Carmel, $2n = 48+2B$; drawings of somatic metaphase plates from: c, Agios Nicolaos, $2n = 48$; d, Piles, $2n = 48$. — Arrows indicate B-chromosomes. Scale bars = 5 μm.
1750. *Genista fasselata* Decne. subsp. *crudelis* (Meikle) Chrtek & B. Slavik — $2n = 48+0-6B$ (Fig. 2a).

Cy: Paphos District, Mt. Troodos, Platres, 34° 59’ N, 32° 58’ E, seeds obtained from Botanical Garden, Berlin-Dahlem (s.n., s.coll., s.exsicc.).

The subsp. *crudelis* (= *G. fasselata* var. *crudelis* Meikle) is apparently endemic to Cyprus; it was described for Mt.Troodos (Chrtek & Slavik 1981, Greuter & al. 1989). The chromosome number $2n = 48+0-6B$ was constantly counted on the basis of 16 metaphase plates. Chromosome size ranges from 0.88 to 2.42 μm (0.30-0.45 μm for B-chromosomes). No previous karyological data are known for this taxon.

Spach (1844) included *Genista fasselata* in sect. *Acanthospartum* Spach; furthermore, Gibbs (1966) preferred to include the species in a distinct monospecific section, *Fasselospartum* P.E. Gibbs, because of a series of differential characters between *G. fasselata* and *G. acanthoclada*, as the branching (alternate instead of opposite), the spines recurved, axillary and flower-bearing (instead of branches terminated by a spine), a clearly different shape of the pulvinules (black, scale-like instead of swollen and prominent) and the standard (glabrous instead of sericeous). The type of spines observed in *G. fasselata* is rather rare in *Genista*, being absent in all the other taxa of subgen. *Spartocarpus*, which includes the sections *Spartocarpus*, *Acanthospartum*, *Fasselospartum* and *Cephalospartum* Spach emend. P.E. Gibbs. *G. fasselata* results clearly distinguishable from all the taxa of *G. acanthoclada* aggr. also for several pollen characters (Rizzi Longo & Feoli Chiapella 2007).

Fig. 2. Photomicrograph and relative drawing of somatic metaphase plate of: a, *Genista fasselata* subsp. *crudelis* (Mt. Troodos), $2n = 48$. — Scale bars = 5 μm.
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References


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Report (1751) by A. Troia, P. Marino & A. M. Orlando

1751. Isoëtes todaroana Troia & Raimondo — 2n = 22 (Fig. 1).

Si: Mazara del Vallo (province of Trapani), contrada “Critazzo”, 37°41’07”N, 12°37’05”E, ca. 60 m a.s.l., May 2010, Angelo Troia (PAL).

Isoëtes todaroana is a terrestrial/amphibian species recently described from one single site in Sicily (Troia & Raimondo 2010a), and its chromosome number is reported here for the first time.

The genus Isoëtes includes both diploids (2n = 22) and polyploids (3x, 4x, 5x, 6x, 8x, 10x, 12x) (Troia 2001). Particularly worthy of mention is the high proportion of polyploids with respect to diploids: according to Troia & Raimondo (2010b), the percentage of polyploid species in the genus is between 56 and 59%.

Our observations show that the species is diploid. In the Mediterranean area, diploid species (usually terrestrial or amphibian) are relatively more common than polyploid ones, but aneuploidy also occurs (e.g. I. histrix Bory with 2n = 20, cf. Cesca & Peruzzi 2001). According to Taylor & Hickey (1992), I. todaroana should be another of the diploid terrestrial species resulting from gradual speciation via isolation and genetic divergence, in contrast to aquatic species in which interspecific hybridization and chromosome doubling processes prevail.


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Reports (1752) by E. Di Gristina, A. Geraci & P. Marino

**1752. Pilosella sphaerocephala** (Rchb.) F. W. Schultz & Sch. Bip. — 2n = 27 (Fig. 1).

**It:** Trento, Moena, Passo San Pellegrino, moorlands on acid soil, 1910 m a.s.l., 46° 22’ N, 11° 46’ E, 08 Aug 2011, *E. Di Gristina* (PAL).
*Pilosella* Vaill. is a large genus constituted of at least 3000 perennial herbaceous plants (Pignatti 1982) occurring in Europe, temperate Asia, North Western Africa (Zahn 1923; Sell & West 1975; Pignatti 1982), North America, Patagonia and New Zealand (Mráz & al. 2008).

*Pilosella sphaerocephala* (Rchb.) F. W. Schultz & Sch. Bip. (*Hieracium sphaerocephalum* Rchb.) is an hemicryptophyte rosulate flowering in Summer between July and August and its distribution is restricted to Eastern and Central Eastern Alps (Sell & West 1976). This taxon is considered by Zahn (1923) as “Zwischenarten” (*species intermediae collectivae*) between *P. glacialis* (Reyn.) F. W. Schultz & Schp. Bip. and *P. hoppeana* (Schult.) F. W. Schultz & Schp. Bip., including 18 subspecies. On the other hand, according to Sell & West (1976), *P. sphaerocephala* should be treated as good species because it often occurs in fairly uniform populations where hypothetical parents are absent.

The chromosome number $2n = 3x = 27$ reported here, obtained by the observation of 30 metaphase plates of 15 individuals, represents the first record for *P. sphaerocephala* from Italy. This datum is conform to the report of Schuhwerk & Lippert (2002, sub *H. sphaerocephalum* subsp. *furcatum* (Hoppe) Zahn) for a population of Austrian Tyrolean Alps but it doesn’t agree with the number $2n=36$ reported by the same authors (Schuhwerk & Lippert 1997, sub *H. sphaerocephalum* Froel.) for *P. sphaerocephala* from the Bavarian Alps (Germany).

![Fig. 1. Microphotograph of mitotic metafase plate of *Pilosella sphaerocephala*, $2n = 27$. – Scale bar = 5 µm.](image)
References


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