





M.M.Grishko National Botanical Garden
NATIONAL ACADEMY OF SCIENCES OF UKRAINE

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M.M. Grishko National Botanical Garden of the National Academy of Sciences of Ukraine - an important center for conservation and enrichment of plant diversity

Rakhmetov D.B, Zaimenko N.V., Gaponenko M.B., Shumik M.I.

Д.Б.РАХМЕТОВ

**ТЕОРЕТИЧНІ ТА ПРИКЛАДНІ
АСПЕКТИ ІНТРОДУКЦІЇ
РОСЛИН В УКРАЇНІ**



Я.Б.Блюм, Г.Г.Гелетуха, І.П.Григорук, К.В.Дмитрук,
В.О.Дубровін, А.І.Смирна, Г.М.Заборник, Г.М.Халетин,
М.Д.Мельничук, В.Г.Мироненко, Д.Б.Рахметов,
А.А.Сибірин, С.П.Циганков

**БІОЛОГІЧНІ РЕСУРСИ І
ТЕХНОЛОГІЇ ВИРОБНИЦТВА
БІОПАЛИВА**

Квіт. 2010

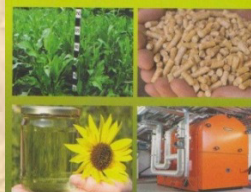
Д.Б. Рахметов, Т.О. Щербакова, С.Д. Рахметов



**МІСКАНТУС В УКРАЇНІ:
ІНТРОДУКЦІЯ, БІОЛОГІЯ, БІОЕНЕРГЕТИКА**



ЕНЕРГЕТИЧНІ РОСЛИННІ РЕСУРСИ



D.RAKHMETOV
Science Deputy Director
(innovative development),
d.a.s., Professor

О.А. Кербильов, Д.Б. Рахметов

**ПОЛЕЗНІ РОСЛИНИ В УКРАЇНІ:
ОТ ІНТРОДУКЦІЇ
ДО ІСПОЛЬЗОВАННЯ**



Today global climate change is one of the most serious problems in the world. Therefore, adaptation of the human conditions to the climate change is of crucial importance. According to the Paris agreement (December 2015) is it essential for humanity to develop measures for reduction of the negative impacts of climate change on biosystems.

Improving the quality of life is one of the main and most important tasks of any government. Due to the Earth deteriorating environmental conditions the issues of providing balanced human food, technical, energy, and pharmaceutical commodities has become the primer concern.

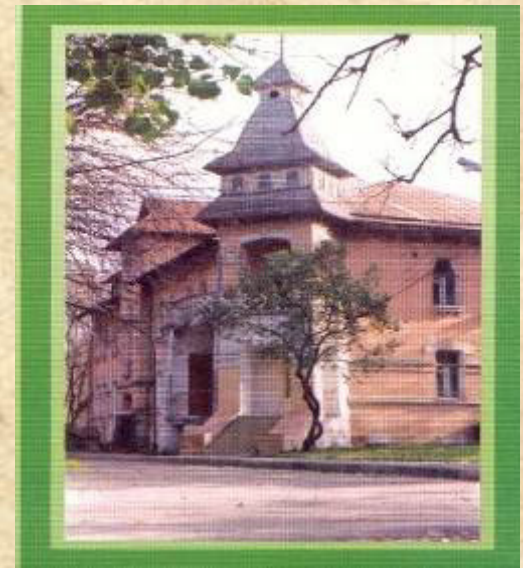
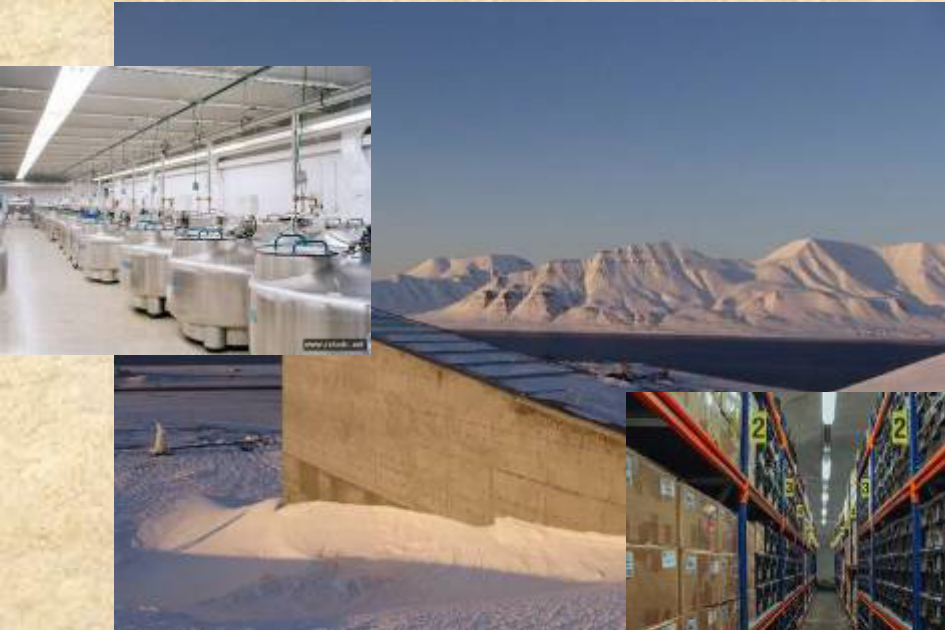


According to FAO, between 1900 and 2000 the crop diversity has dropped by 75%. The projected number of species may fall further from 16 to 22% by 2055. This includes disappearance of natural flora and important food plants due to the climate change.

In 2008 Norway opened the Svalbard Global Seed Vault. Total of 7400000 samples stored worldwide, national government genetics bank is 6.6 million, 45% of which are located in 7 countries.

Currently, there are about 1,750 gene banks, and 130 of them include more than 10 thousand species.

The National Center for plant genetic resources of Ukraine accumulates 145.9 thousand specimens representing 493 cultures, 1730 species of plants.



The diversity of Ukraine includes about 80 species of trees, 280 shrubs, 985 herbaceous annual plants, and from of higher plants, where about 600 species are endemic and 611 are rare and endangered plants.

About 30% of Ukraine territory is accounted for arrays of natural or secondary (partly natural) vegetation, among which are medicinal (100 species), vitamin high (over 200 species), oil (250 species), honey high (over 1000 species) , tanning and coloring (100 species) plants species .



The total number of introduced plants in Ukraine is about 35 thousand taxa

Great work on the protection of plant diversity is carried out of Ukraine. As of 01/01/2018, the natural reserve fund of Ukraine is 8,296 territories and objects with a total area of 4.318 million hectares, which is 6.6%.

This includes, in particular, 19 natural and 4 biosphere reserves, 48 national nature parks, 310 reserves, 132 nature monuments, 18 botanical gardens, 7 zoological parks, 19 dendrological parks, and 89 parks-monuments of landscape art.



The most vulnerable species (611) of the natural flora are included in the Red Book of Ukraine and are protected by law.

In Ukraine, there is the Green Book of Ukraine, which includes rare and typical plant communities in the area, which require a special regime for their use. This book contains 126 plant communities that need protection.





(founded in 1935)

**Kremenetskiy
Botanical Garden
(founded in 1806)**



In Ukraine, an important role in the protection of plant diversity is played by botanical gardens and arboretums. About 50 botanical gardens and arboretums have been created and are functioning effectively, where a great scientific and practical work is carried out to develop modern methods for preserving the plant diversity of the world.

**Botanical garden
at Kharkov University
(founded in 1804)**



**Khorol Botanical Garden
(founded in 2005)**

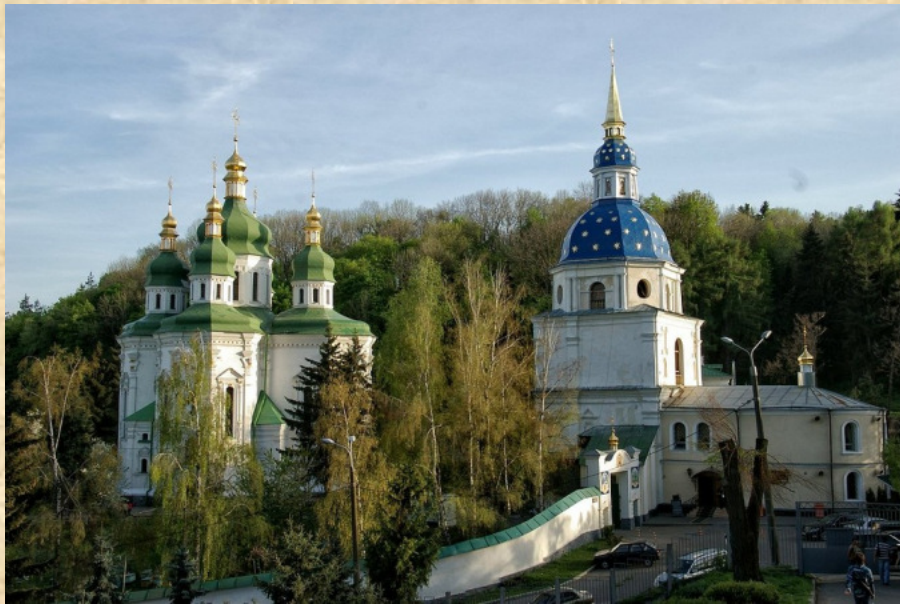


Zruchno Travel

M.M. Gryshko National Botanical Gardens

The green crown of Kyiv cannot be imagined without M.M. Gryshko National Botanical Gardens (NBG). The idea to create a botanical garden appeared in autumn 1918 as National Academy of Sciences was found. The construction works were launched in 1935. During World War II Kyiv was temporarily occupied, most collections were destroyed. After Kyiv was liberated the construction of the Garden was renewed (1944). The works were carried out under the wakeful supervision and with personal participation of Academician Mykola M. Gryshko (1901-1964). Nowadays NBG takes the leading positions among the botanical gardens of Europe and the world for its size, richness and variety of collections, location and the level of researches.





The Garden (NBG) is famous not only for its richness of vegetation but also for its relics: Vydubets'ky, Monastery, Zvirnets caves and Krasny Dvor (Red Court)



Science conducted at M.M. Gryshko National Botanical Gardens in the following areas :

- Introduction, acclimatization and breeding of plants;
- The study of conservation, preservation, enrichment and use of biological diversity of plants;
- Environmental monitoring and optimization biogeocenosis;
- Landscape design and gardening construction.

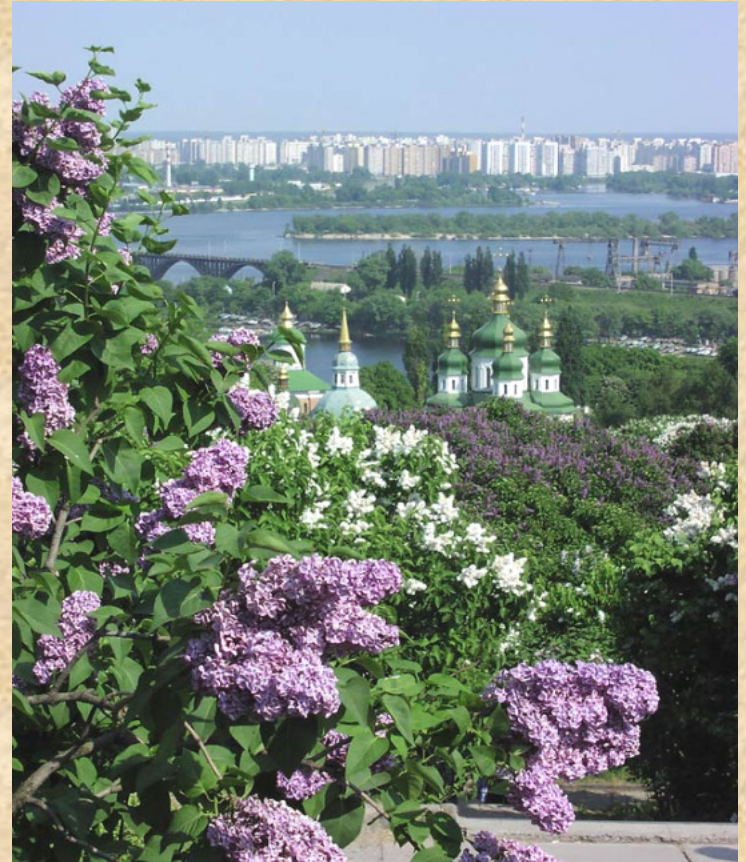
Priority research areas:

- Chemical interaction of plants (allelopathy);
- Medical botany, integrated use of medicinal plants;
- Bioindication and environmental monitoring of ambient pollution environment;
- Biotechnology;
- Bioenergetics;
- Environmental and educational activities.

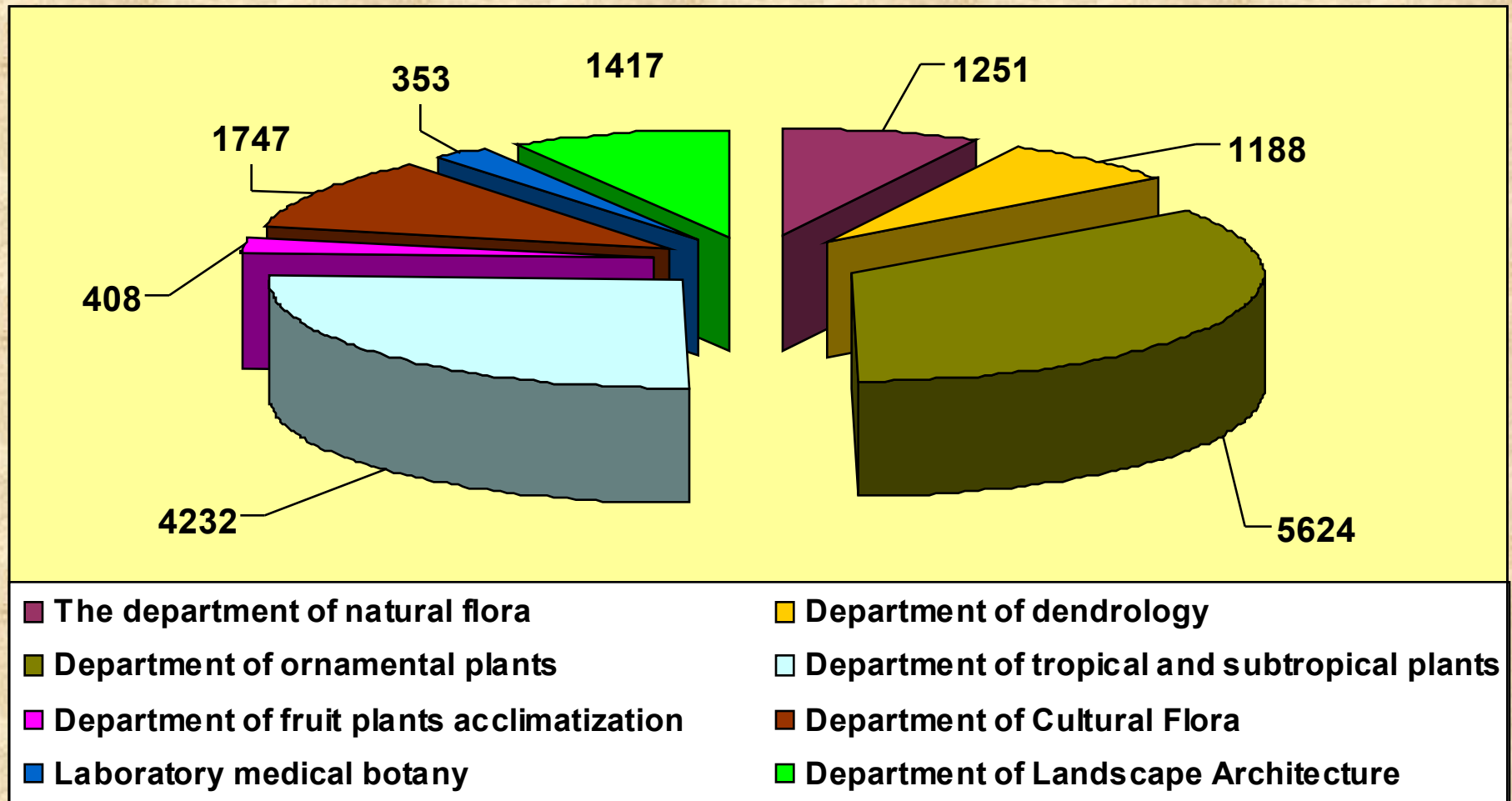
Departments;

- ❖ The department of natural flora
- ❖ Department of dendrology
- ❖ Department of ornamental plants
- ❖ Department of fruit plants acclimatization
- ❖ Department of Cultural Flora
- ❖ Department of tropical and subtropical plants
- ❖ Department allelopathy
- ❖ Department of Landscape Architecture
- ❖ Laboratory medical botany
- ❖ Laboratory bioindication and hemosystematyks

**Today is: 2 Cor. NAS of
Ukraine,
14 doctors and 80 candidates.**

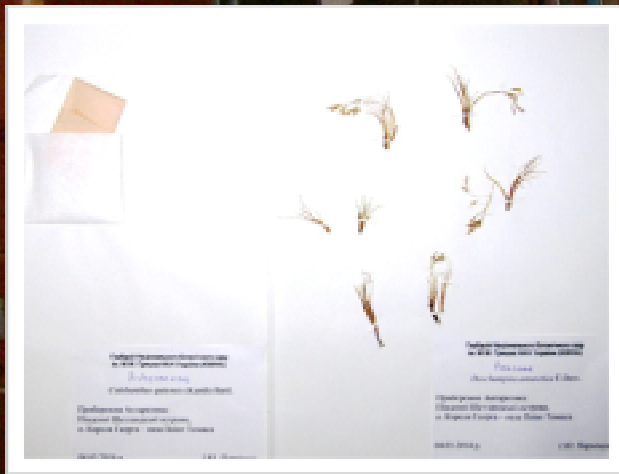


Collection Fund of Live Plants M. M. Grishko NBG

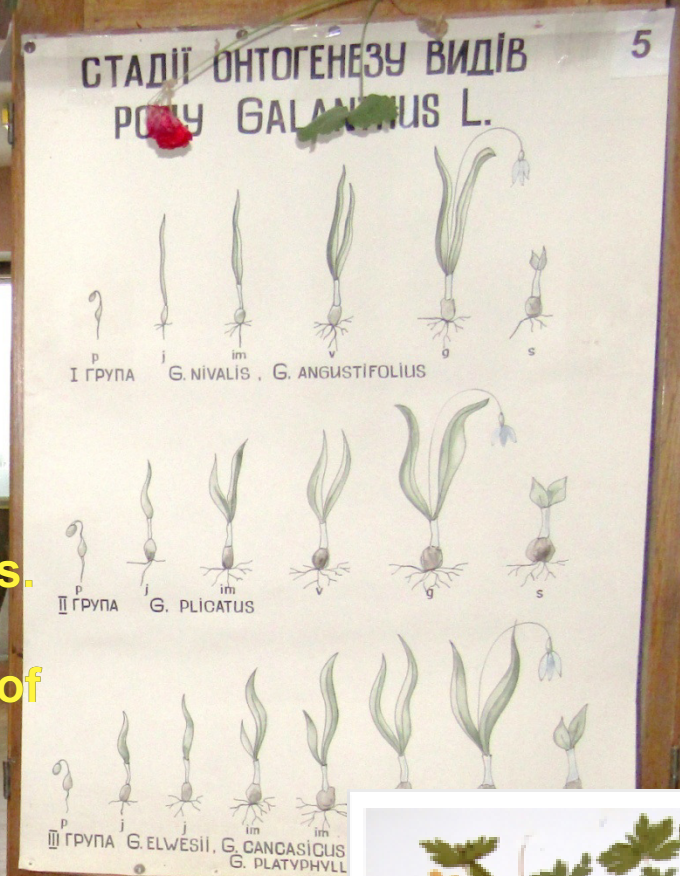


On the area of 130 hectares, including greenhouses and conservatories, more than 16.200 species, forms and varieties of plants have found their home.

Herbarium of the M. M. Grishko
National Botanic Gardens
National Academy of Sciences is one
the largest in Ukraine.
His funds are presented
more than 11780 taxa
on more than 145 thousand herbarium sheets.
Wealth is unique for Ukraine
herbarium specimens of introduced species of
plants



Samples of flowering plants
flora of Antarctica



Sample of ontogenetic
herbarium



Seed Laboratory of the M. M. Grishko National Botanic Gardens National Academy of Sciences

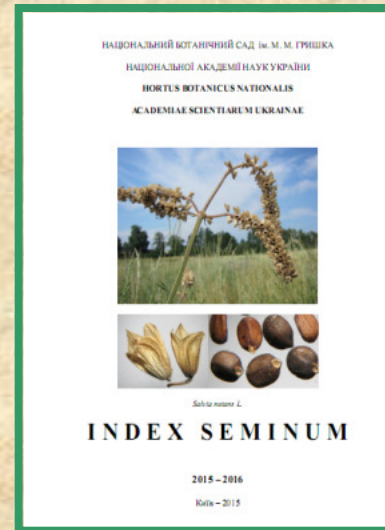
A collection of fruits and seeds of 12,600 samples has been created.

Since 1947 a list of seeds for exchange has been published - "Index seminum", standardized by the International Association of Botanic Gardens. It is currently sent to 1,420 destinations.

The seed exchange fund is about 900 specimens.



Vincetoxicum rossicum
Kleop.



Calla palustris L.



Alcea rugosa Alef.



Lychnis
chalcedonica L.



The National Botanical Garden of M.M.Grishko of NAS of Ukraine (NBS) has made important fundamental and applied research in the introduction, acclimatization, breeding, biotechnology of useful plants, enrichment plant resources and introduction of new developments within the experimental phytotechnologies, economic and ethnobotany.

Of the total number of new crops included in this register - 51% of crops and 43% of varieties accounted for NBS share.

Contribution of M.M.Grishko National Botanic Garden of NAS of Ukraine to the enrichment of genetic resources of Ukraine cultivated plants according to the varieties State Register

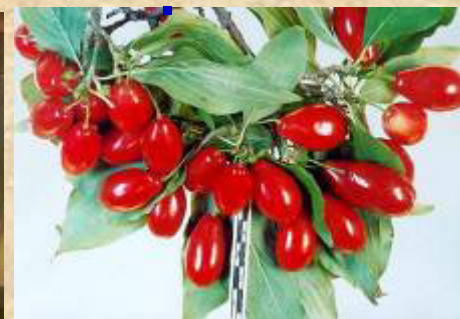
Results of introduction and breeding	Quantity		Share, %	
	crop	variety	crop	variety
Introduced plants and their varieties in the State Register Ukraine	137	733	44,3	11,4
Contribution of M.M.Gryshko NBS of NAS of Ukraine in enrichment cultural flora	70	312	22,7	4,9
Participation of NBS among institutions involved in introduction on the territory of Ukraine, %			51,1	42,6

Note - in the State Register of Plant Varieties the total number of crops - 309, varieties - 6427

The lists of plants varieties (365 varieties) was submitted to the Department of Agriculture and Technology Policy in agriculture Ministry of Agriculture and Food of Ukraine for inclusion into the State Register of plant varieties suitable for dissemination in Ukraine in 2018 and the State Register of patents for 2018.



Оригінальна



Щедрий



Київська гібридна



Видубецький



18 Кащенка



Botanical geographic areas of M.M. Gryshko National Botanical Garden

Plants from various geographical zones of Ukraine and CIS (former USSR) form the so-called botanical-geographical areas. The expositions the Forests of Ukraine, the Ukrainian Carpathians, the Crimea, the Steppes of Ukraine, the Caucasus, the Middle Asia, the Altai and Western Siberia and the Far East give the idea about the plant kingdom of these regions as well as typical landscape and relief.



**Belt of coniferous forests on the
section «Carpathians»**



**Beech forests on the
section «Caucasus»**

Arboretum – collection of trees and shrub - looks very attractive. It consists of 1,188 species, cultivars and forms.



***Forsythia suspensa* 'Decipiens'**



***Forsythia ovata* 'Tetragold'**



***Exochorda tianschanica*
Gontsch.**



***Stephanandra tanakae* Franch. et Sav.**



***Kerria japonica* 'Plena'**



Spiraea japonica

Syringa collection in Kiev NBG numbers 21 species (form 28 well-known in the world) and 210 varieties. Late flowering varieties are created as a result of intervarietal and interspecific hybridization.

Lilac varieties created in NBG





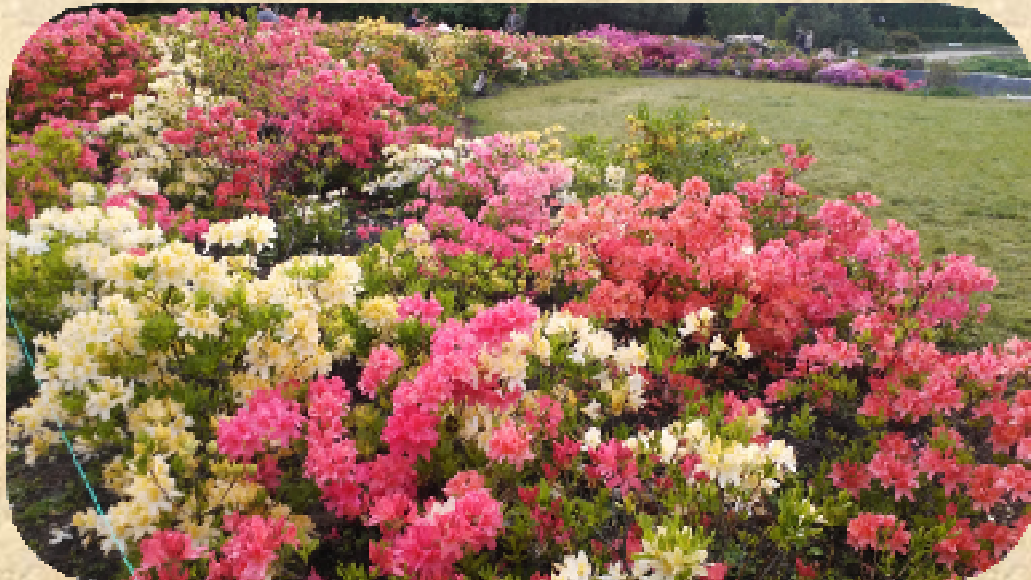
In the last period in the Garden, particular attention is paid to the creation of new ones Exhibitions of the "Gardens of the World". Scientific substantiation and projects have been developed creating in the NBG botanical-landscape areas of ethnic orientation such as "Ukrainian Garden", "Austrian Alpine Garden", "Korean Traditional Garden", "Tibetan Nature and Culture", "Indonesian Garden" etc.

On the other hand great attention is paid to the creation of new exhibition areas as "Seasons", "Gravel Garden" etc. Among the new expositions is special attention deserves the "Garden of Flavors".





Creating such expositions allows, along with preservation and enrichment of plant diversity, to improve the landscapes of the garden, performing an important ecological, aesthetic, educational role and expanding the visitor's perceptions, not only about certain types and forms of introduced plants, but on the whole, on cultural-historical, geographical and the ethnobotanical component of new compositions in combination.





"Korean Traditional Garden"





“Austrian Alpine Garden”



"Tibetan Nature and Culture"



“FRENCH GARDEN”





ROCK GARDEN

“JAPANESE GARDEN”



“INDONESIAN TRADITIONAL GARDEN”



Discovery exhibition "Garden of flavors"



Done a great job of creating exposure area "Garden of flavors", which was involved in new forms and types of aromatic plants: *Artemisia ludoviciana*, *A. arborescens*, *A. vulgaris* "Schanlim", *Origanum leviagata* "Aurea", *O. vulgare*, *Mentha squaleolens*, *M. hortensis*, *M. perita* "Chocolad", *M. crispa*, *Melissa officinalis*, *Thymus*, *Lavandula* an. *Munstead*.

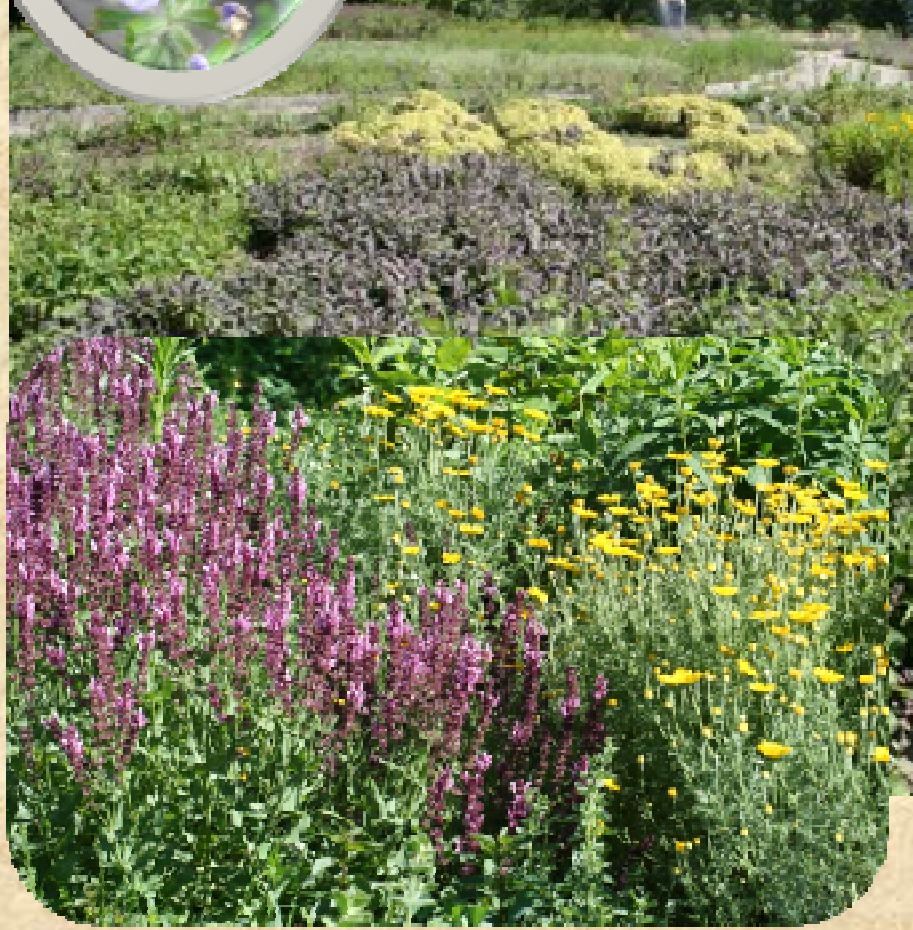




**Salvia officinalis L.
Variegata**



**Salvia
horminum L.**



"Garden of flavors"



"Garden of flavors"

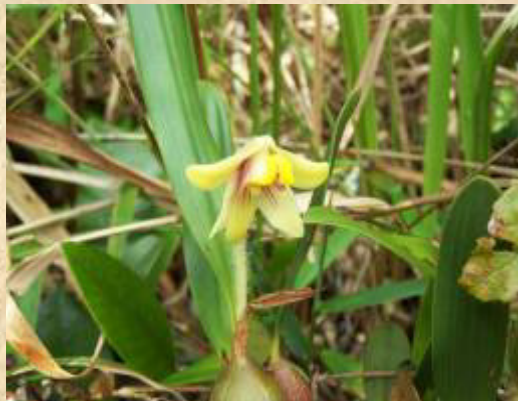
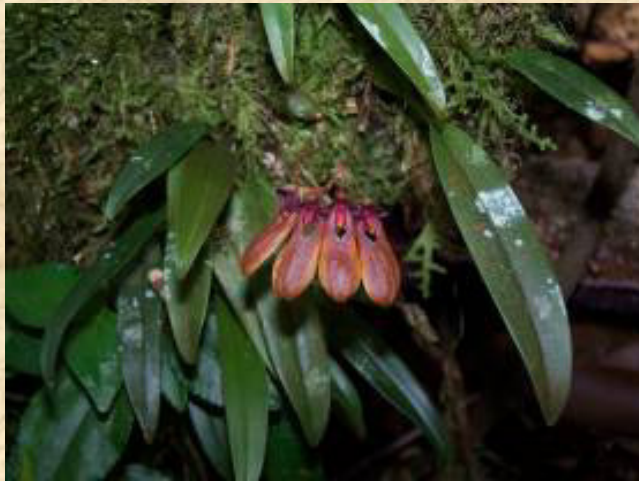


"Garden of flavors"



About 4,300 species, forms and varieties of tropical and subtropical plants are in the greenhouses and conservatories. The collection of orchids numbers 600 species and forms of these pearls of the plant kingdom. Orchids from Kyiv have traveled into space several times.

The features of the reproductive biology of orchid hothouse conditions for culture and established the factors that affect the efficiency of the studied species reproduction ex situ.

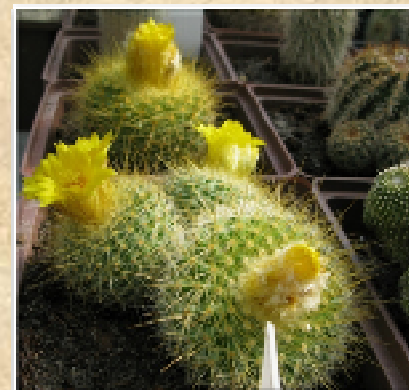


As a result of comprehensive experimental studies and observations of the development of orchid ex situ and in situ analysis of the peculiarities of life strategies orchids.



1 - *Dendrobium parishii* Rchb.f.; 2 – *D. phalaenopsis* Fitzg.; 3 – *D. moniliforme* (L.) Sw.; 4 - *Disa uniflora* P.J. Bergius; 5 - *Eulophia streptopetala* Lindl.; 6 -*Grammatophyllum scriptum* (L.) Blume ; 7 - *Guarianthe aurantiaca* (Bateman ex Lindl.) Dressler & W.E.Higgins; 8 - *Ludisia discolor* A. Rich.; 9 - *Eryodes barbata* (Lindl.) Rolfe; 10 - *Sophronitis lobata* (Lindl.) Van den Berg & M.W.Chase; 11 – *S. lundii* (Rchb.f. et Warm.) Van den Berg et M.W. Chase; 12 – *S. mantiqueirae* (Fowlie) Fowlie; 13 – *S. purpurata* (Lindl. et Paxton) Van den Berg et M.W. Chase; 14 – *S. sincorana* (Schltr.) Van den Berg et M.W. Chase; 15 - *Laelia rubescens* Lindl.

New Arrivals Nerium oleander

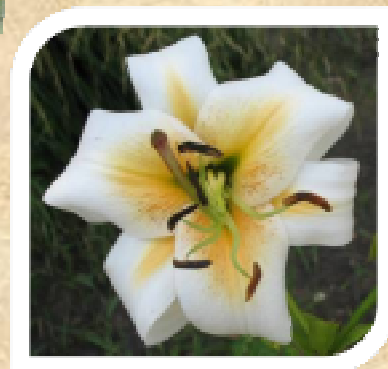
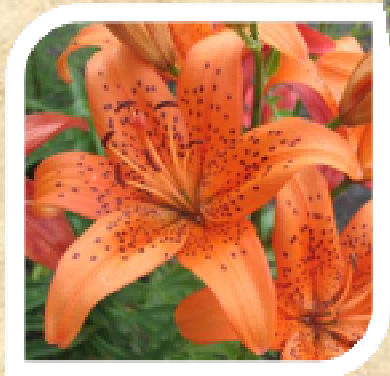


Updating collection of succulent plants



An original of introduction assessment raised new varieties of dahlias (200), Iris (120) daylily (100), gladiolus (100), lilies (80), chrysanthemum (80), peonies (70) Astilba (50) and other cultures criteria that determine their decorative and household-biological quality. Selected varieties promising for use in green construction and selection work.

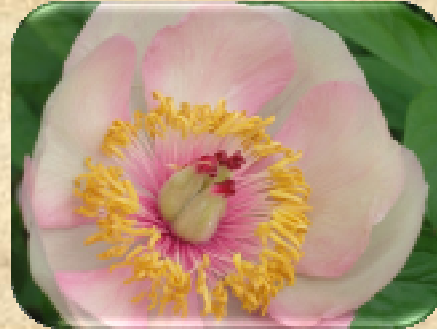
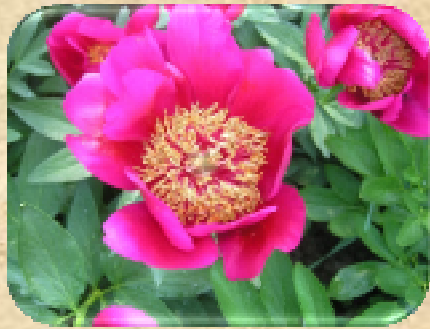
Currently, the gene pool has 5624 specimens, which are represented by 4187 cultivars, 954 species, and 483 promising breeding numbers.



Using breeding methods derived from starting material of flower-ornamental plants and a number of promising breeding numbers lilies, peonies, kalistefusa Chinese, Astilba, gladiolus, iris, daylily, chrysanthemums dribnokvitkovoyi.

Obtained 33 patents for new varieties of flower and decorative plants.





Herbaceous ornamental plants occupy particular place in the selective work of the M.M.Grishko National Botanical Garden NAS of Ukraine.

There are species of *Paeonia* L. genus among them. Hybridization of *Paeonia lactifolia* and *Paeonia officinalis* with wild species resulted in hybrid forms creation with principally new indications of flower's structure, originality and coloration purity. 41 varieties are created as a result of selective work.

