

Trouskinov E. V., Kiru S. D. PROMINENT POTATO RESEARCHERS AT VIR: THEIR CONTRIBUTION IN POTATO GENE POOL DEVELOPMENT, SYSTEMATICS AND BREEDING. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 5–12.

This is a review of the most significant contributions of VIR's scientists who worked with potato genetic resources and had a great influence on its introduction, taxonomy studies and breeding. A crucial role was performed by the expedition of S. M. Bukasov and S. V. Juzepchuk to Central and South Americas in 1925–1929, organized by N. I. Vavilov. Further research on the introduced varieties and the development of new valuable cultivars on their basis were the outstanding achievements of I. A. Veselovsky, A. J. Kameron and K. Z. Budin. Of paramount importance were the works on potato systematics carried out by S. M. Bukasov and V. S. Lekhnovich. Further significant contribution to the biogeography, breeding and seed production of potato was made by A. G. Zykin, L. E. Gorbatenko and M. A. Vavilova.

Key words: potato, expeditions, introduction, collection, systematics, species, breeding, variety.

Naumova L. G., Ganich V. A. PRESERVING THE GENE POOL OF INDIGENOUS GRAPE VARIETIES IN THE DON RIVER VALLEY. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 13–17.

The article discusses the urgent need to preserve indigenous grape varieties of the Don River area. Collections are an extremely valuable and powerful source of potentially useful genes required by breeders to produce higher yielding varieties with better adaptability to the environment. Ampelographic studies have a long history, but have not lost their relevance up to the present time.

Key words: grapes, ampelographic collection, indigenous varieties.

Pryvalov F. I., Grib S. I., Matys I. S. NATIONAL GENETIC DIVERSITY PROGRAMME AS THE BASIS FOR THE DEVELOPMENT OF THE NATIONAL GENE BANK OF PLANT GENETIC RESOURCES IN THE REPUBLIC OF BELARUS. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 18–27.

The main milestones of plant genetic resources research activities in Belarus are presented in the article. The genetic diversity collected and held by research institutions participating in plant genetic resources research and conservation efforts in Belarus is described. The results of practical utilization of the global crop diversity in breeding practice are shown.

Key words: crop genetic diversity, breeding process, collections.

Sabitov A. S., Chebukin P. A., Zhang J., Burlyaeva M. O. COLLECTING GENETIC BIODIVERSITY OF CROP WILD RELATIVES IN THE RUSSIAN FAR EAST AND NORTH-EAST CHINA (MATERIALS OF FEES/VIR MISSIONS FROM 2001 TO 2013). Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 28–45.

The article summarizes the results of the collecting missions carried out by the Far East Experiment Station (VIR) across the territory of the Russian Far East and the North-East of China from 2001 to 2013. The maps of exploration routes are shown. As a result of explorations, the areas of some species were updated, new plant species were introduced, and unique collections of fruit and berry plants, vegetables and field crops were developed. All in all, 1033 accessions of 74 cultivated and wild plant species were added to the collection of VIR.

Key words: collecting mission, crop wild relatives, *Ribes*, *Lonicera*, *Actinidia*, *Fragaria*, *Vaccinium*, *Rubus*, *Phaseolus*, *Glycine*, *Lathyrus*, *Vicia*, *Vigna*.

Abugalieva S. I., Baibosynova S. M., Kondybaev A. B., Podolskih A. N., Turuspekov Ye. K. GENETIC AND PHENOTYPIC DIVERSITY OF THE ICE COLLECTION IN KAZAKHSTAN. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 46–59.

The collection of *Oryza sativa* L. from the Kazakh Rice Research Institute, Kyzylorda, Kazakhstan, which consisted of 96 accessions, has been analyzed according to 20 indicators of yield, grain quality traits, and allelic status of 26 microsatellite (SSR) loci. Intra-varietal heterogeneity of a number of rice accessions has been revealed. Genetic passports for commercial rice cultivars from Kazakhstan were developed. A

number of promising rice lines have been selected for their high yield, grain quality, earliness, adaptability and other valuable traits.

Key words: rice, genetic diversity, yield, grain quality, SSR markers.

Anisimova A. V., Abdullaev R. A. SCREENING OF BARLEY FROM DAGHESTAN FOR NET AND SPOT BLOTCH RESISTANCE. Proceedings on applied botany, genetics and breeding, Vol. 175. I. 4. 2014. pp. 60–64.

The resistance of 278 barley accessions from Daghestan to the agents of net blotch (*Pyrenophora teres* f. *teres* Drechsl.) and spot blotch (*Cochliobolus sativus* Ito and Kurib.) was analyzed under laboratory conditions. Five accessions were resistant to a mixture of *C. sativus* isolates from the northwestern (St. Petersburg) population, while 17 accessions were classified under the medium resistance category. Seven forms possessed the highest resistance to the northwestern population of *P. teres* f. *teres*, and a lower level of expression was identified in 21 accessions. Fifteen accessions manifested resistance to the Dagestan (Derbent) population of the fungus, and 5 forms were resistant to both populations. The north-western and Dagestan *P. teres* f. *teres* populations differed in virulence and aggressiveness. Three accessions possessed multiple resistance to the agents of net and spot blotches.

Key words: barley, resistance, net blotch, spot blotch.

Anisimova I. N., Gavrilova V. A., Alpatieva N. V., Kuznetsova E. B., Karabitsina Y. I., Rozhkova V. T. SUNFLOWER COLLECTION IN THE RESEARCH ON GENETIC MECHANISMS OF POLLEN FERTILITY RESTORATION. Proceedings on applied botany, genetics and breeding, Vol. 175. I. 4. 2014. pp. 65–74.

The role of the sunflower genetic collection in the studies of genetic mechanisms of cytoplasmic male sterility (CMS) suppression is demonstrated. The restorer lines presented in the collection are characterized by significant genetic diversity. They have been obtained by three different ways: 1) by introducing Rf genes into the genotypes of autofertile lines; 2) by self-pollination of commercial hybrids; 3) as a result of interspecific hybridization. In order to throw light on the diversity of pollen fertility restoration genes, a complex comparative genetic approach have been used. It includes molecular marking of genotypes, hybridological analysis, characterization of RFL-PPR genes' polymorphism, and development of molecular markers for their mapping. The data obtained indicate that RFL-PPR genes are involved in the control of pollen fertility restoration character in sunflower.

Key words: sunflower, *Helianthus annuus*, genetic collection, lines, CMS, pollen fertility restoration, RFL-PPR genes, molecular markers, hybridological analysis.

Garkushka V. G., Frolov A. N., Grushevaya I. V. GENETIC DIVERSITY OF MAIZE AND ITS RESISTANCE TO EUROPEAN CORN BORER. Proceedings on applied botany, genetics and breeding, Vol. 175. I. 4. 2014. pp. 75–81.

With its worldwide leading positions in both yield per hectare and total grain production, maize serves as a crop of multipurpose use. Today, maize breeding efforts are targeted inter alia at the development of hybrids for food purposes, whose cultivation specifically requires high resistance to harmful organisms. Among the latter, European corn borer occupies the central place.

Key words: maize, genetic diversity, European corn borer.

Lebedeva, M. V., Teplyakova S. B. MOLECULAR MARKING OF THE VRN-H2 LOCUS IN BARLEY USING MULTIPLEX PCR. Proceedings on applied botany, genetics and breeding, Vol. 175. I. 4. 2014. pp. 82–86.

The *Vrn-H2* locus plays the key role in determining the heading date for barley and wheat. In the *Vrn-H2* locus of winter barley varieties a cluster of three *ZCCT-H* genes has been identified. The «winter» allele of the locus is considered as dominant, while the «spring» allele of the *Vrn-H2* locus is recessive and manifests physical deletion of all *ZCCT-H* genes. In this study, barley varieties with different growth habits were analyzed using gene-specific multiplex PCR. The PCR enables to identify reliably dominant and recessive alleles of *Vrn-H2*.

Key words: barley, *Vrn-H2*, vernalization, molecular markers, multiplex PCR.

Pomortsev, A. A., Boldyrev, S. V., Lyalina, L. V. THE COMPLEX OF POLYMORPHIC LOCI ENCODING SEED PROTEINS FOR IDENTIFICATION OF BARLEY VARIETIES. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 87–91.

The problems of laboratory-based seed control of barley varieties using electrophoresis of alcohol-soluble seed proteins (hordeins) are discussed. This method is shown to be capable of identifying approximately 80% of modern commercial varieties cultivated in Russia. Hordein spectra can discriminate all cultivars in only two of 12 regions of the country. Therefore, electrophoresis of water-soluble seed proteins is suggested for complete and precise identification of varieties with identical hordein spectra. Electrophoretic spectra of water-soluble proteins are not affected by plant cultivation environments.

Key words: barley, seed storage proteins, laboratory-based seed control of barley varieties.

Radchenko E. E., Kuznetsova T. L., Malinovskaya E. V. DONORS OF EFFECTIVE GENES OF GREENBUG RESISTANCE IN SORGHUM FOR BREEDING IN KRASNODAR REGION.

Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 92–98.

Sorghum lines with high level of greenbug resistance and other important traits are recommended for plant breeding. Limited (1–2) backcrosses are proved to be an efficient method for the development of high yielding and aphid resistant sorghum forms. Greenbug resistance in accessions k-1362, k-924, k-928, k-929, and k-1237 is not linked to any negative plant characters.

Key words: sorghum, greenbug, plant resistance.

Rozhnova N. A., Gerashchenkov G. A. PROTEIN AND BIOCHEMICAL MARKERS AS APPLIED TO INDUCED SYSTEMIC RESISTANCE OF TOBACCO AND POTATO TO PLANT VIRUSES.

Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 99–108.

Immunity-inducing activities of arachidonic acid, alpha-tocopherol acetate and ubiquinone 50 were detected in model plant systems of the Solanaceae family. Ranges of their optimal concentration and effects of their prolonged activity were identified. Protein spectra analysis led to the assumption concerning the presence of alternative signal transduction ways in tobacco and potato plants.

Key words: *Nicotiana tabacum*, *Solanum tuberosum*, arachidonic acid, ubiquinone 50, vitamin E, antiviral resistance, induced proteins, system acquired resistance.

Savelyev, N. I., Savelyeva N. N. UTILIZATION OF THE FRUIT CROP GENETIC COLLECTION IN BREEDING FOR HIGHER ADAPTIVE POTENTIAL AND FRUIT QUALITY. Proceedings on applied botany, genetics and breeding. Vol. 175. I. 4. 2014. pp. 109–114.

Resistance potential of cultivated fruit plants to low temperatures and diseases have been disclosed. On the basis of DNA markers, dominant homozygous genotypes (V_fV_f) of apple have been identified for scab resistance, and initial forms carrying alleles responsible for lower levels of ethylene (Md-ACS1 и Md-ACO1) and expansin (MD-Exp7) synthesis have been selected. Utilizing the genetic collection in breeding practice resulted in releasing new apple, pear, sour cherry and plum cultivars with high adaptive potential, productivity and fruit quality.

Key words: cultivated fruit plants, hybrid seedlings, resistance to low temperatures, scab, fruit quality, DNA markers, donors.