



Chromosome numbers in some species of Poaceae from Russia: further studies

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ABSTRACT

Chromosome numbers for 37 species in Poaceae from 24 genera (*Achnatherum*, *Agrostis*, *Anisantha*, *Arctopoa*, *Arrhenatherum*, *Arundinella*, *Avenella*, *Bromopsis*, *Cinna*, *Cleistogenes*, *Deschampsia*, *Digitaria*, *Elymus*, *Eragrostis*, *Festuca*, *Glyceria*, *Hordeum*, *Koeleria*, *Melica*, *Ochlopoa*, *Poa*, *Puccinellia*, *Schedonorus*, *Schizachne*) from Russia are presented. In *Anisantha haussknechtii* (Boiss.) Holub, *Arctopoa reventa* Prob., *Bromopsis bargusiniensis* (Drobow) Tzvelev, *Deschampsia hybridogena* Tzvelev, *Koeleria sibirensis* (Domin) Tzvelev and *Puccinellia hultenii* Swallen the chromosome numbers were revealed for the first time. The new chromosome numbers were obtained for *Bromopsis flexuosa* and *Echinochloa caudata*. For some regions chromosome numbers were obtained first: for *Cinna latifolia*, *Digitaria ischaemum* and *Echinochloa caudata* – in Siberia, *Achnatherum confusum* – in West Siberia, *Deschampsia susumanica* and *Eragrostis minor* – in the Russian Far East, *Avenella flexuosa* – in the Kuril Islands, *Agrostis scabra*, *Bromopsis ciliata*, *Elymus novae-angliae*, *Eragrostis multicaulis*, *Hordeum brachyantherum*, *H. jubatum*, *Ochlopoa annua*, *Poa angustifolia* and *P. trivialis* – first in Kamchatka Peninsula, *Bromopsis flexuosa* was studied first in Khabarovskii Krai, *Achnatherum splendens*, *Elymus peschkovae*, *Melica nutans* and *Schizachne callosa* – in Irkutskaya Oblast', *Cleistogenes squarrosa* and *Hordeum jubatum* – in Buryatia Republic, *Arundinella anomala* – in Zabaikal'skii Krai, *Poa attenuata* – in Sakha (Yakutia) Republic.

Key words: chromosome numbers, vascular plants, Poaceae, flora, Russia

РЕЗЮМЕ

Пробатова Н.С., Седедец В.П., Черныгина О.А. Числа хромосом некоторых видов злаков (Роасеае) России: дальнейшее изучение. Сообщаются числа хромосом (2n) для 37 видов злаков из 24 родов (*Achnatherum*, *Agrostis*, *Anisantha*, *Arctopoa*, *Arrhenatherum*, *Arundinella*, *Avenella*, *Bromopsis*, *Cinna*, *Cleistogenes*, *Deschampsia*, *Digitaria*, *Elymus*, *Eragrostis*, *Festuca*, *Glyceria*, *Hordeum*, *Koeleria*, *Melica*, *Ochlopoa*, *Poa*, *Puccinellia*, *Schedonorus*, *Schizachne*) во флоре России. Впервые исследованы в карнологическом отношении *Anisantha haussknechtii* (Boiss.) Holub, *Arctopoa reventa* Prob., *Bromopsis bargusiniensis* (Drobow) Tzvelev, *Deschampsia hybridogena* Tzvelev, *Koeleria sibirensis* (Domin) Tzvelev, *Puccinellia hultenii* Swallen. Для *Bromopsis flexuosa* и *Echinochloa caudata* выявлены новые (не известные ранее) значения чисел хромосом. Впервые исследованы виды в ряде регионов России: в Сибири – *Cinna latifolia*, *Digitaria ischaemum* и *Echinochloa caudata*, а *Achnatherum confusum* – впервые для Западной Сибири, *Deschampsia susumanica* и *Eragrostis minor* – впервые для Дальнего Востока, *Avenella flexuosa* – на Курильских островах, *Agrostis scabra*, *Bromopsis ciliata*, *Elymus novae-angliae*, *Eragrostis multicaulis*, *Hordeum brachyantherum*, *H. jubatum*, *Ochlopoa annua*, *Poa angustifolia* и *P. trivialis* впервые исследованы на п-ове Камчатка, *Bromopsis flexuosa* – впервые в Хабаровском крае, *Achnatherum splendens*, *Elymus peschkovae*, *Melica nutans* и *Schizachne callosa* – впервые в Иркутской обл., *Cleistogenes squarrosa*, *Digitaria ischaemum* и *Hordeum jubatum* – в Республике Бурятия, *Arundinella anomala* – в Забайкальском крае, *Poa attenuata* – в Республике Саха (Якутия).

Ключевые слова: числа хромосом, сосудистые растения, злаки, Роасеае, флора, Россия

Here we present further results of chromosome number (CN) study of 37 Poaceae species from Russia, mainly from East Siberia and the Russian Far East, as well as from West Siberia and Crimea (Fig. 1). This contribution continues the previous publication (Probatova et al. 2015). These data will be added to the book under preparation "Poaceae of Russia" by Tzvelev & Probatova. Chromosome countings in some species were made by E.G. Rudyka, on squashed preparations of root tips fixed with Carnoy's solution. We also included here some previously not published CN countings of A.P. Sokolovskaya

(indicated by AS). The root tips were taken from living plants, or from seedlings obtained through herbarium specimens, which were collected in the field. Preparations were stained with iron hematoxylin. Voucher specimens are preserved in the Herbarium VLA, Vladivostok (some – in LE, TK and IRK). First CN data are indicated by asterisk (*). The number of the dot on the map follows the special number of voucher specimen. Brief information on the affinity and distribution of the species studied is given.



Figure 1 Study area. Dots with numbers from 1 to 37 are the sampling plot locations (according to numbering in the text)

Achnatherum confusum (Litv.) Tzvelev, $2n = 24$

Russia, West Siberia, Tomskaya Oblast', near Tomsk city, the Malaya Kirghizka River basin, open south slope, 23 Aug 2013, coll. A.L. Ebel 12737: **1** (TK). CN was obtained first for West Siberia. This species, described from Altai, is distributed mainly in Siberia; in the Russian Far East (RFE) it occurs in central Kamchatka (the Bystraya Kozyrevskaya River basin), common in Amurskaya Oblast', but rare – in Primorsky Krai and Sakhalin. The populations of *A. confusum* in Kamchatka are obviously relict, the same can be true in Sakhalin and Primorsky Krai. In Russia the CN of *A. confusum* was studied in Sakha (Yakutia) Republic, Zabaikal'skii Krai and Amurskaya Oblast' (the references will be done in the book mentioned above). The CN $2n = 24$ is constant. $2n = 2x$ ($x = 12$).

Achnatherum splendens (Trin.) Nevski, $2n = 48$

Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Rai-on, the Baikal Lake, Ol'khon Island, sandy-stony riverside to the ferry quay, 15 Aug 2014, coll. D.A. Krivenko 12841: **2** (VLA, IRK). *A. splendens* was studied first in Irkutskaya Oblast'. This species is distributed from the south of Volga region through South Siberia, to Zabaikal'e, but mostly in Central Asia. Described from Zabaikal'e. Steppes and semi-deserts, solonetzic meadows and sands, stony slopes and pebbles up to the higher mountain belt. For *A. splendens* $2n = 48$ is the first reliable CN count from Russia, and it agrees with data from Kazakhstan and Kyrgyzstan (Probatova & Seledets 2008). $2n = 4x$.

Agrostis scabra Willd., $2n = 42$ (AS)

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Petropavlovsk-Kamchatskii city, Nikol'skaya Hill, *Betula ermanii* forest, eroded plots on the slope, 19 Sep 1970, coll. N.S. Probatova & V.P. Seledets 3104: **3** (VLA). North Pacific. Riverside sands and pebbles, moist erosional plots, roadsides. Its CN was studied many times in the RFE,

from Chukotka to Primorsky Krai: the hexaploid CN $2n = 42$ is constant. In Kamchatka Peninsula the CN for *A. scabra* is revealed first. $2n = 6x$.

Anisantha haussknechtii (Boiss.) Holub, $2n = 28$ (AS)

Russia, Caucasus, Republic of Daghestan, outskirts of Derbent city, the spur of Dzhalganskii mountain ridge, near the western wall of Naryn-Kala fortress, on the slope of a canyon, *Artemisia* pasture, 14 Jul 1975, coll. N.S. Probatova & V.P. Seledets 4288: **4** (VLA). Earlier the CN of this plant was published under *A. rubens* var. *caucasica* (Hack.) Tzvelev (Sokolovskaya & Probatova 1979). Mediterranean. Stony slopes, sands, gravels and slide-rocks of the lower mountain belt. Described from Iraq. In Russia *A. haussknechtii* occurs only in the east part of Caucasus. $2n = 4x$.

Arctopoa reventa Prob., $2n = 42$

Russia, the Russian Far East, Primorsky Krai, Mikhailovskii Rai-on, northern outskirts of Novoshakhtinskii settlement, 15 m from the railway embankment of the Ozernaya Pad' station, meadow in depression, 4 Jun 2012, coll. V.T. Lapenko 12113: **5** (VLA). Anthropophyte. *A. reventa* is studied insufficiently yet; it occurs rarely, on disturbed habitats. Described from the south of Primorsky Krai. Its close relative is *A. subfastigiata* (Trin.) Prob. First CN count for the species. $2n = 6x$. In the genus *Arctopoa* (Griseb.) Prob. almost all the species studied are hexaploids.

Arrhenatherum elatius (L.) P. Beauv. ex J. Presl et C. Presl, $2n = 28$ (AS)

Russia, Republic of Crimea, Ai-Petrinskaya yaila, 5 Aug 1974, coll. V.V. Fedyeva 3980: **6** (VLA). Euro-Mediterranean species, adventive in many temperate regions. Meadows, forest clearings. The tetraploid CN $2n = 28$ is the most common for this species. Previously the CN of the species was studied in Russia in Leningradskaya Oblast' and Daghestan. $2n = 4x$.

***Arundinella anomala* Steud., 2n = 36**

Russia, East Siberia, Zabaikal'skii Krai, Nerchinsko-Zavodskii Raion, near Voznessenka village, 731 m alt., grassy-forb meadow steppe, 29 Aug 2013, coll. S.G. Kazanovsky 12486: **7** (VLA, IRK). Mainly East Asia (partly Central Asia). Described from Japan. The CN of this species this time is studied at the western limits of its geographical range. Meadows, sands and pebbles, stony slopes and rocks, sometimes at the seacoast; up to the lower mountain belt. This is the first CN count for *A. anomala* from Zabaikal'skii Krai. The CN of the species is not constant: in Khabarovskii Krai and Primorskii Krai we revealed $2n = 34, 34-36, 36$. The basic CN is unclear. $2n = 2x, 4x?$

***Avenella flexuosa* (L.) Drejer, 2n = 28**

Russia, the Russian Far East, Sakhalinskaya Oblast', Kuril Islands, Shikotan Isl., 3 km SW of Krabozavodskoe settlement, poorly matted loamy slope near the road, 3 Aug 2010, coll. V.Yu. Barkalov 11713: **8** (VLA). Mainly European. Described from Europe. Forest edges and glades, tundras, sandy meadows. The distribution of *A. flexuosa* is very peculiar: in Asiatic Russia the species occurs in the Russian Far East (disjunction in Siberia), and moreover, it is almost absent in continental part of the Russian Far East (except Kamchatka and near Magadan): the character of its distribution in the Russian Far East resembles some typical North Pacific species (e.g., *Agrostis mertensii* Trin.). Perhaps there exist a separate, NW Pacific race? *A. flexuosa* in the Kuril Islands was studied for the first time, earlier its CN have been studied in Russia from Karelia, Leningradskaya Oblast', Murmanskaya Oblast', Sakhalin and Kamchatka (as *Lerchenfeldia flexuosa*). $2n = 4x$.

****Bromopsis bargusinensis* (Drobow) Tzvelev, 2n = 28**

Russia, East Siberia, Irkutskaya Oblast', Sliudyanskii Raion, left riverside of the Snezhnaya River, 555 m alt., sandy-pebbly bank of the river, 13 Jul 2014, coll. S.G. Kazanovsky 12899: **29** (VLA, IRK). East Siberian species, endemic of around the Baikal Lake. Riverside sands and pebbles, meadows, forest clearings; up to the middle mountain belt. Described from Transbaikalia. *B. bargusinensis* belongs to a complicate group of the genus – *B. aggr. pumpelliana* (Scribn.) Holub. We revealed the first CN for *B. bargusinensis*. $2n = 4x$. However, the variable ploidy is quite possible within species of the *B. aggr. pumpelliana*.

***Bromopsis ciliata* (L.) Holub, 2n = 14**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Yelizovskii Raion, the valley of Nalycheva River in its middle course, near Nalychevskie hot springs, the nature park "Nalychevo", along the path across the low shrubby tundra, frequent, 18 Aug 2015, coll. O.A. Chernyagina 12888: **9** (VLA). North Pacific. Light deciduous forests, meadows, forest edges and glades, among shrubs. Described from Canada. Earlier the species was commonly known as *B. canadensis* (Michx.) Holub. Distributed in Kamchatka, Sakhalin, the Kurils, also near Magadan and Nikolaevsk (the Lower Amur). Studied from Sakhalin and South Kurils. This is the only one diploid species of *Bromopsis* in the RFE. Its relative *B. richardsonii* (Link) Holub ($2n = 28$) does not occur in Russia. $2n = 2x$.

***Bromopsis flexuosa* (Drobow) Tzvelev, 2n = 28 (AS)**

Russia, the Russian Far East, Khabarovskii Krai, Ul'chskii Raion, the Amur River, Schschuchii Island opposite Mariinskoe settlement, sandy steep, 24 Jun 1978, coll. N.S. Probatova & E.G. Rudyka 5058: **10** (VLA); Russia, the Russian Far East, Khabarovskii Krai, Ul'chskii Raion, outskirts of Bogorodskoe settlement, sandy bank of the Amur River, among shrubs, 1 Jul 1981, coll. N.S. Probatova & V.P. Seledets 5958: **11** (VLA); Russia, the Russian Far East, Khabarovskii Krai, Ul'chskii Raion, right riverside of the Amur River, 9 km down the stream of Bulava village, the Cape Auri, on pebbles, 24 Jun 1978, coll. N.S. Probatova & E.G. Rudyka 5061: **12** (VLA).

— 2n = 56 (AS)

Russia, the Russian Far East, Amurskaya Oblast', Tygdinskii Raion, Peremykinskii Post, 7 Jul 1977, coll. E.V. Boyko & V.M. Starchenko 4846: **13** (VLA); Russia, the Russian Far East, Amurskaya Oblast', Selemdzhinskii Raion, 7 km N of Norsk settlement, the flood-plain of Selemdzha River, meadow, 19 Aug 1976, coll. N.S. Probatova & V.P. Seledets 4571: **14** (VLA); Russia, the Russian Far East, Amurskaya Oblast', Dzheltulakskii Raion, near Tyndinskii settlement, left riverside of the Tynda River, on pebbles, coll. N.S. Probatova & E.G. Rudyka 4013: **15** (VLA). The latter specimen was referred earlier to *B. pumpelliana* s. str. (Sokolovskaya & Probatova 1977). The CN of *B. flexuosa* was studied first in Khabarovskii Krai. The species was described from Amurskaya Oblast' (the Bureja River). Forest edges and glades, light forests, sandy riversides, among shrubs; up to lower mountain belt. This species also belongs to *B. aggr. pumpelliana* (Scribn.) Holub. *B. flexuosa* is distributed mainly in the Amur River basin, from Baikal Siberia to Sakhalin. Polymorphous species: we revealed two cytotypes within *B. flexuosa*: tetraploid (4x) and octoploid (8x), and their distribution needs special attention. Basing on our data presented here and earlier, we suppose that populations with $2n = 28$ occur mainly in the Lower Amur while those with $2n = 56$ – in the upper part of the Amur River basin. One cannot exclude the role of North Pacific *B. ciliata* (L.) Holub in formation of more ancient – tetraploid populations in the Lower Amur, which is close to Sakhalin. These species are rather similar by habit. Further polyploidization (8x) could favour the migrations to the west – in the Upper Amur, and there few populations with 4x might also remain (Probatova & Seledets 2008 – as *B. pumpelliana*: $2n = 28$ – Amurskaya Oblast', Selemdzha River, Dagmara, Probatova N.S. & Seledets V.P. 4455 – VLA). $2n = 4x, 8x$. Variable ploidy.

***Cinna latifolia* (Trevir.) Griseb., 2n = 28**

Russia, West Siberia, Republic of Khakassia, Shirinskii Raion, in vicinity of Efremkino village, the valley of the Belyi Ijus River, in forest, 17 Aug 2013, coll. A.L. Ebel 12732: **16** (TK). Nearly Holarctic. Described from Arctic America. Forest species. There are some CN reports for *C. latifolia* in Russia: from Republic of Buryatia, Khabarovskii Krai, Primorskii Krai, Sakhalin. The CN is constant. $2n = 4x$.

***Cleistogenes squarrosa* (Trin.) Keng, 2n = 40**

Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, near Zun-Murino settlement, Biological station of

the Siberian Institute of Plant Physiology & Biochemistry of Siberian Branch of RAS, the Khyr-Gorkhon River, 704 m alt., sandy slope, 21 Aug 2010, coll. Yu.N. Pochinchik 12912: **17** (VLA, IRK). East Europe-Asian. Sands, gravels, stony slopes and rocks, in steppes; up to the middle mountain belt. Described from Middle Asia. The CN of *C. squarrosa* was studied from Amurskaya Oblast' and Zabaikal'skii Krai and is studied first for Buryatia Republic. The CN $2n = 40$ is characteristic for all studied *Cleistogenes* species of Russian flora. $2n = 4x$.

****Deschampsia hybridogena* Tzvelev, $2n = 26$**

Russia, European part, Republic of Karelia, Prijazhinskii Raion, 4 km W from Kolatsel'ga village, *Picea* forest with *Vaccinium vitis-idaea* and Ericaceae, forest edge, 27 Sep 2008, coll. N.S. Probatova & V.P. Seledets 11205: **18** (VLA). The voucher specimen was identified by N.N. Tzvelev. *D. hybridogena* was described from Kola Peninsula. Distributed in European Arctic, North Europe, up to North Ural. Meadows, forest edges, riverside and coastal sands and gravels. Probably it is a hybrid of *D. cespitosa* (L.) P. Beauv. and *D. glauca* Hartm. (Tzvelev & Probatova 2010). First CN count for the species. $2n = 2x$. The CN $2n = 26$ is the most common in very complicated genus *Deschampsia*.

***Deschampsia susumanica* Prob. et Chiappella, $2n = 26$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Bystrinskii Raion, Opa'kinskie springs, at the rivulet, 3 Aug 2013, coll. V.V. Buryi 12596: **19**. (VLA). *D. susumanica* was described in 2015 from Magadanskaya Oblast' (Susumanskii Raion). Riverside sands and pebbles, near hot springs. Distributed in Lena and Kolyma rivers basins and in Kamchatka Peninsula. Endemic. The CN is obtained first for *D. susumanica* in the Russian Far East. Before $2n = 26$ was revealed in Yakutia (Tzvelev et al. 2015). $2n = 2x$.

***Digitaria ischaemum* (Schreb.) Muhl., $2n = 36$**

Russia, East Siberia, Republic of Buryatia, Kjakhtinskii Raion, in vicinity of Ust'-Kjakhta settlement, the Selenga River, right riverside, 565 m alt., stony-uliginous bank, riverside plant community, 13 Aug 2015, coll. S.G. Kazanovsky 12896: **20** (VLA, IRK). The species is described from Germany. Europe-Caucasian species, adventive in Siberia, the Russian Far East, North America and in other temperate regions. Riverside sands and gravels, pine forests, roadsides, in settlements; up to the middle mountain belt. *D. ischaemum* is studied in Siberia for the first time. The CN counts were made in Russia from Volga region and Primorskii Krai. The CN $2n = 36$ is constant. $2n = 4x$.

***Echinochloa caudata* Roshev., $*2n = 54$**

Russia, East Siberia, Republic of Buryatia, Kjakhtinskii Raion, in vicinity of Ust'-Kjakhta settlement, the Selenga River, right riverside, 565 m alt., stony-uliginous bank, riverside plant community, 13 Aug 2015, coll. S.G. Kazanovsky 12895: **20** (VLA, IRK). East Asian, mainly in the Amur River basin, sometimes as adventive. Rice fields, sand and pebble river banks, damp meadows, roadsides. Described from Dahuria (the Argun' River). The CN of *E. caudata* is studied in Siberia for the first time and it is a new CN for the species: in Khabarovskii Krai and Primorskii Krai we

revealed for *E. caudata* $2n = 36$ (Sokolovskaya & Probatova 1977). Variable ploidy. $2n = 4x, 6x$.

***Elymus novae-angliae* (Scribn.) Tzvelev, $2n = 28$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Bystrinskii Raion, NW part of the nature park "Bystrinskii", 468 m alt., on the roadside, 3 Aug 2014, coll. V.V. Buryi 12820: **22** (VLA). North American species. Widely introduced as forage grass and occurs not rarely in Russia as adventive or wilding on roadsides, in settlements, field edges. In Russia its CN was revealed from Novossibirskaya Oblast', Omskaya Oblast', Irkutskaya Oblast', Amurskaya Oblast', Khabarovskii Krai and Primorskii Krai. This is the first CN report from Kamchatka Peninsula. $2n = 4x$.

***Elymus pendulinus* (Nevski) Tzvelev, $2n = 28$**

Russia, West Siberia, Republic of Khakassia, Shirinskii Raion, in vicinity of Efremkino village, lower part of the slope to the valley of the Belyi Ijus River, in shrubs, 17 Aug 2013, coll. A.L. Ebel 12733: **16** (TK). East Asian species, distributed in the south of East Siberia and the Russian Far East. Now it is studied at the west border of its geographical area. Forest clearings and forest edges, among shrubs; up to the lower mountain belt. Described from the south of the Amur River (Soyuznoe). The CN was known from Zabaikal'skii Krai, Khabarovskii Krai and Primorskii Krai. $2n = 4x$.

***Elymus peschkovae* Tzvelev, $2n = 28$**

Russia, East Siberia, Irkutskaya Oblast', Kazachinskii Raion, 78 km from Okunajskii settlement to Zhigalovo, right riverside of the Kharakhikta River, 831 m alt., on the roadside, 11 Aug 2014, coll. D.A. Krivenko 12964: **21** (VLA, IRK). East Siberia – Far East. Stony slopes, rocks and pebbles; up to the middle mountain belt. Described from Yakutia. *E. peschkovae* is studied in Irkutskaya Oblast' for the first time; the CN was known from Magadanskaya Oblast' and Amurskaya Oblast'. $2n = 4x$.

***Eragrostis minor* Host, $2n = 40$**

Russia, the Russian Far East, Khabarovskii Krai, Bikin'skii Raion, Bikin town, along the railway embankment, 17 Sep 2009, coll. L.A. Antonova 12716: **23** (VLA). Mainly Euro-Mediterranean; as adventive – in Siberia, in the RFE and in many other countries. Riverside sands and gravels, in steppes, on roadsides, a weed in settlements. Described from Italy. The CN was obtained first for *E. minor* in the Russian Far East. The same CN $2n = 40$ was revealed in Russia from Krasnodarskii Krai, Daghestan, Zabaikal'skii Krai. However from Zabaikal'e also $2n = 20$ and 30 were reported (see Chepinoga 2014). Variable ploidy. $2n = ?2x, 4x$ and aneuploids?

***Eragrostis multicaulis* Steud., $2n = 40$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Ust'-Bol'sheretskii Raion, flood-lands of the Bannaya River, on thermal field, 17 Aug 2014, coll. O.A. Chernyagina & L. Shtreker 12791: **24** (VLA). East Asia. In the south of RFE, alien in some regions of European Russia. Anthropophyte. Riverside sands and gravels, field edges, roadsides, as a weed in settlements. Described from Japan. This is the second CN report for the species;

the first was from Primorskii Krai. *E. multicaulis* is studied from Kamchatka Peninsula for the first time. $2n = 4x$.

***Eragrostis pilosa* (L.) P. Beauv., $2n = 20$**

Russia, the Russian Far East, Amurskaya Oblast', Blagoveshchensk city, on roadside, 12 Sep 2001, coll. E. Aistova 11802: **37** (VLA); Russia, the Russian Far East, Amurskaya Oblast', Arkharinskii Raion, Leninskoe settlement, the grass-plot near the office of collective farm "Fakel", 25 Jul 2005, coll. T.N. Tolmacheva 11801: **36** (VLA). Eurasian. Riversides, gravels, on roadsides and in settlements. Anthropophyte. Described from Italia. The most common species of *Eragrostis* in the Russian Far East. The CN $2n = 20$ is rare for *E. pilosa*, however it was already revealed from Primorskii Krai (Probatova et al. 2009), while from Zabaykalskii Krai $2n = 40$ is known (Chepinoga et al. 2009; Chepinoga & Gnutikov 2014). The CN $2n = 20$ was reported either from Slovakia (Murin et al. 1999); also there are some aneuploid reports for the species. Variable ploidy. $2n = 2x$, $4x$ and aneuploids.

***Festuca extremiorientalis* Ohwi, $2n = 28$**

Russia, West Siberia, Republic of Khakassia, Shirinskii Raion, in vicinity of Efremkino village, the valley of Belyi Iyus River, in forest, 17 Aug 2013, coll. A.L. Ebel 12725: **16** (TK). East Asia. Occurs in South Siberia, South Far East. In forests. Described from Korea. The CN is constant, it was already known in Russia from Khabarovskii Krai, Primorskii Krai, South Kuriles. $2n = 4x$.

***Glyceria orientalis* Kom., $2n = 20$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Karaginskii Raion, Drankinskii hot springs, between Severnaya and Yuzhnaya groups, lower part of the slope, at the cold rivulet, 2 Sep 2015, coll. O.A. Chernyagina 12882: **25** (VLA); Kamchatka Peninsula, Petropavlovsk-Kamchatskii city, S slope of Petrovskaya Hill, Gagarina Street, at the rivulet, abundant, 14 Sep 2014, coll. O.A. Chernyagina 12875: **3** (VLA). Endemic of Kamchatka. Flood-plain meadows, *Salix* communities, along the rivulets. Described from Kamchatka (the Paratunka River basin). The species is obviously hybridogenous: *G. alnas-teteretum* Kom. \times *G. lithuanica* (Gorski) Gorski. Its CN was revealed first by A.P. Sokolovskaya (1963). $2n = 2x$.

***Hordeum jubatum* L., $2n = 28$**

Russia, East Siberia, Republic of Buryatia, Severo-Baikalskii Raion, in vicinity of Nizhneangarsk town, the Baikal Lake, Yarki Island, 521 m alt., on sands, 8 Aug 2014, coll. D.A. Krivenko 12842: **26** (VLA, IRK); Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Bystrinskii Raion, Opal'kinskii Spring, 736 m alt., at the rivulet, 3 Aug 2013, coll. V.V. Buryi 12802: **19** (VLA). North America; actively expanding in Europe, as well as in Middle, Central and East Asia, naturalized in many regions and in all the Russian Far East. Disturbed meadows, gravels, roadsides, in settlements. Described from Canada. For *H. jubatum* this is the first CN report from Kamchatka Peninsula as well as from Buryatia Republic. CN counts in Russia were from Irkutskaya Oblast', Yakutia, Magadanskaya Oblast', Amurskaya Oblast', Primorskii Krai. $2n = 4x$.

***Hordeum brachyantherum* Nevski, $2n = 28$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Avachinskaya Bay, the mouth of the Paratunka River, along the coast, in tidal zone, 23 Sep 2014, coll. O.A. Chernyagina 12790: **27** (VLA). North Pacific (Kamchatka, the Kurils, Commander Isls). Described from Aleutian (Atka Isl.) and Commander (Bering) islands, from Alaska to California and Oregon. Meadows and pebbles, roadsides. Anthropophyte. The CN was earlier revealed from Bering Isl. (Probatova & Sokolovskaya 1982). For *H. brachyantherum* this is the first CN report from Kamchatka Peninsula. $2n = 4x$.

****Koeleria sibirensis* (Domin) Tzvelev, $2n = 28$**

Russia, East Siberia, Irkutskaya Oblast', Ust'-Ordynskii Buryatskii Okrug, Alarskii Raion, near Aljaty settlement, the Aljaty Lake, along the lakeside, 4 Jul 2011, coll. A.A. Gnutikov 12288: **28** (VLA). First CN data for the species. Earlier this specimen was erroneously referred to *K. cristata* (L.) Pers. (Probatova et al. 2013). The species is endemic, it was described from Lena River and it is distributed around the Baikal Lake and in South Yakutia. Occurs on riverside and lakeside sands and pebbles, meadows and forest clearings. $2n = 4x$.

***Melica altissima* L., $2n = 18$**

Russia, West Siberia, Republic of Khakassia, Shirinskii Raion, in vicinity of Efremkino village, right riverside of the Belyi Iyus River, rocky massif Togyz-Az, stony slide-rocks, 9 Aug 2013, coll. A.L. Ebel 12735: **16** (TK). Geographical area: East Europe – Siberia – Central Asia. Light forests, forest edges and glades, stony slopes and rocks, among shrubs; up to the middle mountain belt. In Russia it occurs in European part, Caucasus, Siberia. Described from Siberia. The CN was studied in Russia in Stavropol'skii Krai, Permskii Krai, Altai Republic. $2n = 2x$.

***Melica nutans* L., $2n = 18$**

Russia, East Siberia, Irkutskaya Oblast', Sliudyanskii Raion, left riverside of the Snezhnaya River, 569 m alt., *Pinus sibirica* forest with *Abies*, *Populus*, *Waldsteinia* and forb-grass layer, 13 Jul 2014, coll. S.G. Kazanovsky 12901: **29** (VLA, IRK). Eurasian. In forests, among shrubs; up to the upper mountain belt. In Russia *M. nutans* was studied earlier in Permskii Krai and Buryatia Republic, now it is studied first in Irkutskaya Oblast'. Isolated populations from Kamchatka and Sakhalin may belong to a separate species. $2n = 2x$.

***Ochlopoa annua* (L.) H. Scholz, $2n = 28$**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Sobolevskii Raion, in vicinity of Sobolevo, Ustjevoe settlement, 12 Aug 2014, coll. R.N. Bukhalova & Yu.N. Gerassimov 12793: **35** (VLA). Cosmopolite. Anthropophyte. Roadsides, disturbed plots, riversides, as a weed in settlements; to the upper mountain belt. In the Russian Far East – everywhere, except the Arctic. Described from Europe. In Russia the CN was studied (under the name *Poa annua* L.) from Permskii Krai, Irkutskaya Oblast', Amurskaya Oblast', Khabarovskii Krai, Primorskii Krai, Sakhalin, the Kurils (Paramushir, Onkotan). This is the first CN report from Kamchatka Peninsula. $2n = 4x$.

***Poa angustifolia* L., 2n = 56**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Bystrinskii Raion, outskirts of Esso settlement, 497 m alt., forb meadow, 11 Jul 2014, coll. V.V. Buryi 12792: **31** (VLA). Eurasian, introduced to North America and elsewhere in temperate regions. Dry meadows, steppes, riverside and coastal sands and pebbles, roadsides. In all the RFE (but alien in the north, in Sakhalin and in the Kurils). Described from Europe. In Russia the CN was studied from Leningradskaya Oblast', Saratovskaya Oblast', Irkutskaya Oblast', Zabaikal'skii Krai, North Koryakia, Primorskii Krai, Sakhalin (2n = 56, 63–64, c. 70, 70–72), and this is the first CN report from Kamchatka Peninsula. Variable ploidy. 2n = 8x, 9x, 10x and aneuploids.

***Poa attenuata* Trin., 2n = 28**

Russia, East Siberia, Sakha-Yakutia Republic, central part, the Vilui River basin, near Kyssyl-Syr settlement, Makhhatta tukulan, the flood-plain of the Vilui River, *Salix* forest on sandy beach, 13 Jul 2015, coll. I.A. Galanina 12873: **32** (VLA). Siberian species. Stony slopes, pebbles, highland steppes; in the middle and upper mountain belts. Described from Altai. The CN was studied in Russia from Altai Republic, Irkutskaya Oblast', Buryatia Republic, Zabaikal'skii Krai. This is the first CN count from Yakutia. The tetraploid CN 2n = 28 is constant in *P. attenuata*. 2n = 4x.

***Poa trivialis* L., 2n = 14**

Russia, the Russian Far East, Kamchatskii Krai, Kamchatka Peninsula, Sobolevskii Raion, the Bol'shaya Vorovskaya River basin, in vicinity of Sobolevo settlement, swampy flooding riverside, 12 Aug 2014, coll. R.N. Bukhalova & Yu.N. Gerassimov 12793: **30** (VLA). Euro-Siberian species, alien elsewhere in the world in all continents. Adventive in the Russian Far East. Moist meadows, riversides, roadsides. Described from Europe. CN counts in Russia – from Leningradskaya Oblast', Karelia, Primorskii Krai, Sakhalin, South Kurils (Shikotan Isl.). For *P. trivialis* this is the first CN report from Kamchatka. 2n = 2x.

****Puccinellia hultenii* Swallen, 2n = 42**

Russia, the Russian Far East, Primorskii Krai, Nakhodka city, southern microdistrict, Sportivnaya Street, roadside, 20 Aug 2013, coll. S.V. Prokopenko 12551: **33** (VLA). First CN count for the species. This is the only one reliable site of this North American (N Pacific?) species in Russia; moreover, it has already been collected from Nakhodka Bay in 1913 (Nakhodka, meadow along the seacoast, on sands, 18 VI 1913, coll. A. Bulavkina 310 — LE). It was also reported from the mouth of Penzhina River. Described from Alaska. Anthropophyte. 2n = 6x.

***Schedonorus giganteus* (L.) Soreng et Terrell, 2n = 42**

Russia, West Siberia, Tomskaya Oblast', in vicinity of Tomsk city, left riverside of the Malaya Kirghizka River (the Tom' River basin), valley of the rivulet, birch forest (*Betula pubescens*), 20 Aug 2013, coll. A.L. Ebel 12607: **1** (TK). Europe, West Siberia, South-West and Middle Asia, introduced to North America. Forest species. In Russia its CN was studied from Caucasus (Krasnodarskii Krai, Chechenskaya Republic, Kabardino-Balkaria Republic), Permskii

Krai, Novosibirskaya Oblast, Krasnoyarskii Krai (West Sayan Mts.). The most common CN for *S. giganteus* is 2n = 42, however 2n = 28 was revealed three times. Variable ploidy. 2n = 4x, 6x.

***Schizachne callosa* (Turcz. ex Griseb.) Ohwi, 2n = 20**

Russia, East Siberia, Irkutskaya Oblast', Sliudyanskii Raion, lower course of the Sliudyanka River, right riverside, 570 m alt., *Populus suaveolens* forest with forb layer, 7 Aug 2015, coll. S.G. Kazanovsky 12946: **34** (VLA, IRK). East Europe – Siberia – Central and East Asia. Forest species; up to the middle mountain belt. Distributed in the most part of the Russian Far East, except Kamchatka and northwards. Described from Baikal Lake. The CN is constant, it was studied in Russia from Altai Republic, Zabaikal'skii Krai, Khabarovskii Krai, Primorskii Krai. *S. callosa* was studied first in Irkutskaya Oblast'. 2n = 2x.

CONCLUSION

The 37 species from 24 genera presented here demonstrate the diversity of CNs: different ploidy levels, a series of basic CN numbers (x = 7, 9, 10, 12, 13, 17). The tetraploids prevail (18 species), but 11 species are diploids. There are species with variable ploidy in *Bromopsis*, *Echinochloa*, *Schedonorus*, *Poa* and this phenomenon indicates progressive species. The tetraploid CNs (2n = 4x) prove the optimal ploidy level for species. The hexaploid CN (2n = 6x) indicates the hybrid origin of the taxa. 6 species were studied caryologically for the first time. For 2 species the new CN data were obtained.

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