

Protection of steppe communities and plant conservation: a case of one Russian territory

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Summary

The Eurasian steppe is a kind of temperate grasslands which suffers most from human activities. Russia conserves no less than 75% of the Pan-European pool of steppe ecosystems which is the greatest reservoir of endangered plants. The piedmonts of Western Altai is one of a few areas where relatively large no fragmented steppe sites still remain. These sites are characterized by high level of plant species richness. Many plant species of the sites are included in federal and regional Red Data Books. For these reasons the steppe sites of the piedmonts of Western Altai can be identified as IPAs. However applying criteria of IPAs we faced some obstacles and inadequacy which seems to be rather common to Russia on the whole.

Protection of steppes is a conservation target of high priority

Temperate grasslands of all types are the most imperiled ecosystem on the planet. These habitats have been so modified by human activity, that only small areas of them remain in a natural state nowadays. Temperate grasslands have the lowest level of protection among other biomes of the globe: as recently as in 1998, only 0.69% of the biome area was under some kind of protective status. Moreover, this protection level is not only the lowest of all biomes but is lower by several orders of magnitude (HENWOOD, 1998).

The Eurasian steppe is a kind of temperate grasslands which suffers most from human activities. In Russia, for many decades the principal source of threats to steppe vegetation was an extensive agricultural development, turning the steppe to arable lands, settlement and road development, pesticides and fertilizers use, land reclamation, afforestation and massive over-grazing.

Today Russia conserves vast area of steppes – about 50 millions ha, that make no less than 75% of the Pan-European pool of these ecosystems (SMELANSKY, 2003). Meanwhile, all kinds of grasslands (not only steppe) constitute only 1% of the total amount of federal protected areas in Russia. All other conservation measures for steppes (i.e. protected areas of lower levels, agro-environmental measures, protection of single species, etc.) are absolutely insufficient as well.

For these reasons steppe grasslands have become the greatest reservoir of endangered plants. Over 110 flowering plant species listed in the Russian national Red Data Book (25% of the total list) are related with steppe habitats (RED DATA BOOK 1988). Besides, regional Red Data Books of different subjects of Russian Federation include many steppe plant species not listed on the national level (GORBATOVSKY, 2004). Thus conserving of steppes is conserving of wild plants. Sustainable survival of Russian (and European) plant diversity is not guaranteed unless the steppe habitats are protected sufficiently.

Altai piedmonts is one of priority steppe areas

Steppe ecosystems are highly fragmented everywhere in Russia. However there are some areas where relatively large no fragmented steppe sites still remain. This does not result from any conservation efforts but rather from natural peculiarities of landscapes and agricultural practices. All these areas are hilly or salty and therefore rest unploughed. For many decades (and even centuries) the main form of land use here was sheep and cattle breeding. No more than 4-5 such areas are in Russia westward of the Enisey River. First of all these are the piedmonts of South Ural, Western Altai and Sayan Mts. Each of these areas contains several large steppe sites of natural and/or semi natural grasslands of 30-100 sq. km.

It is also important that the piedmonts of Western Altai and Sayan Mts. are the territories belonging to the Altay-Sayan Ecoregion, which was recognized by the experts of WWF as one of

200 regions of the planet with the highest level of biodiversity. Plant diversity of the Russian part of this region is quite comparable with the vegetation richness of the European Centres of plant diversity and Endemism (DAVIS *et al.*, 1994).

Conservation activity and attempt of Important Plant Areas (IPA) identifying

For 5 years (1999-2004) Siberian Environmental Center (Novosibirsk) has been developing a program directed to protecting steppe ecosystems and endangered species in the piedmonts of Western Altai. Using remote sensing data (Landsat images) and land-use plans we have mapped all steppe remnants and identified 6 large (above 3000 ha) sites with the best conservation features (location far from villages, absence of large roads, inclusion entire watersheds). Then we investigated flora of the vascular plants of this sites. According to our data, the flora of investigated sites contains about 600 species, that is a half of the total flora of the Western Altai piedmonts (KRASNOBOROV *et al.*, 2003). Many endangered species included in federal and regional Red Data Books were also recorded. For many of them these steppe sites serve as natural sanctuary. Our target is protection of all these sites. We suppose that their identifying as IPAs would be one of the measures putting in steppe conservation.

Trying to apply IPA criteria to steppe of the Western Altai piedmonts

To estimate opportunity of identifying steppe of the Western Altai piedmonts as IPAs we tried to apply criteria following ANDERSON (2002).

Criterion A

In the area there is no species listed as globally threatened (**A_i**) and there are only a few ones listed as threatened in Europe (**A_{ii}**). These are 3 species from Bern Appendix I: *Dracocephalum ruyschiana* L., *Pulsatilla patens* (L.) Miller (listed also in Habitat Directive Annexes), *Trapa natans* L., and 5 species from Habitat Directive Annexes II/IV: *Adenophora liliifolia* (L.) Ledeb., *Ligularia sibirica* (L.) Cass., *Stipa zaleskii* Wilensky, *Agrimonia pilosa* Ledebour. All these species are common and unthreatened here, especially *S. zaleskii*, indicated as a characteristic dominant grass of the main steppe communities.

National list of IPA selection species is not compiled yet. Therefore for indication threatened endemic and near endemic/limited range species which would be estimated as ones of categories **A_{iii}** and **A_{iv}** we used the only valid list of threatened plant species of Russian Federation presented in the federal (national) RED DATA BOOK (1988; RF RDB). Within the large steppe sites only 4 threatened near endemic species (distributed also in adjacent Kazakhstan and/or Mongolia and/or China) were recorded: *Gymnospermium altaicum* (Pall.), *Iris ludwigii* Maxim., *I. tigridia* Bunge, *Paeonia hybrida* Pall. Two of them – *Gymnospermium altaicum* and *Paeonia hybrida* are estimated as important flagship species of the Altay-Sayan Ecoregion (KUPRIYANOV, 2001). So only 4 species correspond to criterion **A_{iv}** and no one to criterion **A_{iii}**.

Besides at least 20 limited range endemic species not included in the RF RDB were recorded. Among them *Seseli buchtormense* (Fisch. ex Spreng.) W. Koch, *Ferula soongarica* Pall. ex Spreng., *Arabis fruticulosa* C.A. Mey., *Corydalis schanginii* (Pall.) B.Fedtsch., *Dracocephalum discolor* Bunge, *Thymus petraeus* Serg., *Eremurus altaicus* (Pall.) Stev., *Tulipa altaica* Pall. ex Spreng., *Alcea froloviana* (Litv.) Iljin and some other demand the most attention as the species limited in their distribution by steppes of western Altai in Russia and Kazakhstan. Today we do not have comprehensive data to estimate the level of threat of these species, but nevertheless all of them can be estimated as possible candidates to National list of IPA selection species.

In the steppe sites 4 neither non-endemic, nor near endemic species which have been included to RF RDB as endangered ones were recorded. Besides *Galitzkyia spathulata* (Steph.) V. Boczantzeva, *Fritillaria meleagris* L., *Rheum compactum* L. occurred here. These species are included in renewed but not yet published list of RF RDB (PRONKINA & VARLYGINA, pers. comm.)

Criterion B

Species richness of each site is near 340. This species pool belongs to several habitat types. The principal of them represent 3 habitat types of EUNIS level 2: E1 (Dry grasslands), E7 (Sparsely wooded grasslands) and F3 (Temperate and mediterraneo-montane scrub habitats). The minor types are C2 (Surface running waters), F9 (Riverine and fen scrubs), G5 (Lines of trees...), H2 (Scree), and H3 (Inland cliffs, rock pavements and outcrops). As concerns the main habitat types, relative richness of the steppe sites seems to be rather high.

Criterion C

In the sites extensive areas were occupied by the habitats that could be indicated as "sub-continental steppic grasslands" and "stepped and garland grasslands". These habitat types are listed as priority threatened ones in Annex 1 of Habitat Directive (positions 34.31 and 36.43).

Obstacles and inadequacy in criteria applying

Trying to identify IPAs we faced many problems that seems to be rather common to Russia on the whole.

1. As concerns criterion A, the European lists of endangered species are significantly inapplicable to Russian flora. Extremely low overlap between them reflects low representation of Russian species in European documents.
2. The great obstacle is quantifying of thresholds because there are only few data on national resources of species and cover of habitat types at national level.
3. The habitat list in Habitat Directive Annex is inadequate to habitat diversity of Russia. Thus, it is not clear whether our steppes belong to types 34.31 and 36.43. If not, then they are undeservedly omitted.
4. Habitat types of EUNIS level 2 for our case are too generalized. Thus, we have to classify meadow steppes, true steppes, dry steppes and their stony variants as Dry grasslands. But it is pointless to compare these plant communities by their species richness.

References

- ANDERSON, S. - 2002- *Identifying Important Plant Areas*. Plantlife International.
- DAVIS, S.D.; V.H. HEYWOOD & A.C. HAMILTON (Eds.) -1994- *Centers of Plant Diversity: A Guide and Strategy for their Conservation*. Volume 1 Europe, Africa, South West Asia and the Middle East. WWF & IUCN
- GORBATOVSKY, V.V. -2003- *Red Data Books of the Subjects of the Russian Federation: the reference book*. NIA-Priroda, Moscow (in Russian).
- HENWOOD, W.D. -1998- (Ed.) – *The World's temperate grasslands: a beleaguered biome*. Parks 8(3): 1-2.
- KRASNOBOROV, I.M. et al. -2003- *Opredelitel rasteniy Altaiskogo kraya* (Identification key to plants of Altai Territory). Publishing House of SB RAS, Branch "GEO", Novosibirsk (in Russian).
- KUPRIYANOV, A.N. (Ed.) -2001- *Protected areas of the Altai-Sayan Ecoregion*. Asia, Kemerovo (in Russian)
- RED DATA BOOK OF THE RUSSIAN FEDERATION (plants) -1988- Rosagropromisdat, Moscow (in Russian)
- SMELANSKY, I. -2003- *Biodiversity of agricultural lands in Russia: current state and trends*. Moscow: UCN - The World Conservation Union.