

## Areas of distribution of cultivated and wild-growing forage plants in electronic "Atlas of Economic Plants and Their Diseases, Pests and Weeds of Russia and Neighboring Countries"

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In order to study cultivated plants occurring in Russia and adjacent countries and their wild relatives, as well as major diseases and pests, an electronic Atlas of Economic Plants and Pests of Russia and Adjacent Countries has been developed. The process of its development was a laborious complex work involving expertise of diverse specialization from a number of Russian scientific institutions. This work was supported by the United States Department of Agriculture (USDA) and funded by the International Science and Technology Center (ISTC).

Key objects of the Atlas are cultivated plants and their wild relatives. The N. I. Vavilov Institute of Plant Industry (VIR) has accumulated enormous factual materials on the distribution of these plants over the territory of the former Soviet Union—special reference books, archives of VIR collecting missions in different years, *in situ* collections of cultivated and wild species preserved in the National Genebank of Russia and the Herbarium of Cultivated Plants, their Wild Relatives and Weeds. These sources of information together with floristic lists of regional Flora, Directories, regional and national (Botanical Institute of Russian Academy of Sciences) herbaria, monographs and publications on separate taxa, published maps of areas of distribution and other literary references served as the basic material for mapping the areas of crop species and their wild relatives.

Area maps for 100 cultivated species were developed, among them are 28 forage crop-species maps. The list of cultivated plants was compiled on the basis of the periodical edition "Catalog of Commercial Crop Varieties".

The species of Crop Wild Relatives (CWR) were selected for the Atlas according to the "List of CWR in Russia" prepared by VIR Department of Agrobotany and taking into account their agricultural significance. Among them are 255 forage species. Forage species of the Atlas belong to three main families: *Leguminosae* Endl, *Poaceae* Barnhart, *Chenopodiaceae* Vent and some others.

Each object in the Atlas is represented by the following materials: area map layers, metadata, description of the techniques used for map development with references on information sources, brief description of the object and its image.

Map layers: vector and raster. Vector maps are presented in Mapinfo exchange Format (MIF/MID). Main types of vector layers are polygonal and punctual; for auxiliary layers a linear demonstration variant (polyline) is possible. Datum—WGS84. Scale 1:20000000. Each layer is supplemented with metadata. Raster Maps: data format—Idrisi 32 for Windows—9x/NT/2000/XP. Datum—WGS84. Each layer is supplemented with metadata. Vector layers of boundaries and coastlines are superimposed on geographically bound rasters. Composition saved in .gif or .jpg formats give information on precision of geographic binding. Metadata include: name of the map; name of the author of the map, name of the GIS expert, release date of the map; scale and precision of the map (units of measurements, for example: raster cell 10x10 km); projection indicating the datum and ellipsoid; basic contents of the map, classifier, accuracy of the classifier; mapping methods (brief, reference), data sources (reference); rights and copyrights, notes. The text is adjusted to the source materials with the help of hyperlinks.

Descriptions include: correct name of the species—Latin (according to the International Code of Botanical Nomenclature, and its major synonyms), main morphological, geographical, ecological and biological features of the species, utilization and economical value.

The Atlas materials are stored on CD and available on the web ([www.agroatlas.spb.ru](http://www.agroatlas.spb.ru)) in Russian and in English. Area maps of the species, included to the Atlas, are invaluable for analyzing biodiversity of major crops and their relatives in Russia and adjacent countries. The maps may be used also for breeding purposes—for example, to select plant forms (ecotypes) adapted to certain environments, resistant to diseases and pests, possessing certain commercial characters and potential for growing in similar conditions in another places of the country or of the world. The Atlas can serve also as the basis for analyzing spatial statistics describing the distribution of crop and CWR species diversity over Russia and adjacent countries. The Atlas can also be used as a guideline manual for specialists and students of agronomic, biological and geographic colleges.