Turczaninowia 26, 2: 140–146 (2023)
DOI: 10.14258/turczaninowia.26.2.12
http://turczaninowia.asu.ru

ISSN 1560–7259 (print edition)
TURCZANINOWIA
ISSN 1560–7267 (online edition)

УДК 581.527.7:576.316(571.14)

Chromosome numbers in some alien plant species of the Novosibirsk Region: post IV

E. Yu. Zykova[1, 2*], T. V. Pankova[1, 3], M. N. Lomonosova[1, 4]

[1] *Central Siberian Botanical Garden SB RAS, Zolotodolinskaya St., 101, Novosibirsk, 630090, Russian Federation*

[2] *E-mail: elena.yu.zykova@gmail.com; ORCID iD: https://orcid.org/0000-0002-1847-5835*

[3] *E-mail: ankova_tv@mail.ru; ORCID iD: https://orcid.org/0000-0003-3661-0719*

[4] *E-mail: mlomonosova@mail.ru; ORCID iD: https://orcid.org/0000-0003-0510-5349*

** Corresponding author*

Keywords: adventive species, diploids, invasive species, Novosibirsk Region, polyploids, West Siberia.

Summary. This paper presents the chromosome numbers (2*n*) for 12 alien species collected in the Novosibirsk Region from the families Apocynaceae, Asteraceae, Campanulaceae, Caryophyllaceae, Fabaceae, Lamiaceae, Plantaginaceae, Poaceae. For *Asclepias syriaca* L. (2*n* = 22), *Veronica filiformis* Sm. (2*n* = 14), *Setaria italica* (L.) P. Beauv. (2*n* = 18), and *Sorghum drummondii* (Nees ex Steud.) Millsp. et Chase (2*n* = 20), chromosome numbers were determined for the first time on the material from Russia; for *Tanacetum parthenium* (L.) Sch. Bip. (2*n* = 18), *Campanula persicifolia* L. (2*n* = 16), and *Genista tinctoria* L. (2*n* = 48) – from Asian Russia; for *Calendula officinalis* L. (2*n* = 32) and *Rudbeckia hirta* L. (2*n* = 38) – from Siberia. Chromosome numbers on the material from the Novosibirsk Region were revealed for the first time for *Lapsana communis* L. (2*n* = 14) and *Silene noctiflora* L. (2*n* = 24). For all the species studied, brief notes on their general distribution and dispersal in the Novosibirsk Region are provided, along with literature data on chromosome numbers from other regions of Russia.

Числа хромосом некоторых чужеродных видов растений Новосибирской области: сообщение IV

Е. Ю. Зыкова, Т. В. Панкова, М. Н. Ломоносова

Центральный сибирский ботанический сад СО РАН, ул. Золотодолинская, д. 101, г. Новосибирск, 630090, Россия

Ключевые слова: адвентивные виды, диплоиды, Западная Сибирь, инвазивные виды, Новосибирская область, полиплоиды.

Аннотация. Приводятся числа хромосом (2*n*) для 12 адвентивных видов из семейств Apocynaceae, Asteraceae, Campanulaceae, Caryophyllaceae, Fabaceae, Lamiaceae, Plantaginaceae, Poaceae на материале из Новосибирской области. Впервые для России приводится число хромосом для *Asclepias syriaca* L. (2*n* = 22), *Veronica filiformis* Sm. (2*n* = 14), *Setaria italica* (L.) P. Beauv. (2*n* = 18), *Sorghum drummondii* (Nees ex Steud.) Millsp. et Chase (2*n* = 20), для Азиатской части России – *Tanacetum parthenium* (L.) Sch. Bip. (2*n* = 18), *Campanula persicifolia* L. (2*n* = 16), *Genista tinctoria* L. (2*n* = 48), для Сибири – *Calendula officinalis* L. (2*n* = 32) и *Rudbeckia hirta* L. (2*n* = 38), для Новосибирской области – *Lapsana communis* L. (2*n* = 14) и *Silene noctiflora* L. (2*n* = 24). Для всех исследованных видов приводятся краткие сведения по общему распространению и расселению в Новосибирской области, литературные данные по числам хромосом с территории России.

Поступило в редакцию 15.11.2022
Принято к публикации 22.07.2023

Submitted 15.11.2022
Accepted 22.07.2023

We continue the karyological study of adventive species in the flora of the Novosibirsk Region (An'kova, Zykova, 2020, 2021; Zykova, Pankova, 2021; Zykova et al., 2022a). In this paper, we present the results for 12 species found in the Novosibirsk Region. Among them, *Dracocephalum thymiflorum* and *Veronica filiformis* are invasive species in the region, whereas *Asclepias syriaca*, *Lapsana communis*, and *Silene noctiflora* are potentially invasive (very active in other regions). The most species spread at various times from sites of introduction with the exception of *Lapsana communis, Silene noctiflora*, and *Dracocephalum thymiflorum* which are unintentionally entered.

Chromosome numbers were counted by direct observation in metaphase in root meristem squash preparations according to the method used by Zykova and Pankova (2021). Metaphase plates were observed under 100× magnification of the Axioscope 40 (Karl Zeiss, Axio Lab) microscope and photographed with an AxioCam MRc 5 digital camera. For all species, literature references on chromosome numbers known on material collected in Russia are given. Latin names of plants are provided according to the "Catalog of Life" (Hassler, 2023). Voucher specimens have been deposited to the Herbarium of the Central Siberian Botanical Garden SB RAS (NS, Novosibirsk).

Apocynaceae

Asclepias syriaca L., **2*n* = 22**

"Novosibirsk Region, Novosibirsk District, environs of Akademgorodok, mixed forest, adjacent to the old exposition areas of the Central Siberian Botanical Garden. 27 IX 2020. E. Zykova, Z894-2020" (NS0045583).

Distribution: The native area of *Asclepias syriaca* covers North America and adjacent areas of Canada. It was previously experimentally cultivated as a rubbery species and now is used as ornamental and melliferous plant. The species has widely settled in the countries of Central and Southern Europe, where it is prohibited for cultivation (*Asclepias syriaca,* 2023). In Siberia, it was first found outside of culture in the Altai Territory (Terekhina, 1998). Recently discovered in the Novosibirsk Region and the Republic of Altai (Ebel, Zykova, 2022).

The chromosome number was determined for the first time in Russia. The same chromosome number was reported for some countries of Eastern Europe (Rice et al., 2015).

Diploid (2*x*), *x* = 11.

Asteraceae

Calendula officinalis L., **2*n* = 32**

"Novosibirsk Region, Koltsovo City, edge of a wheat field, 54°54'49''N, 83°10'26''E. 17 VIII 2021. T. Pankova, E. Zykova, Z949-1721" (NS0045588) (Fig. 1A).

Distribution: Mediterranean species widely cultivated all around the world. In the Novosibirsk Region, it was recorded in the Novosibirsk agglomeration (Zykova, Shaulo, 2020, 2021; Zykova et al., 2022b). However, as the species easily spreads from cultivated sites, it can be found in other districts of the region.

This is the first report of the chromosome number for Siberia. The same number is determined for the Primorye Territory (Probatova, 2014, and references therein).

Tetraploid (4*x*), *x* = 8.

Lapsana communis L., **2*n* = 14**

"Novosibirsk Region, Novosibirsk City, Akademgorodok, Akademicheskaya Street, wasteland, 54°59'N, 83°00''E. 12 IX 2017. E. Zykova, Z621-7317" (NS0045584) (Fig. 1B).

Distribution: Euro-Mediterranean species with a Holarctic secondary range. Known in most regions of Southern Siberia (Ebel et al., 2014). It was first discovered in the Novosibirsk Region in 2017 in Akademgorodok of the Novosibirsk City (Shaulo, Zykova, 2018), where it still remains in these habitats.

This is the first report of the chromosome number for the Novosibirsk Region. The same chromosome complement has been published earlier from the Republic of Karelia and the Leningrad Region (Probatova et al., 2009), the Republic of North Ossetia-Alania (Probatova, Seledets, 2008), the Krasnodar Territory (Probatova et al., 2013), and from the Republic of Altai (Zykova et al., 2020).

Diploid (2*x*), *x* = 7.

Rudbeckia hirta L., **2*n* = 38**

"Novosibirsk Region, Ordynskoye District, the vicinity of the village of Yarki, between the highway and the forest belt, a forb-grass meadow. 9 VIII 2019. D. N. Shaulo, Z827" (NS) (Fig. 1C).

Distribution: North American species, widely cultivated as an ornamental plant, sometimes runs wild. In the Novosibirsk Region, outside of culture, it was first noted in the village Payvino (Krylov, Sergievskaya, 1964). To date, it is mentioned for the Novosibirsk City and surroundings (Zykova, 2019; Zykova, Shaulo, 2020; Zykova et al., 2022b).

This is the first report of the chromosome number for Siberia. The same number is determined for the Primorye Territory (Probatova, 2014, and references therein).

Diploid (2*x*), *x* = 19.

Tanacetum parthenium (L.) Sch. Bip. (*Pyrethrum parthenium* (L.) Sm.), **2*n* = 18**

"Novosibirsk Region, Novosibirsk City, Akademgorodok, Garden Association "Niva", near the roads. 02 IX 2021. E. Zykova, Z974-2221" (NS0047039) (Fig. 1D).

Distribution: European-Mediterranean species cultivated as ornamental plant, running wild. Outside of culture it was registered in Akademgorodok of the Novosibirsk City (Shaulo, Zykova, 2013, 2022).

This is the first report of the chromosome number for Asian Russia. The same chromosome number was determined in material from the Primorye Territory (Probatova, 2014, and references therein).

Diploid (2*x*), *x* = 9.

Campanulaceae

Campanula persicifolia L., **2*n* = 16**

"Novosibirsk Region, Novosibirsk District, Akademgorodok, mixed forest across the road from the old exhibition areas of the Central Siberian Botanical Garden. 16 IX 2020. E. Zykova, Z893-1320" (NS) (Fig. 1E).

Distribution: European species, occasionally cultivated. In the Novosibirsk Region, it was discovered as a wild in 2018; by now, it is known in the Novosibirsk City and its surroundings (Zykova, Shaulo, 2019, 2021).

This is the first report of the chromosome number for Asian Russia. The same chromosome number was mentioned for the Leningrad Region (Agapova et al., 1990).

Diploid (2*x*), *x* = 8.

Caryophyllaceae

Silene noctiflora L., **2*n* = 24**

"Novosibirsk Region, Novosibirsk District, Lozhok village, wasteland, 54°50'34"N, 83°11'35"E. 22 IX 2020. E. Zykova, Z887-1720" (NS0047041) (Fig. 1F).

Distribution: European species, distributed in the Northern Hemisphere. It is included in the list of invasive and potentially invasive species of Siberia (Ebel et al., 2014). In the Novosibirsk Region, only two localities of the species are known: on the territory of the Central Siberian Botanical Garden in the Novosibirsk City (Zykova et al., 2014) and in the village of Lozhok in the Novosibirsk District (Shaulo, Zykova, 2022).

This is the first report of the chromosome number for the Novosibirsk Region. The same number was recorded from the Republic of Altai (Lomonosova et al., 2018), the Sakhalin Region (Probatova et al., 2007, and references therein), the Krasnodar (Magulaev, 1992) and the Altai (An'kova et al., 2019) Territories. The number 2*n* = 36 was registered in material from the Altai Territory (An'kova et al., 2019).

Diploid (2*x*), *x* = 12.

Fabaceae

Genista tinctoria L., **2*n* = 48**

"Novosibirsk Region, Akademgorodok, Central Siberian Botanical Garden, birch-pine forest. 12 IX 2018. D. N. Shaulo, Z707" (NS).

Distribution: European species, often cultivated, rarely runs wild. In the Novosibirsk Region, outside of cultivation, it has been recorded in the Novosibirsk City (Akademgorodok) (Shaulo, 2000). To date, it has been registered in the Novosibirsk City and its surroundings (Zykova, 2019).

This is the first report of the chromosome number for Asian Russia. The same chromosome number was mentioned for the Stavropol Territory (Magulaev, 1980).

Tetraploid (4*x*), *x* = 12.

Lamiaceae

Dracocephalum thymiflorum L., **2*n* = 14**

"Novosibirsk Region, Novosibirsk City, Akademgorodok, forest edge along the descent to the "Ob Sea". 11 VI 2021. E. Zykova, Z959-0621" (NS0045585).

Distribution: European-Caucasian-Central Asian species, penetrated in Siberia and the Far East. On the territory of the Novosibirsk Region, it was already known by the beginning of the 20th century (Krylov, 1907). Now it is pointed out for 9 districts of the region (Zykova, 2019).

The same number was recorded from the Irkutsk Region (Chepinoga, 2014, and references therein), the Primorye (Probatova, 2014, and references therein) and the Khabarovsk (Probatova et al., 1991) Territories. The number 2*n* = 20 was registered in material from the Novosibirsk Region (Krasnikov, 1991).

Diploid (2*x*), *x* = 7.

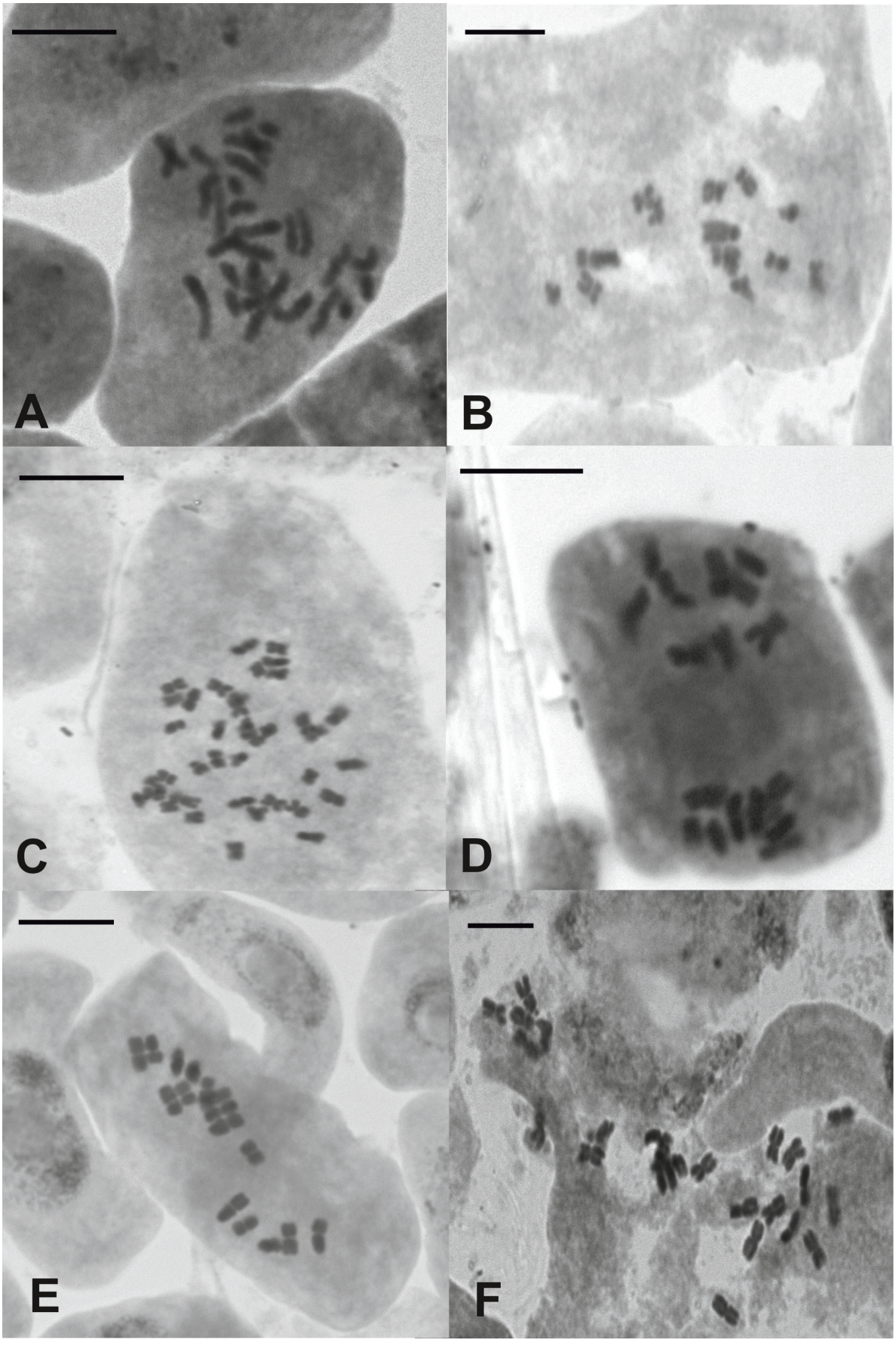

Fig. 1. Mitotic metaphases: A – *Calendula officinalis*, 2*n* = 32; B – *Lapsana communis*, 2*n* = 14; C – *Rudbeckia hirta*, 2*n* = 38; D – *Tanacetum parthenium*, 2*n* = 18; E – *Campanula persicifolia*, 2*n* = 16; F – *Silene noctiflora*, 2*n* = 24. Scale = 10 μm.

Plantaginaceae

Veronica filiformis Sm., **2*n* = 14**

"Novosibirsk Region, Novosibirsk City, Central Siberian Botanical Garden, parterre. 05 VI 2021. E. Zykova, Z960-0321" (NS0045587).

Distribution: Caucasian-West Asian species with a secondary Holarctic range. In Siberia, it is grown as a ground cover and easily runs wild. In the Novosibirsk Region, it was first discovered in 1998 in the valley of the river Zyryanka (Shaulo, Durnikin, 2001). By now, it has spread widely across Akademgorodok, where is abundant and gives a background when flowering (Zykova, 2019).

The chromosome number was determined for the first time in Russia. The same chromosome number was reported for Europe (Rice et al., 1915).

Diploid (2*x*), *x* = 7.

Poaceae

Setaria italica (L.) P. Beauv., **2*n* = 18**

"Novosibirsk Region, Maslyanino District, Penkovo village, the territory of the granary, near the buildings, 54°20'16"N, 83°59'47"E. 24 IX 2020. D. N. Shaulo, Z880" (NS0045586); "Novosibirsk Region, Maslyanino District, Penkovo village, the territory of the granary, near the buildings, 54°20'16"N, 83°59'47"E. 24 IX 2020. D. N. Shaulo, Z881" (NS0047038).

Distribution: Cultivated plant predominantly in subtropical regions of the Earth with an unknown primary range, rare in Siberia. It was found in the Novosibirsk Region in 2020 (Shaulo, Zykova, 2022).

The chromosome number was determined for the first time in Russia. The same chromosome number was reported for different countries of Eurasia (Rice et al., 1915).

Diploid (2*x*), *x* = 9.

Sorghum drummondii (Nees ex Steud.) Millsp. et Chase (*S. sudanense* (Piper) Stapf), **2*n* = 20**

"Novosibirsk Region, Maslyanino District, Penkovo village, the territory of the granary, near the buildings, 54°20'16"N, 83°59'47"E. 24 IX 2020. D. N. Shaulo, Z888" (NS0047040).

Distribution: An African species widely cultivated as a fodder plant, as adventive species is very rare in Siberia, found in the Novosibirsk Region in 2020 (Shaulo, Zykova, 2022).

The chromosome number was determined for the first time in Russia. The same chromosome number was reported for Europe, Near East and India (Rice et al., 2015), most counts were made on cultural material.

Tetraploid (4*x*), *x* = 5.

Conclusion

The study provides the first records of chromosome numbers for 12 alien species based on the material from the Novosibirsk Region. Most species are diploids. Three species are tetraploids: *Calendula officinalis, Genista tinctoria*, and *Sorghum drummondii*. Our data correlate with data on chromosome numbers determined on the material from the regions of East Siberia, the Far East, and European Russia.

Acknowledgements

The study was carried out as part of the Scientific Program № AAAA-A17-117012610055-3 of the Central Siberian Botanical Garden SB RAS. The pretreatment of sample with chemical reagents (colchicine, hematoxylin and chloral hydrate) were financially supported by the Ministry of Education and Science of Russia under Agreement № 075-15-2021-1056 of September 28, 2021 between the BIN RAS and the Ministry of Science and Higher Education of the Russian Federation, also under Agreement № ЕП/29-10-21-4 of October 29, 2021 between BIN RAN and CSBG SB RAS. In preparing the publication, materials from the bioresource scientific collections of the CSBG SB RAS UNU № USU 440537 (NS) were used.

REFERENCES / ЛИТЕРАТУРА

Agapova N. D., Arkharova K. B., Vakhtina L. I., Zemskova E. A., Tarvis L. V. 1990. *Chisla khromosom tsvetkovykh rasteniy flory SSSR: Aceraceae – Menyanthaceae* [*Chromosome numbers of flowering plants of the USSR flora: Aceraceae – Menyanthaceae*]. Leningrad: Nauka. 509 pp. [In Russian] (***Агапова Н. Д., Архарова К. Б., Вахтина Л. И., Земскова Е. А., Тарвис Л. В.*** Числа хромосом цветковых растений флоры СССР: Aceraceae – Menyanthaceae. Л.: Наука, 1990. 509 с.).

An'kova T. V., Zykova E. Yu. 2020. Chromosome numbers in some alien plant species of Novosibirsk Region (Novosibirsk City): post I. *Turczaninowia* 23, 3: 5–11. DOI: 10.14258/turczaninowia.23.3.1

An'kova T. V., Zykova E. Yu. 2021. Alien species in the Novosibirsk City, Russia. In: N. S. Probatova (ed.). Botanica Pacifica plant chromosome data 1. *Botanica Pacifica* 10(1): 110. DOI: 10.17581/bp.2021.10103

An'kova T. V., Zykova E. Yu., Ebel A. L. 2019. IAPT/IOPB chromosome data 31/2. Ed. K. Marhold. *Taxon* 68(6): 1375–1376; E6–E7. DOI: 10.1002/tax.12176

Asclepias syriaca. 2023. *In: EPPO Global database.* **URL:** https://gd.eppo.int/taxon/ASCSY (Accessed 25 July 2023)**.**

Chepinoga V. V. 2014. *Chromosome numbers of plant species from Baikal Siberia*. Novosibirsk: Nauka. 419 pp. [In Russian] (***Чепинога В. В***. Хромосомные числа растений флоры Байкальской Сибири. Новосибирск: Наука, 2014. 419 с.).

Ebel A. L., Strelnikova T. O., Kupriyanov A. N., Anenkhonov O. A., Ankipovich E. C., Antipova E. M., et al. 2014. Invasive and potential invasive species of Siberia. *Byull. Glavn. bot. sada (Moscow)* [*Bulletin Main Botanical Garden*] 1(200): 52–61. [In Russian] (***Эбель А. Л., Стрельникова Т. О., Куприянов А. Н., Аненхонов О. А., Анкипович Е. С., Антипова Е. М., и др.*** Инвазионные и потенциально инвазионные виды Сибири // Бюл. Глав. ботан. сада, 2014. № 1 (вып. 200). С. 52–61). URL: http://www.gbsad.ru/science/doc/biulleten_gbs_2014_200_1.pdf

Ebel A. L., Zykova E. Yu. 2022. *Asclepias syriaca* L. (Apocynaceae). In: A. V. Verkhozina (ed.). Findings to the flora of Russia and adjacent countries: New national and regional vascular plant records, 4. *Botanica Pacifica* 11(1): 132. DOI: 10.17581/bp.2022.11116

Hassler M. 2023. World Plants: Synonymic Checklists of the Vascular Plants of the World (version Nov 2018). In: Y. Roskov, G. Ower, T. Orrell, D. Nicolson, N. Bailly, P. M. Kirk, T. Bourgoin, R. E. DeWalt, W. Decock, E. van Nieukerken, L. Penev (eds.). *Species 2000 et ITIS Catalogue of Life*, 2020-08-01 Beta. Species 2000: Naturalis, Leiden, the Netherlands. URL: www.catalogueoflife.org/col (Accessed 25 July 2023).

Krasnikov A. A. 1991. Chromosome numbers in some species of vascular plants from Novosibirsk Region. *Bot. Zhurn.* 76(3): 476–479. [In Russian] (***Красников А. А.*** Числа хромосом некоторых видов сосудистых растений Новосибирской области // Бот. журн., 1991. Т. 76, № 3. С. 476–479).

Krylov P. N. 1907. *Dracocephalum* L. In: *Flora Altaya i Tomskoy gubernii* [*Flora of Altai and Tomsk province*]. Vol. 4. Tomsk. Pp. 1031–1045. [In Russian] (***Крылов П. Н.*** *Dracocephalum* L. // Флора Алтая и Томской губернии. Т. 4. Томск, 1907. С. 1031–1045).

Krylov P. N., Sergievskaya L. P. 1964. *Rudbeckia* L. In: *Flora Zapadnoy Sibiri* [*Flora of Western Siberia*]. Vol. 12(2). Tomsk: Tomsk University Press. P. 3482. [In Russian] (***Крылов П. Н., Сергиевская Л. П.*** *Rudbeckia* L. // Флора Западной Сибири. Т. 12(2). Томск: Изд-во ТГУ, 1964. С. 3482).

Lomonosova M. N., Zykova E. Yu., An'kova T. V. 2018. Chromosome numbers of invasive species of the Altai Republic flora. II. *Turczaninowia* 21, 4: 63–72. DOI: 10.14258/turczaninowia.21.4.7

Magulaev A. Yu. 1980. Chromosome numbers in some Fabaceae in the North Caucasus. *Bot. Zhurn.* 65(6): 836–843. [In Russian] (***Магулаев А. Ю.*** Хромосомные числа некоторых бобовых Северного Кавказа // Бот. журн., 1980. Т. 65, № 6. С. 836–843).

Magulaev A. Yu. 1992. Chromosome numbers in some species of vascular plants of the Northern Caucasus flora. *Bot. Zhurn.* 77(10): 88–90. [In Russian] (***Магулаев А. Ю.*** Хромосомные числа некоторых видов сосудистых растений Северного Кавказа // Бот. журн., 1992. Т. 77, № 10. С. 88–90).

Probatova N. S. 2014. *Khromosomnyye chisla sosudistykh rasteniy Primorskogo kraya* [*Chromosome numbers in vascular plants of the Primorye Territory*]. Vladivostok: Dalnauka. 343 pp. [In Russian] (***Пробатова Н. С.*** Хромосомные числа сосудистых растений Приморского края. Владивосток: Дальнаука, 2014. 343 с.).

Probatova N. S., Barkalov V. Yu., Rudyka E. G. 2007. *Kariologiya flory Sakhalina i Kurilskikh ostrovov. Chisla khromosom, taksonomicheskiye i fitogeograficheskiye kommentarii* [*Caryology of the flora of Sakhalin and the Kurile Islands. Chromosome numbers, taxonomic and phytogeographical comments*]. Vladivostok: Dalnauka. 392 pp. [In Russian] (***Пробатова Н. С., Баркалов В. Ю., Рудыка Э. Г.*** Кариология флоры Сахалина и Курильских островов. Числа хромосом, таксономические и фитогеографические комментарии. Владивосток: Дальнаука, 2007. 392 с.).

Probatova N. S., Kazanovskiy S. G., Rudyka E. G., Seledets V. P., Ovchinnikova S. V. 2013. IAPT/IOPB chromosome data 16. K. Marhold (ed.) *Taxon* 62(6): 1359–1360; E10–E13. DOI: 10.12705/626.41

Probatova N. S., Seledets V. P. 2008. IAPT/IOPB chromosome data 5. K. Marhold (ed.). *Taxon* 57(2): 555–558; E7–E16. URL: http://www.iapt-taxon.org/files/iopb/IAPT_IOPB_Chr_data5.pdf

Probatova N. S., Seledets V. P., Rudyka E. G., Gnutikov A. A., Kozhevnikova Z. V., Barkalov V. V. 2009. IAPT/IOPB chromosome data 8. K. Marhold (ed.). *Taxon* 58(4): 1284–1288; E11–E20. URL: www.iapt-taxon.org/files/iopb/IAPT_IOPB_Chr_data8.pdf

Probatova N. S., Sokolovskaya A. P., Rudyka E. G. 1991. Chromosome numbers in some species of vascular plants from the Soviet Far East and other regions of the USSR. *Bot. Zhurn.* 76(8): 1174–1178. [In Russian] (***Пробатова Н. С., Соколовская А. П., Рудыка Э. Г.*** Числа хромосом некоторых видов сосудистых растений Дальнего Востока и других регионов СССР // Бот. журн., 1991. Т. 76, № 8. С. 1174–1178).

Rice A., Glick L., Abadi S., Einhorn M., Kopelman N., Salman-Minkov A., Mayzel J., Chay O., Mayrose I. 2015. The Chromosome Counts Database (CCDB) – a community resource of plant chromosome numbers. *New Phytol.* 206(1): 19–25. DOI: 10.1111/nph.13191

Shaulo D. N. 2000. *Genista* L. In: *Opredelitel rasteniy Novosibirskoy oblasti* [*Key to plants of the Novosibirsk Region*]. Novosibirsk: Nauka. P. 233. [In Russian] (***Шауло Д. Н.*** *Genista* L. // Определитель растений Новосибирской области. Новосибирск: Наука, 2000. С. 233).

Shaulo D. N., Durnikin D. A. 2001. The floristic findings in South Siberia. *Turczaninowia* 4, 4: 73–75. [In Russian] (***Шауло Д. Н., Дурникин Д. А.*** Флористические находки в Южной Сибири // Turczaninowia, 2001. Т. 4, № 4. С. 73–75). URL: http://old.ssbg.asu.ru/turcz/p73-75.pdf

Shaulo D. N., Zykova E. Yu. 2013. Findings of adventive species in the Novosibirsk Region. *Rastitelnyy mir Aziatskoy Rossii* [*Plant Life of Asian Russia*] 1(11): 37–43. [In Russian] (***Шауло Д. Н., Зыкова Е. Ю.*** Находки адвентивных видов в Новосибирской области // Растительный мир Азиатской России, 2013. № 1(11). С. 37–43).

Shaulo D. N., Zykova E. Yu. 2018. New findings of some adventive and native plant species in Novosibirskaya Oblast. *Turczaninowia* 21, 3: 63–71. [In Russian] (***Шауло Д. Н., Зыкова Е. Ю.*** Новые находки адвентивных и аборигенных видов в Новосибирской области // Turczaninowia, 2018. Т. 21, № 3. С. 63–71). DOI: 10.14258/turczaninowia.21.3.8

Shaulo D. N., Zykova E. Yu. 2022. New and rare adventive species in the Novosibirsk region. *Rastitelnyy mir Aziatskoy Rossii* [*Plant Life of Asian Russia*] 15(2): 144–151. [In Russian] (***Шауло Д. Н., Зыкова Е. Ю.*** Новые и редкие адвентивные виды в Новосибирской области // Растительный мир Азиатской России, 2022. № 15(2). С. 144–151). DOI: 10.15372/RMAR20220205

Terekhina T. A. 1998. *Asclepias syriaca* L. – a new species for the Siberia flora. *Turczaninowia* 1, 2: 16–17. [In Russian] (***Терехина Т. А.*** *Asclepias syriaca* L. – новый вид для флоры Сибири // Turczaninowia, 1998. Т. 1, № 2. С. 16–17).

Zykova E. Yu. 2019. Alien flora of the Novosibirsk Region. *Acta Biologica Sibirica* 5, 4: 127–140. [In Russian] (***Зыкова Е. Ю.*** Адвентивная флора Новосибирской области // Acta Biologica Sibirica, 2019. Вып. 5, № 4. С. 127–140). DOI: 10.14258/abs.v5.i4.7147

Zykova E. Yu., An'kova T. V., Lomonosova M. N. 2020. Chromosome numbers of invasive and potentially invasive species in the flora of the Republic of Altai. III. *Turczaninowia* 23, 1: 133–139. DOI: 10.14258/turczaninowia.23.1.15

Zykova E. Yu., Korolyuk A. Yu, Korolyuk E. A., Lashchinskiy N. N. 2014. High vascular plants. In: *Rastitelnoye mnogoobraziye Tsentralnogo sibirskogo botanicheskogo sada SO RAN* [*Plant diversity of the Central Siberian Botanical Garden SB RAS*]. Novosibirsk: GEO Publ. Pp. 318–437. [In Russian] (***Зыкова Е. Ю., Королюк А. Ю., Королюк Е. А., Лащинский Н. Н.*** Высшие сосудистые растения // Растительное многообразие Центрального сибирского ботанического сада СО РАН. Новосибирск: Академическое изд-во «Гео», 2014. С. 318–437).

Zykova E. Yu., Pankova (An'kova) T. V. 2021. Chromosome numbers in some alien plant species of Novosibirsk Region: post II. *Turczaninowia* 24, 2: 12–18. DOI: 10.14258/turczaninowia.24.2.2

Zykova E. Yu., Pankova T. V., Lomonosova M. N. 2022a. Chromosome numbers in some alien plant species of Novosibirsk Region: post III. *Turczaninowia* 25, 2: 47–54. DOI: 10.14258/turczaninowia.25.2.3

Zykova E. Yu., Shaulo D. N. 2019. Finds in the adventive flora of Novosibirsk Oblast. *Turczaninowia* 22, 3: 110–115. [In Russian] (***Зыкова Е. Ю., Шауло Д. Н.*** Новинки в адвентивной флоре Новосибирской области // Turczaninowia, 2019. Т. 22, № 3. С. 110–115. DOI: 10.14258/turczaninowia.22.3.6

Zykova E. Yu., Shaulo D. N. 2020. Findings in the flora of Novosibirsk Region. *Turczaninowia* 23, 3: 58–66. [In Russian] (***Зыкова Е. Ю., Шауло Д. Н.*** Находки во флоре Новосибирской области // Turczaninowia, 2020. Т. 23, № 3. С. 58–66. DOI: 10.14258/turczaninowia.23.3.6

Zykova E. Yu., Shaulo D. N. 2021. New and rare species in the flora of the Novosibirsk Region. *Turczaninowia* 24, 2: 19–27. [In Russian] (***Зыкова Е. Ю., Шауло Д. Н.*** Новые и редко встречающиеся виды во флоре Новосибирской области // Turczaninowia, 2021. Т. 24, № 2. С. 19–27. DOI: 10.14258/turczaninowia.24.2.3

Zykova E. Yu., Shaulo D. N., Pankova T. V., Krivenko D. A. 2022b. Floristic findings of adventive species in the Novosibirsk Region. *Turczaninowia* 25, 3: 17–23. [In Russian] (***Зыкова Е. Ю., Шауло Д. Н., Панкова Т. В., Кривенко Д. А.*** Новинки в адвентивной флоре Новосибирской области // Turczaninowia, 2022. Т. 25, № 3. С. 17–23). DOI: 10.14258/turczaninowia.25.3.2