Main Regularities of Eco-geographical Differentiation in Endemic Element of the Russian Far East Flora

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Endemic element of the Russian Far East (RFE) flora includes 497 species of 150 genera and 46 families. The level of endemism in structure of regional natural flora reaches 11.1% as a whole, and in structure of its native fraction – 13.1%. As a result of chorologic and ecocenotic analysis of RFE flora endemic element it is revealed that it consists of 8 main geographical groups and 7 main floristic complexes. The largest number of endemic species is concentrated in Arctic – Alpine & Montane (140, 28.2%), Forest (107, 21.5%) and Maritime (88, 17.7%) floristic complexes as well as in Russian Far East – West-Pacific (136, 27.4%), Japan Sea (88, 17.7%) and North-East-Asian – Beringian (69, 13.9%) geographical groups. It's possible to distinguish three main areas with similar eco-geographical differentiation of endemics on RFE as follows: (1) North-East Asia sector of RFE which North-East-Asian – Beringian and Maritime – Okhotia – Beringian geographical groups approximately correspond to, (2) Continental part of East Asia sector of RFE (West – Okhotian, Amur – Okhotian, Amur – Ussurian, Okhotsk Sea and Japan Sea groups) and (3) Oceanic part of East Asia sector (Russian Far East – West Pacific group). Taxonomical variety of RFE endemics on these territories makes up accordingly (1) – 99 species (19.9%), (2) – 259 (52.8%) and (3) – 136 (27.4%).

Key words: endemic element, flora, floristic complex, geographical element, Russian Far East

The level of endemism of flora is one of the basic parameters of its degree of originality and ancient age (Tolmachev, 1974). On other side, the features of geographical distribution and ecocoenotic differentiation of this most original element of regional flora are necessary data for understanding of main tendencies of its historical development. Endemics of RFE flora are rather variously widespread on the territory of the region and consequently as it usually happens concerning endemic element of the flora, they don't represent a uniform type of distribution as well as its habitats are very different. The some aspects of endemism for separate territories of the Russian Far East (RFE) had been considered by Tolmachev (1969), Gursenkov (1967, 1969), Popov (1970), Yurtsev (1974), Khokhryakov (1989), Schlotgauer *et al.* (2001), Kozhevnikov (2003a) and others. But real possibility to analyse endemic plants of RFE as complete element of flora was appeared at last time only after finishing long-time project on recent revision of all floristic data for RFE region as a whole (Vascular plants ..., 1985–1996 Flora ..., 2006).

On the basis of data of a recent regional book series "Vascular plants ..." (1985–1996) considering the results of subsequent floristic-systematic monitoring "Flora ..." (2006) with last corrections it is established that natural RFE flora covers 4460 species of vascular plants of 993 genera and 180 families, 3789 species of which are native and 671 are introduce (alien) plants. Endemic element of RFE natural flora includes 497 species of 150 genera and 46 families. The level of endemism in structure of natural flora reaches 11.1% as a whole, and in structure of its native fraction – 13.1 %. There are 7 endemic genera: *Microbiota* Kom. (Cupressaceae), *Acelidanthus* Trautv. et Mey. (Melanthiaceae), *Miyakea* Miyabe et Tatew. (Ranunculaceae), *Magadania* M. Pimen. et Lavrova (Apiaceae), *Ermania* Cham. ex Botsch. (Brassicaceae), *Astrocodon* Fed. and *Popoviocodonia* Fed. (Campanulaceae).

Materials and Methods

The object of our project here was to examine spatial differentiation of endemic plants of RFE flora. We focused especially on geographical distribution and ecocoenotic specialization of endemic and subendemic species of this territory. With the purpose of revealing of actually geographical rules in distribution of endemics on RFE region on the basis of similarity and distinction of areas of separate species the preliminary work on development of classification of their areas (Kozhevnikov, 2000, 2003b) has been executed. As a result of chorologic analysis of RFE flora endemic element 8 main geographical

groups: North-East-Asian - Beringian (NEA = BER), Maritime-Okhotian - Beringian (MOKH = BER), West-Okhotian (WOKH), Amur - Okhotian (AM = OKH), Amur - Ussurian (AM = USS), Russian Far East - West-Pacific (RFE = WP), Okhotsk Sea (OKHS) and Japan Sea (JPS) are revealed (Kozhevnikov, 2007a,b). Each of them is divided into geographical series and subgroups.

For definition of ecocoenotic characteristic of separate species the principle of division of flora on floristic (landscape - ecological) complexes and ecocoenotic groups is used (Malyshev, Peshkova, 1984; Khokhryakov, 1989; Kozhevnikov, 1995, 1997, 2001). Native flora of RFE consists of 7 main floristic complexes (Kozhevnikov, 2007a,b). Floristic (landscape - ecological) complexes and ecocoenotic groups for each of them with abbreviations are shown as follow.

Arctic complex (AR) with Arctic Tundra (AT) and Arctic Littoral (AL) groups.

Hypoarctic complex (HA) with Tundra (TU), Mari - Forest (MF) and Grass Deciduous Forest (GDF) groups.

Arctic - Alpine & Montane complex (AAM) with Alpine (ALP), Subalpine (SALP), Arctoalpine (AA), Hypoarctic Motane (HAM) and Montane (MM) groups.

Forest (FT) with Light Coniferous Forest (LCF), Dark Coniferous Forest (DCF) and Nemorous (NM) groups.

Steppe (ST) complex with Steppe (SS), Montane Steppe (MS), Forest-Steppe (FS) and Cryophyte Steppe (CS) groups.

Meadow Flood Plain (MFP) complex with Aquatic (AQ), Marsh (MH), River-bed (RB), Meadow (MD), Scrub (SC) and Termophyte (Hot spring) (TP) groups.

Maritime (MT) complex with Water Littoral (WL), Supralittoral (SL), Littoral Meadow (LMD), Maritime Petrophyte (MP) and Maritime Meadow (MMD) groups.

Full list of endemic species of RFE flora with indication of their belonging to floristic complexes and geographical elements is resulted in special work (Kozhevnikov, 2007a).

Results and Discussion

1. North-East-Asian - Beringian geographical group (NEA=BER)

NEA = BER includes 12 geographical subgroups which can be divided into 4 geographical series. As a whole it is typical for this chorologic group to be spread on north remote of RFE - mainly in North - East Asian sector on region from arctic coast

of Arctic Ocean to Kamchatka and northern coast of Sea of Okhotsk. Maritime - Arctic and Chukotka - Koryak geographic series form the basis of NEA = BER, but tendency of geographical differentiation of other species in two directions - south - eastern toward suboceanic sector of RFE (to Kamchatka) and south - western toward continental part of RFE (to Kolyma plateau) is distinctly shown (Fig. 1).

NEA = BER covers 69 species of 6 main floristic complexes (*Chrysosplenium arctomontanum* (Petrovsky) Charkev., *Hierochloë wrangelica* Jurtz. et Probat., *Oxytropis beringensis* Jurtz., *Sparganium probatovae* Tzvel., *Taraxacum czukoticum* Jurtz.). Species of Hypoarctic (34) and Arctic (21) complexes prevail over species of Arctic - Alpine & Montane (7), Steppe (4), Maritime (2) and Meadow Flood Plane (1) complexes very essentially.

By species richness the several categories of species predominate in NEA=BER very distinctly. They are Chukotka - Anadyr - Penzhina (28) and Vrangeli (18) geographical subgroups, Hypoarctic tundra (34) and Arctic tundra (19) ecocoenotic groups as well as fractions of Chukotka Tundra (19) and Vrangeli Arctic tundra (15) species.

2. Maritime-Okhotian - Beringian geographical group (MOKH = BER)

MOKH=BER includes 10 geographical subgroups which can be divided into 2 main geographical series with submeridional spread with the exception of Anadyr - Penzhina subgroup (1, *Corispermum maynense* Ignatov) only. As a whole MOKH = BER is situated some southwards of NEA = BER. The northern boundary of MOKH = BER doesn't reach arctic coast of Arctic Ocean but in south direction the species of these geographical group penetrate into Okhotia sector of RFE very deeply. In comparison with NEA = BER the tendency of division of total area of MOKH = BER into oceanic (Kamchatka, Komandor Islands and north part of Kuril Islands) and continental (Okhotia) sectors of RFE is shown more evidently (Figs. 2 & 3).

MOKH=BER consists of 30 species of 5 main floristic complexes (*Corispermum maynense*, *Leotopodium stellatum* Khokhr., *Poa beringiana* Probat., *Stellaria kolymensis* Khokhr., *Taraxacum varioviolaceum* Khokhr.). Species of Arctic - Alpine & Montane complex (19) prevail over species of Meadow Flood Plain (5), Hypoarctic (3), Maritime (2) and Steppe (1) complexes very essentially. By species richness Hypoarctic Mountane ecocoenotic group (12) and fraction of Chukotka - Okhotia - Kamchatka Hypoarctic Mountane (6) species predominate in NEA=BER very distinctly. But domination of Chukotka - Okhotia - Kamchatka geographical subgroup (7 species) is insignificant.

Fig. 1. Main area of North - East - Asian - Beringian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Chukotka - Koryak, 2. Vrangeli - Chukotka, 3. Vrangeli, 4. Koryak, 5. Chukotka - Anyuy - Kolyma, 6. Chukotka - Anadyr - Penzhina, 7. Chukotka - Anyuy.

Fig. 2. Main area of Maritime-Okhotian - Beringian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Chukotka - Okhotia - Kamchatka, 2. Chukotka - North Okhotia - Kamchatka with additional sectors in Komandor and North Kurile floristic districts, 3. Anadyr - Penzhina - North Okhotia, 4. Chukotka - North Okhotia.

Fig. 3. Main area of Maritime-Okhotian - Beringian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Chukotka - Koryak - Kamchatka - Komandor, 2. Anadyr-Penzhina - Kamchatka, 3. Chukotka - Okhotia (it are not shown additional sector with Koryak floristic district), 4. Koryak - North Okhotia.

3. West – Okhotian geographical group (WOKH)

WOKH includes 5 geographical subgroups with North Okhotian and South Okhotian centers of species richness (Fig. 4). The Kolyma and Okhotia – Kolyma geographical subgroups form basis of North Okhotian center (11 species). The penetration of part species into maritime areas of central and southern sectors of Okhotia is typical for Okhotia – Kolyma geographical subgroup. South Okhotian center (7 species) is presented by Aldan and Okhotia – Aldan geographical subgroups. Okhotia – Kolyma – Aldan subgroup with 2 species (*Aconitum ajanense* Steinb., *Poa ajanensis* Probat.) has got integral role for WOKH as a whole.

WOKH consists of 20 species of 4 main floristic complexes (*Carex pseudodahurica* Khokhr., *Minuartia sibirica* (Regel et Til.) N.S. Pavlova, *Valeriana ajanensis* (Regel et Til.) Kom., *Taraxacum nigrocephalum* Khokhr.). Species of Arctic-Alpine & Montane complex (11 species) prevail over species of Forest (5), Meadow Flood Plain (3) and Hypoarctic (1) complexes very greatly. The evident leading positions in Arctic – Alpine & Montane complex are taken up by Alpine (5 species) and Montane (5) ecocoenotic groups. The domination of Kolyma geographical subgroup (8 species) is heavy.

4. Amur – Okhotian geographical group (AM = OKH)

AM=OKH includes 9 geographical subgroups which can be divided into two very unequal geographical series: Amur – North Okhotian (Okhotia – Amgun – Bureya, Okhotia – North Amur – Sakhalin – Sikhotealin and Okhotia – North Amur – Sikhotealin subgroups; 4 species) and Amur – South Okhotian (other 6 subgroups; 34) (Figs. 5 & 6). First of them hasn't got high species richness but it has got vaster extension which runs up to Central and North Okhotia and Koryak.

AM = OKH covers 38 species of 3 main floristic complexes [*Aconitum karafutense* Miyabe et Nakai, *A. subvillosum* Worosch., *Aster woroschilowii* Zdorovjeva et Schapoval, *Hedysarum latibracteatum* N.S. Pavlova, *Rhodiola stephanii* (Cham.) Trautv. et Mey., *Saussurea soczavae* Lipsch., *Smelovskia inopinata* (Kom.) Kom.]. Species of Arctic – Alpine & Montane (22 species) and Forest (13 species) complexes prevail over species of Meadow Flood Plane complex (3) very essentially. By species richness Bureya (17) and South Okhotia – Bureya – Sikhotealin (9) geographical groups, Alpine ecocoenotic group (14) and fraction of Bureya Alpine species (9) predominate in AM = OKH very distinctly.

Fig. 4. Main area of West - Okhotian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Okhotia - Aldan, 2. Okhotia - Kolyma, 3. Aldan, 4. Okhotia - Kolyma - Aldan.

Fig. 5. Main area of Amur - Okhotian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Okhotia - North Amur - Sikhotealin, 2. Okhotia - North Amur - Sakhalin - Sikhotealin, 3. Okhotia - Amgun - Bureya, 4. South Okhotia - Bureya - Sikhotealin.

Fig. 6. Main area of Amur - South Okhotian series of Amur - Okhotian geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Dzhugdzhur - Bureya, 2. Amgun - Bureya - Sakhalin - Sikhotealin, 3. Amgun - Bureya - Sikhotealin, 4. Bureya, 5. Amgun - Bureya.

5. Amur - Ussurian geographical group (AM = USS)

AM=USS includes 11 geographical subgroups which are represented by two series: Bureya - Sikhotealin (Bureya - Sikhotealin, Upper Zeya - Bureya - Sikhotealin, Zeya - Amur, Sikhotealin and Sikhotealin - Amgun - Sakhalin subgroups; 24 species) and Amur (Upper Amur, Lower Amur, Central Amur, Khingan, Khanka - Iman and Khanka subgroups; 35) (Figs. 7 & 8). The distribution of Bureya - Sikhotealin series is connected with the main mountain areas of the southern part of RFE such as Upper Zeya, Bureya and Sikhotealin but distribution of Amur series to valleys of Amur and Ussuri is restricted.

AM = USS covers 59 species of 4 main floristic complexes (*Carex lancibracteata* A. E. Kozhevnikov, *Corydalis gorinensis* Van, *Saxifraga selendzensis* Gorovoi et Worosch., *Phlojodicarpus komarovii* Gorovoi, *Taraxacum woroschilovii* Guban.). Species of Forest (21) and Meadow Flood Plain (24) complexes prevail over species of Arctic - Alpine & Montane (10) and Steppe (4) complexes very essentially. By species richness Central Amur (14) and Sikhotealin (13) geographical subgroups, Nemorous (12) and River - bed (11) ecocoenotic groups as well as fraction of Central Amur Nemorous (6) and Sikhotealin Alpine (4) species predominate in AM=USS more or less distinctly.

6. Russian Far East - West-Pacific geographical group (RFE = WP)

RFE - WP includes 16 geographical subgroups with three main areas of species richness on Kamchatka (54 species of RFE endemics, including 32 species of Kamchatka endemics), Kurile Islands (50, including 25 species of Kuriles endemics) and Sakhalin (65, including 50 species of Sakhalin endemics) (Fig. 9). The main area of distribution of RFE - WP species is oceanic territories of RFE (Sakhalin, Kuriles, Kamchatka, Komandor Islands). But some part of them penetrates on adjoining territories of mainland near coast of Bering Sea, Sea of Okhotsk and Sea of Japan.

RFE - WP consists of 136 species of 5 main floristic complexes (*Carex diastena* V.Krecz., *Castilleja olgae* Khokhr., *Dracocephalum charkeviczii* Probat., *Minuartia barkalovii* N.S.Pavlova, *Oxytropis retusa* Matsum.). Species of Arctic - Alpine & Montane (47 species) and Maritime (34) complexes prevail over species of Hypoarctic (19), Forest (17) and Meadow Flood Plain (19) complexes. By species richness Sakhalin (50), Kamchatka (32) and South Kurile (17) geographical subgroups, Alpine ecocoenotic group (27) as well as fractions of Sakhalin Alpine (12) and Kamchatka Grass Deciduous Forest (10) species predominate in RFE - WP more or less distinctly.

Fig. 7. Area of Bureya – Sikhotealin series (1. Sikhotealin – Amgun – Sakhalin, 2. Sikhotealin, 3. Bureya – Sikhotealin, 6. Upper Zeya – Bureya – Sikhotealin, 7. Zeya – Amur subgroups) and several subgroups of Amur series (4. Khanka – Iman, 5. Khingan) of Amur – Ussurian geographical group of endemic element of Russian Far East flora.

Fig. 8. Main area of Amur series of Amur - Ussurian geographical group of endemic element of Russian Far East flora and areas of its several subgroups (see fig. 7 also). 1. Lower Amur, 2. Central Amur with additional sectors in Upper Zeya, Amgun and south subdistrict of Ussurian floristic districts), 3. Upper Amur.

Fig. 9. Main area of Russian Far East - West-Pacific geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Russian Far East - West Pacific, 2. Kamchatka - Kurile with additional sector in North Okhotia for *Saxifraga purpurascens* Kom.), 3. Komandor, 4. Sikhotealin - South Kurile, 5. Koryak - Kamchatka - North Kurile.

7. Okhotsk Sea geographical group (OKHS)

OKHS includes 14 geographical subgroups (Figs. 10 & 11). One of them - Kamchatka - Okhotia - Amgun - Sakhalin subgroup (1 - *Anemonastrum sachalinensis* (Juz.) Starodub.) is integral for OKHS as a whole but other 13 subgroups can be divided into 3 chorologic series. The main of them - Okhotian geographical series (44 species) is situated along the western seashore of the Sea of Okhotsk and includes 3 centers of species richness in northern (Tauy - Gizhiga and Tauy - Penzhina subgroups; 8 species), central (Tauy, Tauy - Urak and Tauy - Uda subgroups; 21) and southern (Amgun, Amgun - Sakhalin and Uda subgroups; 8) sectors of Okhotia. Okhotia subgroup (5 species) is integral for this series. The species of Okhotian geographical series in its distribution gravitate towards seashore of Sea of Okhotsk and eastern side of Dzhugdzhur Range.

Two other geographical series of OKHS are Okhotia - Kamchatka (Okhotia - Kamchatka and North Okhotia - Kamchatka subgroups; 11 species) and Okhotia - Japan Sea (Okhotia - Ussuri - Sakhalin and Okhotia-Amgun - Sakhalin subgroups; 3). They have got penetration to the seashore of Kamchatka as well as Primorye and Sakhalin accordingly.

OKHS covers 57 species of 5 main floristic complexes (*Agrostis kronokensis* Probat., *Anemonastrum sachalinensis* (Juz.) Starodub., *Bupleurum atargense* Gorovoi, *Draba majae* Berkut. et A.Khokhr., *Taraxacum kolymense* Khokhr.). Species of Maritime complex (23) and Arctic-Alpine & Montane (16) prevail over species of Forest (8), Hypoarctic (5) and Meadow Flood Plain (4) complexes essentially. By species richness Maritime Petrophyte ecocoenotic group (13 species) dominates in OKHS very evidently but Okhotsk - Kamchatka (8) and Tauy - Uda (8) as well as fractions of Tauy Maritime - Petrophyte (4) species prevail lightly.

8. Japan Sea geographical group (JPS)

JPS includes 7 geographical subgroups with 3 unequal areas of species richness in northern (Primorye - Amgun subgroup; 2 species), central (Eastern Primorye subgroup; 23) and southern (Khasan, Southern Primorye, Southern Primorye - Khanka subgroups; 37) sectors of JPS (Fig. 12). Sikhotealin - Sakhalin (5 species) and Primorye (21) subgroups can be considered as integral ones for JPS as a whole.

The main area of distribution of JPS species is parts of Primorsky Territory (Primorye) and in Khabarovsk Territory in borders of the Sea of Japan basin (eastern side of Sikhote - Alin Range) as well as some of them penetrate on the western part of

Fig. 10. Main area of Okhotian series of Okhotsk Sea geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Okhotia, 2. Tauy - Urak with additional sector in watershed area of Dzhugdzhur Range, 3. Okhotia - Amgun - Sakhalin, 4. Tauy, 5. Tauy - Uda, 6. Tauy - Gizhiga, 7. Tauy - Penzhina, 8. Amgun - Sakhalin, 9. Uda.

Fig. 11. Main area of Okhotia - Kamchatka (subgroups: 1. Okhotia - Kamchatka, 2. North Okhotia - Kamchatka with additional sector in North Kurile floristic district) and Okhotia - Japan Sea (3. Okhotia - Ussuri - Sakhalin subgroup) series of Okhotsk Sea geographical group of endemic element of Russian Far East flora.

Fig. 12. Main area of Japan Sea geographical group of endemic element of Russian Far East flora and areas of its several subgroups. 1. Primorye, 2. Khasan, 3. Sikhotealin - Sakhalin, 4. Eastern Primorye, 5. Primorye - Amgun, 6. Southern Primorye.

Sakhalin Island near Tatar Strait. Usually the species of JPS in their distribution gravitate towards seashores and maritime areas. With rare exception they don't penetrate through watershed line on western side of Sikhote – Alin Range. One of the most serious of them is *Carex austroussuriensis* A. E. Kozhevnikov from Southern Primorye – Khanka subgroup. This species is penetrating from seashore of South Primorye through Suifun–Khanka watershed into Khanka Lake Plane (basin of Amur River).

JPS covers 88 species of 5 main floristic complexes (*Anemonastrum brevipedunculatum* (Juz.) Holub, *Dimeria neglecta* Tzvel., *Leontopodium palibinianum* Beauverd, *Ligularia vorobievii* Worosch., *Pseudostellaria rigida* (Kom.) Pax). Species of Forest complex (43) prevail over species of Maritime (27), Arctic – Alpine & Montane (8), Meadow Flood Plain (6) and Steppe (4) complexes very essentially. By species richness Southern Primorye subgroup (32), Nemoral ecocoenotic group (39) and fraction of Nemoral Southern Primorye species (18) predominate in JPS very distinctly.

9. Main regularities of eco – geographical differentiation of RFE flora endemic element species

Features of geographical and ecocoenotic differentiations of species in the main geographical groups of endemic element of RFE flora considered above allow to distinguish the most common rules of eco – geographical differentiation of this group of plants. As it has been already marked, indigenous RFE flora is presented by 7 basic floristic (landscape – ecological) complexes (Kozhevnikov, 1995, 2001, 2003a, 2007a,b). The summarized data about geographic distribution of endemics of RFE flora into the main floristic complexes is shown in Table 1.

The largest number of endemic species (140, 28.2%) is concentrated in Arctic – Alpine & Montane (AAM) floristic complex. Rather high level of endemism in this complex is shown in many areas of RFE, except its North – Eastern Asia (7), Amur – Ussuri (10) and Sea of Japan (8) sectors. At the same time the main area of taxonomical variety in this complex is situated in West Pacific sector of RFE, i.e. in its oceanic areas (Kamchatka, Kuriles, Sakhalin) where 47 endemics are presented.

There is Forest (FT) floristic complex on the second place by the level of species richness, it is totaled 107 (21.5%) endemic species. Main area of distribution of endemics of this complex is Sea of Japan sector of RFE (43). Rather high level of endemism among species of Forest floristic complex is observed in Amir – Ussuri (21), Russian Far East – West Pacific (17) and Amur – Okhotia (13) sectors also.

The third position in this line is presented by Maritime (MT) floristic complex, where 88 (17.7%) endemic species are available. Main area of their variety is located in oceanic

Table 1. The distribution of endemic species of the Russian Far East flora into the main floristic (landscape – ecological) complexes and geographical (chorologic) groups

Geographical groups	Floristic complexes							Total (%)	
	AR	HA	AAM	FT	ST	MFP	MT		
NEA=BER	21	34	7	–	4	1	2	69 (13.9)	99 (19.9)
MOKH=BER	–	3	19	–	1	5	2	30 (6.0)	
WOKH	–	1	11	5	–	3	–	20 (4.0)	
AM=OKH	–	–	22	13	–	3	–	38 (7.7)	117 (23.6)
AM=USS	–	–	10	21	4	24	–	59 (11.9)	
RFE=WP	–	19	47	17	–	19	34	136 (27.4)	281 (56.6)
OKHS	–	6	16	8	–	4	23	57 (11.5)	
JPS	–	–	8	43	4	6	27	88 (17.7)	
Total	21	63	140	107	13	65	88	497	
(%)	(4.2)	(12.7)	(28.2)	(21.5)	(2.2)	(13.1)	(17.7)	(100)	

areas of RFE – Kamchatka, Kuriles, Sakhalin (34), and also in its Sea of Japan (27) and Sea of Okhotsk (23) sectors.

The Meadow Flood Plane (MFP) floristic complex (65, 13.1%) has got two main areas of species richness of endemics – in Amur – Ussuri (24) and Russian Far East – West Pacific (19) sectors. It is totaled 63 endemic species (12.7%) in Hypoarctic (HA) floristic complex which is the mostly rich presented in North – East – Asian – Beringian (34) and Russian Far East – West Pacific sectors of RFE (19). All endemic species of the Arctic (AR) floristic complex (21, 4.2%) are widespread exclusively in North-East-Asian – Beringian sector of RFE. In a Steppe (ST) floristic complex (13, 2.2%) the area of the main development of endemic species is not expressed obviously, but all of them are widespread exclusively in continental part of RFE.

Taxonomical structure of natural flora in separate subregions of RFE has got the features that allow to distinguish three large territories on the basis of this important parameter (Kozhevnikov, 2003b). The analysis of geographical differentiation of species of endemic element of RFE flora shows that in this case similar rule is traced (Kozhevnikov, 2007a,b). With the certain share of conditional character it is possible to designate their

correlation as follows: (1) North - East Asia sector of RFE which North-East-Asian - Beringian and Maritime-Okhotia - Beringian geographical groups approximately correspond to, (2) Continental part of East Asia sector of RFE (West - Okhotian, Amur - Okhotian, Amur - Ussurian, Okhotsk Sea and Japan Sea groups) and (3) Oceanic part of East Asia sector (Russian Far East - West Pacificgroup). Taxonomical variety of RFE endemics in these subregions makes up accordingly (1) - 99 species (19.9%), (2) - 259 (52.8%) and (3) - 136 (27.4%).

At the same time there are certain differences shown in features of ecocenotic differentiation of endemic species. North-East-Asian - Beringian (NEA = BER) chorologic group precisely differs from the others by presence of species of the Arctic floristic complex and also by a high share of Hypoarctic species (33.) Maritime - Okhotian - Beringian (MOKH=BER) and West - Okhotian (WOKH) chorologic groups show significant similarity in precisely expressed prevalence in their structure of species of Arctic - Alpine & Montane complex (accordingly 19 and 11 species). Amur - Okhotian (AM = OKH) and Amur - Ussurian (AM=USS) chorologic groups show appreciable similarity in a significant role which Arctic - Alpine & Montane and Forest species play in their structure, but thus in Amur - Okhotian group Arctic-Alpine & Montane species (22) prevail that makes it similar to West - Okhotian (11) and Maritime - Okhotian - Beringian (19) groups, and in Amur - Ussurian group species of the Meadow Flood Plain complex (24) dominate and the Forest complex (21) is richly presented in it.

Though Russian Far East - West Pacific (RFE=WP), Okhotsk Sea (OKHS) and Japan Sea (JPS) geographical groups have got their own features, but they show precisely expressed similarity on a degree of development and rather equal participation of species of Maritime complex in their structure, thus first two groups are distinguished by primary development of Arctic - Alpine & Montane (accordingly 47 and 16), and Japan Sea - Forest (43) species. Thereupon it is necessary to note that if to transfer the species of Japan Sea and Okhotsk Sea groups into Russian Far East - West Pacific group (Table 1) it will turn out to be 117 species (23.6%), in continental part of East Asia sectors of RFE (without coastal and gravitating to sea coasts endemics) and to be 281 species (56.6%) in oceanic parts of RFE (considering endemism of actually coast territories).

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