



Chromosome numbers in some vascular plant species from Altai Region, Baikal Siberia and Primorskii Territory (Russia)

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ABSTRACT

The chromosome numbers (2n) for 44 vascular plant species of 43 genera from 21 families: Alliaceae, Apiaceae, Asteraceae, Boraginaceae, Brassicaceae, Cannabaceae, Caryophyllaceae, Chenopodiaceae, Convallariaceae, Fabaceae, Hymenocaceae, Iridaceae, Lamiaceae, Liliaceae, Melanthiaceae, Plantaginaceae, Poaceae, Ranunculaceae, Rosaceae, Scrophulariaceae, Violaceae from Siberia (Altaiskii Krai, Irkutskaya Oblast', Republic of Buryatia) and from the Russian Far East (Primorskii Krai) are presented. The CN is first studied in *Trigonotis peduncularis* Benth. ex S. Moore et Baker. The first CN counts from Russia – for *Amblynotus rupestris* (Pall. ex Georgi) Popov ex Serg. and *Phragmites stenophyllus* (Boiss.) Rouy ex Prain, from Asiatic Russia – for *Arenaria serpyllifolia* L., from Siberia – for *Turritis glabra* L. Eight species – *Aquilegia sibirica* Lam., *Berteroa incana* (L.) DC., *Cannabis ruderalis* Janisch., *Dactylis glomerata* L., *Elymus caninus* (L.) L., *Lycopus exaltatus* L. f., *Plantago salsa* Pall., *Setaria pumila* (Poir.) Roem. et Schult. are studied for the first time from Altai, *Bupleurum bicaule* Helm, *Contioselinum tataricum* Hoffm. – first from Baikal Siberia, *Neotorularia humilis* (C.A. Mey.) Hedge et J. Léonard and *Minuartia laricina* (L.) Mattf. – from Primorskii Krai. In *Suaeda kulundensis* Lomon. et Freitag the new cytotype 2n = 36 (4x) is found. In *Puccinellia tenuissima* (Litv. ex V.I. Krecz.) Litv. ex Pavlov also the tetraploid cytotype is revealed: 2n = 28 (4x); both new cytotypes are from Altai.

Keywords: chromosome numbers, vascular plants, Siberia, Altaiskii Krai, Irkutskaya Oblast', Republic of Buryatia, Far East, Primorskii Krai, Russia

РЕЗЮМЕ

Пробатова Н.С., Прокопенко С.В., Завгородняя О.Ю., Кривенко Д.А.
Числа хромосом некоторых видов сосудистых растений с Алтая, из Байкальской Сибири и Приморского края (Россия). Приводятся числа хромосом (2n) для 44 видов флоры Алтая (Западная Сибирь), Прибайкалья и Забайкалья (Восточная Сибирь), Приморского края (Дальний Восток), из 43 родов и 21 семейства: Alliaceae, Apiaceae, Asteraceae, Boraginaceae, Brassicaceae, Cannabaceae, Caryophyllaceae, Chenopodiaceae, Convallariaceae, Fabaceae, Hymenocaceae, Iridaceae, Lamiaceae, Liliaceae, Melanthiaceae, Plantaginaceae, Poaceae, Ranunculaceae, Rosaceae, Scrophulariaceae, Violaceae. Впервые исследован в кариологическом отношении *Trigonotis peduncularis* Benth. ex S. Moore et Baker, впервые для России – *Amblynotus rupestris* (Pall. ex Georgi) Popov ex Serg. и *Phragmites stenophyllus* (Boiss.) Rouy ex Prain, а для азиатской части России – *Arenaria serpyllifolia* L.; впервые для Сибири исследован *Turritis glabra* L., а для Байкальской Сибири – *Bupleurum bicaule* Helm и *Contioselinum tataricum* Hoffm., впервые для Алтая – *Aquilegia sibirica* Lam., *Berteroa incana* (L.) DC., *Cannabis ruderalis* Janisch., *Dactylis glomerata* L., *Elymus caninus* (L.) L., *Lycopus exaltatus* L. f., *Plantago salsa* Pall., *Setaria pumila* (Poir.) Roem. et Schult.; для Приморского края впервые – *Neotorularia humilis* (C.A. Mey.) Hedge et J. Léonard и *Minuartia laricina* (L.) Mattf. У *Suaeda kulundensis* Lomon. et Freitag установлено новое для вида число хромосом 2n = 36, а у *Puccinellia tenuissima* (Litv. ex V.I. Krecz.) Litv. ex Pavlov – 2n = 28: оба новых 4x цитотипа – с Алтая.

Ключевые слова: числа хромосом, сосудистые растения, Сибирь, Алтайский край, Иркутская область, Республика Бурятия, Дальний Восток, Приморский край

Here we submit new results of chromosome number (CN) studies on vascular plants from Russia: 44 species mainly from Siberia, and also from the Russian Far East (RFE) – Primorskii Krai, or Primorye (Fig. 1). This contribution continues the series of previous publications by N.S. Probatova et al. Chromosome countings were made on squashed preparations of root tips fixed with Carnoy's solution. The root tips were taken mostly from seedlings obtained through

herbarium specimens, or living plants collected in the field. Preparations were stained with iron hematoxylin. Voucher specimens are preserved in the VLA herbarium, Vladivostok or in the NS herbarium, Novosibirsk, some also in the IRK herbarium, Irkutsk. First CN data are indicated by asterisk (*). The number of the dot on the map follows the number of voucher specimen. Brief information on the species studied is given.

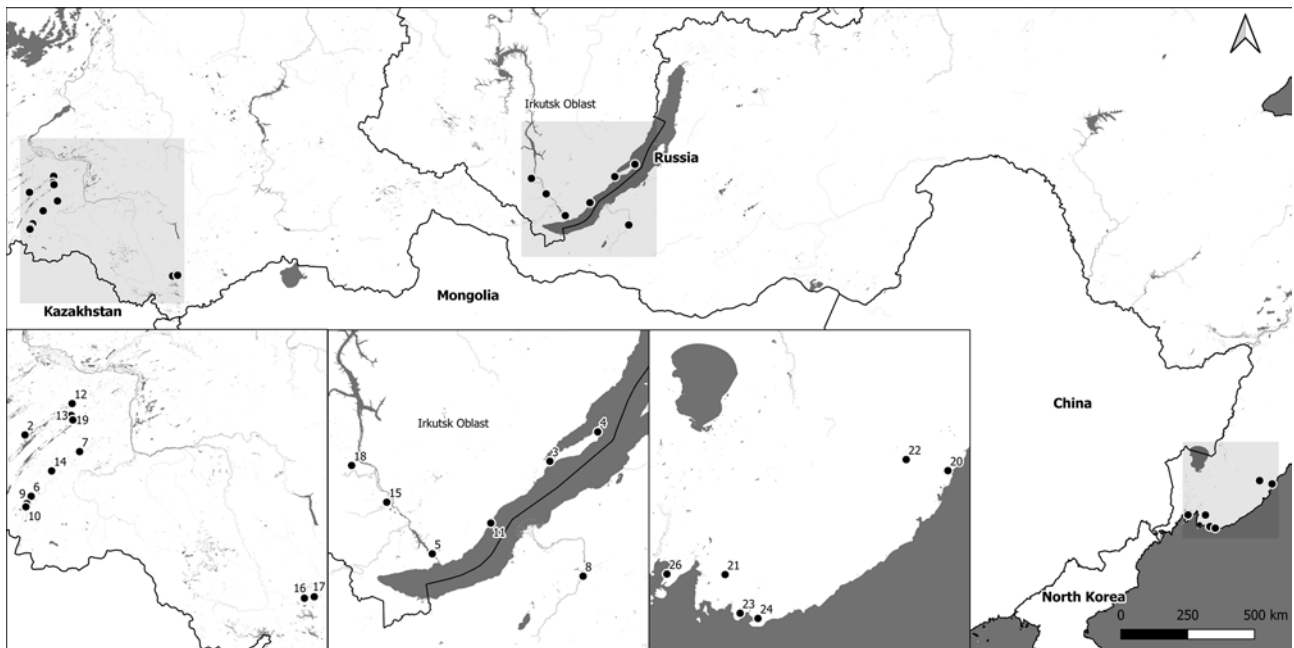


Figure 1 Study area. Dots with numbers from 1 to 26 are the sampling plot locations (according to numbering in the text)

ALLIACEAE

Allium splendens Willd. ex Schult. et Schult. f., **2n = 16**

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, right riverside of the Pylovka River, 524 m alt., in forest, 11 Sep 2018, coll. O.Yu. Zavgorodnyaya 13373: **1** (IRK, VLA).

— **2n = 32**

Russia, Far East, Primorskii Krai, Kavalerovskii Raion, right riverside of Zerkal'naya River, near the Lake Zerkal'noe, 100 m alt., upper part of N slope, oak forest with *Rhododendron* and *Lespedeza*, scarce, 6 Aug 2018, coll. S.V. Prokopenko 13293: **20** (VLA).

Distribution: Central and East Siberia, Far East; East Asia. In light forests, among shrubs, meadows, stony slopes and slide rocks, to upper forest belt. Described from Siberia. This species was studied many times, and it is a real polymorphic complex: its CNs vary significantly, especially in Baikal Siberia, where 2n = 16 was the most common (see Chepinoga 2014), but also polyploid CNs occur: 2n = 32, 40, 48. Such CN variability was revealed in *A. splendens* also in the Russian Far East, but the tetraploid CN 2n = 32 there was obviously more common (2n = 16, 32, 64 – see Probatova et al. 2007, Probatova 2014, and unpublished data). Species with variable ploidy (2x, 4x, 5x, 6x, 8x; x = 8).

APIACEAE

Bupleurum bicaule Helm, **2n = 22**

Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, the Baikal Lake, NE part, Ol'khon Island, near Uzury settlement, 595 m alt., steppe, 19 Oct 2018, coll. O.Yu. Zavgorodnyaya 13387: **4** (VLA).

Distribution: Siberia; NE Kazakhstan, Central Asia (Mongolia), East Asia (China). In mountain stony steppes, stony and rubbly slopes, rare on rocks. Described from Kras-

noyarsk, lectotype – from Altai. Extremely variable as to its CNs: 2n = 12, 22, 24, 28, 32, 36 (see Pimenov & Ostroumova 2012). First report of CN from Baikal Siberia.

Carum buriaticum Turcz., **2n = 22**

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, right riverside of the Pylovka River, 456 m alt., lakeside, 14 Sep 2018, coll. O.Yu. Zavgorodnyaya 13374: **1** (IRK, VLA).

Distribution: Siberia, Central Asia (Mongolia), East Asia (China). Meadows, steppes, stony slopes. Described from Transbaikalia. From Altai and from the Baikal Siberia the CN 2n = 22 was already reported (see Chepinoga 2014). Diploid (2x; x = 11).

Conioselinum tataricum Hoffm., **2n = 22**

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, right riverside of the Pylovka River, 636 m alt., in forest, 12 Sep 2018, coll. O.Yu. Zavgorodnyaya 13369: **1** (IRK, VLA).

Distribution: Central and East Europe, Siberia, Middle Asia (mountains), Kazakhstan, Central Asia (Mongolia), East Asia (China). Dark coniferous, mixed and deciduous forests, among shrubs, in meadows, along riversides. Described from West Siberia. The CN 2n = 22 was reported from Novosibirskaya Oblast', Altai, Krasnoyarskii Krai, Khakassia and Tyva Republics (see Goldblatt & Johnson 1979+, Rice et al. 2014). First CN count from the Baikal Siberia. Diploid (2x; x = 11).

ASTERACEAE

Iva xanthiifolia Nutt. (≡ *Cyclachaena xanthiifolia* (Nutt.) Fresen.), **2n = 36**

Russia, West Siberia, Altaiskii Krai, Romanovskii Raion, 3 km SE of Romanovo settlement, weedy-ruderal plant

community, 27 Sep 2018, coll. D.A. Krivenko 13352: **2** (IRK, VLA).

Distribution: N American species, alien in Russia and elsewhere: Siberia – Altaiskii Krai, Far East – Khabarovskii Krai (near Khabarovsk), Primorskii Krai; West and East Europe, Caucasus, Middle Asia. As a weed near plantations and farms, waste areas, railway embankments. Described from America. This CN is the second count from Siberia: earlier its CN was studied in Altaiskii Krai (Krasnikov et al. 2003). Tetraploid (4x; x = 9).

BORAGINACEAE

Amblynotus rupestris (Pall. ex Georgi) Popov ex Serg. (≡ *Eritrichium rupestre* (Pall. ex Georgi) Bunge), **2n = 48**

Russia, East Siberia, Irkutskaya Oblast', Olkhonskii Raion, near Sakhyurta settlement, W coast of the Baikal Lake, 514 m alt., stony steppe, 12 Sep 2018, coll. D.A. Krivenko 13361: **3** (IRK, VLA).

Distribution: Siberia, Central Asia (Mongolia), East Asia (China). Stony and rubbly desert slopes, steppes. Described from Dahuria. Second CN report for the species, but first – in Russia: earlier it was studied in China (Ma et al. 1990). Tetraploid (4x; x = 12).

Brachybotrys paridiformis Maxim. ex Oliv., **2n = 24**

Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Novonezhino settlement, Sapfirova canyon, broad-leaved valley forest, abundant, 25 May 2019, coll. E.P. Kudryavtseva & S.V. Prokopenko 13416: **21** (VLA).

Distribution: Far East – S Primorye; East Asia – NE China, Korean Peninsula. Umbrageous leaved forests in river valleys. Described from China. Poorly studied species: this is the third CN count, all from Primorye. Diploid (2x; x = 12). The CN 2n = 24 is constant.

Trigonotis peduncularis* Benth. ex S. Moore et Baker, **2n = 24

Russia, Far East, Primorskii Krai, Muravyov-Amurskii Peninsula, Vladivostok, near Akademgorodok, forest margin, at roadside, 29 May 2019, coll. E.B. Volynets 13404: **26** (VLA).

Distribution: Far East – Amur, Primorye; E Europe, Siberia, Middle Asia, Central Asia (Mongolia), Himalayas, East Asia (China). On plantations, fallows, dry grassy areas, among shrubs. Described from near Astrakhan. This is first CN count for the species. Diploid (2x; x = 12).

BRASSICACEAE

Alyssum lenense Adams, **2n = 16**

Russia, East Siberia, Irkutskaya Oblast', Olkhonskii Raion, the Baikal Lake, Ol'khon Island, Uzury settlement, 711 m alt., steppe, 2 Oct 2018, coll. O.Yu. Zavgorodnyaya 13366: **4** (VLA).

Distribution: East Europe, Siberia, Central Asia (Mongolia), East Asia (Northern China). Steppe stony and sandy slopes, pine steppe forests. Described from Yakutia. Diploid (2x; x = 8). This is the third CN count from Baikal Siberia, all of them 2n = 16 (see Chepinoga 2014).

Berteroa incana (L.) DC., **2n = 16**

Russia, West Siberia, Altaiskii Krai, Rubtsovskii Raion, near Bezrukavka village, left riverside of the Alei River, forb-

bluegrass steppe meadow, 18 Sep 2018, coll. D.A. Krivenko 13408: **10** (VLA).

Distribution: Europe, Caucasus, Siberia, Far East (alien), Middle and Central Asia (Mongolia), West China. Riversides, as a weed on abandoned fields, fallows, roadsides, in settlements. Described from N Europe. Diploid (2x; x = 8). Many CN reports, mostly from Europe, from the Russian Far East, but only one was from Siberia (see Goldblatt & Johnson 1979+, Rice et al. 2014). The CN 2n = 16 is constant. This is first CN count from Altai.

Neotorularia humilis (C.A. Mey.) Hedge et J. Léonard (≡ *Braya humilis* (C.A. Mey.) B.L. Rob., *Torularia humilis* (C.A. Mey.) O.E. Schulz), **2n = 42**

Russia, Far East, Primorskii Krai, Kavalerovskii Raion, near Kavalerovo settlement, nature monument “Dersu Rock”, calcareous rocks, 3 Aug 2018, coll. S.V. Prokopenko 13299: **22** (VLA).

Distribution: Siberia, Far East (very rare, with disjunctions); Middle Asia, Central Asia (Mongolia), Himalayas, East Asia (China), N America. Rubbly slide-rocks, sandy and pebble riverside banks, in steppes, on calcareous rocks, outcrops of limestone. Described from Altai. Only two localities of this species in Primorskii Krai. In the Arctic it is represented by subspecies – *Braya humilis* subsp. *arctica* (Böcher) Rollins, with the same CN 2n = 42. Hexaploid (6x; x = 7), but in whole – variable ploidy: 2n = 42, 56 (see Bolkhovskikh et al. 1969). Its CN is firstly studied in Primorskii Krai.

Turritis glabra L., **2n = 12**

Russia, East Siberia, Irkutskaya Oblast', Irkutskii Raion, 51st km of the Baikal'skii route, right side of the Angara River, 462 m alt., afforested riverside, 20 Aug 2018, coll. D.A. Krivenko 13351: **5** (IRK, VLA).

Distribution: Europe, Caucasus, Siberia, Far East (alien); West and Central Asia, East Asia, North America, Australia (alien). In steppe and forest belts, sandy meadows, stony slopes, riverside pebbles, sometimes as a weed on railway embankments, fallows and vegetable gardens. Described from Europe. Diploid (2x; x = 6). Several CN counts from Europe (see Goldblatt & Johnson 1979+, Rice et al. 2014). First CN count from Siberia.

CANNABACEAE

Cannabis ruderalis Janisch., **2n = 20**

Russia, West Siberia, Altaiskii Krai, Rubtsovskii Raion, outskirts of Mamontova settlement, weedy-ruderal plant communities, 20 Sep 2018, coll. D.A. Krivenko 13354: **6** (VLA).

Distribution: Europe, Asia. As a weed in forest plantations, riversides, roadsides, settlements. There are two CN reports (2n = 20) from Siberia (Novosibirskaya Oblast', Krasnoyarskii Krai – Krasnikov & Shaulo 1990, Stepanov & Muratova 1995). Diploid (2x; x = 10). First CN report from Altai.

CARYOPHYLLACEAE

Arenaria serpyllifolia L., **2n = 20**

Russia, Far East, Primorskii Krai, Nakhodka city, near bus stop, on the slope oriented towards Nakhodkinskii Prosp., 23 Jun 2017, coll. S.V. Prokopenko 13287: **23** (VLA).

Distribution: Europe, Caucasus, Siberia, Far East (alien in Primorye – Dal'negorsk, Anisimovka, Nakhodka), Middle Asia and Asia Minor, Mediterranean, as alien in East Asia, N America, Australia. Roadsides and near settlements. Described from Europe. The first report from Asiatic part of Russia. For this species more often $2n = 40$ was reported, or $2n = 20, 40$ (see Goldblatt & Johnson 1979+, Rice et al. 2014). Variable ploidy?

***Minuartia laricina* (L.) Mattf., $2n = 26$**

Russia, Far East, Primorskii Krai, Partisanskii Raion, in vicinity of Khmylovka village, 840 m alt., the ridge of Chernyi Kust Mt., the slope, near the top, frequent, 5 Jul 2019, coll. S.V. Prokopenko 13414: **24** (VLA).

Distribution: East Siberia, Far East - Amur, Primorye, N Sakhalin; East Asia – NE China, Korea. On rocks, scree, stony slopes, in steppes, *Pinus* and *Pinus-Larix* forests. Described from Siberia. In the Far East it was studied from Amurskaya Oblast': $2n = 26$ (Probatova et al. 2006). First CN count from Primorye.

CHENOPODIACEAE

***Atriplex laevis* C.A. Mey., $2n = 36$**

Russia, East Siberia, Irkutskaya Oblast', Chermkhovskii Raion, near the village Khudorozhkina, ruderal community, 12 Oct 2018, coll. D.A. Krivenko 13407: **18** (IRK, VLA).

Distribution: West Siberia, Kazakhstan, Central Asia (Mongolia). Saline habitats, moist meadows, riversides. Described from Kazakhstan? Two CNs were revealed: $2n = 18$ from Baikal Siberia and Altai (Lomonosova et al. 2001, Probatova et al. 2012) and $2n = 36$ – from Novosibirskaya Oblast' and Mongolia (Lomonosova & Krasnikov 1992, Lomonosova et al. 2003). Variable ploidy.

***Chenopodium album* L., $2n = 54$**

Russia, West Siberia, Altaiskii Krai, Rebrikhinskii Raion, between Voronikha and Rozhnev Log settlements, plantations of *Pinus sylvestris*, 27 Sep 2018, coll. D.A. Krivenko 13406: **19** (IRK, VLA).

Distribution: almost cosmopolite (excl. the Arctic). Ruderal habitats, as a weed on plantations, vegetable gardens, roadsides, fallows. Described from Europe. Multiple CN counts from the world (in Siberia – from Altaiskii Krai, Novosibirskaya Oblast', Tyva Republic, Krasnoyarskii Krai, and Baikal Siberia) (see Goldblatt & Johnson 1979+, Rice et al. 2014). However not all CNs reported in the literature could be referred to *Ch. album*, but only $2n = 54$ (Lomonosova 2018). Hexaploid ($6x; x = 9$).

***Suaeda kulundensis* Lomon. et Freitag, $2n = 36^*$**

Russia, West Siberia, Altaiskii Krai, Aleiskii Raion, 2 km W of the railway station Yazevka Sibirskaya, right riverside of the Sukhnev Log River (left tributary of the Yazevka River), forb-grass saline steppe, 24 Sep 2018, coll. D.A. Krivenko 13353: **7** (IRK, VLA).

Distribution: SE Europe, W Siberia, N Kazakhstan, NW China. Steppe zone. Previous reports indicated that this species has two ploidy levels: octoploid $2n = 72$ (Lomonosova & Freitag 2009, Lomonosova 2018) and decaploid $2n = 90$ (Lomonosova & Shaulo 2010). Now we added the third – $4x$ cytotype ($2n = 36$). Variable ploidy ($4x, 8x, 10x$).

CONVALLARIACEAE

***Polygonatum involucratum* (Franch. et Sav.) Maxim., $2n = 18$**

Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Novonezhino settlement, Sapfirova canyon, oak forest with *Lespedeza*, 25 May 2019, coll. E.P. Kudryavtseva & S.V. Prokopenko 13417: **21** (VLA).

Distribution: Far East – Amur (rare), S Primorye; East Asia – China, Korea, Japan. Mixed umbrageous forests, forest margins, in shrubs. Described from Japan. This is the third CN count from Russia (see Probatova 2014). Diploid ($2x; x = 9$).

FABACEAE

***Amphicarpaea japonica* B. Fedtsch., $2n = 20$**

Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Novonezhino settlement, Sapfirova canyon, oak forest with *Lespedeza*, 25 May 2019, coll. E.P. Kudryavtseva & S.V. Prokopenko 13420: **21** (VLA).

Distribution: Far East (Amur, Primorye, Kurils – Kunashir Isl.); East Asia – Korea, Japan. In broad-leaved forests, forest margins, among shrubs, rarely in meadows, in river valleys. Described from Japan. This species in S Primorye has two chromosome numbers: $2n = 20$ and 22 , both occur on the islands of Peter the Great Bay, near Vladivostok and in Khasanskii Raion (see Probatova 2014). Variable CNs ($2x; x = 10, 11$).

***Vicia unijuga* A. Braun, $2n = 24$**

Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Novonezhino settlement, Sapfirova canyon, oak forest, 25 May 2019, coll. E.P. Kudryavtseva & S.V. Prokopenko 13419: **21** (VLA).

Distribution: Siberia, Far East – Amur, Primorye, S Sakhalin, S Kurils; Central Asia (Mongolia), East Asia. Mixed and broad-leaved forests, forest margins, among shrubs. Described from Siberia. Multiple CN reports, from Siberia, Far East and adjacent countries – China, Korea, Japan (see Goldblatt & Johnson 1979+, Rice et al. 2014, Krivenko & Burlyaeva 2016). There are two ploidy levels within this species – $2x, 4x$ ($2n = 12, 24$). Variable ploidy. Tetraploid cytotype mostly occurs in East Asian part of the species area, that would lead to possible taxonomic conclusions (Burlyaeva et al. 2016).

HYPECOACEAE

***Hypocoum erectum* L., $2n = 16$**

Russia, East Siberia, Republic of Buryatia, Tarbagataiskii Raion, right riverside of the Selenga River, Voznesenovka settlement, 503 m alt., roadside, weedy-ruderal plant community, 13 Jul 2018, coll. D.A. Krivenko 13358: **8** (IRK, VLA).

Distribution: Siberia, Central Asia (Mongolia), East Asia (Northern China). Sandy and rubbly steppes, pebbles in the river valleys, dry *Pinus* forests, *Populus* forests, sandstone and limestone rocks, sometimes on waste places. Described from Siberia. Three CN reports from Baikal Siberia (see Chepinoga 2014). Diploid ($2x; x = 8$).

IRIDACEAE

***Iris halophila* Pall., $2n = 44$**

Russia, West Siberia, Altaiskii Krai, Rubtsovskii Raion, left riverside of the Alei River, near Zakharovo settlement, saline

meadow, 18 Sep 2018, coll. D.A. Krivenko 13372: **9** (VLA).

Distribution: SE Europe, W Siberia, Kazakhstan, Middle Asia, Central Asia (Mongolia). Saline steppe meadows, riverside salt meadows, in *Achnatherum splendens* communities. Described from Kazakhstan (Kulundinskaya steppe). Its CN $2n = 44$ was already reported from Altaiskii Krai (Doronkin 1987). Tetraploid ($4x; x = 11$).

LAMIACEAE

Galeopsis bifida Boenn., $2n = 32$

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, 456 m alt., lakeside, 14 Sep 2018, coll. O.Yu. Zavgorodnyaya 13376: **1** (IRK, VLA).

Distribution: Europe, Asia (but alien in the Far East), alien in North America. Common weed, and among shrubs, in forest margins. Described from Europe. The CN is constant, it was studied from W Siberia and Baikal Siberia (see Goldblatt & Johnson 1979+, Rice et al. 2014). Tetraploid ($4x; x = 8$).

Lamium album L., $2n = 18$

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, 456 m alt., lakeside, 14 Sep 2018, coll. O.Yu. Zavgorodnyaya 13367: **1** (IRK, VLA).

Distribution: Europe, Caucasus, Siberia, West Asia. Meadows, in forests and among shrubs, on shadow places, sometimes as a ruderal plant in settlements. Described from Europe. The CN was reported from West Sayan, Putorana Plateau and East Sayan: $2n = 18$ (Goldblatt & Johnson 1979+, Rice et al. 2014). Diploid ($2x; x = 9$).

Lycopus exaltatus L. f., $2n = 22$

Russia, West Siberia, Altaiskii Krai, Rubtsovskii Raion, near Bezrukavka village, left riverside of the Alei River, forb-bluegrass meadow, 18 Sep 2018, coll. D.A. Krivenko 13360: **10** (IRK, VLA).

Distribution: Europe, Siberia, West and Middle Asia. Occurs in flood plains, bogs, meadows, forest edges. Described from Italy. First CN report from Altai. The CN $2n = 22$ is constant in this genus. Diploid ($2x; x = 11$).

LILIACEAE

Lilium pumilum Redouté, $2n = 24$

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskii Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, 456 m alt., lakeside, 14 Sep 2018, coll. O.Yu. Zavgorodnyaya 13377: **1** (IRK, VLA).

Distribution: Middle and East Siberia, Far East, Central Asia (Mongolia), East Asia (NE China, Korean Peninsula). On the rocks in forest belt, steppe meadows. Described from cultivated plants. The CN ($2n = 24$) was many times reported, incl. from Baikal Siberia (see Chepinoga 2014). Diploid ($2x; x = 12$).

MELANTHIACEAE

Anticlea sibirica (L.) Kunth (\equiv *Zigadenus sibiricus* (L.) A. Gray), $2n = 32$

Russia, East Siberia, Irkutskaya Oblast', Irkutskii Raion, SW coast of the Baikal Lake, Kharghino Bay, 463 m alt.,

lakeside, 28 Aug 2018, coll. O.Yu. Zavgorodnyaya 13378: **11** (IRK, VLA).

Distribution: East Europe, Siberia, Far East; East Asia. Described from Siberia. In high-mountain matted slopes, on the rocks, in coniferous, mixed and deciduous forests, clearings, in light *Larix* or dwarf *Betula* forests. Calciphilous plant. Its CN was studied many times from the Middle and East Siberia ($2n = 32$ – see Goldblatt & Johnson 1979+, Rice et al. 2014). Tetraploid ($4x; x = 8$).

PLANTAGINACEAE

Plantago depressa Willd., $2n = 12$

Russia, East Siberia, Republic of Buryatia, Tarbagataiskii Raion, right riverside of the Selenga River, Voznesenovka settlement, 503 m alt., roadside, weedy-ruderal plant community, 13 Jul 2018, coll. D.A. Krivenko 13382: **8** (VLA).

Distribution: Siberia, Far East (mainly southern continental part); Middle Asia, Central Asia, East Asia. Meadows, saline meadows, steppe meadows, grassy slopes, light forests, fallows, riversides, roadsides. Described on cultivated plants. Multiple CN reports (incl. from Baikal Siberia): $2n = 12$ (see Goldblatt & Johnson 1979+, Rice et al. 2014). Diploid ($2x; x = 6$).

Plantago salsa Pall., $2n = 12$

Russia, West Siberia, Altaiskii Krai, Aleiskii Raion, 2 km W of the railway station Yazevka Sibirskaya, right riverside of the Sukhnev Log River (left tributary of the Yazevka River), forb-grass saline steppe, 24 Sep 2018, coll. D.A. Krivenko 13355: **7** (IRK, VLA).

Distribution: Europe, Caucasus, Middle and Minor Asia, S Siberia, Far East (alien in Chukotka), Central Asia (Mongolia), W China. Saline meadows in the steppe zone, saline lakesides in the river valleys. Described from the south of the Yenisei Siberia. First CN report from Altai. Diploid ($2x; x = 6$).

POACEAE

Dactylis glomerata L., $2n = 28$

Russia, West Siberia, Altaiskii Krai, Rebrikhinskii Raion, 1 km NE of the railway station Rebrikha, the Trubachikha River, *Calamagrostis*-forb meadow along the riverside, 26 Sep 2018, coll. D.A. Krivenko 13357: **12** (IRK, VLA).

Distribution: almost Holarctic, but absent in Arctic regions, and only as alien or naturalized – in the Far East of Russia. Meadows, clearings, light forests, roadsides, in settlements, cultivated as fodder or lawn plant. The limit of its natural area of distribution in Russia – Transbaikalia. Described from Europe. Many CN reports (see Goldblatt & Johnson 1979+, Rice et al. 2014) give tetraploid CN $2n = 28$. This is the first CN count in *D. glomerata* from Altai. Tetraploid ($4x; x = 7$). In the Altai Mts (middle and upper belts) *D. altaica* Besser occurs, but its CN still remains unknown.

Elymus caninus (L.) L., $2n = 28$

Russia, West Siberia, Altaiskii Krai, Rebrikhinskii Raion, 1 km NE of the railway station Rebrikha, the Trubachikha River, *Calamagrostis*-forb meadow along the riverside, 26 Sep 2018, coll. D.A. Krivenko 13363: **12** (IRK, VLA).

Distribution: Europe, Asia, but absent in the Far East of Russia; alien in North America. The limit of its natural area of distribution in Russia is in Transbaikalia. In forests, forest margins and clearings, among shrubs, sometimes in subalpine meadows and stony slopes, up to the upper mountain belt. Described from Europe. Its CN was studied several times in Russia – $2n = 28$, from Karelia and West Siberia (see Goldblatt & Johnson 1979+, Rice et al. 2014), but from Altai its CN is reported now for the first time. Tetraploid ($4x; x = 7$) like most of *Elymus* spp.

Koeleria cristata (L.) Pers., $2n = 28$

Russia, West Siberia, Altaiskii Krai, Aleiskii Raion, 4 km NW of Krasnyi Yar settlement, right riverside of the Solonovka River (left tributary of the Alei River), *Artemisia-Stipa* steppe, 24 Sep 2018, coll. D.A. Krivenko 13424: **25** (VLA).

Distribution: Europe, Caucasus, Siberia, Far East (S of continental part); Middle, Central and East Asia, N America. Described from Europe. Steppes, meadows, forest clearings, stony slopes and rocks, up to middle mountain belt. Polymorphous species. Multiple CN counts, however it is still not clear if this species is represented by both di- and tetraploid levels. The majority of CN reports from Russia gives $2n = 28$, in Baikal Siberia – only $2n = 28$ (see Chepinoga 2014), but for Altai only $2n = 14$ was indicated (see Goldblatt & Johnson 1979+, Rice et al. 2014). In Primorye – $2n = 14$, only one report of $2n = 28$ (see Probatova 2014). Variable ploidy ($2x, 4x; x = 7$).

Milium effusum L., $2n = 28$

Russia, East Siberia, Irkutskaya Oblast', Slyudyanskiy Raion, W coast of the Baikal Lake, 94th kilometer of Krugobaikal'skaya railway road, right riverside of the Pylovka River, 636 m alt., in forest, 12 Sep 2018, coll. O.Yu. Zavgorodnyaya 13370: **1** (VLA).

Distribution: almost Holarctic (but absent in Arctic regions). Forest species. Described from Europe. Multiple CN counts (forth of them are from Baikal Siberia) give (see Chepinoga 2014) tetraploid CN – $2n = 28$ ($4x; x = 7$).

Phragmites stenophyllus (Boiss.) Rouy ex Prain, $2n = 48$

Russia, West Siberia, Altaiskii Krai, Aleiskii Raion, 2 km W of the railway station Yazevka Sibirskaya, right riverside of the Sukhnev Log River (left tributary of the Yazevka River), forb-grass saline steppe, 24 Sep 2018, coll. D.A. Krivenko 13362: **7** (IRK, VLA).

Distribution: Mediterranean. Saline habitats. Described from SW Asia. First CN count from Russia. Tetraploid ($4x; x = 12$).

Puccinellia tenuissima (Litv. ex V.I. Krecz.) Litv. ex Pavlov, $2n = 14$

Russia, West Siberia, Altaiskii Krai, Aleiskii Raion, 2 km W of the railway station Yazevka Sibirskaya, right riverside of the Sukhnev Log River (left tributary of the Yazevka River), forb-grass saline steppe, 24 Sep 2018, coll. D.A. Krivenko 13371: **7** (IRK, VLA).

— $2n = 28^*$

Russia, West Siberia, Altaiskii Krai, Rebrikhinskiy Raion, 7 km W of Rozhnev Log settlement, grassy steppe meadow, 27 Sep 2018, coll. D.A. Krivenko 13375: **13** (IRK, VLA).

Distribution: SE Europe, Siberia, Central Asia, alien elsewhere. Saline habitats. Described from Kazakhstan. The tetraploid CN – $2n = 28$ is new for the species: only $2n = 14$ (from Altai) was known before. *P. tenuissima* as well as *P. tenuiflora* (Griseb.) Scribn. et Merr. and *P. macranthera* V.I. Krecz. (see Ovchinnikova & Probatova 2015a) have two ploidy levels within one species ($2x$ and $4x$; $4x$ and $8x$, respectively). Variable ploidy. Not constant CNs are rare in *Puccinellia* spp. Recently such instability of CN was observed also in Far Eastern species *P. tzyzelevii* Ovchinnikova et Prob.: $2n = 28$ and 42 , this species likely has hybrid origin (Ovchinnikova & Probatova 2015b). Variable ploidy ($2x, 4x; x = 7$).

Setaria pumila (Poir.) Roem. et Schult., $2n = 36$

Russia, West Siberia, Altaiskii Krai, Pospelikhinskiy Raion, near Kotlyarovka settlement, 20 Sep 2018, coll. D.A. Krivenko 13359: **14** (IRK, VLA).

Distribution: Cosmopolite (except Arctic regions). Weedy species. Described from France or America. First CN count from Altai. This is the most common and well-known CN for this species. Rarely the diploid CN $2n = 18$ also occurs (Amurskaya Oblast' – Probatova et al. 2013). Tetraploid ($4x; x = 9$). Variable ploidy ($2x, 4x; x = 9$).

RANUNCULACEAE

Anemone sylvestris L., $2n = 16$

Russia, East Siberia, Irkutskaya Oblast', near Angarsk city, left riverside of the Kitoi River, 455 m alt., light forb-grass *Pinus* forest, 16 Jul 2018, coll. D.A. Krivenko, O.A. Chernysheva & M.V. Kostina 13392: **15** (IRK, VLA).

Distribution: Europe, Siberia; Central and East Asia. Meadows, open slopes, forest edges, light forests, forb steppes. Described from Central Europe. The CN was studied from West Siberia (Tomskaya Oblast'), Baikal Siberia and Yakutia: $2n = 16$ (see Goldblatt & Johnson 1979+, Rice et al. 2014). Diploid ($2x; x = 6$).

Aquilegia sibirica Lam., $2n = 14$

Russia, West Siberia, Altai Republic, Ulaganskiy Raion, [the riverside of] Chibit River, 5 Jul 2019, coll. A.S. Erst, T.V. Erst, K. Xiang & L. Lian 021: **16** (NS).

Distribution: Siberia, Middle Asia, Central Asia (Mongolia). Forest edges and clearings, light forests, up to high-mountains. Described from Siberia. The CN $2n = 14$ was reported from Siberia (Buryatia and Tyva republics – Friesen 1991, Agapova et al. 1993). First CN count from Altai. Diploid ($2x; x = 7$).

Paraquilegia microphylla (Royle) J.R. Drumm. et Hutch., $2n = 14$

Russia, West Siberia, Altai Republic, Ulaganskiy Raion, Aktash mine, 3054 m alt., 10 Aug 2018, coll. A.S. Erst & T.V. Erst 129: **17** (NS).

Distribution: Siberia; Middle Asia, Central Asia. In high-mountains on placers, rock fissures. Described from Himalayas. There were 4 CN reports from Baikal Siberia (see Chepinoga 2014). First CN count from Altai. Diploid ($2x; x = 7$). The CN is constant.

Thalictrum foetidum L., $2n = 14$

Russia, East Siberia, Irkutskaya Oblast', Irkutskii Raion, SW coast of the Baikal Lake, Kharghino Bay, 463 m alt.,

lakeside, 28 Aug 2018, coll. O.Yu. Zavgorodnyaya 13379: 11 (IRK, VLA).

Distribution: Europe, Siberia, Far East; Central and East Asia. Light *Betula* and *Larix* forests, forest edges and meadows. Described from Europe. The CN of *T. foetidum* was already studied from Altai, Baikal Siberia and Yakutia (Goldblatt & Johnson 1979+, Rice et al. 2014). The CN is constant. Diploid ($2x$; $x = 7$).

ROSACEAE

Chamaerhodos erecta (L.) Bunge, $2n = 14$

Russia, East Siberia, Republic of Buryatia, Tarbagataiskii Raion, right riverside of the Selenga River, Voznesenovka settlement, 503 m alt., roadside, weedy-ruderal plant community, 13 Jul 2018, coll. D.A. Krivenko 13411: 8 (VLA).

Distribution: Siberia, Far East; Middle Asia, Central Asia (Mongolia), East Asia (Northern China). Mountain dry stony slopes, on sands, pebbles, in pine forests. Described from Dahuria. The CN of *C. erecta* was studied from Tyva and Yakutia republics: $2n = 14$. The CN is constant. Diploid ($2x$; $x = 7$).

SCROPHULARIACEAE

Linaria acutiloba Fisch. ex Rchb., $2n = 12$

Russia, East Siberia, Irkutskaya Oblast', Irkutskii Raion, SW coast of the Baikal Lake, Kharghino Bay, 463 m alt., lakeside, 28 Aug 2018, coll. O.Yu. Zavgorodnyaya 13364: 11 (IRK, VLA).

Distribution: East Europe, Siberia, Far East; Central Asia (Mongolia), East Asia (China). Meadows, steppes, riverside stony slopes, abandoned fields. Described from Dahuria. Diploid ($2x$; $x = 6$). Four reports from Baikal Siberia (see Chepinoga 2014). The CN is constant.

VIOLACEAE

Viola mandshurica W. Becker, $2n = 48$

Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Novonezhino settlement, Sapfirova canyon, meadow, 25 May 2019, coll. E.P. Kudryavtseva & S.V. Prokopenko 13415: 21 (VLA).

Distribution: Far East: Amur, Primorye, S Kurils; East Asia: China, Korea, Japan. Oak forests, forest clearings, among shrubs, rubbly and grassy slopes near the seacoast, dry meadows and abandoned fields. Described from surroundings of Vladivostok. In this species the CN $2n = 48$ is the most common, however once the tetraploid CN $2n = 24$ was also reported (see Probatova 2014). The CNs of the Far Eastern *Viola* were compiled and discussed in the special paper (Probatova et al. 2001). Variable ploidy ($4x$ (?), $8x$; $x = 6$).

CONCLUSION

Most of the species studied – 24 (53%) are diploids, with different basic numbers: $x = 6, 7, 8, 9, 10, 11, 12, 13$. The 14 species have tetraploid CNs, one of the rest (*Chenopodium album*) is hexaploid. The CN is first studied in *Trigonotis peduncularis*. The first CN counts from Russia – in *Amblynotus rupestris* and *Phragmites stenophyllus*. Nine species – *Allium splendens*, *Bupleurum bicaule*, *Koeleria cristata*,

Neotorularia humilis, *Puccinellia tenuissima*, *Setaria pumila*, *Suaeda kulundensis*, *Vicia unijuga*, *Viola mandshurica* have variable ploidy, and in *Amphicarpaea japonica* the basic CN is not constant. Eight species are studied for the first time from Altai, *Bupleurum bicaule*, *Conioselinum tataricum* – from Baikal Siberia, *Neotorularia humilis* and *Minuartia laricina* – from Primorskii Krai. In *Suaeda kulundensis* and *Puccinellia tenuissima* new cytotypes ($4x$) are revealed from Altai plants.

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