



University of Kentucky  
UKnowledge

---

International Grassland Congress Proceedings

XXI International Grassland Congress / VIII  
International Rangeland Congress

---

## Genetic Resources of Halophytes and Their Utilization for Sustainable Development of Russian Rangelands

Nariman Shamsutdinov

*All-Russian Institute of Hydraulic Engineering and Land Reclamation, Russia*

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/15-2/39>

The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

---

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

## Genetic resources of halophytes and their utilization for sustainable development of russian rangelands

Nariman Shamsutdinov

All-Russian Institute of Hydraulic Engineering and Land Reclamation, Bolshaya Academicheskaya St., 44, 141550, Moscow, Russia, E-mail: aridland@mtu-net.ru

**Key words** halophytes, ecotypes, varieties, desert fodder plants

**Introduction** It was found that arid regions of Russia occupying more than 100 million ha include dry-steppe (74.5 mln ha), semidesert (28.7 mln ha), and desert (5.6 mln ha). Due to unwise management of natural pastures and irrigated lands many have become degraded: productivity of natural pasture ecosystems has decreased 1.5 to 2-fold, 8-10; and valuable forage varieties have disappeared. Every year production of irrigated lands is reduced due to salinity problems, and currently 30% of the irrigated lands are not used for agriculture due to heavy salinization and low value.

**Materials and Methods** Field experiments were conducted in Tsaritsyn and Solenozaimischensky stations. This territory is a part of a natural-climatic region called Lower Circum-Volga Area (Nizhnee Povolzhie). By meteorological conditions and natural vegetation the area of investigations is in a semidesert zone with complexes of zonal light-chestnut and brown soils with solonetz soils. Genetic resources were determined using natural flora of the Republic of Dagestan, the Republic of Kalmykia, the Astrakhan, Volgograd, Rostov, Samara, Saratov, Orenburg Regions, and the Stavropol Territory. Five expeditions were organized for collection of germ plasma of halophytes. Field experiments on formation of a collection of halophytes were conducted following Shamsutdinov *et al.*, 2000. At present the genofund contains 50 varieties and 1200 specimens, out of which 25 forage varieties were selected as significant for initial selection studies.

**Results and Discussions** Halophyte flora of Russia comprises 512 varieties (Shamsutdinov, *et al.*, 2001) which belong to 255 genera and 55 families. Their significance for selection of salt-resistant strains of forage halophytes and development for saline lands is great. The greatest number of halophytes is contained in the *Asteraceae* family, making 15.1%. Rather high numbers of halophytes are observed in such families as *Poaceae* (62 varieties), *Chenopodiaceae* (48), *Fabaceae* (34), *Cyperaceae* (30), *Ranunculaceae* (23), *Brassicaceae* (21), *Lamiaceae* (21), *Apiaceae* (19), *Caryophyllaceae* (18), *Polygonaceae* (15), *Scrophulariaceae* (13), *Liliaceae* (11), *Rosaceae* (10) and *Rubiaceae* (10). Among polymorphic genders one can distinguish *Carex* (23), *Artemisia* (15), *Salsola* (9), *Trifolium* (9), *Ranunculus* (9), *Galium* (9), *Astragalus* (8), *Plantago* (8), *Euphorbia* (7), *Limonium* (7), *Polygonum* (7), *Veronica* (7), *Juncus* (6), *Stipa* (6), and *Potentilla* (6), which includes 1.2-4.5% of the total number of halophytes. In arid regions in saline soils there is a deficit of moisture accessible to organisms caused by high osmotic pressure of a soil solution as well as high daytime temperatures and low air humidity. The most important anatomic-morphological and physiological-biochemical characteristics of halophytes that ensure their normal functioning and development under saline conditions are: salt accumulation, salt release, and salt resistance. Halophytes of the Russian Federation are not homogeneous by their salt resistance. Out of 512 halophyte varieties found in the flora of Russia 340 varieties refer to oligohalophytes, 71—to mesohalophytes, 57—to mesoeuhalophytes, and 42—to euhalophytes.

**Conclusions** The natural flora of Russia contains a great number of environmentally specific plant varieties - halophytes that are important for agricultural development as forage plants. On the basis of this genofund we chose three varieties of forage halophytes: *Eurotia ceratoides* Alsu, *Camphorosma lessingii* Favorit, and *Suaeda altissima* Zemfira to put on the State Selection Register and admit for use on the territory of the Russian Federation (Fedin, 1985). These halophyte varieties are used for phytoreclamation of pastures and restoration of fertility of secondary saline soils in arid regions of Russia. Prospects for utilization of halophytes in agriculture in arid zones of Russia are enormous because more than the half of the arid pastures are degraded and are in need of phytoreclamation.

### References

- Fedin, A. (ed.) (1985) Methodology of the State Varieties Testing of Agricultural Crops. Moscow. Kolos: 267. /in Russian/  
Shamsutdinov, Z. Sh., Nazaryk, L. A., Ionis, *et al.* (2000) The methodical indicating for mobilization of vegetative resources and introduction of fodder plants. Moscow. *Rosselychozacademiya*: 82. /in Russian/  
Shamsutdinov, Z. Sh., Savchenko, I. V., Shamsutdinov, N. Z. (2001) Halophytes of Russia, Their Environmental Assessment and Utilization. Moscow. *Edel-M*: 399. /in Russian/

**Acknowledgement** This paper is prepared with the support of the Federal Agency for Science & Innovations (MD-569.2007.04) & Russian Foundation for Basic Research (#07-05-13596)