

On Identification of Important Plant Areas in the Saratov Region

Olga N. Davidenko , Tatyana N. Davidenko 

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Authors' credentials:

Olga N. Davidenko, Candidate of Biology, Assistant Professor, Chair of Plant Biology and Ecology, Saratov State University. Astrakhanskaya st., 83, Saratov, RF, 410012.
(alenska71980@mail.ru)
Research ID: D-6572-2013

Tatyana N. Davidenko, Candidate of Biology, Assistant Professor, Chair of Plant Biology and Ecology, Saratov State University. Astrachanskaya st., 83, Saratov, RF, 410012.
(zlata-babochka2008@mail.ru)
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Abstract: Conservation of phytodiversity is an integral part of conserving biodiversity in general. An efficient method of conserving rare species and their habitats is identification of important plant areas (IPAs). The aim of this study is to analyze the available knowledge, procedural framework and actual data on the Saratov Region's rare plant species and their habitats which can provide the basis for identification of important plant areas at the regional level. The study examines the prerequisites and opportunities of identification of IPAs in the Saratov Region to maintain efficient monitoring of rare species and plant communities and evaluate botanical significance and representative value of the existing and contemplated specially protected nature areas. It is argued here that identification of important plant areas is justified by its efficiency in detection and protection of habitats of valuable and vulnerable plant species. The study examines the criteria used to identify IPAs at the international level. It also analyzes such adjustments to the criteria which proved most efficient at the regional level in Russia. The research offers a list of the flowering plants recommended for listing in the Saratov Region Red Data Book 3rd Edition which are most significant for identification of the regional IPAs. The article reviews the principal activities designed to establish the information basis for identification of important plant areas in the Saratov Region, as well as specific procedures and recommendations on arranging an information system on a number of territories under the IPA criteria.

Keywords: important plant areas, biodiversity, protected species, endemic species, nature conservation, habitats, Saratov Region.

Conserving biodiversity in general and plant diversity in particular is nowadays an important area of concern. The species listed in the Red Data Book, especially the endemic ones, require particular attention. One of the possible ways of conservation of such species is identification of important plant areas (IPAs). IPAs are identified by experts in compliance with unified criteria [1]. IPAs are intended to be areas of great botanical importance for threatened species, habitats and plant diversity in general, that can be identified, protected and managed as sites. The WWF/IUCN Centres of Plant Diversity project (1994) identified large regions of botanical importance. However, the IPA program is intended to build on this approach to identify areas that are appropriate for a site-based approach to conservation.

The success of the Important Bird Areas project inspired botanists to begin a similar project and in 1995 the urgent need to identify Europe's most important plant sites was proposed at the first Planta Europa Conference in Hyères, France. In the following years, after extensive consultation and several pilot studies, European botanists reached consensus about the criteria used to identify important plant areas, and the first IPA Guidelines were published in time for the 3rd Planta Europa Conference in the Czech Republic in 2001 [2,3]. The first phase of the programme is to identify the sites of Europe's most important plants areas, and the second phase is to ensure that they receive proper protection and management. The IPA project will also develop programmes and protocols for monitoring IPAs [4,5].

These areas can demonstrate an exceptional diversity of species and contain habitats of endangered, vulnerable, rare or endemic plants. IPAs are not assigned the specially protected nature area status. An area's system of IPAs serves mostly as a source of information required for phytodiversity assessment, efficient monitoring of species and plant communities, as well as evaluation of the botanical and representative value of the existing and contemplated specially protected nature areas.

The following criteria has been adopted for IPA identification [4,6]:

Criterion A: Threatened Species

IPAs are intended to identify and conserve populations of the most threatened plant species in Europe and the world (IUCN Red List of Threatened).

Criterion A: Categories

There are 4 categories of Criterion A.

- A(i) Globally threatened plants
- A(ii) European threatened plants
- A(iii) Threatened endemics not covered by the accepted sources for A(i) or A(ii)
- A(iv) Threatened near endemic/limited range species not covered by the accepted sources A(i) or A(ii).

Criterion B: Richness

IPAs are intended to identify and conserve areas of exceptional botanical richness. Existing European

legislation targets a limited range of threatened species and habitats with no direct provision for conserving areas of outstanding botanical richness, important for the biodiversity of plants and other organisms.

Criterion C – Threatened Habitats

IPAs will identify sites of threatened habitat types. For the IPA Project in Europe, threatened habitats are taken to be those listed on Annex I of the Habitats Directive and on Resolution 4 of the Bern Standing Committee 16. A combined list of threatened habitats from both of these documents has been created for use in the IPA project in Europe, based on information in the EUNIS habitats system [4].

The IPA central database is an on-line data entry system, and each national partner can download their country's data into MS Access from the website. Each user of the database has a login password and use of the on-line site is governed by a data sharing agreement, which covers data ownership issues and confidential information. For each IPA, data is collected on the area, altitude, boundary, region where the site is located, general habitats, land-use, existing protection, threats, site management, qualifying criteria and details of the site compiler [3].

Summary fact-sheets on each site are available, and it is possible to generate detailed statistics and reports from the background Access database. The IPA database is compatible with the Important Bird Areas database and was developed with assistance from BirdLife International. The database holds information on sites identified through the Important Plant Areas Programme [7].

Lists of important plant areas have been compiled for most countries of Central, Eastern and Southern Europe and the United Kingdom [8-16]. Among the former USSR countries such work has been performed for Belarus and partially for Ukraine and Armenia [7]. Separate attempts have been taken in Kazakhstan [17] and Uzbekistan [18].

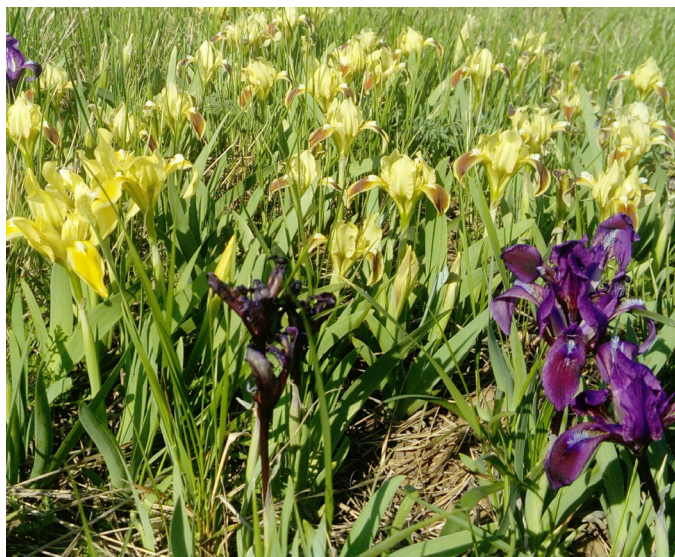
The recent years witnessed an increasing interest towards this issue in Russia. The IPA identification system is best developed in the Altay and Sayans area, where the identification procedures have been adjusted, the criteria updated and intensive



a



b



c



d

Figure 1. Some rare plant species of Saratov region:

a – *Adonis wolgensis*, b – *Atraphaxis replicata*, c – *Iris pumila*, d – *Ephedra distachya*

work is under way [19–21]. A number of regions extensively implement grid mapping and analyze archive records, herbarium specimens and recent publications, as well as make use of the researchers' own field studies with subsequent IPA identification and introduction of a separate GIS issue-related layer within the existing systems. In the Oryol Region, for instance, such approach has ensured identification of 50 IPAs [22]. Similar activities are carried out in Perm Krai [23], the Murmansk [24] and Samara [25] regions and some other regions.

A considerable number of publications suggesting expansion of the specially protected nature area network were released in the Saratov Region over recent years [26–29]. Despite the fact that the nature conservation capacity of some of such territories exceeds manifold that of the existing nature monuments, these areas for different reason have not yet been covered by the scope of nature conservation activities. The possible ways to address this issue include identification of IPAs intended primarily to detect and protect the most important areas and habitats of outstanding and vulnerable plant species.

There has been laid a sufficient groundwork for identification of IPAs in the Saratov Region. The major steps already taken include the following:

1. The activities related to preparation of the Saratov Region Red Data Book 3rd Edition gave impetus to reviewing and updating the lists of algae, mosses, gymnospermous and flowering plants in need of protection [30,31]. The categories and status of the species in need of protection were rendered compliant with those specified in the Red Data Book of the Russian Federation [32]. It was recommended to expand to the range of the species listed in the upcoming 3rd edition of the Saratov Region Red Data Book to include one more alga species, 15 bryophyte species, 13 pteridophyte species and one gymnospermous species. The list of the flowering plants recommended for protection was extended by 34 additional species. Five species are new to the region's flora (*Aeluropus pungens* (Bieb.) K. Koch, *Astragalus ceratoides* Bieb., *Petrosimonia brachyphylla* (Bunge) Iljin, *Senecio noeanus* Rupr. and *Teucrium polium* L.). The recently gathered collections have confirmed dwelling in the region of six species (*Allium coeruleum* Pall., *Camphorosma lessingii* Litv., *Ceratophyllum tanaiticum* Sapjegin, *Halocnemum strobilaceum* (Pall.) Bieb., *Hymenolobus procumbens* (L.) Fourr. and *Silene cretacea* Fisch. ex Spreng.). The most noticeable supplements have been made to the halophile and aquatic plants' sections due to the significant intensification of the related research in recent years.

2. The increasing researchers' interest towards the region's lichen flora [33-35] has considerably enriched the knowledge on those lichen species of the Saratov Region which require protection. As the IPA identification activities imply aiming at various groups, the above-mentioned is crucial in ensuring the comprehensive coverage of the recommended evaluation criteria.

3. Saratov State University herbarium is the Lower Volga region's largest collection of preserved plant specimens and is listed in the international Index Herbariorum. Its digital database is being constantly updated and upgraded to ensure maximum speed and convenience of search procedures. All the herbarium tags are digitally stored and processed [36]. Its collection is constantly replenished with newly gathered specimen, many of

which are provided with the data on the respective species' exact location.

4. Other preliminary steps include development of procedural network, conduction of field research and compilation of a justified list of the region's plant communities in need of protection [37]. An expert assessment based on 11 criteria enabled identification of unique, truly rare plant communities, as well as the exemplary communities which due to their certain composition and structure peculiarities can be considered conditionally undisturbed.

5. A number of digital databases have been formed and are maintained, namely *Protected Plant Species of the Saratov Region*, *Plant Cover Structure of the Saratov Region Specially Protected Nature Areas* and *Saratov Region's Plant Communities in Need of Protection* [38-39]. These databases are being generated and populated since year 2011 by the staff members of Saratov State University Chair of Plant Biology and Ecology.

6. Significant efforts are dedicated to justify establishment of new nature monuments in the region. Only within the recent decade upwards of 20 new nature areas were scrutinized and recommended for protection. For many of them certain further measures have been taken, such as mapping their habitats, collecting data on the ceno-populations of the protected species thereof and establishing monitoring over their populations.

The following can be suggested concerning regional-level application of IPA identification criteria:

As of Criterion A:

A(i) These are the plants listed in the International Union for Conservation of Nature's (IUCN) Red List under Categories CR, EN, VU by the new IUCN criteria.

A(ii) When implementing on the regional scale the lists of species established by the Bern Convention and the Habitats Directive, definite scepticism must be exercised and some widely occurring species should be excluded from consideration. For instance, such species under European protection as *Pulsatilla patens* (L.) Mill. and *Cypripedium*

calceolus L., are also rare in the region, whereas *Jurinea cyanoides* (L.) Reichenb., which is listed in Appendix I to the Bern Convention and Appendix II to the Habitats Directive, is a common species in the Saratov Region. With due account taken of the experience of IPA identification in individual regions of Russia [19] this category can also include the species listed in the Russia's Red Data Book and occurring in the Saratov Region.

A(iii) In Russia they are represented by the endemic species listed in the Saratov Region Red Data Book under Categories 1 and 2 and not included in the previous list.

A(iv) This group can include the national-level subendemic species listed in the regional Red Data Book and not included in the previous two lists.

The species recommended for listing in the regional Red Data Book under Categories 3,4 and 5 serve the basis for identification of IPAs by Criteria B (species richness).

The table below lists those flowering plants recommended for listing in the Saratov Region Red Data Book 3rd Edition which are the most significant for identification of the regional IPAs.

Identification of IPAs in the Saratov Region requires first of all systematic arrangement of the available data on the relevant locations under the IPA criteria. This justifies maintenance of a separate database linked to those already in operation. It is imperative to arrange the information in conformity to the structure of IPA registration cards adjusted to the regional specifics in compliance with the issued suggestions. It is necessary to develop a unified classification of habitats to encompass the entire diversity of the Saratov Region natural conditions. The most acceptable way of addressing the issue can be combining landscape peculiarities with the plant formation features to the level of formations or association groups. In particular cases specification of edaphic factors can be required. The latter is especially important for calciphyte and halophyte species and their communities. Implementation of the project requires joint efforts of specialists from various organizations dealing with research of plant species and communities and landscapes of the Saratov Region.



a



b



c

Figure 2. Landscapes of Volga Upland:
a – carbonate soil steppes, b – chalk slopes,
c – forest vegetation

TABLE.
List of the Russia's Red Data Book Species and Endemic Species Recommended for Protection in the Saratov Region

| Species | Endemistic region | Category as per the Red Data Book of Russia* | Recommended category within the region |
|---|--|--|--|
| <i>Allium regelianum</i> A. Beck. | endemic to the southeastern part of European Russia | 2 | 1 |
| <i>Anthemis trotzkiana</i> Claus | endemic to the Volga-Ural region | 3 | 1 |
| <i>Artemisia salsoloides</i> Willd. | endemic to the southern Volga-Don interfluvium, Ukraine and the eastern Black Sea region | 3 | 2 |
| <i>Asperula exasperata</i> V. Krecz. ex Klok. | endemic to the Volga-Don region | – | 3 |
| <i>Astragalus stenocercus</i> C.A. Mey | endemic to Siberia and the northern part of Middle Asia | – | 1 |
| <i>Astragalus zingeri</i> Korsh. | endemic to the Middle and northern part of Lower Volga region | 2 | 2 |
| <i>Bulbocodium versicolor</i> (Ker-Gawl.) Spreng. | – | 2 | 2 |
| <i>Centaurea carbonata</i> Klok. | endemic to the Volga-Don interfluvium and the Black Sea region | – | 3 |
| <i>Cephalanthera longifolia</i> (L.) Fritsch | – | 3 | 1 |
| <i>Cephalanthera rubra</i> (L.) Rich | – | 3 | 1 |
| <i>Cypripedium calceolus</i> L. | – | 3 | 1 |
| <i>Eriosynaphe longifolia</i> (Fisch. ex Spreng.) DC. | endemic to the southeastern part of European Russia and the northern Caspian Sea region | 2 | 2 |
| <i>Fritillaria ruthenica</i> Wikstr | – | 3 | 2 |
| <i>Gypsophila volgensis</i> A. Krasnova | endemic to the Middle and northern part of Lower Volga region | – | 3 |
| <i>Hedysarum grandiflorum</i> Pall. | – | 3 | 3 |
| <i>Hedysarum razoumovianum</i> Fisch. & Helm | endemic to the Volga region and western Kazakhstan | 3 | 3 |
| <i>Hyssopus cretaceus</i> Dubjan. | endemic to the southern part of European Russia | 3 | 3 |
| <i>Iris pineticola</i> Klokov | endemic to the Volga-Don region | – | 2 |
| <i>Iris pumila</i> L. | – | 3 | 5 |
| <i>Koeleria sclerophylla</i> P. Smirn. | endemic to the Middle Volga region and the Southern Urals | 3 | 3 |
| <i>Lepidium meyeri</i> Claus | endemic to the basins of the Volga, Don and Ural | 2 | 3 |
| <i>Matthiola fragrans</i> Bunge | endemic to the eastern Black Sea region and western Kazakhstan | 3 | 3 |
| <i>Orchis coriophora</i> L. | – | 2 | 1 |
| <i>Orchis militaris</i> L. | – | 3 | 1 |
| <i>Orchis palustris</i> Jacq. | – | 1 | 1 |
| <i>Orchis ustulata</i> L. | – | 3 | 1 |
| <i>Paeonia tenuifolia</i> L. | – | 2 | 4 |
| <i>Potentilla vulgarica</i> Juz. | endemic to the Volga Upland | 1 | 3 |
| <i>Scorzonera pratorum</i> (Krasch.) Stank. | endemic to the Lower Volga region and the southern part of Western Siberia | – | 3 |
| <i>Scrophularia sareptana</i> Kleop. ex Ivanina | endemic to the southern part of European Russia | – | 3 |
| <i>Silene cretacea</i> Fisch. ex Spreng. | endemic to Eastern Europe and Kazakhstan | 3 | 1 |
| <i>Silene hellmannii</i> Claus | endemic to European Russia and Ukraine | 3 | 3 |
| <i>Stipa cretacea</i> P.A. Smirn. | endemic to the Middle Don basin | – | 3 |
| <i>Stipa dasyphylla</i> (Lindem.) Trautv. | – | 3 | 3 |
| <i>Stipa pennata</i> L. | – | 3 | 4 |
| <i>Stipa pulcherrima</i> C. Koch | – | 3 | 3 |
| <i>Stipa zalesskii</i> Wilensky | – | 3 | 3 |
| <i>Thymus cimicinus</i> Blum ex Ledeb. | endemic to the Middle and northern Lower Volga region | 3 | 3 |

* 1 – endangered, 2 – decreasing number, 3 – rare, 4 – uncertain status

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