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Additions to Chromosome Numbers for Vascular Plants from Sakhalin and the Kurile Islands (1)

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Abstract As a supplement to chromosome information published in the book entitled “Caryology of the flora of Sakhalin and the Kurile Islands” (Probatova, Barkalov, Rudyka 2007), the chromosome numbers for 57 vascular plant species from Sakhalin and the Kurile Islands (44 genera, 21 families), are presented here. Twenty-two species were added to the Annotated list in the book mentioned above. Chromosome numbers are reported for the first time in the following six species: *Cardamine sachalinensis*, *Elymus franchetii*, *Minuartia barkalovii*, *Oxytropis calcareorum*, *Persicaria extremiorientalis*, *Popoviocodonia stenocarpa* (the first chromosome information for the genus *Popoviocodonia*). Additionally, new cytotypes are revealed in three species: *Lathyrus pilosus*, *Oxytropis hidakamontana*, and *Potentilla matsumurae*.

Key words: chromosome numbers, vascular plants, Sakhalin, the Kurile Islands, taxonomy, phytogeography

Introduction

This is our first contribution since the publication of the book “Caryology of the flora of Sakhalin and the Kurile Islands. Chromosome numbers, taxonomic and phytogeographical comments” (Probatova *et al.* 2007). The book is the first of a series devoted to studies on chromosome numbers in the flora of individual subregions of the Russian Far East. The book contains the chromosome numbers data for 536 vascular plant species that were studied on Sakhalin, Moneron and (or) on the Kurile Islands. During the caryological studies of the island flora that have been underway since 1960 we obtained information for: 356 species from Sakhalin (23.4 % of the total number of vascular plant species), 257 species from the Kuriles (18.4 % of the total vascular flora), and 48 species from Moneron Island. The chromosome number data are accompanied with information on ecology and phytogeography, as well as species distribution on the islands. For many species, caryotaxonomic and phytogeographical comments are also given. Chromosome numbers were considered in the context of available global species data. For 184 plant species, the chromosome numbers were obtained from natural protected areas. Among the leading families of the flora studied, the greatest

number of species (98 spp.) are from Poaceae; among them, the prevalence of polyploids (72 %, against 28% of diploids) is revealed. On the contrary, in the next largest family, Asteraceae (65 spp. studied), the prevalence of diploids is pronounced (57%, against 43% of polyploids). Chromosome numbers from the majority of species are constant, and only a few species are characterized by intraspecific polymorphism. In some groups, isolation of the insular populations is expressed to a greater or lesser degree. A second book, with chromosome numbers for the flora of the continental part of the Sea of Japan area and the islands of Peter the Great Bay (the Primorsky Territory), is now in the process of compilation.

This paper contains new chromosome counts on the vascular plants from the Kurile Islands and Sakhalin. Three papers have been published in Japan since 2000 (Probatova *et al.* 2000a), two of them were in the series “Biodiversity and Biogeography of Kuril Islands and Sakhalin”, vols. 1 and 2 (Probatova *et al.* 2004a; Probatova *et al.* 2006a). In the present paper, chromosome counts for 57 species are given. For six species there was no previously published information on the chromosome numbers, and for three species new chromosome numbers (new cytotypes) are reported.

Materials and Methods

Counts were primarily made by E.G. Rudyka (R.), with assistance from Z.V. Kozhevnikova (K.), on squashed preparations of root tips fixed with Carnoy's solution. The root tips were taken from seedlings grown from seeds obtained from herbarium specimens, which were collected by V.Yu. Barkalov. Preparations were stained with iron hematoxylin. First counts are indicated with an asterisk (*). Introduced (alien) species are indicated with a (+). Voucher specimens are preserved in the Herbarium VLA, Vladivostok. The plants were identified by V.Yu. Barkalov. The plant names and geographical distribution of the species studied are, in most cases, given according to "Vascular Plants of the Soviet Far East", Vols. 1–8 (Kharkevich 1985–1996), Cherepanov (1995), and "Flora of the Russian Far East. Addenda et corrigenda ..." (Kozhevnikov and Probatova 2006). For some species, new data on island distributions were provided by Barkalov. The species notes and manuscript, including English translation, were prepared by N.S. Probatova.

Annotated List of Plants with Chromosome Numbers Studied

FAMILY APIACEAE

1. *Kitagawia terebinthacea* (Fisch. ex Spreng.) M. Pimen.

(*Peucedanum terebinthacea* (Fisch. ex Spreng.) Ledeb.; *P. deltoideum* Makino et Yabe; *P. paishanense* Nakai)

Chromosome number. $2n=22$ (K.).

Voucher specimen. VLA 10868, Kuriles, Shikotan Island, Del'fin Bay, on the rocks, 31.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; south of the Russian Far East, East Siberia; China, Korea, Japan. Mountains, coastal rocks.

Note. This species was studied in the Amur R. basin, in the Primorsky Territory, as well as in China, Korea and Japan: everywhere $2n=22$, under different species names (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1988; Agapova *et al.* 1990; Goldblatt and Johnson 1994, 2003).

FAMILY ASTERACEAE

2. +*Arctium tomentosum* Mill.

Chromosome number. $2n=36$ (R.).

Voucher specimen. VLA 10791, Kuriles, Shikotan Island, in vicinity of Krabozavodskoye settlement, Anamka R., roadside, 5. IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; Eurasia (but introduced in the Russian Far East).

Note. The chromosome number in *A. tomentosum* has not been studied in the Kuriles before. It was previously known from the environs of Vladivostok ($2n=36$ – Probatova *et al.* 1991). Many authors give the same chromosome number ($2n=36$) for *A. tomentosum*

(see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984, 1985, 1988; Agapova *et al.* 1990; Goldblatt and Johnson 1990, 1994, 2003, 2006).

3. *Arnica unalaschcensis* Less.

Chromosome number. $2n=38$ (R.).

Voucher specimen. VLA 10847, Kuriles, Shikotan Island, Notoro Mt., meadow near the top of the mountain, 25.VIII. 2007, coll. V. Barkalov.

Distribution. Kuriles; North Pacific area (insular territories). Mostly – in mountain meadows.

Note. The chromosome number ($2n=38$) in *A. unalaschcensis* was also studied from Simushir, Urup and Iturup Islands (Probatova *et al.* 2000a, 2007). It was studied much earlier on Bering Island, the Commander Islands (Sokolovskaya 1968). Also $2n=38$ and $2n=c.40$ have been reported from Japan (see Bolkhovskikh *et al.* 1969; Nishikawa 1986).

4. *Eupatorium glehnii* Fr. Schmidt ex Trautv.

Chromosome number. $2n=20$ (R.).

Voucher specimen. VLA 10846, Kuriles, Shikotan Island, Tzerkovnaya Bay, tall herbs community on the slope, 2.IX.2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Japan. Forest edges, bush.

Note. This species has been studied in Japan ($2n=20$ – Kawano 1961; Watanabe *et al.* 1990).

5. *Leontopodium kurilense* Takeda

Chromosome number. $2n=26$ (R.).

Voucher specimen. VLA 10844, Kuriles, Shikotan Island, Shikotan Mt., on the rocks, 23.VIII. 2007, coll. V. Barkalov.

Distribution. South Kuriles (Iturup and Shikotan Islands). Endemic. Mountains, coastal rocks.

Note. In the literature, we found only one report for this species: $2n=26$ (Sakai 1934). The chromosome number $2n=48$ for "*L. kurilense*", from Chukotka and from the south of Magadansky Region, Nagayevo Bay (see Agapova *et al.* 1990), as well as $2n=52$ – from Anujskoye Plateau (Zhukova and Petrovsky 1987), belong to other species, but not to *L. kurilense*, because the latter does not occur there, according to Barkalov (1992). *L. kurilense* was described from Shikotan Island.

6. *Lepidotheca suaveolens* (Pursh) Nutt.

Chromosome number. $2n=18$ (R.).

Voucher specimen. VLA 10812, Kuriles, Shikotan Island, middle course of Gorobets R., roadside, 5.IX.2007, coll. V. Barkalov.

Distribution. Sakhalin, Moneron, Kuriles; East Asia, North America; expanded throughout the world as alien.

Note. We obtained the chromosome number ($2n=18$) for *L. suaveolens* on Moneron Island and from the Lower Amur R. basin (Probatova and Sokolovskaya 1990; Probatova *et al.* 2007). There is the only one chromosome number for this species in the literature,

sometimes reported under different species names: *Matricaria matricarioides* (Less.) Porter, *M. discoidea* DC. etc. (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984, 1988; Agapova *et al.* 1990; Goldblatt and Johnson 2003).

7. *Picris japonica* Thunb.

Chromosome number. $2n=10$ (R.).

Voucher specimen. VLA 10790, Kuriles, Shikotan Island, Anamka R., forest edge, roadside, 5. IX.2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; the Amur River basin (downstream from Khabarovsk), the Primorsky Territory; Korea, Japan. Meadows.

Note. The species has been thoroughly investigated in the Russian Far East: its chromosome number ($2n=10$) is known from Sakhalin, Moneron and the Kuriles, Anuchina Island (Probatova *et al.* 2007), as well as from Primorsky Territory and Amur R. basin, in China and Japan (see Bolkhovskikh *et al.* 1969; Agapova *et al.* 1990; Goldblatt and Johnson 1991, 1998, 2006).

8. *Solidago dahurica* Kitag.

(? *S. decurrens* Lour.)

Chromosome number. $2n=18$ (K.).

Voucher specimen. VLA 10871, Kuriles, Shikotan Island, the middle course of Gorobets R., meadow on the slope, 5. IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; Far East, Siberia. Forests and wetlands.

Note. This species was studied in Sakhalin and in the Primorsky Territory, also there were many reports of its chromosome number ($2n=18$) from East Siberia (see Agapova *et al.* 1990; Probatova *et al.* 2007).

FAMILY BRASSICACEAE

9. *Cardamine regeliana* Miq.

Chromosome number. $2n=32$ (R.).

Voucher specimen. VLA 10808, Kuriles, Shikotan Island, Zvezdnaya Bay, maritime slope, near the stream, 30.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; North Pacific. Moist meadows, along the streams.

Note. Chromosome number ($2n=32$) in *C. regeliana* was reported recently from the Kuriles (Simushir, Kharimkotan, Brat Chirpojev Islands) in Probatova *et al.* (2007). This species has also been studied from Kamchatka and Sakhalin (see Agapova *et al.* 1990). We have not found more chromosome reports for *C. regeliana* in the literature; perhaps they were under "*C. scutata* Thunb." (e.g., $2n=32$ – in Lihová and Kučera 2007, from Japan).

10. *Cardamine sachalinensis* Miyabe et Miyake

Chromosome number. $2n=32^*$ (R.).

Voucher specimen. VLA 8880, Sakhalin, Vostochno-Sakhalinskiye Mts., Nabiljsky Range, Chamginsky Pass, the spot elevation "1511 m", along the rivulet, in moss community, 8. VIII. 2002, coll. V.

Barkalov.

Distribution. Sakhalin; endemic. Montane meadows, near the streams.

Note. This specimen was misidentified as *C. yezoensis* Maxim. in Probatova *et al.* (2007), as has now been established by V.Yu. Barkalov. *C. sachalinensis* was reported in the Russian Far East by Woroshilov (1982). There was no previous chromosome information for *C. sachalinensis*.

11. *Cardamine* sp.

(cfr. *C. appendiculata* Franch. et Savat.)

Chromosome number. $2n=16^*$ (R.).

Voucher specimen. VLA 10432, Kuriles, Kunashir Island, the nature reserve "Kurilsky", Ozernaya R., on the slope, near the waterfall, 9. IX. 2006, coll. V. Barkalov.

Distribution. South Kuriles (Kunashir Island). Only known hitherto in the locality indicated above.

Note. The plants, collected in autumn, had half-dry stems without seeds (crumbled). Plants appeared to be ready for dormancy and were almost lying on the surface of the moist soil (melkozem) with thick (up to 8 mm) green rhizome-like stems (10–15 cm long), and small rosettes of very small leaves in the place of the buds. From these "rhizomes" we cultivated plants in the greenhouse in Vladivostok, and Barkalov wrote the following short description. Stems in lower part, as well as the leaves, pubescent, leaflets in 2–3 pairs, sessile, ovoid, sparse pubescent, edge dentate, the last leaflet not larger than the lateral ones. Flowers white, petals ca.7 mm long. It might represent a distinct species, as was mentioned by Woroshilov (1982) in his Note to *C. yezoensis* Maxim., however it is hardly a close relative of *C. schinziana* O.E. Schulz, and is (most probably) more closely related to *C. appendiculata* Franch. et Savat., distributed in Japan (Honshu). Further study of these plants is needed.

12. *Cardaminopsis lyrata* (L.) Hiit.

Chromosome number. $2n=16$ (R.).

Voucher specimen. VLA 10807, Kuriles, Shikotan Island, Zvezdnaya Bay, maritime slope, at the stream, 30.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; North Pacific. Rocks and screes.

Note. The chromosome number ($2n=16$) was known earlier for *C. lyrata* from North Sakhalin (Schmidt Peninsula) and from the Kuriles, Urup Island (Probatova *et al.* 2006a, 2007). The species has also been studied in Chukotka, Kamchatka and near Magadan, Koni Peninsula, under different names: *Arabidopsis lyrata* subsp. *kamtschatica* (Fisch. ex DC.) O'Kane et Al-Shehbaz; *Arabis lyrata* L.; *A. kamtschatica* (Fisch.) Ledeb. However, the authors report two chromosome numbers (two ploidy levels) – $2n=2x=16$ and $2n=4x=32$, from North America – $2n=16$ (see Bolkhovskikh *et al.* 1969; Ornduff 1968; Goldblatt 1984, 1985; Agapova *et al.* 1990; Goldblatt and Johnson 2003). The geographical distribution of

these two cytotypes in *C. lyrata* seems to be of great interest.

13. *Draba kurilensis* (Turcz.) Fr. Schmidt
(*Draba borealis* auct., p.p.)

Chromosome number. $2n=32$ (R.).

Voucher specimen. VLA 10863, Kuriles, Shikotan Island, Del'fin Bay, on the rocks, 31.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Japan. Sea coasts, on the rocks.

Note. *D. kurilensis* with $2n=16$ (2x) was known from Sakhalin, and with $2n=32$ (4x) – from Moneron and the Kuriles: Matua and Shishkotan Islands (see Agapova *et al.* 1990; Probatova *et al.* 2004a, 2006a, 2007). This species belongs to the North Pacific complex *D. borealis* DC. aggr., and some authors do not recognize *D. kurilensis* as a species. However, very high chromosome numbers have been reported for *D. borealis* s str.: $2n=64$ (8x) from East Chukotka, $2n=80$ (10x) – from North America (see Bolkhovskikh *et al.* 1969; Agapova *et al.* 1990). We believe the chromosome numbers provide additional reasons to consider *D. kurilensis* as a separate species, one that occupies a more ancient part of the *D. borealis* aggr. area of distribution (Probatova *et al.* 2007). It is noteworthy that the ploidy levels in *D. borealis* aggr. rise to the north. Typically, *D. kurilensis* occurs in the South Kuriles. The geographical distribution of cytotypes within *D. borealis* aggr. needs to be clarified.

14. *Draba ussuriensis* Pohle

Chromosome number. $2n=16$ (R.).

Voucher specimen. VLA 10586, Sakhalin, Poronajsky District, Vostochno-Sakhalinskiye Mts., Vaida Mt., the upper course of Vitnitsa R., near the limestone rocks, 20.VIII. 2006, coll. V. Barkalov.

Distribution. Sakhalin; West Pacific area. Near sea coasts.

Note. *D. ussuriensis* is poorly investigated cytologically. There were only two chromosome reports, both from the environs of Magadan city, the coast of the Sea of Okhotsk: $2n=16$ (under "*D. villosula* Tolm.") and $2n=32$ (see Agapova *et al.* 1990). The diploid cytotype found in Sakhalin is probably a relict.

FAMILY CAMPANULACEAE

15. *Popoviocodonia stenocarpa* (Trautv. et C. A. Mey.) Fed.

(*P. uyemurae* Kudo; *Campanula stenocarpa* Trautv. et C. A. Mey., *C. uyemurae* (Kudo) Miyabe et Tatew.)

Chromosome number. $2n=34^*$ (R.).

Voucher specimen. VLA 10600, Sakhalin, Vostochno-Sakhalinskiye Mts., Nabiljsky Range, the environs of Chamginsky Pass, the spot elevation "1511 m", stony slope, near the ridge of watershed, ca. 1400 m above sea level, tundra vegetation, 15. VIII. 2006, coll. V. Barkalov, V. Yakubov.

Distribution. Sakhalin; Sea of Okhotsk area (south),

Sikhote-Alinj Mts. Mountain tundras, rocks.

Note. There was no chromosome information for this species in the literature. The genus *Popoviocodonia* is monotypic, and it is endemic to the Russian Far East. The diploid chromosome number $2n=34$ (2x) is also common for many species of the related genus *Campanula* L.

FAMILY CARYOPHYLLACEAE

16. *Dianthus superbus* L.

Chromosome number. $2n=30$ (K.)

Voucher specimen. VLA 10853, Kuriles, Shikotan Island, meadow on the stony slope, 23.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; Eurasia. Stony slopes and meadows.

Note. The very polymorphic species *D. superbus* was studied from Moneron Island, $2n=30$ (Probatova *et al.* 2007) and from the Khabarovsk Territory, Botchinsky nature reserve, $2n=30$ (Probatova *et al.* 2006c). Most authors report $2n=30$ for *D. superbus*, e.g., from Siberia, as well as from Japan, Hokkaido (Nishikawa 1985) and from Korea (Lee 1967), but sometimes $2n=60$ and 90 are also reported (see Bolkhovskikh *et al.* 1969; Agapova *et al.* 1990; Goldblatt 1981, 1985, 1988; Goldblatt and Johnson 1990, 1991, 1996, 2000, 2003).

17. *Minuartia barkalovii* N.S. Pavlova

(*M. arctica* auct.)

Chromosome number. $2n=26^*$ (K.)

Voucher specimen. VLA 10835, Kuriles, Iturup Island, Stokap volcano, on volcanic scoria slide-rocks near the top, 11.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; Japan (?). Stony slopes and rocks in the mountains.

Note. *M. barkalovii* was described by Pavlova (1996) from the Stokap volcano on Iturup Island. We studied its chromosome number in the "*locus classicus*" of the species. *M. barkalovii* is related to *M. arctica* (Stev. ex Ser.) Graebn.: for *M. arctica* $2n=22, 26, 38, 52$ are known, from Siberia (see Agapova *et al.* 1990).

18. *Minuartia verna* (L.) Hiern

Chromosome number. $2n=24$ (R.).

Voucher specimen. VLA 10591, Sakhalin, Vostochno-Sakhalinskiye Mts., Nabiljsky Range, near Chamginsky Pass, the spot elevation "1511 m", mountain tundra belt, on the rocks, 15. VIII. 2006, coll. V. Barkalov, V. Yakubov.

Distribution. Sakhalin; Holarctic. Rocky slopes.

Note. This is the second chromosome count for *M. verna* in the Russian Far East (and in Sakhalin). The first one was made from the Schmidt Peninsula ($2n=24$ – Probatova *et al.* 2004a). There is a series of chromosome numbers within this species reported in the international literature: $2n=24, 26, 48, 78, 120$ (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984,

1985; Goldblatt and Johnson 1990, 1996, 1998, 2000). However, the most common diploid cytotype is ($x=12$).

19. *Stellaria ruscifolia* Pall. ex Schlecht.

Chromosome number. $2n=26$ (R.).

Voucher specimen. VLA 10834, Kuriles, Iturup Island, Stokap volcano, on volcanic scoria slide-rocks near the top, 11.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin (north), Kuriles; North Pacific area. Coastal rocks.

Note. This is the second chromosome count for *S. ruscifolia* from the Kuriles. The first one was made from Ekarma Island ($2n=26$ – Probatova *et al.* 2000a). The same chromosome number $2n=26$ is known in *S. ruscifolia* from the environs of Magadan, in the Sea of Okhotsk (Zhukova and Petrovsky 1987). However, $2n=c.50$ has been reported for *S. ruscifolia* from North America (see Bolkhovskikh *et al.* 1969), this probably is $2n=52$.

FAMILY CHENOPODIACEAE

20. *Atriplex subcordata* Kitag.

(*A. gmelinii* auct., p.p.)

Chromosome number. $2n=36$ (R.).

Voucher specimen. VLA 10824, Kuriles, Shikotan Island, Tserkovnaya Bay, sandy seashore, 2.IX.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles. West Pacific area. Sea coasts.

Note. This is the first chromosome count for *A. subcordata* from the Kuriles. Earlier we reported $2n=36$ for *A. subcordata* from Sakhalin (Probatova *et al.* 2006a). Two chromosome numbers (two ploidy levels) were published for *A. subcordata* from Japan, $2n=36$ (see Bolkhovskikh *et al.* 1969) and $2n=54$, from Hokkaido (Nishikawa 1981). Later, Nishikawa (1986) reported $2n=36$ for “*Atriplex gmelinii*” from Hokkaido. In the Primorsky Territory, $2n=36$ was also known in *A. subcordata* (Probatova and Sokolovskaya 1990). *A. subcordata* has more of a distribution in the southern area than *A. gmelinii* C. A. Mey. According to Ignatov (1988), in the South Kuriles and Primorsky Territory only *A. subcordata* occurs. The existence of hexaploid cytotype $2n=54$ in *A. subcordata* needs more evidence.

21. *Chenopodium glaucum* L.

Chromosome number. $2n=18$ (R.).

Voucher specimen. VLA 10815, Kuriles, Shikotan Island, Del’fin Bay, seashore, 31.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; nearly cosmopolitan.

Note. *Ch. glaucum* is well studied caryologically, as shown in the international literature, and is reported almost everywhere as $2n=18$ (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1985, 1988; Agapova *et al.* 1990; Goldblatt and Johnson 1991, 1994, 1998, 2000, 2003, 2006); only once was $2n=36$ reported (see Goldblatt 1984).

FAMILY FABACEAE

22. *Lathyrus japonicus* Willd.

(*L. maritimus* auct.)

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10861, Kuriles, Shikotan Island, Zvezdnaya Bay, maritime slope, meadow, 30.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; North Pacific area. Sea shores.

Note. The chromosome number in *L. japonicus* ($2n=14$) was studied from Sakhalin, Kamchatka, Chukotka, North Koryakia, the Primorsky Territory, Japan and elsewhere (see Bolkhovskikh *et al.* 1969; Goldblatt 1988; Agapova *et al.* 1990; Goldblatt and Johnson 1991, 1994, 2003, 2006; Probatova *et al.* 2007).

23. *Lathyrus pilosus* Cham.

(*L. palustris* var. *pilosus* (Cham.) Ledeb.)

Chromosome number. $2n=56^*$ (R.).

Voucher specimen. VLA 10814, Kuriles, Shikotan Island, Anamka R., along the edge of a moist meadow, 5.IX.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Russian Far East; Siberia; Arctic and East Europe, China, Japan, North America. In damp forests and wetlands.

Note. *L. pilosus* belongs to a small group, *L. palustris* aggr., peculiar because of its rather frequent polyploidy, which is not common at all for the genus *Lathyrus* L. The most frequent variables in the polymorphic species *L. pilosus* are hairiness and width of the leaflets (Pavlova 1989). Plants from Sakhalin and the South Kuriles, with broad leaflets (up to 15 (23) mm wide), have been described as *L. miyabei* Matsum. (*L. pilosus* var. *miyabei* (Matsum.) Hara). For *L. pilosus* and *L. palustris* (the latter is absent in the Russian Far East), beside $2n=14$ (many reports), several authors give $2n=42$, mostly under the name “*L. palustris* var. *pilosus*”, and from various parts of its area of distribution including: Finland, Slovakia, China, Japan, North America (see Bolkhovskikh *et al.* 1969 – for “*L. palustris*”; Goldblatt 1981, 1988; Goldblatt and Johnson 1991, 1998, 2006). There is a paper on hexaploid *L. palustris* (Khawaja *et al.* 1995), where it is considered as a natural autohexaploid. We revealed for the first time a new, octoploid ($8x$) cytotype in *L. pilosus* (*L. palustris* aggr.). The taxonomic status of *L. miyabei* requires revision.

24. *Oxytropis calcareorum* N. S. Pavlova

Chromosome number. $2n=32^*$ (R.).

Voucher specimen. VLA 10583, Sakhalin, Poronajsky District, Vostochno-Sakhalinskyye Mts., Vaida Mt., the upper course of Vitnitsa R., near the limestone rocks, 20.VIII.2006, coll. V. Barkalov.

Distribution. Sakhalin (north). Endemic. Rocks, mountain tundras. Calciphyte.

Note. Previously, no chromosome information existed for this species. According to Pavlova (1989),

O. calcareorum might be identical to *O. rukutamensis* Sugawara, but the latter name was invalid.

25. *Oxytropis hidakamontana* Miyabe et Tatew.

(*O. retusa* auct., p. p.)

Chromosome number. $2n=64^*$ (R.).

Voucher specimens. VLA 10800, Kuriles, Shikotan Island, Shikotan Mt., rocks in the top of the mountain, 8. IX. 2007, coll. V. Barkalov; VLA 10802, Kuriles, Shikotan Island, Notoro Mt., near the top of the mountain, on the rocks, 24.VIII.2007, coll. V. Barkalov.

Distribution. South Kuriles; Japan. Stony slopes, coastal rocks.

Note. Only one chromosome report for this species existed, $2n=16$, in Pavlova *et al.* (1989). It is also from Shikotan Island (Gorobets Bay, near Krabozavodsk). It was previously published as "*Oxytropis retusa*", in Gurzenkov and Pavlova (1984). We have now received two specimens (from two different mountains) that are not diploid, but octoploid (8x), with chromosome number $2n=64$. According to Pavlova (1989), the plants from the South Kuriles do not agree well with *O. hidakamontana*, and they might belong to a separate species. The situation with these plants in Shikotan Island needs to be clarified, and further chromosome studies on this group are also needed.

26. *Oxytropis sachalinensis* Miyabe et Tatew.

Chromosome number. $2n=16$ (R.).

Voucher specimens. VLA 10796, Sakhalin, Schmidt Peninsula, Taliki R., meadow on the slope of the mountain, 14.VIII. 2001, coll. V. Barkalov; VLA 10798, Sakhalin, Schmidt Peninsula, Boljshaya Longri R., mountainside, 16. VIII. 2001, coll. V. Barkalov.

Distribution. Sakhalin (north and east). Endemic. Mountain tundras, meadows and rocks.

Note. The chromosome number in *O. sachalinensis* was counted previously on Sheltinga Cape, Sakhalin (east), $2n=16$ (Probatova *et al.* 2006a). This species is a relative of *O. ajanensis* (Regel et Til.) Bunge (Pavlova 1989), which also has $2n=16$ (Yurtsev and Zhukova 1972).

FAMILY GERANIACEAE

28. *Geranium erianthum* DC.

Chromosome number. $2n=28$ (R.).

Voucher specimen. VLA 8341, Kuriles, Paramushir Island, Vassiljeva Peninsula, in vicinity of Pernatoye Lake, meadow, 25.VII. 2000, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; North Pacific area. Meadows.

Note. This species was studied from Shumshu Island: $2n=28$ (Probatova *et al.* 2000a), as well as from Chukotka and from North America. $2n=30$ was reported in Japan (see Bolkhovskikh *et al.* 1969; Goldblatt 1984; Agapova *et al.* 1990).

FAMILY HEMEROCALLIDACEAE

29. *Hemerocallis yezoensis* Hara

Chromosome number. $2n=22$ (R.).

Voucher specimen. VLA 10448, Kuriles, Kunashir Island, Sea of Okhotsk coast, near the mouth of Ozernaya R., marine terrace, grass meadow, 6.IX. 2006, coll. V. Barkalov.

Distribution. South Kuriles (Kunashir Island); Japan. Meadows on sea coasts.

Note. The chromosome number for *H. yezoensis* ($2n=22$) was determined from Japan (see Bolkhovskikh *et al.* 1969; Goldblatt and Johnson 1991).

FAMILY HYPERICACEAE

30. *Hypericum kamtschaticum* Ledeb.

(*H. paramushiriense* Kudo)

Chromosome number. $2n=16$ (R.).

Voucher specimen. VLA 10653, Kuriles, Kunashir Island, north-east part, the caldera of Tyatya Volcano, meadow, 14.IX.2006, coll. V. Barkalov.

Distribution. Kuriles; West Pacific area. Mostly sea coasts (rocks and meadows).

Note. This species is poorly studied. Its chromosome number was hitherto known only from Japan: $2n=16$ (Kogi 1984; Nishikawa 1985). The same chromosome number $2n=16$ has also been revealed in two relative species: *H. yezoense* Maxim., from Moneron Island, and *H. attenuatum* Choisy, from the south of the Primorsky Territory (see Agapova *et al.* 1990; Probatova *et al.* 2004a; Probatova *et al.* 2006b).

31. *Hypericum yezoense* Maxim.

Chromosome number. $2n=16$ (K.).

Voucher specimen. VLA 10860, Kuriles, Shikotan Island, Zvezdnaya Bay, maritime stony slope, meadow, 30.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Japan. Rocks and meadows.

Note. The chromosome number in *H. yezoense* was studied for the first time not long ago, on Moneron Island: $2n=16$ (Probatova *et al.* 2004a).

FAMILY JUNCACEAE

32. *Juncus bufonius* L.

Chromosome number. $2n=34$ (R.).

Voucher specimen. VLA 10870, Kuriles, Shikotan Island, Del'fin Bay, sand banks by the lakeside, 31.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Holarctic (as alien – in South America and Australia). Sandbanks, uliginose banks.

Note. The species was previously studied in the South Kuriles, Kunashir Island: $2n=50, 54, 56$ (Probatova *et al.* 2000a). From Chukotka, $2n=34$ and 52 were reported (Zhukova and Petrovsky 1987; Agapova *et al.* 1990). This is a very polymorphic species, with $2n=30, 34, 52, c.60, c.70, 80, c.100, 106,$

108, 110, 120 (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984; Goldblatt and Johnson 1994, 1998).

FAMILY LAMIACEAE

33. +*Galeopsis tetrahit* L.

Chromosome number. $2n=32$ (R.).

Voucher specimen. VLA 10787, Kuriles, Shikotan Island, Zvezdnaya Bay, sea shore, near the rivulet, 29.VIII. 2007, coll. V. Barkalov.

Distribution. South Kuriles (Shikotan Island); Europe; as alien – in the Primorsky Territory (near Vladivostok, very rare) and in North America.

Note. This alien species is reported for the first time from the Kuriles. There are many reports of $2n=32$ for *G. tetrahit* in the literature (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984, 1985, 1988; Goldblatt and Johnson 1991, 1998, 2000, 2003), but $2n=30$ was found once from Baikal Siberia (see Agapova *et al.* 1990) which, most probably, is incorrect.

FAMILY ONAGRACEAE

34. *Epilobium fastigiato-ramosum* Nakai

Chromosome number. $2n=36$ (R.).

Voucher specimen. VLA 10854, Kuriles, Shikotan Island, Zvezdnaya Bay, marine terrace, small bog with herbs and mosses, 30.VIII. 2007, coll. V. Barkalov.

Distribution. South Kuriles (Shikotan Island, first report for the Kuriles!); south of the Russian Far East; South Siberia; Mongolia, China, Korea, Japan. Forest edges, wetlands.

Note. We only found one chromosome report in the literature for *E. fastigiato-ramosum*, from China ($2n=36$, Chen C.-J. *et al.* 1992).

35. +*Oenothera biennis* L.

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10811, Kuriles, Shikotan Island, Del'fin Bay, coastal sand dunes, roadside, 31.VIII.2007, coll. V. Barkalov; VLA 10869, Kuriles, Shikotan Island, Ostrovnoy Peninsula, sand dunes in roadside, 31.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles, introduced (naturalized in the Russian Far East); Japan; native in North America; as alien – almost cosmopolitan.

Note. This species was studied in Sakhalin ($2n=14$, Probatova and Rudyka 1981). For *O. biennis* many authors give $2n=14$ (see Agapova *et al.* 1993; Goldblatt 1981, 1988; Goldblatt and Johnson 1990, 1991, 1994, 2000, 2003), in the old literature $2n=28$ was found (see Bolkhovskikh *et al.* 1969).

FAMILY ORCHIDACEAE

36. *Oreorchis patens* (Lindl.) Lindl.

Chromosome number. $2n=c.48$ (R.).

Voucher specimen. VLA 9096, Sakhalin, Dolinsky District, the environs of Sokol settlement, on the slope

of a hill, mixed forest, 16. VII. 2003, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; West Pacific area. In forests.

Note. The chromosome number ($2n=48$) was already revealed from Sakhalin, Moneron and the Kuriles, Urup Island (Probatova and Sokolovskaya 1995; Probatova *et al.* 2007). In Japan there were reports $2n=48$ and, sometimes, $2n=50$ (see Bolkhovskikh *et al.* 1969; Goldblatt and Johnson 1991).

FAMILY PAPAVERACEAE

37. *Chelidonium asiaticum* (Hara) Krachulkova

Chromosome number. $2n=10$ (R.).

Voucher specimen. VLA 10822, Kuriles, Shikotan Island, Malokuriljskoye settlement, near the buildings, 6.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; south of the Russian Far East; China, Korea, Japan. Forest edges, sandbanks. Described from Japan.

Note. This is the first chromosome count for this species in the Kuriles. *Ch. asiaticum* is the only native species to East Asia, its chromosome number, $2n=10$, has been revealed many times in the Primorsky Territory, in the Amur River basin and in Sakhalin (Probatova and Sokolovskaya 1986; Probatova *et al.* 1996, 1998, 2000c, 2006a; Shatalova 2000). All reports of $2n=10$ for “*Ch. majus* L.” (instead of $2n=12$) from the Russian Far East, China, Korea and Japan (see Bolkhovskikh *et al.* 1969; Goldblatt 1984, 1985; Goldblatt and Johnson 1991, 1998, 2003; Agapova *et al.* 1993), as well as “*Ch. majus* var. *asiaticum*”, must be referred to *Ch. asiaticum*.

FAMILY PINACEAE

38. *Picea glehnii* (Fr. Schmidt) Mast.

Chromosome number. $2n=24$ (R.).

Voucher specimen. VLA 10433, Kuriles, Kunashir Island, in vicinity of Goryachyi Plyazh settlement, along the road, 11. IX. 2006, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Japan. Forests.

Note. The chromosome number in *P. glehnii* was studied from Sakhalin, $2n=24$, and from Japan, $2n=24+0-5B$ (see Goldblatt and Johnson 1991, 2006).

FAMILY POACEAE

39. *Agrostis flaccida* Hack.

Chromosome number. $2n=14$ (K.).

Voucher specimen. VLA 10833, Kuriles, Shikotan Island, Tomari Mt., meadow near the mountain top, 26.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Japan; West Pacific area (mostly insular). Meadows.

Note. *A. flaccida* has been studied in Sakhalin and the Kuriles (Paramushir, Iturup and Kunashir Islands) and found to be $2n=14$ (see Agapova *et al.* 1993;

Probatova *et al.* 1989; Rudyka 1990; Probatova *et al.* 2000a). As for other chromosome numbers, $2n=21$, 28, 56, from Japan, for "*A. flaccida*" (see Bolkhovskikh *et al.* 1969; Goldblatt, 1988; Goldblatt and Johnson 1990) they might belong to some other species or represent hybrids of *A. flaccida*.

40. *Agrostis matsumurae* Hack. ex Honda
(*A. clavata* subsp. *matsumurae* (Hack. ex Honda) Tateoka; ?*A. macrothyrsa* Hack.)

Chromosome number. $2n=42$ (R.).

Voucher specimen. VLA 10865, Kuriles, Shikotan Island, the slope of Ploskaya Mt., forest stream bank, 27.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Japan. In forests, near the rivulets.

Note. Sometimes *A. matsumurae* is considered as conspecific with *A. macrothyrsa* Hack. or with *A. clavata* Trin. There are some chromosome counts from Sakhalin and the Kuriles (Paramushir, Iturup Islands) of $2n=42$ (Probatova *et al.* 2007 – as *A. clavata*). For *A. matsumurae* from Japan, $2n=28$ and 42 were reported (see Bolkhovskikh *et al.* 1969).

41. *Deschampsia macrothyrsa* (Tatew. et Ohwi) Kawano

Chromosome number. $2n=26$ (R.).

Voucher specimen. VLA 8612, Sakhalin, northwards from Pomrj Bay, in vicinity of the former Mujzma settlement, 10.VIII. 2001, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; the Sea of Japan area. Sea coasts. Salt marches and meadows.

Note. The species has received little study. The only chromosome report was given by A.P. Sokolovskaya in Probatova (1984), from the "*locus classicus*" of *D. macrothyrsa* (Solovyovka, or "Soriofka"), in the south of Sakhalin (see Probatova *et al.* 2007).

42. *Elymus franchetii* Kitag.

Chromosome number. $2n=42^*$ (K.).

Voucher specimen. VLA 10841, Kuriles, Shikotan Island, the middle coarse of Gorobets R., on the edge of *Alnus hirsuta* forest, by the road, 24.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; south of the Russian Far East; China, Korea, Japan (?).

Note. This species was described from China and belongs to *E. dahuricus* aggr. According to Acad. N.N. Tzvelyov's opinion (his personal communication to Probatova), *E. franchetii* occupies the "intermediate" position between *E. dahuricus* Turcz. ex Griseb. s. str. and *E. excelsus* Turcz. ex Griseb., but the morphological features distinguishing it from the coastal species *E. woroschilovii* Probat. are not clear. No published chromosome information was found for *E. franchetii*.

43. *Festuca ovina* L.

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10864, Kuriles, Shikotan Island, the upper course of Ostrovnaya R., rubbly-melkozem slide-rocks on the slope of the mountain, 25.VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles; Holarctic. Steppes and meadows.

Note. *F. ovina* was studied in Sakhalin and the Kuriles (Iturup and Shikotan Islands), as well as in various regions of the Far East and all of Russia: $2n=14$ (Alexeev *et al.* 1990). Chromosome counts other than $2n=14$ in the extensive literature (especially in old sources) are likely not to belong to *F. ovina* s. str.

44. *Milium effusum* L.

Chromosome number. $2n=28$ (R.).

Voucher specimen. VLA 10842, Kuriles, Shikotan Island, Tserkovnaya Bay, on the edge of *Alnus hirsuta* forest with tall herbs, 3.IX.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Holarctic (?). Forests, tall herbs communities.

Note. The chromosome number in *M. effusum* was studied in Sakhalin and the Kuriles (Urup, Iturup, Kunashir Islands), $2n=28$ (Probatova *et al.* 2000a, 2007). In the Amur R. basin (Russian part), in the Primorsky Territory, as well as in the other regions of Russia, this species have been studied many times ($2n=28$ – Probatova and Sokolovskaya 1981; Probatova *et al.* 2000b, 2001, 2004b and unpublished data). In the literature for *M. effusum* many authors report $2n=28$, rarely $2n=28+0-1B$ or $2n=26$ (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984, 1985, 1988; Goldblatt and Johnson 1994, 1996, 2003; Agapova *et al.* 1993). There is only one report of $2n=14$ from European Arctic of Russia (Khibinskiye Mts.) which is obviously an error; moreover, the voucher specimen was not found in LEU Herbarium.

45. *Poa palustris* L.

Chromosome number. $2n=28$ (R.).

Voucher specimen. VLA 10803, Kuriles, Shikotan Island, Del'fin Bay, lakeside, *Salix* community, 31.VIII.2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Holarctic. Wet meadows.

Note. Polymorphic species. Its chromosome number was studied in Sakhalin and the Kuriles (Simushir, Iturup, Kunashir Islands), $2n=28$ (see Agapova *et al.* 1993; Probatova *et al.* 2000a). Also $2n=28$ was revealed for *P. palustris* in Kamchatka, the Amur R. basin and the Primorsky Territory. Most authors report $2n=28$ for *P. palustris* (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984; Goldblatt and Johnson 1990, 1991, 1994; Agapova *et al.* 1993; Shatalova 2000), but $2n=42$ (and especially $2n=14$) seem not to belong to this species.

46. *Poa trivialis* L.

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10858, Kuriles, Shikotan Island, Anamka R., *Alnus hirsuta* forest, with tall herbs near the rivulet, 5.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, South Kuriles (introduced, also in Kamchatka and the Primorsky Territory); Europe, Siberia, Central Asia; naturalized in many regions. Moist places along roads, disturbed meadows, near the rivulets.

Note. *P. trivialis* was studied on Sakhalin and the Kuriles, Shikotan Island, near Krabozavodsk and has a count of $2n=14$ (see Agapova *et al.* 1993). For *P. trivialis* most authors report $2n=14$ (sometimes with 1-4B-chromosomes), but rarely $2n=28$, but the latter chromosome number, most probably, does not belong to this species (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1984, 1985, 1988; Goldblatt and Johnson 1990, 1991, 1994, 1996, 1998, 2003; Agapova *et al.* 1993).

FAMILY POLYGONACEAE

47. *Acetosella angiocarpa* (Murb.) A. Löve

(*Rumex angiocarpus* Murb.)

Chromosome number. $2n=42$ (R.).

Voucher specimen. VLA 10836, Kuriles, Shikotan Island, Tserkovnaya Bay, along the abandoned road near seashore, 3.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles (introduced ?); not reported for the rest of the Russian Far East; almost cosmopolitan. Roadsides, disturbed habitats.

Note. This species was studied in Sakhalin and the Kuriles, Iturup Island, $2n=42$ (Probatova and Sokolovskaya 1989; Probatova *et al.* 1996). In the literature we found $2n=14, 15, 28, 42$ (see Bolkhovskikh *et al.* 1969; Goldblatt 1984, 1985).

48. *Persicaria extremiorientalis* (Worosch.) Tzvel.

Chromosome number. $2n=22^*$ (R.).

Voucher specimen. VLA 10823, Kuriles, Shikotan Island, Del'fin Bay, sea shore, 1.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Sea of Japan area; introduced (?) to some countries of South and South-East Asia. Riverbanks, roadsides. Described from Moneron Island.

Note. No chromosome data were known up to this point for *P. extremiorientalis*. According to Tzvelyov (1989), the species might be of hybrid origin.

49. *Persicaria scabra* (Moench) Mold.

(*Polygonum scabrum* Moench)

Chromosome number. $2n=22$ (R.).

Voucher specimen. VLA 10856, Kuriles, Shikotan Island, the middle course of Gorobets R., moist place on the edge of a bog, along the roadside, 5.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Holarctic. Riverbanks, roadsides.

Note. *P. scabra* was studied on Sakhalin and

the Kuriles, Kunashir Island, $2n=22$ (Probatova and Sokolovskaya 1989). In the literature we found $2n=22$ and 44 for this species (see Bolkhovskikh *et al.* 1969; Goldblatt 1988; Agapova *et al.* 1993; Goldblatt and Johnson 1994, 2003).

50. *Rumex crispus* L.

Chromosome number. $2n=60$ (R.).

Voucher specimen. VLA 10805, Kuriles, Shikotan Island, the valley of Gorobets R., roadside, 5.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Holarctic; introduced to other regions.

Note. The species was studied from Vladivostok ($2n=60$, Probatova and Sokolovskaya 1989). For *R. crispus* the chromosome number $2n=60$ is unanimously reported in the literature (see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1985, 1988; Goldblatt and Johnson 1990, 1991, 1994, 1998, 2000, 2003, 2006; Agapova *et al.* 1993).

FAMILY ROSACEAE

51. *Fragaria nipponica* Makino

(*F. nipponica* var. *yezoensis* (Hara) Kitam.; *F. yezoensis* Hara)

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10788, Kuriles, Shikotan Island, the bottom of Shikotan Mt., in vicinity of Malokuril'skoye settlement, alder forest (*Alnus hirsuta*), near the stream, 23. VIII. 2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Japan. Forest edges, meadows.

Note. The species was studied previously on the Kuriles (Simushir, Matua, Kunashir Islands), $2n=14$ (under "*F. yezoensis*", in Probatova *et al.* 1989, 2000a). This chromosome number also is known from Japan (see Bolkhovskikh *et al.* 1969; Goldblatt and Johnson 1991, 1994). The tetraploid chromosome number $2n=28$, reported in some cases, probably does not belong to this species.

52. *Potentilla dickinsii* Franch. et Savat.

Chromosome number. $2n=14$ (R.).

Voucher specimen. VLA 10840, Kuriles, Shikotan Island, Tserkovnaya Bay, on the rocks along the mountain ridge, 3.IX. 2007, coll. V. Barkalov.

Distribution. South Kuriles (Shikotan Island; also reported from Kunashir, in Woroschilov 1982); Korea, Japan. Described from Japan. Coastal slopes and rocks.

Note. This species is poorly investigated. There were two chromosome reports for *P. dickinsii*, one from Korea and one from Japan, and both stated $2n=14$ (Kawano 1963; Lee 1967).

53. *Potentilla matsumurae* Th. Wolf

Chromosome number. $2n=14^*$ (R.).

Voucher specimen. VLA 10820, Kuriles, Shikotan Island, Shikotan Mt., on the rocks, 23.VIII. 2007, coll. V.

Barkalov.

Distribution. Sakhalin (south), Kuriles; Japan; Sea of Japan area (?). Mountain tundras, alpine meadows, stony slopes and rocks.

Note. We found the only one chromosome report, from Japan, for *P. matsumurae* of $2n=28$ (Shimotomai 1929). We revealed a new, diploid ($2x$) cytotype in this species. Further studies are needed.

54. *Potentilla megalantha* Takeda

(*P. fragiformis* subsp. *megalantha* (Takeda) Hult.)

Chromosome number. $2n=70$ (R.).

Voucher specimen. VLA 10644, Kuriles, Kunashir Island, the Sea of Okhotsk coast, westwards of Golovnina Volcano, stony slope of marine terrace, 6.IX. 2006, coll. V. Yakubov.

Distribution. Sakhalin, Kuriles; West Pacific. Coastal rocks.

Note. *P. megalantha* was previously studied several times on the Kuriles, from Shumshu, Ushishir, and the Urup Islands ($2n=70$, Probatova *et al.* 2000a, 2006a). From Japan there were counts made by Shimotomai (1930a, b) of $2n=70$. In its closely related species, the North Pacific *P. fragiformis* Willd. ex Schlecht., two cytotypes were known, $2n=42$ and 56, according to many reports in the literature (see Agapova *et al.* 1993). Moreover, we recently revealed $2n=28$ in *P. fragiformis* from the Shantarskye Islands, in the Sea of Okhotsk (unpublished). Taking all these data into consideration, we have complementary evidence to consider *P. megalantha* as a separate species with a constant, decaploid ($10x$) chromosome number of $2n=70$.

FAMILY RUBIACEAE

55. *Galium trifidum* L.

Chromosome number. $2n=24$ (R.).

Voucher specimen. VLA 10885, Kuriles, Shikotan Island, Tserkovnaya Bay, seashore, along the edge of Picea wood, 3.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Kuriles; Holarctic. Damp forests, bogs and wetlands.

Note. This is the only chromosome number reported for *G. trifidum* in the literature. This species was studied from Chukotka, as well as in Japan and in North America ($2n=24$, see Bolkhovskikh *et al.* 1969; Goldblatt 1981, 1985; Agapova *et al.* 1993). We also obtained this chromosome number for *G. trifidum* from the Amur R. basin, the Khabarovsk Territory (unpublished).

FAMILY SCROPHULARIACEAE

56. *Scrophularia grayana* Maxim. ex Kom.

Chromosome number. $2n=20$ (R.).

Voucher specimen. VLA 10825, Kuriles, Shikotan Island, Tserkovnaya Bay, seashore, 2.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin (south), South Kuriles; Sea of Japan area. Coastal rocks and meadows.

Note. Not long ago we revealed the diploid chromosome number $2n=20$ in *S. grayana* from the Kuriles (Iturup Island), and from Moneron (Probatova *et al.* 2006a), but $2n=40$ in the south continental coast of the Primorsky Territory (Probatova *et al.* 2006b). We assume the insular part of *S. grayana*'s area of distribution to be more ancient than the continental one.

57. *Veronica schmidtiana* Regel

Chromosome number. $2n=34$ (R.).

Voucher specimen. VLA 10859, Kuriles, Shikotan Island, Shikotan Mt., maritime slope, on the screes with melkozem, 6.IX. 2007, coll. V. Barkalov.

Distribution. Sakhalin, Moneron, South Kuriles; Japan. Coastal rocks and screes.

Note. *V. schmidtiana* was studied from Moneron Island (Probatova *et al.* 2006a), and earlier from Japan (see Bolkhovskikh *et al.* 1969). In all cases $2n=34$.

General remarks

Twenty-two species now make up the addition to the list of the species from Sakhalin and the Kuriles with studied chromosome numbers. They are: *Arctium tomentosum*, *Cardamine sachalinensis*, *Cardamine sp.*, *Chenopodium glaucum*, *Draba ussuriensis*, *Elymus franchetii*, *Epilobium fastigiatum*, *Eupatorium glehnii*, *Galeopsis tetrahit*, *Galium trifidum*, *Hemerocallis yezoensis*, *Hypericum kamtschaticum*, *Kitagawia terebinthacea*, *Lathyrus pilosus*, *Leontopodium kurilense*, *Minuartia barkalovii*, *Oxytropis calcareorum*, *Persicaria extremiorientalis*, *Popoviocodonia stenocarpa*, *Potentilla dickinsii*, *P. matsumurae*, *Rumex crispus*. Thus, the total number of species, with chromosome numbers obtained on local material, is equal to $536 + 22 = 558$ spp. studied (in Sakhalin $356 + 4 = 360$ spp., in the Kuriles $257 + 29 = 286$ spp.).

This study represents the first caryological investigation of the representatives of the genera *Arctium*, *Atriplex*, *Chelidonium*, *Chenopodium*, *Dianthus*, *Eupatorium*, *Galeopsis*, *Galium*, *Kitagawia*, *Lathyrus*, *Leontopodium*, *Lepidotheca*, *Minuartia*, *Oenothera*, *Solidago*, *Vicia* – in the Kuriles, and the first caryological report on the genus *Popoviocodonia*, from Sakhalin.

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