

Ministry of Science and Higher Education of the Russian Federation
Federal Research Center
the N.I. Vavilov All-Russian Institute of Plant Genetic Resources (VIR)

Proceedings
of the All-Russian Scientific and Practical Conference

**PLANT GENETIC RESOURCES
FOR GENETIC TECHNOLOGIES:
TO THE 100TH ANNIVERSARY
OF PUSHKIN LABORATORIES OF VIR**

St. Petersburg, June 22–23, 2022

Abstracts

St. Petersburg, 2022

under Agreement No. 075-15-2021-1050 (of Sept. 28, 2021)
with financial support from Helicon Company Ltd.



UDC 575:631.52:631/635:631.117.4(470+571)

Plant Genetic Resources for Genetic Technologies : To the 100th Anniversary of Pushkin Laboratories of VIR : Proceedings of the All-Russian Scientific and Practical Conference, St. Petersburg, 22–23 June 2022 : Abstracts : scientific online edition / Yu. V. Ukhatova, E. A. Sokolova (eds) ; N.I. Vavilov All-Russian Institute of Plant Genetic Resources. – St. Petersburg : VIR, 2022. – 233, [1] p. : tab., ill.

ISBN 978-5-907145-84-9

The program and abstracts of the All-Russian Conference *Plant Genetic Resources for Genetic Technologies: To the 100th Anniversary of Pushkin Laboratories of VIR* are presented. The conference was held at VIR on June 22–23, 2022, under Agreement No 075-15-2021-1050 of Sept. 28, 2021 (hereinafter: Event/Conference).

The new technological setup aimed at the development of bioeconomy increases the demand for bioresource collections (BRC), including collections of plant genetic resources. Currently, new approaches to collection management and studying are being actively introduced. The foundations for the work with collections of plant genetic resources were laid 100 years ago by Nikolai Vavilov. On May 20, 1922, the Central Breeding and Genetic Station (since 1939: Pushkin Laboratories of VIR) was organized in Detskoye Selo (Pushkin) as one of the sites for environmental and geographical testing of the collection accessions. At the same time, this experimental site became the core element for the development of VIR's methodological divisions whose aim was comprehensive studying of accessions using the methods of genetics, physiology, anatomy, cytology, biochemistry, and technological assessment.

The objective of the Conference was to highlight the full scope of modern trends in the work with collections of plant genetic resources and their application in fundamental science and applied sectors of economy. The issues of conservation, integrated studying (including comprehensive characterization and genetic certification) and utilization of crop genetic resources and their wild relatives were discussed. Aspects of inventorying and development of uniform principles for BRC management were also considered.

The thematic areas of the Conference included: Conservation of Plant Genetic Resources Collections, Study of Plant Genetic Resources, and Applied Research on Plant Genetic Resources. This edition also contains the abstracts of presentations prepared by heads of departments, employees and veterans of VIR, showing the activities of the Institute's departments and laboratories for 100 years – up to the present time.

Addressed to a wide range of experts in the field of the work with bioresource collections, including students, postgraduate students and young scientists under the age of 39.

Abstracts are published in the authors' initial versions. The authors (co-authors) of the published abstracts are responsible for the impartiality and reliability of the data presented.

The Conference's website: <https://www.vir.nw.ru/blog/2021/10/29/brk2021/>

UDC575:631.52:631/635:631.117.4(470+571)

ISBN 978-5-907145-84-9

DOI 10.30901/978-5-907145-84-9

© Federal Research Center
the N.I. Vavilov All-Russian Institute
of Plant Genetic Resources (VIR), 2022
© Authors of articles, 2022

CONTENTS

Program of the Conference <i>Plant Genetic Resources for Genetic Technologies: To the 100th Anniversary of Pushkin Laboratories of VIR</i>	14
SECTION 1. CONSERVATION OF COLLECTIONS OF PLANT GENETIC RESOURCES	25
<i>Avagyan A. E., Sargsyan G. Zh.</i> Strategic aspects of establishing seed collections of vegetable crops in Armenia.....	26
<i>Bulatova N. Sh.</i> Vavilov's vector for the cytogenetic study of bioresources.....	28
<i>Gavrilenko T. A.</i> Cultivated potato species in the VIR collection.....	29
<i>Kruchkov S. N., Solonkin A. V., Solomentseva A. S., Egorov S. A., Romanenko A. K.</i> Plants of the collection fund of the Federal Research Center of Agroecology of the RAS as sources of valuable features for a bioresource collection.....	30
<i>Kuleshov A. S.</i> Diversity of the genus <i>Citrus</i> L. in the collection of the FRC SSC RAS.....	32
<i>Mamedova S. M., Vishnyakova M. A.</i> Ecological and geographical diversity of beans (<i>Vicia faba</i> L.) in the VIR collection.....	34
<i>Matys I. S., Markevich I. M.</i> Conservation of plant genetic resources in the National Bank of Seeds of Belarus.....	36
<i>Nadzhodov B. B., Jumaev K. U., Nasyrova F. Yu.</i> "For it alone one should be in the Pamir" – Vavilov and his expeditions to the Pamir.....	38
<i>Pryvalau F. I., Grib S. I., Matys I. S.</i> National collection of plant genetic resources of the Republic of Belarus and the results of its use.....	41
<i>Sarikyan K. M., Grigoryan M. G.</i> The studies of some introduced wild relatives of eggplant in Armenia.....	43
<i>Fomina N. A., Gavrilenko T. A., Travina S. N.</i> Genetic diversity of Andean cultivated potato species preserved at the VIR Polar Experiment Station.....	45
SECTION 2. STUDY OF PLANT GENETIC RESOURCES	48
<i>Apanasova N. V., Belyachenko Yu. A., Gutorova O. V., Gosenova O. L., Smolkina Yu. V., Yudakova O. I.</i> Corn collection of Saratov State University: creation and prospects of use.....	49
<i>Babak O. G., Anisimova N. V., Nekrashevich N. A., Yatsevich K. K., Drozd E. V., Fateev D. A., Berensen F. A., Artemyeva A. M., Kilchevsky A. V.</i> The new polymorphism of <i>Capsicum MYB113-like</i> and <i>Brassica MYB114</i> genes in connection with the anthocyanine biosynthesis regulation.....	51
<i>Baimukhametova E. A., Berezhneva Z. A., Musin Kh. G., Shvets D. Yu., Kuluev B. R.</i> Use of strain <i>K599 Agrobacterium rhizogenes</i> for obtaining transgenic plants.....	53
<i>Berezhneva Z. A., Musin K. G., Kuluev B. R.</i> The role of the <i>PtrXTH1</i> gene in the regulation of stress resistance of transgenic tobacco plants in the hypothermia conditions.....	55
<i>Gainullina K. P., Rummyantsev S. D., Kuluev B. R.</i> The role of the transcription factor gene <i>ABI3</i> in the regulation of biosynthesis of pea seed storage protein.....	57
<i>Galimova A. A., Kuluev B. R.</i> Alleles of high molecular glutenin subunit loci in varieties of the Ante-Ural steppe zone common wheat (<i>Triticum aestivum</i> L.).....	59
<i>Glagoleva A. Y., Shoeva O. Y., Kovaleva O. N., Khlestkina E. K.</i> Investigation of black color of barley grain using plant genetic resources collections.....	61
<i>Gulyaeva E. I.</i> Genetic diversity of Russian common wheat cultivars in leaf rust resistance.....	62
<i>Gurina A. A., Zavarikhina E. A.</i> Tuber dormancy dynamics in primitive potato cultivars of the VIR collection.....	64
<i>Guchetl S. Z., Chelyustnikova T. A., Voloshko A. A.</i> Studying the genetic diversity of VNIIMK sunflower lines using molecular markers.....	66
<i>Dolzhikova M. A., Pavlenko A. A.</i> The use of SSR markers for genetic certification of domestic red currant cultivars (<i>Ribes rubrum</i> L.).....	68
<i>Dunaeva S. E., Efremova O. S., Kamnev A. M., Tikhonova O. A., Orlova S. Yu., Semenova L. G., Gavrilenko T. A.</i> <i>In vitro</i> collection of temperate berry and fruit crops accessions at VIR.....	70

<i>Eremin V. G., Eremin G. V.</i> Prebreeding the gene pool of stone fruit crops in the breeding of clone rootstocks.....	72
<i>Eremina O. V., Sivopliasov V. I., Eremin V. G.</i> Influence of rootstock forms of different ecological and geographical origin on the qualitative characteristics of Alexandria cherry trees.....	74
<i>Ermolaeva L. V., Tikhonova N. G.</i> Results of the study of honeysuckle resistance to aphids in the Northwest of Russia.....	76
<i>Ermolaeva L. V., Khmelinskaya T. V.</i> Resistance of the gene pool of <i>Daucus carota</i> L. to pests and diseases.....	78
<i>Ershova I. V.</i> Biologically active components of Siberian fruits and berries.....	79
<i>Zavarihina E. A., Alpat'eva N. V., Rogozina E. V.</i> Allele dosage of <i>Rpi</i> genes in parental forms detected by the result of DNA markers segregation study in F ₁ potato hybrids.....	81
<i>Zaikina E. A., Kuluev B. R.</i> The role of transcription factor genes in resistance of bread wheat to drought.....	83
<i>Kamnev A. M., Antonova O. Yu.</i> Development of new retrotransposon-based markers for studying of genetic diversity of <i>Rubus</i> L.	85
<i>Kozlov V., Chashinsky A., Rusetsky N., Mikhalkovich I., Semaniuk T., Basko D.</i> Replenishment of the collection of interspecific potato hybrids in the Republic of Belarus.....	87
<i>Kolesova M. A., Lysenko N. S., Tyryshkin L. G.</i> Seedling resistance to fungal diseases in accessions of wild <i>Triticum</i> L. species from the VIR collection.....	89
<i>Kuzemkin I. A., Rozhmina T. A.</i> Comprehensive study of oil flax samples under the conditions of the Central Non-Black Earth Region.....	91
<i>Kulakov Y. V., Domblides E. A.</i> Secondary embryogenesis of carrot (<i>Daucus carota</i> L.) in the culture of isolated microspores <i>in vitro</i>	93
<i>Kuluev A. R., Kuluev B. R., Chemeris A. V.</i> The study of <i>Triticum sinskajae</i> phylogeny through the prism of the chloroplast genome.....	95
<i>Lukina K. L., Kovaleva O. N., Porotnikov I. V.</i> Semi-dwarfing genes identification in VIR barley collection accessions.....	97
<i>Mannapova G. S., Ponomarev S. N., Ponomareva M. L., Sayfutdinova D. D.</i> Research of winter rye and triticale genetic collections for resistance to abiotic stresses.....	99
<i>Mitrofanova O. P., Khakimova A. G., Dementiev A. V.</i> Information resource of the VIR winter bread wheat collection for the implementation of digital technologies and the development of 5Gs.....	100
<i>Mikhailova A. S., Sokolova D. V., Popov V. S., Shvachko N. A.</i> The key betalain coding genes in table beet (<i>Beta vulgaris</i> L.) from the VIR collection.....	102
<i>Moiseeva E. M., Gusev Y. S., Gutorova O. V., Chumakov M. I.</i> Analysis of accessions from the Saratov maize collection for the genes and proteins associated with pollination-free embryo-endospermogenesis.....	104
<i>Musin K. G., Tazetdinov R. A., Gumerova G. R., Baimukhametova E. A., Kuluev B. R.</i> Study the role of the <i>ARGOS-LIKE</i> gene in the regulation of stress tolerance in hairy roots of tobacco.....	106
<i>Naumova L. G., Ganich V. A.</i> Studying the genetic resources of the Don native grape varieties in the collection in the Lower Don.....	108
<i>Nevostrueva E. Yu., Makarenko S. A.</i> Trait-specific collections of garden strawberry in the breeding in the Urals.....	110
<i>Orlovskaya O. A., Vakula S. I., Yatsevich K. K., Khotyleva L. V., Kilchevsky A. V.</i> Grain protein content in wheat genotypes with different <i>NAM-A1</i> and <i>NAM-B1</i> alleles.....	111
<i>Pavlenko A. A., Dolzhikova M. A.</i> The use of microsatellite markers in the mapping of genetic passports of black currants (<i>Ribes nigrum</i> L.) from the VNIISPK collection.....	113
<i>Piskunova T. M., Mutyeva Z. F.</i> Screening of genetic resources of <i>Cucurbita</i> L. from the VIR collection for resistance to downy mildew.....	115
<i>Ponomarev S. N., Ponomareva M. L., Garaeva N. Sh.</i> The role of VIR's gene pool in winter triticale breeding for productivity, winter hardiness and grain quality in the Middle Volga Region.....	117

<i>Ponomareva M. L., Ponomarev S. N., Mannapova G. S., Gilmullina L. F., Sayfutdinova D. D.</i> Genetic resources of winter rye for fundamental and applied breeding purposes.....	119
<i>Porotnikov I. V., Antonova O. Yu., Mitrofanova O. P.</i> Efficiency of SKR gene markers in identification of crossable common wheat forms with rye.....	121
<i>Radchenko E. E., Abdullaev R. A., Akimova D. E., Zajtseva I. Yu.</i> Greenbug resistance in barley landraces from Mongolia.....	123
<i>Ramazanova S. A., Savichenko V. G.</i> Analysis of polymorphism of microsatellite loci of DNA for soybean genotyping by a method of capillary electrophoresis.....	124
<i>Rozanova I. V., Grigoriev Y. N., Efimov V. M., Igoshin A. V., Khlestkina E. K.</i> Search for loci associated with productivity traits in barley.....	125
<i>Rozhmina T. A., Zhuchenko A. A.</i> Formation of flax genetic collection and its use in breeding	126
<i>Romanova O. V.</i> DH-technologies in the genus <i>Allium</i> L.	128
<i>Rybakov D. A., Antonova O. Yu., Cheremisin A. I., Gavrilenko T. A.</i> Nomenclature standards of potato varieties bred at Omsk Agricultural Scientific Center in the VIR collection.....	130
<i>Salikova A. V. (Kushnareva A. V.)</i> . Variability of alkaloid composition in narrow-leaved lupine (<i>Lupinus angustifolius</i> L.) in Leningrad Region conditions.....	132
<i>Tyryshkin L. G.</i> Lability of virulence in phytopathogenic fungi: consequences for practice	133
<i>Chepinoga I. S., Tikhonova A. V.</i> Biological potential of apple varieties immune to scab in the genetic collection of the Krymsk EBS of VIR.....	135
<i>Chumanova E. V., Efremova T. T.</i> Study of isogenic line of Bezostaya 1 cultivar with dominant allele <i>VRN-A1L</i>	137
<i>Sherstobitov V. V.</i> Resistance to clasterosporiosis in common plum cultivars bred at Maikop Experiment Station of VIR.....	140
<i>Elkonin L. A., Gerashchenkov G. A., Borisenko N. V., Kenzhegulov O. A., Sarsenova S. Kh., Panin V. M.</i> Development of new accessions of grain sorghum with improved nutritional value using genome editing.....	142
SECTION 3. APPLIED RESEARCH OF PLANT GENETIC RESOURCES	144
<i>Belov S. N.</i> Improved method for isolation of unpollinated ovules <i>in vitro</i> of cucumber (<i>Cucumis sativus</i> L.).....	145
<i>Butovets E. S., Vasina E. A., Lukyanchuk L. M.</i> Results of the study on the soybean gene pool for breeding purposes.....	146
<i>Domblides E. A., Domblides A. S.</i> The use of biotechnological methods for the breeding of vegetable crops in the FSBSI FSVC.....	148
<i>Ermolaev A. S., Shirokova A. V., Domblides E. A.</i> Differences in the features of pollen and pubescence of leaves as marker traits of plants in gynogenic zucchini lines <i>in vitro</i>	150
<i>Efremova T. T., Chumanova E. V., Zhukova I. M.</i> Cold hardiness of wheat-rye 5R(5A) substituted lines differing in vernalization alleles.....	152
<i>Zayachkovskaya T. V., Stepanov V. A.</i> Production of ms- and mf-lines of radish based on nuclear cytoplasmic male sterility for heterosis breeding.....	154
<i>Zubko O. N., Monakhos S. G.</i> Introgression of black rot (Path. <i>X. campestris</i> pv. <i>campestris</i>) resistance genes into white cabbage (<i>B. oleracea</i> L.).....	156
<i>Kanapin A. A., Bankin M. P., Samsonova A. A., Rozhmina T. A., Samsonova M. G.</i> Genomic regions associated with fusarium wilt resistance in flax.....	157
<i>Kiseleva A. A., Berezhnaya A. A., Leonova I. N., Salina E. A.</i> Genome-wide association analysis to study protein and gluten content in common wheat grain.....	158
<i>Kozar E. V.</i> Peculiarities of European radish embryogenesis in microspore culture <i>in vitro</i>	160
<i>Kornyukhin D. L., Artyemyeva A. M., Shumilina D. V.</i> Study of double haploids of the turnip obtained on the basis of material from the VIR collection.....	162
<i>Lukyanchuk L. M., Butovets E. S., Vasina E. A.</i> The effect of <i>Septoria glycines</i> Hemmi on yield and biochemical parameters in soybean under the conditions of Primorsky Territory.....	163
<i>Mamadova Kh. R., Firsova M. R., Khakulova M. Yu., Khatefov E. B.</i> Breeding evaluation of the response to CMS in corn breeding lines of the Azerbaijan Agricultural Research Institute	165

<i>Mironenko N. V., Khutti A. V., Lashina N. M., Afanasenko O. S.</i> Allelic polymorphism of the targeted site of interaction with the viroid of the <i>StTCP23</i> gene in potato varieties.....	167
<i>Monakhos S. G., Vishnyakova A. V., Sinitsyna A. A.</i> <i>Brassica</i> microspore embryogenesis and embryo germination: genotype specificity and external factors.....	168
<i>Pendinen G. I., Pyukkenen V. P., Mitrofanova O. P.</i> Cytogenetic characteristic of wheat-type forms obtained in progeny of crosses between bread wheat from China and cultivated rye.....	169
<i>Popova A. S., Staruhina A. O., Matveeva S. V., Zaitsev V. G.</i> Relationship of genetic profiles with green and red colour of leaves in lettuce varieties.....	171
<i>Rekoslavskaya N. I., Salyaev R. K., Stolbikov A. S.</i> Genetic engineering methodologies for expanding of plant genetic resources.....	173
<i>Semilet T. V., Kovaleva O. N., Shvachko N. A.</i> Determination of allele combinations of <i>VRN</i> genes in barley of foreign and domestic breeding.....	175
<i>Solovyeva M. V., Rozanova I. V., Shvachko N. A.</i> Identification of breeding-oriented loci of spring bread wheat by genome-wide association studies.....	177
<i>Taipova R. M., Kuluev B. R.</i> Changes in the protein-lipid composition of seeds in mutant forms of <i>Amaranthus cruentus</i> L.	179
<i>Tukuser Y. P.</i> Microclonal propagation of wild type tomato (<i>Solanum pennellii</i> Cor.).....	181
<i>Ulyanov A. V., Karlov A. V., Khatefov E. B.</i> Creation of effective corn haploinductors for hybrid breeding.....	183
<i>Chumakova V. V., Chumakov V. F., Derevyannikova M. V., Mironova T. M.</i> Gene pool of resources of perennial grasses and its use in breeding in the North Caucasus.....	184
<i>Shepelev S. S., Pototskaya I. V., Chursin A. S., Kuzmin O. G., Pozherukova V. E., Aydarov A. N., Esse S. A., Koshkin M. N., Shamanin V. P.</i> Identification of SNP loci of spring bred wheat varieties of the international program KASIB.....	186
VIR's DEPARTMENTS: HISTORY AND MODERNITY	189
<i>Artemyeva A. M.</i> Department of Vegetable and Cucurbit crops: traditions and perspectives... ..	191
<i>Bagmet L. V., Chukhina I. G.</i> Herbarization of VIR collections.....	194
<i>Burenin V. I.</i> It all started in Pushkin Laboratories of VIR.....	195
<i>Vishnyakova M. A.</i> Department of Grain Legume Genetic Resources.....	198
<i>Gavrilenko T. A., Dunaeva S. E., Pendinen G. I.</i> History of VIR's Biotechnology Department, 1983–2022.....	201
<i>Zuev E. V., Mitrofanova O. P., Lyapunova O. A., Chikida N. N.</i> The main aspects of working with the collections of VIR's Wheat Department.....	205
<i>Konarev A. V.</i> The Department of Molecular Biology at Pushkin Laboratories of VIR, 1967–2022.....	209
<i>Kosareva I. A.</i> History of VIR's Department of Plant Physiology.....	211
<i>Kutuzova S. N., Dubovskaya A. G.</i> History and modernity of the Department of Genetic Resources of Oilseeds and Fiber Crops.....	214
<i>Loskutov I. G.</i> Global collections of genetic resources of barley, oats and rye.....	216
<i>Malyshev L. L.</i> Perennial fodder crops in the collection of VIR.....	218
<i>Novikova L. Yu.</i> PGR databases and their analysis at the Department of Automated Information Systems of VIR.....	219
<i>Ozerskaya T. M.</i> Plant Introduction Department.....	221
<i>Radchenko E. E., Anisimova I. N.</i> Genetic studies in Pushkin Laboratories of VIR.....	222
<i>Rogozina E. V.</i> Department of Potato Genetic Resources.....	225
<i>Tikhonova N. G.</i> Fruit crop genetic resources of VIR: collection, conservation and study.....	227
<i>Shvachko N. A., Krylova E. A., Rozanova I. V., Rakhmangulov R. S., Mikhailova A. S., Semilet T. V., Smirnova N. V., Solovieva M. V., Ulyanov A. V., Inozemtseva A. V., Ikhnova V. N., Khlestkina E. K.</i> Genomic and post-genome technologies in the study of accessions from the VIR collection.....	229
Publications dedicated to the history of the Pushkin Laboratories of VIR.....	231
Alphabetical index of authors	232