The General Account on Rufford Small Grant, Project 41.01.05

The research of rare and threatened plants of the Lower Choper Nature Park (Volgograd region, Russia) was fulfilled in 2005-2007 in limits of Project 41.01.05 supported by Rufford Small Grant.

The Lower Choper Nature Park (Nizhnekhopersky Nature Park) was established according to order of the Head of Administration of Volgograd region "On establishing of the State Unit "Nature Park "Nizhnekhopersky", on 25 March 2003, N 205. The Park is situated at the north-west of Volgograd region, at territories of Kumilzhensky, Alexeevsky and Nekhaevsky administrative districts. The total area is 231,206 hectares.

The park was created to organize and carry out the nature protection, renewal, scientific and ecological-educational activity, as well as for more effective conservation of biological diversity.
There is a set of unique virginal ecosystems, such as plots of multi-grass-*Festuca*-feather grass steppe, multi-grass-*Festuca*-feather grass psammophillous steppe, relic calcium-loving communities, upland and ravine forests, aquatic communities, floodland forests and meadows along rivers. All of them are very sensitive to anthropogenous influence and require the constant monitoring.

For more complete identification of rare species in the Park the general list of all known for this territory vascular plants was compiled, using both literature data and our own field observations and collections. Such wide work help better estimate the degree of rarity and to develop more clearly all threatened species, including those ones officially listed to the regional Red Data Book (2006) and Red Data Book of Russian Federation (1988). In limits of Project 41.01.05 the annotated list of total flora has been compiled, including more than 1,300 species. The special attention is given to threatened species from this territory, which have been analyzed separately and more carefully.

As a result of the fulfilled project it may be stated that the flora of the Lower Choper Nature Park is extremely rich with rare and threatened plants, which is connected with wide diversity of nature landscapes and the presence of rather large plots of virgin steppe, upland and floodland forests, chalk denudations and sands at territory of the Park. According to our calculations, there are 83 species included to the Red Data Book of Volgograd region, which is 52,5% from total number of officially threatened species of Volgograd region, taking in mind the fact that the territory of the Park occupies only about 2% of territory of this region.

There are 31 species of the highest level of conservation importance, officially included to the Red Data Book of Russia. On this index the Park is the richest with threatened species need to be protected among all protected territories of Volgograd region, and might be of the whole Russia. 533 species of plants and fungi are included into the Red Data Book of Russia (1988), including 440 species of Angiosperms and 11 species of Gymnosperms. So, at territory of the Park there are about 7% of rare and threatened plants of all-Russian federal

significance. It can be considered as very high index, especially if to compare the territory of the Park with territory of the whole country, and also take in mind that it is situated at plains, not at mountains.

The rarest plants at the Park are such species as *Lycopodium clavatum* L. (known only from 3 places of Volgograd region, being disappeared from one of them), *Physospermum cornubiense* (L.) DC. – known from Vtoroj Log Ravine near Fedoseevskaya stanitsa (Cossack village), *Shivereckia podolica* (Bess.) Andrz. ex DC.– known from environs of Ust-Buzulukskaya stanitsa and near former Akishevskaya stanitsa, *Dianthus eugeniae* Kleop.– near Shubinsky khutor (small Cossack village) at environs of Alexeevskaya stanitsa, *Carex humilis* Leyss. – near Lukovskaya stanitsa and at the mouth of the Tishanka River at right side of the Choper River near Shubinsky khutor, *Dipsacus gmelinii* Bieb.– the lower reaches of the Choper at banks of Peschanoje nad Bolshoje Krivoje Lakes, *Astragalus pseudotataricus* Boiss.– near Shubinsky khutor of Alexeevsky district and near Bukanovskaya stanitsa of Kumilzhensky district, *Gentiana cruciata* L.– environs of former Akishevskaya stanitsa of Nekhaevsky district,
Bellevalia sarmatica (Georgi) Woronow – near Slaschevskaya stanitsa of Kumilzhensky district,
Muscari neglectum Guss. and *Iris aphylla* L – environs of Shakin Khutor of Kumilzhensky district, *Dactylorhiza fuchsii* (Druce) Soo – near Kluchi Khutor, environs of Kumilzhenskaya stanitsa (the only provenance in Volgograd region), *Epipactys atrorubens* (Hoffm. ex Bernh.) Schult. – in Shakinskaya Dubrava of Kumilzhensky district and near former Akishevskaya stanitsa of Nekhaevsky district, *Epipactys helleborine* (L.) Crantz – in Shakinskaya Dubrava and near Kluchi khutor and near Lukovskaya stanitsa at extreme north of Volgograd region, *Orchis*
militaris L. – at place Berezniki, 2 km south-west of Kumilzhenskaya and near former khutor Berezovsky of Alexeevsky district, *Orchis palustris* Jacq. – at south-eastern bank of Zaplino Lake near Alexeevskaya stanitsa, between khutors Chicherinsky and Larinsky, *Clematis orientalis* L. **,** chalk hills of Choper River at environs of Pustovsky khutor.

For many rare plants we made a monitoring at places of its habitat and estimated the territory, occurrence and number of its population. So, the number of population of extremely rare *Clematis orientalis* calculating originally as 52 plants (Firsov, 2002), growing by narrow strip along chalk denudations near Pustovsky khutor, was re-estimating to number about 80 plants – this is the only woody climber throughout huge territory of the Lower Don River.

During two trips in June-July 2005 a special attention was given to rare chalk plants, new places of occurrence for *Linum ucrainicum, Silene cretacea, Artremisia hololeuca* were discovered. Several northern species were found at floodland of Choper and Buzuluk rivers, which grow here at the south limits of its natural distribution. A set of descriptions at places of occurrence of threatened species were made, and also more than 1,000 digital photographs of rare and more typical plants, and places of habitat for threatened species as well as general landscapes and types of vegetation. Special attention was given to visiting of remote areas and places from where collected herbarium specimens

were absent (environs of stanitsas Lukovskaya and Upornikovskaya at Nekhaevsky district).

As a result of business trip of Vjacheslav Byalt in January 2006 to Moscow all available herbarium specimens at the Herbarium of Main Botanic Garden of Russian Academy of Sciences (MHA) were studied. It was clarified that in 1970-1990 there were several (about six) expedition of Moscow botanists, who investigated the territory of Volgograd region (but that work was not finished). It was possible to add to our general list about 100 new species, which we were not still able to discover in the wild.

If earlier, for 9 years period (1996-2004) we had collected about 4,500 sheets of herbarium,
during the season 2005 we collected another 1,500 sheets. So, the general herbarium after it compiled about 6,000 sheets. All herbarium material was dried, organized, put in special order, labeled, identified and analyzed, its data were used in our publications. If the original list compiled only 1,015 species, even after 2005 it was considerably replenished for about 250 species.

Clear pointed maps were compiled for 129 threatened species from the territory of the Park. The article in co-authorship with Deputy Director of the Park Mr. Alexej Sidorov about floating islands of Babinsky Lakes near Alexeevskaya stanitsa was written and published in Germany, in Der Palmengarten Journal (see the list of publications) – this is very rare phenomenon of nature, extremely interesting for ecological and scientific tourism, also for tourists from the United Kingdom. The consultations to Alexeevsky museum of Natural History on local and rare plants were given – this museum managed by Mrs. Valentina Kubrakova is locally famous and includes many interesting specimens on nature and history.

During the vegetative season 2006 we organized three expeditions to the place, which covered the whole territory as completely as it was possible. We tried to see and observe its flora at different seasons of the year.

The first expedition was attempted at the mid of April 2006 not to miss early flowering plants, bulbs and efemeroids. About 850 herbarium sheets were collected, about 1,000 photos were pictured. Places of habitat of many rare and threatened plants were discovered and investigated: tulips, *Bolbocodium versicolor, Primula macrocalyx, Asarum europium, Fritillaria meleagroides, Astragalus pseudotataricus* and many others.

The second one was made in June 2006. About 1,200 herbarium sheets were collected, many threatened plants were investigated. Such rarities as *Melampyrum cristatum, Turgenewia sp., Gladiolus tenuis, Veronica serpylifolia* (very rare for Volgograd region), *Lemna gibba* (aquatic floating plant being discovered for the first time for this territory) and many others.

The third trip was in August of that year. Such rarest species as *Carex bohemica, Rumex acetoselloides, Rubus saxatilis* were discovered in Shakinskaya Dubrava

(Shakinsky Oak Forest), new findings of *Allium savranicum* and *Dianthus squarrosus* at the left side of the Choper River. About 1,000 sheets of herbarium were collected as well as many photos. The field observations and monitoring for such threatened plants as *Hyssopus cretaceus* were made.

As a result of business trip of Vjacheslav Byalt to Moscow in March 2007 all available herbarium data kept at Herbarium of Main Botanic Garden (MHA) were studied, including the personal Herbarium of Dr. A.K. Skvortsov, who in 1960-1980's actively worked in Volgograd region and collected many herbarium specimens from the territory of the present Lower Choper Nature Park. It was possible to add another 25 species to our general list, which have not been found in the wild yet. The specimens of rare species from MHA will be cited in the preparing Conspectus of flora of the Park. Besides, the list of flora of Shakinskaya Dubrava (which is studied separately) was considerably replenished.

The last fifth expedition to the Park in limits of this project took place since 1-st till 15-th May 2007, with 12 days of field work. The flora of right side of the Choper River in limits of all three administrative districts was paid special attention. Several species were discovered which may be considered as the rarest for Volgograd region and even for European part of Russia. These are such as *Rumex tuberosa* (new species for flora of Volgograd region), *Pedicularis physocalyx* (was known only from two points at the north of Volgograd region and included into the Red Data Book of Volgograd region), *Crambe tataria* (earlier was not known from the Choper River) and others. The state of population of *Paeonia tenuifolia* at Mogilnaya Hill of Alexeevsky district was examined and extimated at the very beginning of flowering. The only provenance of *Asarum europaeum* at Kumilzhensky district was examined (environs of former Ozhogin khutor, Lopatin Ravine). The population now is in the good state, but it occupies very small area, because this ravine is not long (about 2 km long). And this species was not discovered anywhere around. More than 30 years ago A.K. Skvortsov collected this species in Kumilzhensky district, and since that time nobody saw this species here.

South-eastern edge of Shakinskaya Dubrava was examined, with rich floristic complex along wet ravine covered with alder and broadleaved forest, including springs and a bog. There were thickets of rare ferns and plants of wet places (*Dryopteris carthusiana, D. filix-mas, Thelypteris palustris, Cystopteris fragilis, Galium odoratum, Symphytum tauricum* and others).

At environs of Krasnovsky khutor of Nekhaevsky district the chalk denudations and hills along the right bank of the Choper River were discovered and examined, very rich floristically. Here 12 of threatened species of Red Data Books of Russia and Volgograd region were identified *(Crambe tataria, Schevereckia podolica, Carex pediformis, Bulbocodium versicolor, Tulipa schrenkii, Serratula nitens* and others). It was the first finding at the right side of the Choper River for such species as *Crambe tataria, Pedicularis physocalyx* and *Serratula nitens*.

As a result of this expedition the vast material on spring flora of the Choper Area was collected (700 sheets of herbarium and about 1,000 digital photos). The dendroflora of the Park was investigated separately and with special attention. So, it was settled that the common for steppe zone shrub *Spiraea hypericifolia* has its northern limit of the natural distribution exactly at the territory of the Park. It is rather common at chalk hills near Bukanovskaya stanitsa and Pustovsky khutor, but absent to the north, at Alexeevsky and Nekhaevsky districts. Besides, the observations on phenology and ecology of arboreal plants were made. After checking of all collected herbarium the general list of flora will be more than 1,400 species.

Besides of studying of only rare plants, we made an attempt to analyze the adventive plants penetrated to the territory of this unique corner of nature of Volgograd region (Byalt, Firsov, 2006). This is very important because many adventives species are very aggressive and may influence the threatened plants. On studying and making inventory of the total 1,300 species, it was possible to find quite many adventive and naturalized ones, usually growing throughout weedy and disturbed places, near agricultural fields, at stanitsas and khutors, at orchards, parks and gardens, around cemeteries and dumps. To this moment 154 adventive and weedy species from 117 genera of 44 families have been identified, which is about 12% of total flora. In general this is not too much, because there are no large towns and settlements, with low density of population, and the influence on flora is moderate. Adventive plants are distributed throughout the Park's territory unequally, and they are usually closely connected to "synanthropous flora" of settlements and disturbed places. But there are species which are actively intruded into natural communities, such as *Acer negundo, Fraxinus pensylvannica, F. americana, F. lanceolata, Amorpha fruticosa,* species of *Ambrosia* и *Xanthium, Bidens frondosa* and others. They are required to be constantly monitored and to search of biological methods of its control. Because the mass distribution of them may let to disappearance of many rare plants of native flora.

Other field of our research was the study of dendroflora of the Park, including species of all ligneous forms, from dwarf sub shrubs till large trees. Totally 157 local and adventive arboreal species of 73 genera of 36 families were identified. Among them there are 119 native species and 37 adventive species (naturalized and penetrating to natural communities). The largest families are: Rosaceae (15/35 [42]), Fabaceae (5/14 [17]), Salicaceae (2/13 [15]), Asteraceae (1/9), Lamiaceae (3/6), Brassicaeae (2/6). Figures mean: number of genera/ number of species [number of species with introducents]. The spectrum of largest families is typical for boreal floras. This is urgent to underline the complete absence at the Choper River of representatives of families *Ericaceae*, *Vacciniaceae* and *Pyrolaceae*, more common in more northern regions. Such native species as *Clematis orientalis, Dianthus rigidus, Artemisia hololeuca, Hyssopus cretaceous, Rubus saxatilis* may be considered among the most rare arboreal. Many of them are absent or very rare in cultivation, and they deserve to be introduced into the Saint-Petersburg Botanic Garden.

It should be underlined that newly published Red Data Book of Volgograd region was not possible to cover due to some reasons all biodiversity of threatened plants occurring at the Lower Choper Nature Park. Some rare species were not put into this Book, though they deserve no doubt to be protected. For example, these are such rarest species as *Allium scorodoprasum* – collected by Gennady Firsov in Shakinskaya Dubrava (the only discovery in Volgograd region), *Rumex acetoselloides* – also discovered in Shakinskaya Dubrava (and the first finding in Region), together with *Carex bohemica* (known only from several points in Volgograd region).

All this confirm the fact that the Park was organized very reasonably and in time, and it should be the important link in the field of nature conservation and protection of threatened species of plants.

The recommendations were given to the Director of the Park Mrs. Tatjana Ponomareva and to the staff how to organize local herbarium and local museum, the explanation on the most threatened plants, unique old trees and picturesque landscapes. The consultations were given in the field of development of ecological tourism, and how to organize local nursery of native interesting plants. The trees of friendship were planted in 2006 and 2007 near the office of the Park at stanitsa Bukanovskaya: *Sorbus fruticosa, Pinus densiflora, Abies holophylla* and *Picea lutzii.* The trees were brought from Saint-Petersburg Botanic Garden, with purpose to help in organizing local arboreal nursery; the trees are of known and good provenance, winter hardy, decorative and botanically interesting.

Supplement 1
Species of Red Data Book of Russia at territory of the Lower Choper Nature Park

1) Artemisia hololeuca Bieb. ex Bess. *(Asteraceae)*
2) A. salsoloides Willd. *(Asteraceae)*
3) Lepidium meyeri Claus *(Brassicaceae)*
4) *Matthiola fragrans* Bunge *(Brassicaceae)*
5) Silene cretacea Fisch. *(Caryophyllaceae)*
6) S. hellmannii Claus *(Caryophyllaceae)*
7) Scrophularia cretacea Fisch. *(Scrophulariaceae)*
8) Astragalus tanaiticus C. Koch *(Fabaceae)*
9) Hedysarum cretaceum Fisch. *(Fabaceae)*
10) *H. grandiflorum* Pall. *(Fabaceae)*
11) Allium regelianum A. Beck. *(Alliaceae)*
12) Bulbocodium versicolor (Ker-Gawl.) Spreng. *(Colchicaceae)*
13) Bellevalia sarmatica (Georgi) Woronow *(Hyacynthaceae)*
14) Fritillaria ruthenica Wikstr. *(Liliaceae)*
15) Tulipa schrenkii Regel *(Liliaceae)*
16) Iris pumila L. *(Iridaceae)*
17) Hyssopus cretaceus Dubjan. *(Lamiaceae)*
*18) Stipa dasyphylla (*Lindem.) Trautv. *(Poaceae)*
19) S. pennata L. *(Poaceae)*
20) S. pulcherrima C. Koch *(Poaceae)*

21) Orchis coriophora L. *(Orchidaceae)*
22) O. militaris L. *(Orchidaceae)*
23) O. palustris Jacq. *(Orchidaceae)*
24) Paeonia tenuifolia L. *(Paeoniaceae).*
25) Serratula tanaitica P. Smirn. *(Asteraceae)*
26) Genista tanaitica P. Smirn. *(Fabaceae)*
27) Elytrigia stipifolia (Czern. ex Nevski) Nevski *(Poaceae)*
28) Stipa zalesskii Wilensky *(Poaceae)*
29) Pulsatilla pratensis (L.) Mill. *(Ranunculaceae)*
30) Cotoneaster alaunicus Golits. *(Rosaceae)*
31) Trapa natans L. *(Trapaceae)*

Supplement 2
List of published articles on Project 41.01.05

1) Gennady Firsov. Ein ungewohnlicher Silberweidenhain // Der Palmengarten 69/1. 2005. S. 50-51. [German]
2) Vjacheslav Byalt, Gennady Firsov und Alexey Sidorov. Die Schwimmenden Inseln der Babinsky-Seen // Der Palmengarten 69/2. 2005. S. 123-125. [German]
3) Gennady A. Firsov. Two wonderful oaks from Russia // International Dendrology Society Yearbook 2005. P. 29-30. [English]
4) Gennady Firsov, Vjacheslav Byalt. Po Khopru i Medveditse / Newspaper "Pobeda". 13 April 2006, № 40 (10854), p. 3. 20 April 2006, № 43-44 (10857-58), p. 7. 27 April 2006, № 48 (10862), p. 3. 4 May 2006, № 50 (10864). P. 3. [Russian]
5) Byalt V.V., Firsov G.A. Predvaritelnie itogi floristicheskogo obsledovanija "Shakinskoj Dubravi" (Volgogradskaya oblast) // Muzei-zapovednik: ecologija i kultura. Materiali vtoroj nauchno-prakticheskoj konferenzii (stanitsa Veshenskaya, 13-16 September 2006). Veshenskaya, 2006. P. 198-201. [Russian]
6) Byalt V.V., Firsov G.A. Analiz adventivnoj flori "Nizhnekhoperskogo" prirodnogo parka // Adventivnaya i synantropnaya flora Rossii i stran blizhnego zarubezhja: sostojanie i perspectivi. Materiali III mezhdunarodnoj nauchnoj konferenzii (Izhevsk, 19-22 September 2006). Izhevsk, 2006. P. 23-25. [Russian]
7) Gennady Firsov. Eine beeindruckende alte Eiche in Shakinskaya Dubrava, Russland // Der Palmengarten 70/1. 2006. S. 48-49. [German]
8) Firsov G.A., Byalt V.V., Grishin S.S. Redkie rastenija Nizhnekhoperskogo prirodnogo parka (Volgogradskaya oblast) // Bot. Journ. 2007. Vol. 92. № 4. P. 102-108. [Russian]
9) G. Firsov. V. Byalt. V dikoj prelesti stepnih razdolij... (Dekorativnie rastenija v nizovjah Hopra// Zvetovodstvo. March-April, N 2. 2007. P. 16-20. [Russian]
10) G.A. Firsov. Novie redkie drevesnie rastenija v botanicheskom sadu BIN RAN v Sankt-Peterburge // Introdukzija redkih rastenij. Materiali Pervoj mezhdunarodnoi konferenzii (posvjaschennoj 300-letiju Karla Linneja). Moscow: MOIP, Agbina, Gos. Istoriko-literaturnij muzej-zapovednik A.S. Pushkina. 2007. P. 27. [Russian]

Supplement 3
Written articles on Project 41.01.05, which have not yet been published

1) Byalt V.V., Sagalaev V.A., Firsov G.A. Prirodnaya i adventivnaya dendroflora Nizhnekhoperskogo prirodnogo parka // Bulletin of the Main Botanic Garden. [Russian]
2) Firsov G.A., Byalt V.V., Grishin S.S. Antropogennoe vlijanie na floru i rastitelnost v nizovjah reki Khoper (Volgogradskaya oblast) // Bulletin of the Main Botanic Garden. [Russian]
3) Vyacheslav V. Byalt, Gennady A. Firsov, Tatjana G. Ponomareva , Vadim A. Sagalayev. Conservation news from the Lower Choper Nature Park, Russia // Oryx, April 2007 (must be published but we have no idea about it). [English]
4) Vjacheslav Byalt and Gennady Firsov. Liliaceous plants in the Nizhnekhopersky Nature Park, Russia //Lilies and related plants (on request of the Royal Horticultural Society). [English]
5) Byalt V.V., Sagalaev V.A., Firsov G.A. Orhidei na Nizhnem Khopre. [Russian]
6) Byalt V.V., Sagalaev V.A., Firsov G.A. Krasnoknizhnie vidi rastenij v Nizhnekhoperskom prirodmon parke (Volgogradskaya oblast) // must be published in Proceedings of the International Botanical Conference in Minsk, Belarus, June 2007. [Russian]
7) Byalt V.V., Alexeeva N.A., Firsov G.A. Semejstvo irisovie (Iridaceae) na Nizhnem Khopre. (It has not been settled yet, in English or in Russian)
8) Byalt V.V., Grabovskaya A.E., Sagalaev V.A., Firsov G.A. Rod Rumex v Nizhnekhoperskom prirodnom parke (Volgogradskaya oblast). [Russian]
9) Firsov G.A., Ponomareva T.G. Dendrological sights of the Lower Choper Nature Park // Sorbifolia, Finnish Dendrology Society. [Finnish]

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