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SUMMARY

Chromosome number of seven species of the genus *Linum* L. section *Linum*, *Adenolinum* and *Stellerolinum* have been studied. The chromosome numbers for *L. squamulosum* Rudolphi ($2n = 18$) and *L. komarovii* Juz. ($2n = 18$) of the section *Adenolinum* were revealed for the first time. The chromosome numbers of *L. decumbens* Desf. ($2n = 16$) and *L. narbonense* L. ($2n = 28$) from the section *Linum*, *L. extraaxillare* Kit. ($2n = 4x = 36$) and *L. pallescens* Bunge ($2n = 18$) from the section *Adenolinum*, and *L. stelleroides* Planch. ($2n = 18$) from the section *Stellerolinum* were confirmed. Karyotype formulas of the studied species are presented. Similarity of *L. stelleroides* karyotype with karyotypes of species from the section *Adenolinum*, as well as of *L. grandiflorum* karyotype with previously studied *L. decumbens* Desf. karyotype was revealed. Peculiarities of chromosome morphology in *L. narbonense* karyotype agree with placing of this species in the subsection *Nervosa* according to anatomic-morphologic characters.

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CHROMOSOME NUMBERS IN SOME VASCULAR PLANT SPECIES FROM ARGENTINA

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ЧИСЛА ХРОМОСОМ НЕКОТОРЫХ ВИДОВ СОСУДИСТЫХ РАСТЕНИЙ ИЗ АРГЕНТИНЫ

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Somatic chromosome counts were made for 13 plant species from Argentina, including: eight species of *Poaceae*, and one each for *Asteraceae*, *Boraginaceae*, *Caesalpinaceae*, *Mimosaceae*, *Solanaceae*. For two species of *Poaceae* — *Agrostis inconspicua* Kunze ex E. Desv. ($2n = 28$) and *Poa chonotica* Phil. ($2n = 42$), the chromosome numbers are reported here for the first time. A new cytotype for *Bothriochloa springfieldii* (Gould) Parodi ($2n = 60$) is also reported.

Key words: chromosome numbers, vascular plants, *Poaceae*, *Asteraceae*, *Boraginaceae*, *Caesalpinaceae*, *Mimosaceae*, *Poaceae*, *Solanaceae*, Argentina.

Plants were grown by N. Probatova at the greenhouse in Vladivostok, from seeds taken from duplicates of herbarium specimens collected by J. Chiapella in Argentina and preserved in the Herbarium VLA (Vladivostok). Fixation of root tips was accomplished using a freshly mixed 3:1 solution of ethanol (96 %): glacial acetic acid; the root tips were then squashed, and stained with iron haematoxylin (Smirnov, 1968). Chromosome counts were performed by E. Rudyka. The paper was prepared by Probatova and Chiapella. Nomenclature for *Poaceae* follows Soreng et al. (2003) and Zuloaga et al. (2003); for all other families, we followed Zuloaga and Morrone (1999). Newly studied species are indicated by an asterisk (*).

ASTERACEAE

Tessaria dodoneifolia (Hook. et Arn.) Cabrera, **2n = 20**. VLA 9793, Argentina, Province of Mendoza, Departamento Capital, Parque General San Martín, CRYCIT campus, surroundings of the Herbarium MERL, 21 III 2003, coll. J. Chiapella 960.

Our count agrees with a previous report by Hunziker et al. (1990) for a more northern locality (Catamarca Province); this chromosome number is the same for other species of *Tessaria* from Argentina. Some species, except *T. dodoneifolia*, have *B*-chromosomes (see: Bolkhovskikh et al., 1969; Waisman et al., 1984; Hunziker et al., 1990). *T. dodoneifolia* is a polymorphic bush or small tree, that is found in wet, low salty places or on the shores of rivers or wetlands (Ariza Espinar, 1979). About eight species of *Tessaria* occur in South America; four are frequent in Argentina, excluding Patagonia (Freire, 1995). The sweet leaves of this species have been used in popular medicine (Del Vitto et al., 1997).

BORAGINACEAE

Cynoglossum creticum Mill., **2n = 24**. VLA 9778, Argentina, Province of Neuquén, Departamento Los Lagos, Route 231, side of the road, mixed forest of *Nothofagus dombevi* and *Austrocedrus chilensis*, 18 II 2003, coll. J. Chiapella 825.

Nearly all the reports for *C. creticum* of Europe and North Africa indicate the same chromosome number: $2n = 24$ (see: Bolkhovskikh et al., 1969; Index..., 1981, 1984, 1988, 1990, 1998, 2000, 2003), except for one count of $2n = 48$ from Syria (Kliphuis and Barkoudah, 1977). Our count is consistent with most previous reports, and it represents the southernmost population studied. The genus *Cynoglossum* L. comprises c.50 species of temperate and subtropical regions (Correa, 1999). *C. creticum* is a common weed of Mediterranean origin and is widely distributed in Europe, including Russia (see Cherepanov, 1995); it is one of the two species from this genus (together with *C. amabile* Stapf and J. R. Drumm.) that has been introduced to Argentina and is the only that is naturalized in Patagonia (Correa, 1999).

CAESALPINIACEAE

Gleditsia triacanthos L., **2n = 28**. VLA 9777, Argentina, Province of Buenos Aires, Departamento Moreno, junction of the Acceso Oeste motorway and Int. Gnecco street, abandoned field, 23 III 2003, coll. J. Chiapella 980.

All the species of *Gleditsia* studied so far have $2n = 28$ (see Bolkhovskikh et al., 1969; Index..., 1981, 1984, 1990, 1991). A count of $2n = 28$ was determined for the South American species *G. amorphoides* (Gris.) Taub., from Argentina (Castronovo, 1945); ours is the first count for *G. triacanthos* in Argentina. The genus *Gleditsia* L. contains c.14 spp. with a disjunctive distribution in eastern North America, northern Argentina and adjacent regions of Brazil, Paraguay and Uruguay, the regions surrounding the Caspian Sea and southeastern Asia (Robertson and Lee, 1976; Mabberley, 1987). Two species occur in Argentina: the native *G. amorphoides* and the introduced and naturalized *G. triacanthos* (Ulibarri, 1997).

MIMOSACEAE

Prosopis chilensis (Molina) Stuntz, **2n = 28**. VLA 9789, Argentina, Province of Mendoza, Departamento Capital, Parque General San Martín, CRYCIT campus, 21 III 2003, coll. J. Chiapella 962.

This is a genus with variable chromosome numbers; counts of $2n = 26, 28, 52, 56$ (see Index..., 1985, 2003) have been reported. Most of the species studied in Argentina have $2n = 26, 28$ (Hunziker et al., 1975; Index..., 2003). *Prosopis* L. is a predominantly American genus with c. 40 species distributed from the USA to central Argentina and Chile (Burkart, 1976); some isolated species are also found in the western Mediterranean, Russia, India, Iran, and Africa (Bernardi, 1984; Cherepanov, 1995). *P. chilensis* is a polymorphic fast-growing species extending from central Peru and Bolivia to central Argentina.

POACEAE

Agrostis inconspicua* Kunze ex E. Desv. (*A. aireformis* Steud.; *A. airoides* Franch.), **$2n = 28$. VLA 9786, Argentina, Rio Negro, Departamento Bariloche, Villa Tacul, close to Llao Llao, coast of Nahuel Huapi Lake, humid forest of *Nothofagus dombeyi*, 18 II 2003, coll. J. Chiapella 838, 841.

No previous chromosome count for this species was found. *Agrostis* L. comprises nearly 220 species distributed throughout cold and cold-temperate regions of the world, and also in mountainous regions of the tropics (Tzvelev, 1976, 1989; Clayton, Renvoize, 1986). There is an important centre of diversification in the Andes of central Argentina and Chile and in Patagonia, with 29 native taxa (Rugolo and Molina, 1994). *A. inconspicua* is distributed in Argentina and Chile, in forests with altitudes up to 2400 m (Rugolo and Molina, 1997).

Anisantha tectorum (L.) Nevski (*Bromus tectorum* L.), **$2n = 14$** . VLA 9772, Argentina, Neuquén, Departamento Los Lagos, Route N 231, side of the road, mixed forest of *Nothofagus dombeyi* and *Austrocedrus chilensis*, 18 II 2003, coll. J. Chiapella 807.

Several counts of $2n = 14$ exist for this taxon (see: Bolkhovskikh et al., 1969; Agapova et al., 1993; Index..., 1981, 1984, 1985, 1990, 1991, 1994, 1998, 2000, 2003, mostly as „*Bromus tectorum*”). *Bromus* L. (s. lat.) comprises c. 150 species widespread in temperate regions (Clayton, Renvoize, 1986); it is represented in Argentina by 30 species; *B. tectorum* L. (= *Anisantha tectorum*) is an introduced weed from Europe (Gutiérrez, Pensiero, 1998).

Axonopus fissifolius (Raddi) Kuhl., **$2n = 40$** . VLA 9781, Argentina, Buenos Aires, Departamento Moreno, junction of the Acceso Oeste motorway and Int. Gnecco street, ruderal vegetation in an abandoned field, 23 III 2003, coll. J. Chiapella 969, 971, 972.

Several counts with $2n = 50, 54$ and 80 (see Bolkhovskikh et al., 1969; Index..., 1981, 1985) were reported for *A. affinis*, a taxon now considered to be conspecific with *A. fissifolius* (Zuloaga et al., 2003). Counts for *A. fissifolius* of $2n = 20, 40, 60$ have been reported (see: Index..., 1981, 1998). The basic chromosome number for the genus *Axonopus* is $x = 10$; most reported numbers are $2n = 20, 40, 60, 80$ (see: Index..., 1984, 1998, 2003). *Axonopus* P. Beauv. is a mostly tropical or subtropical genus with c. 110 species in America, one species in Africa (Clayton, Renvoize, 1986) and nine species in Argentina (Zuloaga, Morrone, 2003).

Bothriochloa springfieldii (Gould) Parodi, * **$2n = 60$** . VLA 9779, Argentina, Mendoza, Departamento Capital, Parque General San Martín, CRYCIT campus, surroundings of the Herbarium MERL, 21 III 2003, coll. J. Chiapella 929.

Chromosome counts reported so far indicate $2n = 40$ (see: Index..., 1998) and $2n = 120$ (see: Bolkhovskikh et al., 1969). The present count of $2n = 60$ ($6x$) is therefore the hexaploid cytotype. About 35 species of *Bothriochloa* Kuntze are widely distributed in warm regions (Clayton, Renvoize, 1986); one of the 11 spp. present in Argentina.

B. springfieldii is a good forage grass with a disjunctive north (Mexico and USA) — south (Argentina and Bolivia) distribution (Vega, 2000).

Elymus angulatus J. Presl, **2n = 28**. VLA 9784, Argentina, Neuquén, Departamento Los Lagos, Route 231, side of the road, mixed forest of *Nothofagus dombeyi* and *Austrocedrus chilensis*, 18 II 2003, coll. J. Chiapella 811; VLA 9780, Argentina, Rio Negro, Departamento Bariloche, Cerro Cireco, close to «Refugio Challhuaco», shaded understory forest of *Nothofagus pumilio*, 18 II 2003, coll. J. Chiapella 857.

Some counts have been reported for taxa considered by Soreng et al. (2003) to be synonyms of *E. angulatus*; all them show $2n = 28$: *E. andinus* Poepp. ex Trin. (Dubcovsky et al., 1989, 1992), *E. gayanus* E. Desv. (Dubcovsky et al., 1992). A meiotic count under the name *E. angulatus* also exhibited an $n = 14$ (see: Index., 1968). The chromosome number of $2n = 28$ is the most common for the genus. *Elymus* L. comprises c.150 taxa common in temperate regions of the world (Tzvelev, 1976, 1989; Clayton, Renvoize, 1986). Some disagreement exists in the delimitation of South American species: Seberg and Petersen (1998) grouped together in *E. angulatus* several taxa recognized as different species by Hunziker (1998) and Hunziker and Xifreda (2000); this resulted in a rather heterogeneous taxon with a widespread geographic distribution and very large ecological range.

Holcus lanatus L., **2n = 14**. VLA 9785, Argentina, Santa Cruz, Departamento Lago Argentino, Parque Nacional Los Glaciares, *Nothofagus pumilio* forest, 26 II 2003, coll. J. Chiapella 919.

Many counts exist for this species; almost all (including the present) indicate $2n = 14$, and more rarely counts of $2n = 14 + 0-2B$, $14 + 1-2B$ (see: Bolkhovskikh et al., 1969; Index., 1981, 1984, 1985, 1988, 1991, 1994, 1996, 2000, 2003, 2006; Agapova et al., 1993). *Holcus* L. is a Mediterranean genus that includes six species (Tzvelev, 1976, 1989; Clayton, Renvoize, 1986); *H. lanatus* was introduced in Patagonia (Nicora, 1978).

Poa chonotica* Phil. (*P. borchersii* Phil.), **2n = 42. VLA 9817, Argentina, Rio Negro, Departamento Bariloche, Cerro Cireco, close to the refugio Challhuaco, *Nothofagus pumilio* forest, 23 II 2003, coll. J. Chiapella 835.

The chromosome number for this species is reported here for the first time. *P. chonotica* is somewhat similar morphologically and cytologically to *Arctopoa eminens* (J. S. Presl) Probat. (= *Poa eminens* J. S. Presl). The chromosome number $2n = 42$ is common in the genus *Arctopoa* (Griseb.) Probat. (= *Poa* subgen. *Arctopoa* (Griseb.) Probat.) (Probatova, 1974, 2003). The similarities suggest a closer relationship of the South American group *Andinae* to *Arctopoa*, rather than to *Poa* s. str. The genus *Poa* L. is divided into three subgenera: *Arctopoa*, *Andinae* and *Poa* (Soreng, 1998); the section *Dioicopoa* is included in subgen. *Poa*. Recent molecular studies on *Poa* (including *Arctopoa*) show that *Arctopoa* and *Andinae* differ from *Poa*, and they group together with *DuPontia* and *Arctagrostis* (Nossov et al., 2007).

Setaria parviflora (Poir.) Kerguelén, **2n = 36**. VLA 9791, Argentina, Mendoza, Departamento Capital, Parque General San Martín, CRYCIT campus, surroundings of the Herbarium MERL, 21 III 2003, coll. J. Chiapella 939.

Our tetraploid count ($x = 9$) represents the southernmost cytotype studied, and agrees with previous counts for this species from Costa Rica (Davidse, Pohl, 1971), Brazil (Oliveira, 1980; Oliveira et al., 1984) and Bolivia (Norrman et al., 1994) performed for *S. geniculata* (Lam.) Beauv. (= *S. parviflora*). For this species, counts of $2n = 36, 72$ have been reported in the literature (see: Bolkhovskikh et al., 1969; Index., 1968, 1981, 1984, 1985, 1990, 1994, 2000). The genus *Setaria* P. Beauv. comprises c.100 mostly tropical and sub-

tropical species; some taxa are also present in temperate regions (Tzvelev, 1976, 1989; Clayton, Renvoize, 1986). *S. parviflora* is a widespread weed that ranges from New York to northern Patagonia (Pensiero, 1999).

SOLANACEAE

Solanum elaeagnifolium Cav., $2n = 24$. VLA 9796, 9807, Argentina, Province of Mendoza, Departamento Capital, Parque General San Martín, CRYCIT campus, surroundings of the herbarium MERL, 21 III 2003, coll. J. Chiapella 952.

Several counts exist for *S. elaeagnifolium*, mostly with $2n = 24$, 72 (Bolkhovskikh et al., 1969; Index., 1981); for Argentinean populations of this polymorphic species, counts with $2n = 12$, 24, 36 were reported by Moscone (1992). The American species *S. elaeagnifolium* is a widespread shrubby plant that is toxic to livestock; it belongs to subgen. *Leptostemonum* and is naturalized in America and Europe (Matesevach, 2002).

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РЕЗЮМЕ

Приводятся числа хромосом ($2n$) для 13 видов сосудистых растений из Аргентины, представляющих семейства *Asteraceae*, *Boraginaceae*, *Caesalpiniaceae*, *Mimosaceae*, *Poaceae*, *Solanaceae*. Для двух видов злаков числа хромосом определены впервые — *Agrostis inconspicua* Kunze ex E. Desv. ($2n = 28$) и *Poa chonotica* Phil. ($2n = 42$). Новое число хромосом установлено у *Bothriochloa springfieldii* (Gould) Parodi ($2n = 60$).