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Chromosome numbers of invasive and potentially invasive species in the flora of the Republic of Altai. Post V

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Summary. Chromosome numbers (2*n*) of 15 invasive and potentially invasive plant species from the families Asteraceae, Brassicaceae, Caryophyllaceae, Malvaceae, Onagraceae, Papaveraceae, Plantaginaceae, Poaceae, Polygonaceae, Portulacaceae, and Rosaceae are reported on the samples collected in the Republic of Altai. To determine the chromosome number (ploidy level), the method of direct counting was used. Among studied species, chromosome complements for *Persicaria orientalis* (2*n* = 22), *Potentilla norvegica* (2*n* = 42), *Veronica persica* (2*n* = 28) were first examined from Russia; for *Papaver rhoeas* (2*n* = 14) and *Rumex obtusifolius* (2*n* = 20) – from Asian part of Russia; for *Bromus squarrosus* (2*n* = 14), *Cosmos bipinnatus* (2*n* = 24), and *Eriochloa villosa* (2*n* = 54) – from Siberia. *Abutilon theophrasti* (2*n* = 42) and *Lepidium densiflorum* (2*n* = 32) were first studied from Western Siberia; *Epilobium ciliatum* subsp. *adenocaulon* (2*n* = 36), *Portulaca oleracea* (2*n* = 36), *Spergularia rubra* (2*n* = 36), and *Xanthium strumarium* (2*n* = 36) – from the Republic of Altai. Common distribution and the history of floristic findings of these species in the Republic of Altai are given. Previously published data on chromosome numbers from Russia are cited.

Числа хромосом инвазивных и потенциально инвазивных видов во флоре Республики Алтай: сообщение 5

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Ключевые слова: кариологическое изучение, расселение видов, Asteraceae, Brassicaceae, Caryophyllaceae, Malvaceae, Onagraceae, Papaveraceae, Plantaginaceae, Poaceae, Polygonaceae, Portulacaceae, Rosaceae.

Аннотация. Приводятся данные о числах хромосом (2*n*) для 15 инвазивных и потенциально инвазивных видов из семейств Asteraceae, Brassicaceae, Caryophyllaceae, Malvaceae, Onagraceae, Papaveraceae, Plantaginaceae, Poaceae, Polygonaceae, Portulacaceae, Rosaceae, полученные на материале из Республики Алтай. Для определения чисел хромосом (уровня плоидности) использован метод прямого подсчета. Впервые для России определено число хромосом у *Persicaria orientalis* (2*n* = 22), *Potentilla norvegica* (2*n* = 42) и *Veronica persica* (2*n* = 28); впервые для Азиатской части России – у *Papaver rhoeas* (2*n* = 14) и *Rumex obtusifolius* (2*n* = 20); впервые

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для Сибири – у *Bromus squarrosus* (2*n* = 14), *Cosmos bipinnatus* (2*n* = 24) и *Eriochloa villosa* (2*n* = 54); впервые для Западной Сибири – у *Abutilon theophrasti* (2*n* = 42) и *Lepidium densiflorum* (2*n* = 32); впервые для Республики Алтай – у *Epilobium ciliatum* subsp. *adenocaulon* (2*n* = 36), *Portulaca oleracea* (2*n* = 36), *Spergularia rubra* (2*n* = 36) и *Xanthium strumarium* (2*n* = 36). Для всех исследованных видов приводятся сведения по общему распространению, истории флористических находок и расселению на территории Республики Алтай, а также литературные данные по числам хромосом с территории России.

We continue the karyological study of invasive and potentially invasive species in the flora of Southern Siberia on the material from the Republic of Altai (Lomonosova et al., 2018; Zykova et al., 2018, 2020, 2021). This research provides data on the chromosome numbers of 15 species, most of which are invasive on the territory of the Republic of Altai. *Epilobium ciliatum* subsp. *adenocaulon* and *Lepidium densiflorum* are also included in the Black Book of the Flora of Siberia (Chernaya kniga …, 2016). The information on the history of floristic studies of examined species in the territory of the Republic of Altai is provided here. For each species, published data on the chromosome numbers determined from the territory of Russia are given. Latin names of plants are given according to the "Catalog of Life" (Hassler, 2021).

The chromosome numbers were determined by direct counting in metaphase on root meristem squash preparations, via the method described earlier (Zykova el al., 2018). Metaphase plates were observed under 100× magnification by the Axioscope 40 (Karl Zeiss, Axio Lab) and photographed by the AxiCam MRc 5 digital camera (AxioVision 4.8 software).

The herbarium specimens (vouchers) are deposited in the Herbarium of the Central Siberian Botanical Garden SB RAS (NS).

ASTERACEAE

Cosmos bipinnatus Cav., **2*n* = 24**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, Protochnaya street, wasteland, 51°58′N, 85°55′E. 18 VIII 2017. E. Zykova", Z524–6017.

Annual. North American species (Protopopova, 1994). It is cultivated in many regions, including Siberia, as an ornamental plant. Plants may reappear via self-sowing, becoming a weed. In the Republic of Altai, it is common as a weed in the northern regions, where it was shown for the first time outside of culture from the Altai Reserve and the Mayma district (Zolotukhin, 2012).

The chromosome number was determined on the Siberian material for the first time. The same number was known from Primorye Territory (Probatova, 2014, and references therein).

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

Xanthium strumarium L., **2*n* = 36**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, Choros-Gurkina street near the Mebelny stop, pebbled bank of the Mayma river, 51°58′N, 85°55′E. 21 VIII 2017. E. Zykova", Z898–6617; "Russian Federation, the Republic of Altai, Gorno-Altaysk city, Shosseynaya street, wasteland, 51°58′ N, 85°55′E. 22 VIII 2017. E. Zykova", Z899–6717.

Annual. Distributes all over the world as an invasive species (Protopopova, 1994). Since the beginning of the 20th century, it spread in the regions of Siberia. In the Republic of Altai it was first discovered in the middle of the 20th century in the village of Cherny Anuy in Ust-Kan district (Krylov, 1949). At present, it is common on the banks of water bodies and in disturbed habitats in the northern regions of the Republic of Altai (Zykova, 2015).

The chromosome number is reported for the first time for the Republic of Altai. The same number was determined from Novosibirsk Region (Lomonosova, 2013), Altai (Chisla khromosom …, 1990) and Primorye (Probatova, 2014, and references therein) Territories.

Tetraploid (4*x*), *x* = 9.

BRASSICACEAE

Lepidium densiflorum Schrad., **2*n* = 32**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, Stroiteley street, by the roads, 18 VI 2020. E. Zykova", Z844–0220.

Annual. A North American species widely dispersed in the Northern Hemisphere, penetrating into the Southern Hemisphere (Kotov, 1979). Since the middle of the 20th century, the first localities in Siberia (including Altai) have been recorded. As invasive species, it is included in the Black Book of the Flora of Siberia (Ebel, 2016). It is one of the most widespread alien species in the Republic of Altai, common in the northern regions, occasionally found in the central ones (Zykova, 2015).

The chromosome number is given for the first time from the Western Siberia. The same number was determined from Republic of Buryatia (Chepinoga, 2014, and references therein), Khabarovsk Territory (Probatova, Sokolovskaya, 1988), Magadan (Probatova et al., 2012) and Amur (Probatova et al., 1996) Regions. The diploid level of the species ($2n$ = 16) registered in the Republic of Sakha (Yakutia) (Lomonosova, 2013) may belong to another related species.

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

CARYOPHYLLACEAE

Spergularia rubra (L.) J. Presl et C. Presl, **$2n$ = 36**

"Russian Federation, the Republic of Altai, Turochak district, Iogach village, stadium, 51°46′N, 87°15′E. 29 VI 2017. E. Zykova", Z338–2617.

Annual or biennial. European species spread throughout the continent (Tzvelev, 2004). It was collected for the first time in the Republic of Altai (Turochak district) in 1996 (Studenikina, 1999), where it had been known to date only from pebbles, water bodies, roadsides (Zykova, 2015).

The chromosome number is given for the first time for the Republic of Altai. The same number was identified from Tyumen Region (Erst et al., 2018). Diploid level of species ($2n$ = 18) was determined for the Republic of Buryatia (Probatova et al., 2016).

Tetraploid ($4x$), x = 9.

MALVACEAE

Abutilon theophrasti Medic., **$2n$ = 42**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, near the hippodrome, wasteland, 51°58′N, 85°55′E. 18 VIII 2018. E. Zykova", Z676–2718.

Annual. East Asian species cultivated as an ornamental plant, widely dispersed in the temperate zone of both hemispheres. In Siberia, single localities have been recorded since the end of the 20th century; in the Republic of Altai it was first discovered in 2018 (Ebel et al., 2018).

The chromosome number is given for the first time for Western Siberia. The same number was determined from Primorye Territory (Probatova, 2014, and references therein), Irkutsk (Chepinoga, 2014, and references therein) and Amur (Shatokhina, 2006) Regions. Tetraploid level ($2n$ = 28) was determined for the Krasnodar Territory (Probatova et al., 2009).

Hexaploid ($6x$), x = 7.

ONAGRACEAE

Epilobium ciliatum subsp. ***adenocaulon*** (Hausskn.) Jäger ex Hand et Buttler, **$2n$ = 36**

"Russian Federation, the Republic of Altai, Mayma district, vicinity of Kysyl-Ozek village, bank of the Saydys river, 51°58′N, 85°55′E. 15 VIII 2018. E. Zykova", Z816–2518.

Perennial. An American species that settled in Eurasia and Australia (Skvortsov, 2005). It was noted in Russia at the end of the 19th century (Skvortsov, 1995). Since the end of the 20th century, it actively spreads in the regions of Siberia including the Republic of Altai (Zykova, 2015). This species is usually found as an invasive species and is listed in the Black Book of Flora of Siberia (Buko, 2016).

The chromosome number is given for the first time for the Republic of Altai. The same number was determined from Krasnoyarsk Territory (Stepanov, Muratova, 1992), Irkutsk (Chepinoga, 2014, and references therein) and Sakhalin (Probatova et al., 2006a) Regions.

Tetraploid ($4x$), x = 9.

PAPAVERACEAE

Papaver rhoeas L., **$2n$ = 14**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, at the Rodnik stop, the bank of the Mayma river, 51°58′N, 85°55′E. 15 VII 2019. E. Zykova", Z803–0419.

Annual. Its native range is from SW Asia and the E Mediterranean (Kadereit, 1997). One of the most widespread species of *Papaver* found from forest to desert areas (Nikitin, 1983). In Siberia, it was noted as a wild in the Tyumen Region (Krylov, 1931). In the Republic of Altai, it was first discovered in 2014 in the city of Gorno-Altaysk (Zykova, 2014), where it is now quite common.

The chromosome number is given for the first time for the asian part of Russia. The same number was determined from Leningrad Region (Safonova, 1991).

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

PLANTAGINACEAE

Veronica persica Poir., **$2n$ = 28**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, near the hippodrome, wasteland, 51°58′N, 85°55′E. 18 VIII 2018. E. Zykova", Z682–2718; Z683–2718.

Annual. Eurasian species, very rare in Siberia. It was first found in Tomsk (Muldiyarov, 1996), later in Novosibirsk and Kemerovo Regions (Ebel et al., 2016); in the Republic of Altai, it was found in 2016

in the Turochak district (Ebel et al., 2016), and in 2018 in the city of Gorno-Altaysk (Zykova, 2019).

The chromosome number was determined in Russia for the first time.

Tetraploid (4*x*), *x* = 7.

POACEAE

Bromus squarrosus L., **2*n* = 14**

"Russian Federation, the Republic of Altai, Mayma district, vicinity of Rybalka village, wasteland on the territory of the Altai Valley base, 51°55′N, 85°51′E. 18 VIII 2015. E. Zykova", Z755–5215; "Russian Federation, the Republic of Altai, Mayma district, vicinity of Mayma village, wasteland on gravel heaps, 52°02′N, 85°54′E. 12 VIII 2017. E. Zykova", Z758–4917; "Russian Federation, the Republic of Altai, bypass road between the city of Gorno-Altaysk and the village of Mayma, on gravel heaps, 51°97′N, 85°86′E. 28 VIII 2018. E. Zykova", Z757–2818.

Annual. The species is native in Europe, North Africa, Asia and spreads over the extratropical regions (Tzvelev, Probatova, 2019). A very rare species in Siberia, recorded in the Altai and Krasnoyarsk Territories (Peshkova, 1990). In the Republic of Altai, it was first discovered in 2015; at present, it is rarely found in the city of Gorno-Altaysk and in the Mayma district (Zykova, 2020).

The chromosome number was determined for the first time on the Siberian material. The same chromosome number was known for the Volgograd Region, Republic of Crimea (Chisla khromosom …, 1993), Krasnodar (Probatova et al., 2009) and Primorye (Probatova, 2014, and references therein) Territories, Astrakhan Region (Probatova et al., 2010).

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

Eriochloa villosa (Thunb.) Kunth, **2*n* = 54**

"Russian Federation, the Republic of Altai, bypass road between the city of Gorno-Altaysk and the village of Mayma, on gravel heaps, 51°97′N, 85°86′E. 28 VIII 2018. E. Zykova", Z897–2818.

Annual. It occurs in tropical and subtropical countries of both hemispheres (Tzvelev, Probatova, 2019). In Siberia, it was first found in the vicinity of the Omsk city (Krylov, Sergievskaya, 1961). Recently two localities were found in Altai Territory (Lomonosova, 2003) and Tomsk Region (Ebel et al., 2009). In the Republic of Altai, it was found in 2017 (Zykova et al., 2019) as a small population in the vicinity of the village of Mayma (Mayma district), which has been preserved for 4 years.

The chromosome number was determined for the first time on the Siberian material. The same chromosome number was known for the Kabardino-Balkarian Republic (Chisla khromosom …, 1993), Amur Region (Probatova et al., 2008a), Khabarovsk (Probatova et al., 1996) and Primorye (Probatova, 2014, and references therein) Territories.

Hexaploid (6*x*), *x* = 9.

Triticum aestivum L., **2*n* = 42**

"Russian Federation, the Republic of Altai, Mayma district, near the village of Mayma, at the customs post, the outskirts of the field, 52°02′N, 85°54′E. 01 VIII 2015. E. Zykova", Z431–3015; "Russian Federation, the Republic of Altai, Mayma district, near the bridge over the Katun river to the village of Platovo, by the road, 52°04′N, 85°55′E. 01 VIII 2015. E. Zykova", Z432–3115.

Annual. Cultivated all over the world (Tzvelev, Probatova, 2019). In the Republic of Altai, it is rarely found in the northern regions along the roads, in ruderal habitats (Zykova, 2015).

Hexaploid (6*x*), *x* = 7.

POLYGONACEAE

Persicaria orientalis (L.) Spach, **2*n* = 22**

"Russian Federation, the Republic of Altai, Gorno-Altaysk city, Protochnaya street, wasteland, 51°58′N, 85°55′E. 18 VIII 2017. E. Zykova", Z760–6017.

Annual. Native to SE Asia and northern Australia, where it grows on riverside sands and pebbles, as well as in disturbed habitats (Tzvelev, 1996; Mayorov et al., 2012). In Siberia, it was recently noted as alien plant in Irkutsk city (Verkhozina et al., 2019). This species was found in the Republic of Altai in 2017 (Ebel, Zykova, 2020).

The chromosome number was determined in Russia for the first time.

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

Rumex obtusifolius L., **2*n* = 20**

"Russia, the Republic of Altai, Mayma district, vicinity of Rybalka village, wasteland at a construction site, 51°55′N, 85°51′E. 2 VIII 2015. E. Zykova", Z872–3315; "Russian Federation, the Republic of Altai, Turochak district, vicinity of Turochak village, wasteland, 52°15′N, 87°07′E. 07 VIII 2015. E. Zykova", Z873–3815; "Russian Federation, the Republic of Altai, Turochak district, Altai State Reserve, Baygazan cordon, weed on the estate, 51°45′N, 87°26′E. 14 VIII 2017. E. Zykova", Z871–5217; "Russian Federation, the Republic of

Altai, Gorno-Altaysk city, Zhilmassiv microdistrict, by the stream, 51°58′N, 85°55′E. 12 VIII 2017. E. Zykova", Z877–1918.

Perennial. The European species that actively spreads in the regions of Southern Siberia (Ebel et al., 2016). In the Republic of Altai, it was known earlier only from Choya and Turochak districts (Zykova, 2015); at present, it is actively settling in the city of Gorno-Altaysk and Mayma district.

The chromosome number is given for the first time for the Asian part of Russia. The same number was determined from Krasnodar Territory (Probatova et al., 2009). Tetraploid level ($2n$ = 40) was noted for the Sakhalin Region (Probatova, et al., 2007, and references therein). Two chromosome numbers ($2n$ = 24 and $2n$ = 36) were determined for the Krasnoyarsk Territory (Stepanov, Muratova, 1995).

Diploid ($2x$), x = 10.

PORTULACACEAE

Portulaca oleracea L., **$2n$ = 36**

"Russian Federation, the Republic of Altai, Turochak district, Altai State Reserve, Baygazan cordon, weed on the estate, 51°45′N, 87°26′E. 14 VIII 2017. E. Zykova", Z896–5217.

Annual. The Mediterranean-Asian species is almost cosmopolitan as an adventive one. In recent years, it has been actively spreading in Southern Siberia (Ebel et al., 2015). In the Republic of Altai, it was first found in 2008 (Zykova, Erst, 2012). Now it settles in the northern regions (Zykova et al., 2019).

The chromosome number is given for the first time for the Republic of Altai. The same number was determined from Primorye Territory (Probatova, 2014, and references therein) and Amur Region (Probatova et al., 2006b). Diploid level ($2n$ = 18) was determined for the Amur Region (Probatova et al., 2008b) and Primorye Territory (Probatova, 2014, and references therein). Hexaploid level ($2n$ = 54) was determined for the Khabarovsk (Probatova et al., 2006b) and Altai (An'kova, Zykova, 2017) Territories.

Tetraploid ($4x$), x = 9.

ROSACEAE

Potentilla norvegica L., **$2n$ = 42**

"Russian Federation, the Republic of Altai, Mayma district, Kysyl-Ozek village, wasteland at the bridge over the Mayma river, 51°53′N, 86°00′E. 07 VIII 2015. E. Zykova", Z422–3515; "Russian Federation, the Republic of Altai, Turochak district, on the 44th km of the Turochak–Artybash highway, by the road, 08 VIII 2015. E. Zykova", Z420–4215.

Annual or biennial. This species has the Holarctic area (Kamelin, 2001). In Siberia, it was widespread to the beginning of the 20th century (Krylov, 1903). In the Republic of Altai it was known for a long time only from Turochak district (Krylov, 1933). Now it is common in Choya and Turochak districts; rarely recorded in Mayma, Onguday and Ust-Koksa ones (Zykova, 2015).

The chromosome number was determined for the first time in Russia. Octoploid level ($2n$ = 56) was mentioned for the Irkutsk Region, the Republic of Buryatia, Trans-Baikal Territory (Chepinoga, 2014, and references therein), Republic of Sakha (Yakutia), Khabarovsk Territory (Chisla khromosom …, 1993), Primorye (Probatova, 2014, and references therein) and Krasnoyarsk (Chepinoga et al., 2012) Territories, Magadan (Probatova et al., 2012), Sakhalin (Probatova et al., 2007, and references therein) and Amur (Probatova et al., 2013) Regions. Nanoploid ($2n$ = 63) was determined for the Republic of Buryatia (Chepinoga, 2014, and references therein). Decaploid ($2n$ = 70) was reported for the Irkutsk Region, Republic of Buryatia (Chepinoga, 2014, and references therein), Novosibirsk and Leningrad Regions (Chisla khromosom …, 1993). *Potentilla norvegica* is an allopolyploid species, which ploidy level ranges from tetraploid ($4x$) to dodecaploid ($12x$) (Persson et al., 2020).

Hexaploid ($6x$), x = 7.

Conclusion

So far, we have studied 64 invasive and potentially invasive species from the territory of the Republic of Altai. This report presents the results of the study of chromosome numbers of 15 species. 10 of them are polyploids, namely *Abutilon theophrasti*, *Epilobium ciliatum* subsp. *adenocaulon*, *Eriochloa villosa*, *Lepidium densiflorum*, *Portulaca oleracea*, *Potentilla norvegica*, *Spergularia rubra*, *Triticum aestivum*, *Veronica persica*, and *Xanthium strumarium*. Among the 15 studied species, the most active in the Republic of Altai are diploids *Rumex obtusifolius*, *Cosmos bipinnatus*, tetraploids *Epilobium ciliatum*, *Lepidium densiflorum*, *Portulaca oleracea*, *Spergularia rubra, Xanthium strumarium*, and hexaploid *Potentilla norvegica*.

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REFERENCES / ЛИТЕРАТУРА

An'kova T. V., Zykova E. Yu. 2017. IAPT/IOPB chromosome data 25. K. Marhold (Ed.). *Taxon* 66(5): 1246; E1–E2. DOI: 10.12705/665.29

Buko T. E. 2016. *Epilobium adenocaulon* Hausskn. In: *Chyernaya kniga flory Sibiri* [*Black book of the flora of Siberia*]. Novosibirsk: "Geo" Publ. Pp. 284–287. [In Russian] (***Буко Т. Е.*** *Epilobium adenocaulon* Hausskn. // Черная книга флоры Сибири. Новосибирск: Академическое изд-во «Гео», 2016. С. 284–287).

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.).

Chepinoga V. V., Gnutikov A. A., Lubogoschinsky P. I., Fleckenstein K. M. 2012. IAPT/IOPB chromosome data 13. K. Marhold (Ed.). *Taxon* 61(4): 889–891; E5–E10. DOI: 10.1002/tax.614023

Chernaya kniga flory Sibiri [*Black book of the flora of Siberia*]. Novosibirsk: "Geo" Publ. 440 pp. [In Russian] (*Черная книга флоры Сибири.* Новосибирск: Академическое изд-во «Гео», 2016. 440 с.).

Chisla khromosom tsvetkovykh rasteniy flory SSSR: Aceraceae–Menyanthaceae [*Chromosome numbers of flowering plants of the USSR flora: Aceraceae – Menyanthaceae*]. 1990. A. L. Takhtadzhyan (Ed.). Vol. 1. Leningrad: Nauka. 509 pp. [In Russian] (*Числа хромосом цветковых растений флоры СССР: Aceraceae – Menyanthaceae*. Под ред. акад. А. Л. Тахтаджяна. Т. 1. Л.: Наука, 1990. 509 с.).

Chisla khromosom tsvetkovykh rasteniy flory SSSR: Moraceae – Zygophyllaceae [*Chromosome numbers of flowering plants of the USSR flora: Moraceae – Zygophyllaceae*]. 1993. A. L. Takhtadzhyan (Ed.). Vol. 2. St. Petersburg: Nauka. 480 pp. [In Russian] (*Числа хромосом цветковых растений флоры СССР: Moraceae–Zygophyllaceae*. Под ред. акад. А. Л. Тахтаджяна. Т. 2. СПб.: Наука, 1993. 480 с.).

Ebel A. L. 2016. *Lepidium densiflorum* Schrad. In: *Chernaya kniga flory Sibiri* [*Black book of the flora of Siberia*]. Novosibirsk: "Geo" Publ. Pp. 162–168. [In Russian] (***Эбель А. Л.*** *Lepidium densiflorum* Schrad. // Черная книга флоры Сибири. Новосибирск: Академическое изд-во «Гео», 2016. С. 162–168).

Ebel A. L., Sheremetova S. A., Buko T. E. 2009. Floristic finds in the Tom basin (Western Siberia). *Bull. Moscow Soc. Natur. Biol. Ser.* 114, 3: 65–67. [In Russian] (***Эбель А. Л., Шереметова С. А., Буко Т. Е.*** Флористические находки в бассейне Томи (Западная Сибирь) // Бюл. МОИП. Отд. биол., 2009. Т. 114, вып. 3. С. 65–67).

Ebel A. L., Verkhozina A. V., Zykova E. Yu., Strelnikova T. O., Khrustaleva I. A., Sheremetova S. A., Mikhailova S. I., Ebel T. V., Murashko V. V. 2018. New findings of alien plant species in Siberia. *Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ.* [*Systematic notes on the materials of P. N. Krylov Herbarium of Tomsk state University*] 118: 50–63. [In Russian] (***Эбель А. Л., Верхозина А. В., Зыкова Е. Ю., Стрельникова Т. О., Хрусталева И. А., Шереметова С. А., Михайлова С. И., Эбель Т. В., Мурашко В. В.*** Новые находки чужеродных видов растений в Сибири // Сист. зам. Герб. Томск. ун-та, 2018. № 118. С. 50–63. DOI: 10.17223/20764103.118.4

Ebel A. L., Zykova E. Yu. 2020. *Persicaria orientalis* (L.) Spach (Polygonaceae). In: *Findings to the flora of Russia and adjacent countries: New national and regional vascular plant records*, 2. A. V. Verkhozina (Ed.). *Botanica Pacifica* 9(1): 144. DOI: 10.17581/bp.2020.09115

Ebel A. L., Zykova E. Yu., Verkhozina A. V., Chepinoga V. V., Kazanovsky S. G., Mikhailova S. I. 2015. New and rare species in adventitious flora of Southern Siberia. *Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ.* [*Systematic notes on the materials of P. N. Krylov Herbarium of Tomsk State University*] 111: 16–32. [In Russian] (***Эбель А. Л., Зыкова Е. Ю., Верхозина А. В., Чепинога В. В., Казановский С. Г., Михайлова С. И.*** Новые и редкие виды в адвентивной флоре Южной Сибири // Сист. зам. Герб. Томск. ун-та, 2015. № 111. С. 16–32). DOI: 10.17223/20764103.111.2

Ebel A. L., Zykova E. Yu., Verkhozina A. V., Mikhaylova S. I., Prokopyev A. S., Strelnikova T. O., Sheremetova S. A., Khrustaleva I. A. 2016. New data on distribution of alien and synanthropic plant species in Siberia. *Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ.* [*Systematic notes on the materials of P. N. Krylov Herbarium of Tomsk state University*] 114: 16–37. [In Russian] (***Эбель А. Л., Зыкова Е. Ю., Верхозина А. В., Михайлова С. И., Про-***

копьев А. С., Стрельникова Т. О., Шереметова С. А., Хрусталева И. А. Новые сведения о распространении в Сибири чужеродных и синантропных видов растений // Сист. зам. Герб. Томск. ун-та, 2016. № 114. С. 16–37). DOI: 10.17223/20764103.114.4

Erst A. S., Mitrenina E. Yu., Sukhorukov A. P., Kuznetsov A. A., Kuzmin I. V., Luferov A. N., Xiang K., Wang W. 2018. IAPT/IOPB chromosome data 27. K. Marhold (Ed.). *Taxon* 67(5): 1042–1043; E6–E8.

Hassler M. 2021. World Plants: Synonymic Checklists of the Vascular Plants of the World (version Nov 2018). In: Species 2000 and ITIS Catalogue of Life, 2020-08-01 Beta. 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: Naturalis, Leiden, the Netherlands. URL: www.catalogueoflife.org/col (Accessed 10 November 2021).

Kadereit J. W. 1997. The genus *Papaver* L. in the Mediterranean area. *Lagascalia* 19: 83–92. URL: institucional.us.es/revistas/lagascalia/19/The%20genus%20Kadereit.pdf

Kamelin R. V. 2001. *Potentilla* L. In: *Flora yevropeyskoy chasti SSSR* [*Flora of the European part of the USSR*]. Vol. 10. St. Petersburg: “Mir i semya” Publ. Pp. 394–452. [In Russian] (***Камелин Р. В.*** *Potentilla* L. // Флора европейской части СССР. Т. 10. СПб.: «Мир и семья». С. 394–452).

Kotov M. I. 1979. *Lepidium* L. In: *Flora Yevropeyskoy chasti SSSR* [*Flora of the European part of the USSR*]. Vol. 4. Leningrad: Nauka. Pp. 56–61. [In Russian] (***Котов М. И.*** *Lepidium* L. // Флора европейской части СССР. Л.: Наука, 1979. Т. 4. С. 56–61).

Krylov P. N. 1903. *Potentilla* L. In: *Flora Altaya i Tomskoy gubernii* [*Flora of Altai and Tomsk province*]. Vol. 2. Tomsk. Pp. 365–395. [In Russian] (***Крылов П. Н.*** *Potentilla* L. // Флора Алтая и Томской губернии. Т. 2. Томск, 1903. С. 365–395).

Krylov P. N. 1931. *Papaver* L. In: *Flora Zapadnoy Sibiri* [*Flora of Western Siberia*]. Vol. 6. Tomsk: Tomsk University Press. Pp. 1234–1239. [In Russian] (***Крылов П. Н.*** *Papaver* L. // Флора Западной Сибири. Т. 6. Томск: изд-во ТГУ, 1931. С. 1234–1239).

Krylov P. N. 1933. *Potentilla* L. In: *Flora Zapadnoy Sibiri* [*Flora of Western Siberia*]. Vol. 7. Tomsk: Tomsk University Press. Pp. 1481–1519. [In Russian] (***Крылов П. Н.*** *Potentilla* L. // Флора Западной Сибири. Т. 7. Томск: изд-во ТГУ, 1933. С. 1481–1519).

Krylov P. N. 1949. *Cosmos* Cav. In: *Flora Zapadnoy Sibiri* [*Flora of Western Siberia*]. Vol. 11. Tomsk: Tomsk University Press. Pp. 2714. [In Russian] (***Крылов П. Н.*** *Cosmos* Cav. // Флора Западной Сибири. Т. 11. Томск: изд-во ТГУ, 1949. С. 2714).

Krylov P. N., Sergievskaya L. P. 1961. *Eriochloa* H. B. In: *Flora Zapadnoy Sibiri* [*Flora of Western Siberia*]. Vol. 12(1). Tomsk: Tomsk University Press. P. 3083. [In Russian] (***Крылов П. Н., Сергиевская Л. П.*** *Eriochloa* H. B.// Флора Западной Сибири. Т. 12(1). Томск: изд-во ТГУ, 1961. С. 3083).

Lomonosova M. N. 2003. *Eriochloa* Kunth. In: *Opredelitel rasteniy Altayskogo kraya* [*Key to plant identification of Altaiskiy krai*]. Novosibirsk: Nauka. P. 583. [In Russian] (***Ломоносова М. Н.*** *Eriochloa* Kunth // Определитель растений Алтайского края. Новосибирск: Наука, 2003. С. 583).

Lomonosova M. N. 2013. IAPT/IOPB chromosome data 16. K. Marhold (Ed.). *Taxon* 62(6): 1358–1359; E8–E10. DOI: 10.12705/626.41

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

Mayorov S. R., Bochkin V. D., Nasimovich Yu. A., Shcherbakov A. V. 2012. *Adventivnaya flora Moskvy i Moskovskoy oblasti* [*Adventive flora of the Moscow and the Moscow Region*]. Moscow: KMK Scientific Press Ltd. 412 pp. [In Russian] (***Майоров С. Р., Бочкин В. Д., Насимович Ю. А., Щербаков А. В.*** Адвентивная флора Москвы и Московской области. М.: Тов-во науч. изд. КМК, 2012. 412 с.).

Muldiyarov E. Ya., Pyak A. I., Ebel A. L. 1996. The new species of mosses and vascular plants for flora of the Tomsk Region. *Bot. Zhurn.* 81(5): 90–93. [In Russian] (***Мульдияров Е. Я., Пяк А. И., Эбель А. Л.*** Новые для флоры Томской области виды мохообразных и сосудистых растений // Бот. журн., 1996. Т. 81, № 5. С. 90–93).

Nikitin V. V. 1983. *Sornyye rasteniya flory SSSR* [*Weed plants of the flora of the USSR*]. Leningrad: Nauka. 454 pp. [In Russian] (***Никитин В. В.*** Сорные растения флоры СССР. Л.: Наука, 1983. 454 с.).

Persson N. L., Eriksson T., Smedmark J. E. E. 2020. Complex patterns of reticulate evolution in opportunistic weeds (*Potentilla* L., Rosaceae), as revealed by low-copy nuclear markers. *BMC Evolutionary Biology* 20, 38: 1–17. DOI: 10.1186/s12862-020-1597-7

Peshkova G. A. 1990. *Bromus* L. In: *Flora Sibiri* [*Flora of Siberia*]. Vol. 2. Novosibirsk: Nauka. Pp. 65–68. [In Russian] (***Пешкова Г. А.*** *Bromus* L. // Флора Сибири. Т. 2. Новосибирск: Наука, 1990. С. 65–68).

Probatova N. S. 2014. *Khromosomnyye chisla sosydistykh rasteniy Primorskogo kraya* [*Chromosome numbers in vascular plants of the Primorye Territory (Russian Far East)*]. 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. *Kariologia 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., Barkalov V. Yu., Rudyka E. G., Pavlova N. S. 2006a. Further chromosome studies on vascular plant species from Sakhalin, Moneron and Kurile Islands. *Biodiversity and Biogeography of the Kuril Islands and Sakhalin* 2: 93–110. URL: http://hdl.handle.net/2115/47822

Probatova N. S., Kazanovsky S. G., Barkalov V. Yu., Nechaev V. A. 2016. IAPT/IOPB chromosome data 22. K. Marhold (Ed.). *Taxon* 65 (5): 1203–1204; E13–E15. DOI: 10.12705/655.40

Probatova N. S., Kazanovsky S. G., Rudyka E. G., Seledets V. P., Nechaev V. A. 2012. IAPT/IOPB chromosome data 13. K. Marhold (Ed.). *Taxon* 61(4): 889–902; E34–E42. DOI: 10.1002/tax.614023

Probatova N. S., Korobkov A. A., Gnutikov A. A., Rudyka E. G., Kotseruba V. V., Seledets V. P. 2010. IAPT/IOPB chromosome data 10. K. Marhold (Ed.). *Taxon* 59 (6): 1935–1937; E6–E10. URL: www.iapt-taxon.org/files/iopb/IAPT_IOPB_Chr_data10.pdf

Probatova N. S., Motorykina T. N., Rudyka E. G., Kriukova M. V., Nechaev V. A. 2013. IAPT/IOPB chromosome data 15. K. Marhold (Ed.). *Taxon* 62 (5): 1081–1082; E26–E29. DOI: 10.12705/625.16

Probatova N. S., Rudyka E. G., Seledets V. P., Nechaev V. A. 2008a. IAPT/IOPB chromosome data 6. K. Marhold (Ed.). *Taxon* 57 (4): 1268–1271; E4–E12. URL: www.iapt-taxon.org/files/iopb/IAPT_IOPB_Chr_data6.pdf

Probatova N. S., Rudyka E. G., Shatokhina A.V., Barkalov V. Yu., Kryukova M.V., Tsyrenova D. Yu. 2006b. Chromosome numbers of some plant species of the Primkorsky Territory and the Amur River basin. *Bot. Zhurn.* 91(5): 785–804. [In Russian] (***Пробатова Н. С., Рудыка Э. Г., Шатохина А. В., Баркалов В. Ю., Крюкова М. В., Цыренова Д. Ю.*** Числа хромосом видов флоры Приморского края и Приамурья // Бот. журн., 2006b. Т. 91, № 5. С. 785–804).

Probatova N. S., Rudyka E. G., Sokolovskaya A. P. 1996. Chromosome numbers in synanthropic plants from the Russian Far East. *Bot. Zhurn.* 81(5): 98–101. [In Russian] (***Пробатова Н. С., Рудыка Э. Г., Соколовская А. П.*** Числа хромосом синантропных видов растений с Дальнего Востока России // Бот. журн., 1996. Т. 81, № 5. С. 98–101).

Probatova N. S., Seledets V. P., Rudyka E. G. 2008b. IAPT/IOPB chromosome data 5. K. Marhold (Ed.). *Taxon* 57(2): 558–562; E16–E24. URL: 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. 1988. Chromosome numbers in vascular plants from Primorye Territory, the Amur River basin, north Koryakia, Kamchatka and Sakhalin. *Bot. Zhurn.* 73(2): 290–293. [In Russian] (***Пробатова Н. С., Соколовская А. П.*** Числа хромосом сосудистых растений из Приморского края, Приамурья, Северной Корякии, Камчатки и Сахалина // Бот. журн., 1988. Т. 73, № 2. С. 290–293).

Protopopova V. V. 1994. *Cosmos* Cav., *Xanthium* L. In: *Flora Yevropeiskoy chasti SSSR* [*Flora of the European part of the USSR*]. Vol. 7. St. Petersburg: Nauka. Pp. 39, 48–52. [In Russian] (***Протопопова В. В.*** *Cosmos* Cav., *Xanthium* L. // Флора европейской части СССР. СПб.: Наука, 1994. Т. 7. С. 39, 48–52).

Safonova I. N. 1991. Chromosome numbers in some species of the family Papaveraceae. *Bot. Zhurn.* 76(6): 904–905. [In Russian] (***Сафонова И. Н.*** Числа хромосом некоторых видов семейства Papaveraceae // Бот. журн., 1991. Т. 76, № 6. С. 904–905).

Shatokhina A. V. 2006. Chromosome numbers of some plants of the Amur Region flora. *Bot. Zhurn.* 91(3): 487–490. [In Russian] (***Шатохина А. В.*** Числа хромосом некоторых представителей флоры Амурской области // Бот. журн., 2006. Т. 91, № 3. С. 487–490).

Skvortsov A. K. 1995. On the taxonomy and nomenclature of adventive species of the genus *Epilobium* (Onagraceae) in the flora of Russia. *Bull. Moscow Soc. Natur. Biol. Ser.* 103, 2: 44–52. [In Russian] (***Скворцов А. К.*** К систематике и номенклатуре адвентивных видов рода *Epilobium* (Onagraceae) во флоре России // Бюл. МОИП. Отд. биол., 1995. Т. 103, вып. 2. С. 44–52).

Skvortsov A. K. 2005. Synopsis of the genus *Epilobium s.str.* in Russia and neighboring countries. *Byull. Glavn. bot. sada (Moscow)* [*Bulletin of the Main Botanical Garden*] 189: 90–104. [In Russian] (***Скворцов А. К.*** Конспект рода кипрей (*Epilobium* s. str.) в России и сопредельных странах // Бюл. Глав. ботан. сада, 2005. Вып. 200. С. 90–104).

Stepanov N. V., Muratova E. N. 1992. Chromosome numbers of some species of higher plants of flora of the Krasnoyarsk Territory. *Bot. Zhurn.* 77(7): 125–126. [In Russian] (***Степанов Н. В., Муратова Е. Н.*** Числа хромосом некоторых видов высших растений флоры Красноярского края // Бот. журн., 1992. Т. 77, № 7. С. 125–126).

Stepanov N. V., Muratova E. N. 1995. Chromosome numbers of some taxa of higher plants of Krasnoyarsk Territory. *Bot. Zhurn.* 80(6): 114–116. [In Russian] (***Степанов Н. В., Муратова Е. Н.*** Хромосомные числа некоторых таксонов высших растений Красноярского края // Бот. журн., 1995. Т. 80, № 6. С. 114–116).

Studenikina E. Yu. 1999. *Vysshiye sosudistyye rasteniya flory Biye-Katunskogo mezhdurechya v predelakh predgoriy i nizkogoriy Altaya* [*Higher vascular plants of the flora of the Biya-Katun interfluve within the foothills and low mountains of Altai*]. Barnaul. 121 pp. [In Russian] (***Студеникина Е. Ю.*** Высшие сосудистые растения флоры Бие-Катунского междуречья в пределах *предгорий* и низкогорий Алтая. Барнаул, 1999. 121 с.).

Tzvelev N. N. 1996. *Persicaria* Mill. In: *Flora Vostochnoy Yevropy* [*Flora of Eastern Europe*]. Vol. 9. St. Petersburg: Nauka. Pp. 125–132. [In Russian] (***Цвелев Н. Н.*** 1996. *Persicaria* Mill. // Флора Восточной Европы. Т. 9. СПб.: Наука, 1996. С. 125–132).

Tzvelev N. N. 2004. *Spergularia* (Pers.) J. et C. Presl. In: *Flora Vostochnoy Yevropy* [*Flora of Eastern Europe*]. Vol. 11. Moscow; St. Petersburg: KMK Scientific Press Ltd. Pp. 127–132. [In Russian] (***Цвелев Н. Н.*** *Spergularia* (Pers.) J. et C. Presl // Флора Восточной Европы. Т. 11. М.; СПб.: Тов-во науч. изд. КМК, 2004. С. 127–132).

Tzvelev N. N., Probatova N. S. 2019. *Zlaki Rossii* [*Cereals of the Russia*]. Moscow: KMK Scientific Press Ltd. 646 pp. [In Russian] (***Цвелёв Н. Н., Пробатова Н. С.*** Злаки России. М.: Тов-во науч. изд. КМК, 2019. 646 с.).

Verkhozina A. V., Belous V. N., Chernysheva O. A., Ebel A. L., Erst A. S., Friesen N. V., Iuzhakova M. A., Kuznetsov A. A., Luferov A. N., Murashko V. V., Murtazaliev R. A., Ovchinnikova S. V., Wang W., Zavgorodnyaya O. Yu., Korolyuk A. Yu., Senator S. A., Zibzeev E. G., Vasjukov V. M., Krivenko D. A. 2019. Findings to the flora of Russia and adjacent countries: New national and regional vascular plant records, 1. *Botanica Pacifica* 8(1): 143–154. DOI: 10.17581/bp.2019.08114

Zolotukhin N. I. 2012. Floristic records in Altai Republic. *Bull. Moscow Soc. Natur. Biol. Ser.* 117, 3: 77–80. [In Russian] (***Золотухин Н. И.*** Флористические находки в Республике Алтай // Бюл. МОИП. Отд. биол., 2012. Т. 117, вып. 3. С. 77–80).

Zykova E. Yu. 2014. New data on the distribution of adventive species in the Altai Republic. *Bull. Moscow Soc. Natur. Biol. Ser.* 119, 6: 74–76. [In Russian] (***Зыкова Е. Ю.*** Новые данные о распространении адвентивных видов во флоре Республики Алтай // Бюл. МОИП. Отд. биол., 2014. Т. 119, вып. 6. С. 74–76). URL: herba.msu.ru/russian/journals/bmsn/archive/moip_2014_119_6.pdf

Zykova E. Yu. 2015. Alien flora of the Republic of Altai. *Rastitelnyy mir Aziatskoy Rossii* [*Plant Life of Asian Russia*] 3(19): 72–87. [In Russian] (***Зыкова Е. Ю.*** Адвентивная флора Республики Алтай // Растительный мир Азиатской России, 2015. № 3(19). С. 72–87). URL: www.izdatgeo.ru/pdf/rast/2015-3/72.pdf

Zykova E. Yu. 2019. Findings of adventive species in the Republic of Altai. *Bull. Moscow Soc. Natur. Biol. Ser.* 124, 6: 66–68. [In Russian] (***Зыкова Е. Ю.*** Находки адвентивных видов в Республике Алтай // Бюл. МОИП. Отд. биол., 2019. Т. 124, вып. 6. С. 66–68). URL: herba.msu.ru/russian/journals/bmsn/archive/moip_2019_124_6.pdf

Zykova E. Yu. 2020. New record of alien species in the Altai Republic. *Bull. Moscow Soc. Natur. Biol. Ser.* 125, 4: 45–46. [In Russian] (***Зыкова Е. Ю.*** Новые местонахождения адвентивных видов в Республике Алтай // Бюл. МОИП. Отд. Биол., 2020. Т. 125, вып. 4. С. 45–46). URL: http://herba.msu.ru/russian/journals/bmsn/archive/moip_2020_125_4.pdf

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., An'kova T. V., Lomonosova M. N. 2021. Chromosome numbers of invasive and potentially invasive species in the flora of the Republic of Altai. IV. *Turczaninowia* 24, 1: 89–97. DOI: 10.14258/turczaninowia.24.1.11

Zykova E. Yu., Ebel A. L., Ebel T. V., Sheremetova S. A. 2019. New findings of alien plants in the Republic of Altai. *Turczaninowia* 22, 1: 143–153. [In Russian] (***Зыкова Е. Ю., Эбель А. Л., Эбель Т. В., Шереметова С. А.*** Новые находки адвентивных видов растений в Республике Алтай // Turczaninowia, 2019. Т. 22, № 1. С. 143–153). DOI: 10.14258/turczaninowia.22.1.11

Zykova E. Yu., Erst A. S. 2012. Floristic findings of some rare and alien species in Siberia. *Turczaninowia* 15, 4: 34–40. [In Russian] (***Зыкова Е. Ю., Эрст А. С.*** Находки некоторых редких и адвентивных видов растений в Сибири // Turczaninowia, 2012. Т. 15, № 4. С. 34–40).

Zykova E. Yu., Lomonosova M. N., An'kova T. V. 2018. Chromosome numbers of invasive species of the Altai Republic flora: post 1. *Turczaninowia* 21, 1: 41–51. [In Russian] (***Зыкова Е. Ю., Ломоносова М. Н., Анькова Т. В.*** Числа хромосом инвазионных видов во флоре Республики Алтай: сообщение 1 // Turczaninowia, 2018. Т. 21, № 1. С. 41–51). DOI: 10.14258/turczaninowia.21.1.