РЕЗЮМЕТА
НА НАУЧНИТЕ ПУБЛИКАЦИИ И ТРУДОВЕ

на гл. ас. д-р Гергана Николова Дешева

представени за участие в конкурс за заемане на академичната длъжност „доцент" по научна специалност „Селекция и семепроизводство на културните растения", ш. 04.01.05, професионално направление 6.1 „Растениевъдство" обявен от Институт по Растителни Генетични Ресурси – гр. Садово, в ДВ, брой 94/25.11.2016 г.

1. **Desheva G., B. Kyosev**. 2015. Genetic diversity assessment of common winter wheat (*Triticum aestivum* L.) genotypes. *Emirates Journal of Food and Agriculture,* 27 (3), 283-290. Impact factor-0.623.

Abstract:
The knowledge about of genetic diversity of common winter wheat (*Triticum aestivum* L.) genotypes is useful for production of more efficient crops adapted to diverse conditions. A set of 32 common winter wheat varieties was used to estimate and then utilize the genetic diversity between common winter wheat genotypes by using cluster analysis and factor analysis and to identify effective factors on genetic improvement. Eight agronomic traits were included in the study. The GCV values were lower than PCV values for all the traits. High genetic advance combined with high heritability showed characters: plant height and spike length. Cluster analysis based on ward's method using Euclidian distance, grouped the cultivars into four clusters. Genotypes in the second group were in the highest rate with respect to number of productive tillers per plant, number of spikelets per spike, number of grains per spike, grain weight per spike and yield per plant. Principal Component analysis was applied to group accessions according to similarity on the basis of eight traits in tree components in the factor plane. The first three components explained 82.63% of total variation in the experiment. Cluster analysis based on the three factors grouped the varieties into four clusters. Genotypes of the first cluster can be used for increase in number of productive tillers per plant in breeding programs. Genotypes of the second cluster can be used for increase in thousand grain weight. Genotypes in the fourth cluster had highest mean with respect to first factor and can be used for increase in number of grain per spike.

Key words: agronomic traits, cluster analysis, common winter wheat, factor analysis, genetic diversity

2. **Desheva G., Z. Uhr, K. Uzundzhalieva, E. Valchinova**. 2013. Status of collection of the genus Aegilops and opportunities for its used in the breeding programs. *Crop wild relative, 9, 34-36*.

Conservation of plant genetic resources (PGR) of cultivated and wild flora is a priority worldwide. It is encapsulated in the Convention on Biodiversity (CBD) which Bulgaria ratified in 1996. The Institute of Plant Genetic Resources in Sadovo is the Coordinator of the National PGR Programme and a member of the European Cooperative Programme for Plant Genetic Resources (ECPGR). On the territory of the Institute is located the National Seed Genebank where 57,684 seed samples are preserved (http://eurisco.ecp–gr.org). The plant species diversity is represented by more than 2670 species of crops and their wild relatives.

Rich ex situ collections are established and maintained with 648 accessions of 30 Aegilops species registered in the National Genebank. The main species in the collection are *Ae. triuncialis* L. (151 accessions), *Ae. cylindrica* Host (89), *Ae. ovata* L. (82) and *Ae. biuncialis* Vis. (70). Foreign material is represented by samples originating from Morocco (59), Azerbaijan (49), Armenia (26), Syria (18), Russia (17) and France (16). There are 79 accessions of unknown origin. Bulgarian material constitutes more than 48% of the samples in the collection. They are represented entirely by local forms and populations collected from different regions of the country. Ten species have been collected: *Ae. triuncialis*, *Ae. biuncialis, Ae. cylindrica, Ae. ovata, Ae. triaristata, Ae. neglecta, Ae. caudata, Ae.comosa, Ae. speltoides* and *Ae. tauschii*. Samples of *Ae. triuncialis* account for more than 30% of the collection, with *Ae. biuncialis, Ae. cylindrica* and *Ae. ovata* accounting for more than 18%, 16% and 13% respectively. The other species are represented by a smaller number of samples.

3. **Desheva G**. 2014. Morphological and agronomical characterization of common wheat landraces (*Triticum aestivum* L.) from the National wheat collection of Bulgaria. *Emirates Journal of Food and Agriculture*, 26(2), 164-169.

Abstract:
The knowledge about the extent of variability, the distribution and the relationship between descriptors within local germplasm collection are a high value for the improvement and the efficient genetic diversity maintenance and utilization of plant species. The objective of this study was to assess the morphological and agronomic characteristics of original germplasm of common wheat (*Triticum aestivum* L.), maintained in *ex situ* collection in IPGR-Sadovo. Fifty-five accessions of *Triticum aestivum* L. stored for more than 10 years in the National gene bank of IPGR-Sadovo were planted under field condition and their agro-morphological characters such as plant shape (at tillering), leaf-flag attitude (at the beginning of heading), spike attitude (at full ripeness), spike awnedness, spike color and spike shape, length of vegetative growth phase, plant height, length of spike, spikelets per spike and 1000 grain mass were recorded. The variation analysis showed that the most relative variable character during the period of study is the length of spike (C.V. %=15.09%), following to 1000 grain mass (C.V. %=8.04%) and spikelets per spike (C.V. %=7.66%). PC-analysis was applied to group accessions according to similarity on the basis of five traits (length of vegetative growth phase, plant height, spike length, spikelets per spike and 1000 seed weight) in two components in the factor plane. The analysis shows that the first component explains 30.349% of the total variation and the second -26.001%. Two factors explain total 56.350% of the variation in the experience. A database with assessment information of regenerated accessions was created. The results of this study will support efforts of conservation and utilization of landraces in winter bread wheat breeding programs.

Key words: accessions, *ex situ* conservation, collection, genetic resources, *Triticum aestivum* L.

4. **Desheva G., Z. Uhr, E. Valchinova, K. Uzundzhalieva**. 2014. Conservation and utilization of wild species of genus Triticum from The National Genebank of Bulgaria. *Trakia Journal of Sciences*, 1, 94-97.

Abstract:

In recent years, increasingly appreciates the importance of The Plant Genetic Resources for development and success of the plant breeding, agriculture and ecology. Collection of wild wheat species of genus Triticum, which supports, study and stored in the IPGR-Sadovo is represented by 45 plant species. It contains 783 accessions of which 160 samples are *Tr. sphaerococcum,* 124 *Tr. turgidum*, 84 *Tr. monococcum*, 73 *Tr. spelta*, 60 *Tr. boeoticum*, 59 *Tr. dicoccon*, 30 *Tr. polonicum,* 22 *Tr. dicoccoides*, 21 *Tr. timopheevi*, 13 *Tr. carthilicum*, 12 *Tr. macha*, 11 *Tr. compactum* and 81 from other species. The maintained germplasm diversity from wild wheat species is determined by their regions of origin. The largest part of accessions are from Russia (97 pieces), Bulgaria (45 pieces), Germany (38 pieces), Spain (16 pieces), USA (13 pieces), India (12 pieces), etc. Particular attentions should be paid to wheat originating from Bulgaria. These are the accessions that form the category of "original" germplasm, whose identity must be controlled in the process of storage and reproduction. Available gene pool is the basis for successful plant breeding improvement working and maintains original germplasm for research.

Key words: collection, wild wheat species, genus Triticum, plant genetic resources.

5. **Desheva G., E. Valchinova, B. Kyosev, S. Stoyanova**. 2014. Grain physical characteristics of and bread-making quality of alternative wheat cereals towards common and durum wheat. *Emirates Journal of Food and Agriculture*, 26(5), 418-424.

Abstract:
The present study is aimed at explaining the physical characteristics and bread-making quality of Khorasan wheat (BGR 40365, BGR 12389), einkorn (B2E0417) and emmer (B2000528). Here we will compare the aforementioned grains to both, common wheat (cv. Enola and Sadovo 1) and durum wheat (cv. Progres and Denitza). The physico-chemical characteristics (i.e thousand kernel weight, gluten content and Pelshenke value), are known to differ significantly among the wheat species, however, few studies have examined these characteristics in ancient grains. The highest thousand kernel weight and test weight were observed in BGR 40365. The highest wet gluten content was found in BGR 12389 (34.02%). One variety of einkorn (B2E0417) was determined to be 'gluten free'. Emmer (B2000528) was characterized by high content of wet gluten (30.13%). The best balance between gluten quantity and quality was observed in two varieties of Khorasan wheat (BGR12389, BGR 40365). PC-analysis was applied to group varieties according to their similarity on the basis of ten traits. Three sub-groups could be identified where the first one composed by the hexaploid wheat cultivar Sadovo 1 and cultivar Enola. The second sub-group included cultivar Progres and BGR 40365, while cultivar Denitza, BGR 12389 and B2000528 constituted the heterogeneous third sub-group.

Key words: bread-making quality, einkorn, emmer, khorasan, physical characteristics of grain

6. **Chipilski R., G. Desheva, B. Kyosev**. 2014. Evaluation of tolerance to osmotic stress of winter bread wheat genotypes using indirect physiological method. *Emirates Journal of Food and Agriculture*, 26 (9):800-806.

Abstract:
Fifteen winter bread wheat cultivars from Romania and Serbia were evaluated with regard to their tolerance to osmotic stress. Evaluation was made by applying the indirect physiological

method, recognizing the growth depression seedling, cultivated in solution with increased osmotic pressure (Atm). Water deficit in most of the genotypes suppresses to a great extent the growth of roots compared to that of the shoot. The average coefficient of root growth depression was 55.77% during the moderate osmotic stress trial and 55.83 % during the strong osmotic stress trial, while with shoots the percentage was 35.76 % and 50.12 %, respectively. The average root length / shoot length ratio (R/Sh ratio) for all genotypes in the control was 1.70; in the 0.5 M and 1 M sample solution sucrose it was 1.14 and 1.55, respectively. In genotypes most tolerant to osmotic stress as Renesansa, Dragana, Izvor and Faur the root/ shoot length ratio is decreased in the highest degree. It was established there is negative regression dependence between the growth of the root/shoot and the solution with increase of osmotic pressure. The equations showed the strong limitation role of osmotic pressure for the growth of the seedling. The results of this study showed that the varieties Renesansa, Dragana, Izvor and Faur had the best ability of osmotic regulation.

Key words: depression coefficient, drought tolerance, osmotic stress, winter bread wheat

7. **Desheva G., T. Cholakov.** 2014. Variability, heritability and genetic progress for some yield components in common winter wheat genotypes (*Triticum aestivum* L.). *Genetics and Plant Physiology*, Special Issue (Part 2), 4(3–4): 191–200.

Summary:
Sixteen common winter wheat genotypes grown in IPGR-Sadovo, Bulgaria during 2011-2013 were evaluated for variability, heritability and genetic progress in a randomized block design. Significant genotypic differences were observed for all traits studied indicating considerable variations among genotypes for each character. The phenotypic coefficient of variation (PCV) was higher than the genotypic coefficient of variation (GCV), which indicates a slight effect of environment on the expression of the characters studied. High PCV and moderate GCV were observed in traits spike length (PCV=20.40%, GCV=19.55%), number of grain per spike (PCV=23.65%, GCV=19.42%), grain weight per spike (PCV=21.60%, GCV=15.54%) and grain yield per plant (PCV=28.24%, GCV=18.12%). Heritability revealed that characters like plant height (95.26%) exhibited the highest heritability followed by spike length (91.78%) and number of grain per spike (67.40%). Genetic progress revealed that it was high for spike length, number of grain per spike, plant height, grain weight per spike and grain yield per plant, whereas low genetic progress was observed for number of productive tillers per plant and number of spikelets per spike. Characteristics like plant height, spike length and number of grain per spike showed high heritability coupled with high genetic progress. Therefore, these characters should be given top priority during selection breeding in wheat. The cluster analysis based on Euclidean dissimilarity using the Between-groups linkage method categorized the germplasm into three clusters. Genotypes 81BM039, 7450, A1BM0309, 81BM052 and 81BM003 are suitable for breeding programs aimed at improving yield in hybridization programs to develop high yielding wheat varieties.

Key words: Cluster analysis; genotypic coefficient of variation; genetic progress; heritability; phenotypic coefficient of variation; variability, wheat.

8. **Chipilski R., B. Kyosev, G. Desheva.** 2014. Evaluation of tolerance to osmotic stress of emmer genotypes (*Triticum dicoccon* Schrank) using indirect physiological method. *Genetics and Plant Physiology*, Special Issue (Part 2), 4(3–4): 182–190.

Summary:
Thirty eight emmer genotypes (*Triticum dicoccon* Schrank) were evaluated with regard to their tolerance to osmotic stress. Evaluation was made by applying the indirect physiological method, recognizing the growth depression in seedlings cultivated in solution with increased osmotic pressure (atm). The osmotic stress induced by adding 0.5 M and 1 M solution of sucrose after germination, inhibited seedling growth in all genotypes studied. Positive and significant at 0.05 and 0.01 level correlations between the two osmotic concentrations in root (r=0.386) and shoot (r=0.757) were observed. On the basis of the obtained common average values, a negative regression dependence between the growth of root/shoot and the solution concentration with increasing osmotic pressure was established. The most tolerant genotypes to osmotic stress were characterized by a low depression of root/shoot growth. The accessions BGR32748, BGR17310, BGR31904, BGR 22611 and BGR32746 demonstrated the best ability of osmotic regulation.

Key words: Depression coefficient; drought tolerance; osmotic stress; emmer.

9. **Kyosev B., G. Desheva**. 2015. Study on variability, heritability, genetic advance and associations among characters in emmer wheat genotypes (*Triticum dicoccon* Schrank). *Journal of Bio Science and Biotechnology, SE/ONLINE*, 221-228.

Abstract:
Thirty eight emmer wheat genotypes grown in IPGR-Sadovo, Bulgaria during 2012-2014 were evaluated to estimates of variability, heritability, genetic advance and associations among characters in the randomized block design in three replications. Eight agronomic traits were included in the study. The phenotypic coefficient of variation (PCV) were higher than genotypic coefficient of variation (GCV) for all the traits. High PCV and GCV were observed in trait grain weight per spike (PCV=30.36%, GCV=24.93%). High genetic advance combined with high heritability showed characters: spike length, grain weight per spike and thousand grain weight. The highly significant and positive phenotypic correlation was found between grain yield per plant and following components: plant height, grain weight per spike, number of grains per spike and thousand grain weight. The grain weight per spike and plant height had strongest direct effect on grain yield per plant. The number of grains per spike via grain weight per spike and thousand grains weight via grain weight per spike had the highest positive indirect effect on the grain yield per plant.

Key words: GCV, genetic progress, heritability, PCV, path analysis, *Triticum dicoccon*

10. **Desheva G.** 2016. Correlation and path-coefficient analysis of quantitative characters in winter bread wheat accessions. *Trakia Journal of Sciences,* 1, 24-29.

Abstract:
The present study was carried out to investigate the correlation and path coefficient analysis in 35 genotypes of winter bread wheat varieties, which were collected from different countries. Data were recorded for eight quantitative characters- number of productive tillers per plant, plant height, spike length, number of spikelets per spike, number of grains per spike, grain weight per spike, thousand grain weight and grain yield per plant. The highly significant and positive genotypic and phenotypic correlation was found between grain yield per plant and following components: number of productive tillers per plant (rg=0.817, rph=0.843), number of grains per spike (rg=0.448, rph=0.393), grain weight per spike

(rg=0.765, rph=0.545), thousand grain weight (rg=0.594, rph=0.402). The number of spikelets per spike correlated positively and significantly with number of grains per spike (rg=0.886, rph=0.487) and grain weight per spike (rg=0.637, rph=0.370). Number of grains per spike had positive and significant phenotypic and genotypic correlations with grain weight per spike (rg=0.748, rph=0.826). Grain weight per spike positively correlated with thousand grains weight (rg=0.622, rph=0.688). The grain weight per spike and number of productive tillers per plant had strongest direct effect on grain yield per plant. The number of grains per spike via grain weight per spike and thousand grains weight via grain weight per spike had the highest positive indirect effect on the grain yield per plant. These relations can be used as selection criteria in breeding study to improve the high yielding cultivars for that region.

Key words: genotypic correlations, path coefficient analysis, phenotypic correlations, winter bread wheat, yield components

11. **Desheva G., M. Sabeva, M. Zacharieva**. 2016. Variation of agronomic traits among introduced winter bread wheat cultivars. *Trakia Journal of Sciences,* 2, 171-175.

Abstract:
Five Romanian and eight Serbian cultivars were evaluated in the conditions of South Bulgaria for nine agronomic traits. Hierarchical Cluster Analysis (HCA) permitted to group the cultivars in two main clusters divided each one in three sub-clusters. The most distant, according to the complex of studied characters, were the cultivars Gruia and Rusiya and the closest ones Gruia and Litera, Faur and Boema, Evropa 90 and Gora. A Principal Component Analysis (PCA) allowed identifying cultivars of potential interest as parental lines for further use in winter bread wheat breeding, as Boema (short stem, high number of grains per spike), Gora (high grain lysine content) and Rusiya (high number of spikelets per spike and thousand kernel weight).

Key words: cluster analysis, principal component analysis (PCA), winter bread wheat

12. **Desheva G.** 2016. Effects of genotype, environment and their interaction on quality characteristics of winter bread wheat. *Journal of Basic and Applied Research*, 2(3), 363-372.

Abstract:
Grain quality is a complex character that depends on a number of traits, and the individual contribution of each trait varies depending on specific reaction to environmental conditions. The objective of this study was to assess the effects of genotype, environmental, and genotype x environmental interaction on quality characteristic of 16 wheat genotypes as well as to analyse the relationships between quality traits. The results of two-way analysis of variance showed that the effect of genotype, environment and genotype x environment interaction were significant ($p \leq 0.001$) for the investigated physical characteristics of grain. The strongest individual influence for thousand kernel weight, test weight and vitreousness had genotype. The interaction genotype x environment had stronger influence on the variance for the crude protein (44.98%) and the lysine (34.93%) than genotype and environment effects. Sources of variation genotype and genotype x environment interaction (year) had almost the equal influence on the variance of wet gluten content and bread making strength index. Genotype demonstrated the strongest influence on the sedimentation value and dry gluten content. The genotype x environment interaction influenced in the largest rate on the variance of gluten

weakness. Protein content showed significant positive correlation with wet gluten content (0.676), gluten weakness (0.646) and dry gluten content. Vitreousness correlated positively with sedimentation value (0.541) while the test weight significantly correlated with dry gluten content. The results of this study can be used as selection criteria to increase grain quality in bread wheat in the region.

Keywords: grain quality, genotype x environmental interaction, winter bread wheat

13. **Desheva G., B. Kyosev, S. Stoyanova, M. Sabeva**. 2016. Grain quality of emmer germplasm (*Triticum dicoccon* Schrank*)* from the National collection of Bulgaria. *Phytologia Balcanica*, 22(2), 223-232.

Abstract:
The present work was carried out to study grain quality of 39 accessions of emmer wheat from the collection of the National Gene Bank of Bulgaria. Two accessions (BGR32746 and BGR19034) possessed the highest wet and dry gluten content and sedimentation value and medium gluten quality. A statistically significant positive correlation was obtained between crude protein content and lysine content, crude ash, wet gluten content and dry gluten content. Hierarchical cluster analysis grouped the accessions into four clusters. The information presented in this study is intended both for breeders who could involve emmer landraces in the breeding programs and for direct practical use by farmers and small bakeries.

Key words: bread-making quality, cluster analysis, emmer, physical characteristics, statistical correlations

14. **Petrova S., G. Desheva**. 2016. Path-coefficient and correlation analysis of quantitative characters in chickpea (Cicer arietinum L.). *Phytologia Balcanica*, 22(2), 243-246.

Abstract:
A correlation and path-coefficient analyses are conducted for seed yield and yield components in 96 genotypes of Chickpea of different origin. Data are recorded for nine quantitative characters: plant height, first pod height, number of branches on main stem, number of pods per plant, number of seeds per plant, number of seeds per pod, weight of seeds per plant, 100-seed weight, and seed yield from 1 m2 area. The relations between these characters can be used as selection criteria in a breeding study aimed at improving the high-yielding cultivars for that region.

Key words: chickpea, correlations coefficient, direct and indirect effects, yield components

15. **Desheva G., K. Uzundzhalieva, S. Stoyanova**. 2016. Ex situ and in vivo conservation and utilization of crop wild relatives in Bulgarian national genebank. *Phytologia Balcanica*, 22 (2), 233-241.

Abstract:
The protection of the crop wild relatives (CWRs) is prioritized goal in the world scale. The need of their effective conservation as a tool to reduce loss of biodiversity is underscored by the CBD, the ITPGRFA and the Global strategy for conservation of plant genetic resources. Bulgaria is one of the countries in the world possessing large distribution of crop wild

relatives – more than 5000 plant species appeared as crop wild relatives. In the IPGR, Sadovo is situated the National genebank where are preserved more than 59187 accessions. In long term conservation, under the temperature of –18 °C, are preserved 18621 CWRs accessions from 26 plant families, 88 genera and 176 species. CWRs are also preserved in vivo in the Botanical garden of IPGR – Sadovo.

Key words: conservation, crop wild relatives, *ex situ, in situ, in vivo*

16. **Uzundzhalieva, K., G. Desheva, R. Ruseva**. 2016. Conservation and manageent of plant genetic resources in Bulgaria. *Phytologia Balcanica*, 22(2), 179-185.

Abstract:
The preservation of plant biodiversity of Bulgarian flora is the main priority in the scientific activities of IPGR – Sadovo that is a part of the National programme in Plant Genetic resources through realization of the "Conservation, Management and Use of PGR in Bulgaria" Project. The main goal is the conservation of the national plant biodiversity. Modern agriculture is based on a limited range of varieties and a few species. Generations before us have used countless local forms with large genetic variation, even within one country and region. The conservation and use of old plant material provides researchers, now and in the future, with valuable germplasm resistant to biotic and abiotic factors, many of which are stored only in the gene bank of IPGR – Sadovo.

Key words: *ex situ, in situ, in vitro*, genetic, plant, resources, storage

17. **Desheva G., B. Kyosev**. 2016. Evaluation of genetic diversity of einkorn genotypes maintained in the National collection of Bulgaria by multivariate analysis. *SCIREA Journal of Agriculture*, 1 (1), 1-15.

Abstract:
The knowledge about of genetic diversity of einkorn wheat (*Triticum monococcum* L.) genotypes is a key to reliable and sustainable production of the food crops adapted to diverse conditions. Twenty two einkorn accessions from the National genebank of Bulgaria were carried out in the experimental field of IPGR-Sadovo, Bulgaria during 2013-2015 growing seasons. Twelve agronomical traits were included in the study. Significant genotypic differences were observed for all studied traits indicating considerable variations among genotypes for each character. Grain yield per plant correlated positively with thousand kernel weight and grain weight per spike. The results from stepwise regression analysis showed that grain weight per spike and number of productive tillers per plant had justified approximately 72% of grain yield variations. Principal Component analysis was applied to group accessions according to similarity on the basis of twelve traits in five components in the factor plane. The first five components explained 82.32% of total variation in the experiment. Cluster analysis based on the five factors grouped the genotypes into four groups. Genotypes in the fourth cluster had the highest mean with respect to first factor. Members of this group can use for increase in number of grain per spike, thousand grain weight and grain yield per plant in breeding programs.

Key words: einkorn, genetic diversity, correlation, stepwise regression, PC-analysis

18. **Desheva G. 2016.** The longevity of crop seeds stored under long-term condition in the National Genebank of Bulgaria. *Agriculture (Poľnohospodárstvo)*, 62 (3), 90-100.

Abstract:
Seed accessions from 7 plant families and 28 species stored for above 20 years in the National gene bank of Bulgaria were evaluated. All seed accessions were maintained as base collection under long-term storage conditions with low moisture contents (5±2%) in hermetically closed containers at –18°C. On the basis of experimental data, the seed stor-age characters σ (standard deviation of seed death in storage), P50% (the time for viability to fall to 50%) and P10% (the time for viability reduction of 10%) were determined allowing the prediction of seed storage life and the regeneration needs. The results showed significant differences in loss of seed viability among species and within the species. After 20–24 years of storage, eleven crops showed minimal viability decline under 5% as compared to the initial viability (oats, barley, maize, bread wheat, durum wheat, smooth brome grass, faba bean, chickpea, sunflower, cucumber and pepper). For the same storage time, another group of crops (sorghum, triticale, orchard grass, tall fescue, common vetch, grass pea, lentil, common bean, rapeseed, tobacco, flax, cabbage and tomatoes) presented 5–10% reduction of seed viability. More significant changes in seed viability – above 10% – were detected for peanuts, lettuce, soybean and rye. The σ values varied from 20.41 years (Arachis hypogaea L.) to 500 years (for Avena sativa L. and Triticum aestivum L). There was wide variation across species, both in time taken for the viability to fall to 50% and in time taken for the seed viability reduction of 10%. The study illustrates the positive effect of both seed storability early monitoring and prediction of regeneration needs as a tool for limiting undesired losses.

Key words: gene bank, long-term storage, seed germination, seed longevity, seed viability

19. **Дешева Г., С. Стоянова**. 2012. Сорбционно сушене на семена от пшеница, граници на влагата и съхранимост. *Аграрни науки*, година IV, брой 10, стр. 67-70.

Резюме:
Извършено е сорбционно сушене на семена от три сорта обикновена пшеница (Садово 1, Садово 772 и Катя) и три сорта твърда пшеница (Прогрес, Възход и Белослава). Използван е показателят водна активност (a_w) за илюстриране на процеса сушене при двата вида пшеница. Определена е равновесната влажност в семената при различни параметри на сорбционното сушене. Установени са обхватите на водна активност (a_w) за постигане на максимална съхранимост (s) при условията на дългосрочно съхранение в генбанка. Най-добра съхранимост се постига при a_w=0,297 за обикновената пшеница и при a_w=0,197 за твърдата пшеница. Препоръчват се граници за влагата в семената съответно 6,35-6,05% за обикновена пшеница и 6,09-5,82% за твърда пшеница. При тези нива на сушене на семената се постига по-добро съхранение в генбанка и се елиминира отрицателното влияние от замръзване на свободната вода при -18^{o}C.

Ключови думи: пшеница, сорбционно сушене, водна активност, съхранимост.

20. **Качакова С., Г. Дешева**. 2013. Сравнителна оценка по добив на сомаклонални линии обикновена зимна пшеница. *Растениевъдни науки*, 50, 9-11.

Abstract:
The studies were conducted in the experimental field of Institute of Plant Genetic Resources "K. Malkov", Sadovo during the period 2009-2011. Fourteen breeding lines were investigated

using block design with 4 replications and 12 m^2 plot size. The aim of the investigation was to estimate somaklonal lines by yield comparing them with standard variety "Sadovo 1". In our study the environment showed the greatest effect on the variability of the trait (50.87%). As a result of Single Factor Analysis of Variance was established that in the 11 breeding lines differences in yields are very well secured and statistically proven in GD 0.1%. The relatively highest yields during the study were obtained from the lines: №14, №8, №863, №19 and cr.94.1.1.

Key words: somaklonal lines, common winter wheat, yield, sources of variation

21. **Дешева Г., С. Качакова**. 2013. Корелационни зависимости между основните структурни елементи на добива при сортове обикновена пшеница. *Растениевъдни науки*, 50, 5-8.

Abstract:
The studies were conducted in the experimental field of Institute of Plant Genetic Resources "K. Malkov", Sadovo during the period 2006-2009. In the investigation were included sixteen cultivars of common winter wheat. The aim of the study was to found correlation between the main structural elements of yield in common winter wheat varieties on the basis of statistical and mathematical processing of the experimental data. It was established that in the period of studies the traits: spike length, seeds per spike and grain mass/plant was the most relative variability. PC-analysis was applied to group accessions according to similarity on the basis of nine traits in two components in the factor plane.

Key words: common winter wheat, correlation coefficients, structural elements of yield, PC-analysis

22. **Дешева Г., С. Стоянова, Н. Нейков**. 2013. Националната колекция от род Triticum – актуално състояние. *Растениевъдни науки*, 50, 3-7.

Abstract:
The National collection of genus *Triticum* in the National genebank (IPGR, Sadovo) is offering opportunities for multilateral use. That is based on existing genetic diversity: local population, breeding materials and wild species originating from the country as well of all over the world. Primitive wheat knows also as "ancient" wheat (einkorn, emmer and spelta) today are the base product of organic agriculture because of increased interest in seeking for non-conventional foods and crops with low inputs. The aim of present study is to present the actual information about the status of *Triticum* collection maintained in the National genebank of IPGR Sadovo for further utilization by breeders and farmers.

Key words: genus *Triticum*, accession, collection, genetic resources, ancient wheat

23. **Дешева Г., С. Стоянова, К. Колев**. 2013. Анализ на образци от обикновена пшеница (*Triticum aestivum* L.) оценени по морфологични и стопански признаци за селекционни цели. *Аграрни науки*, IV, 12, pp 17-24.

Резюме:
Изследването е проведено през периода 2008-2010 г. в опитното поле на ИРГР - гр. Садово. Проучени са 98 образци от *Tr.aestivum* L., съхранявани повече от 20 години в

Националната генбанка на ИРГР - гр. Садово. Образците са оценени по основни морфологични и агротехнически показатели съгласно с унифицирани международни дескрипторни листове. Приложен е корелационен и множествен линеен регресионен анализ за установяване на статистически доказани взаимозависимости между основни структурни елементи на добива. Принципен компонентен анализ (PC) е използван за групиране на образците по сходство въз основа на пет признака при два компонента във факторната равнина за установяване на корелационните връзки между признаците, както и разпределението на генотипите по първите два главни компонента. Създадена е база данни за характеристикова информация на репродуцираните образци.

Ключови думи: *Tr. aestivum* L., образец, колекция, ex situ съхранение, генетични ресурси.

24. **Дешева Г., П. Чавдаров, Б. Кьосев, Евгени Димитров**. 2015. Проучване на генотипове обикновена зимна пшеница по продуктивност и устойчивост към причинителят на фузариоза по класа (*Fusarium culmorum). Аграрни науки,* 7 (17), 3-24.

Резюме:
Изследването е проведено през периода 2009-2012 г. в опитното поле на ИРГР "К. Малков" в гр. Садово. Проучени са продуктивните възможности на 20 генотипа обикновена зимна пшеница (4 сорта и 16 линии) и е установена устойчивостта им към причинителя на фузариоза по класа – *Fusarium culmorum*. Опитът е заложен по блоков метод с рандомизирано разпределение на вариантите в 4 повторения и големина на работната парцелка от 10 m2. Средно за тригодишния период на проучване относително най-високи добиви са получени от линиите 73-31-5 и 660, превъзхождащи стандарта Садово 1 съответно с 9,04 и 8,91%. Доказано по-високи добиви от стандарта са получени и от сортовете *Фермер, Панацея* и *Победа*. Най-ниска продуктивност са показали линиите 135-56-1, 265-12, 27-43-11a, 471-1, 471-2, 491-12, 470-9 и 521-4. В проведеното от нас изследване средата демонстрира най-голяма сила на влияние върху вариабилността на признака добив (72,29%). Имунни сортове и линии към причинителя на фузариоза по класа (*Fusarium culmorum*) при изследваните генотипи пшеница не са отчетени. В групата на чувствителните образци с нападение от 25,01 до 50% заразени семена попадат 17 образеца. Три от проучваните образци (470-9, 372-5 и 347-3) попадат в групата на силно чувствителните с над 50% заразени семена.

Ключови думи: обикновена пшеница, добив, източници на вариране, фузариоза по класа, Fusarium culmorum.

25. **Дешева Г., П. Чавдаров**. 2015. Сравнително проучване на перспективни линии обикновена зимна пшеница. Списание за наука *Новознание*, 4 (4), 47-53.

Резюме:
Изследването е проведено през периода 2009-2012 г. в опитното поле на ИРГР "К. Малков" гр. Садово. Проучени са продуктивните възможности на 18 линии обикновена зимна пшеница и е установена устойчивостта им към причинителя на фузариоза по класа - Fusarium culmorum.Установено е, че с най-къс вегетационен период е BGR 824, с най-ниско стъбло са: 284-1-1-2, 521-10, 557-3-1, с най-дълг клас е 97BM0080, с най-голям брой класчета в клас са: BGR 1115, BGR823, с най-голяма маса на 1000 семена BGR36339, BGR 36397, BGR 36398, а най-високо добивни са: BGR 36398, BGR36339,

284-11-1-2. Тези линии определено представляват интерес за селекцията и могат да бъдат включени в селекционни програми. Имунни линии към причинителя на фузариоза по класа (Fusarium culmorum) при изследваните генотипове пшеницата не са отчетени.

Ключови думи: обикновена зимна пшеница, линии, структурни елементи на добива, Fusarium culmorum

26. **Качакова С., Г. Дешева**. 2014. Корелационни зависимости между основни структурните елементи на добива при сомаклонални линии обикновена зимна пшеница. Сборник на докладите от X юбилейна национална научно-техническа конференция с международно участие „Екология и здраве", 5 юни, 2014, гр. Пловдив, 177-180.

Abstract:
The study was conducted in 2009-2012 in the experimental field of IPGR "Konstantin Malkov"-Sadovo. The analysis included 18 common winter wheat lines obtained by biotechnological methods. The aim of the study was to found correlations between the main quantitative characters that have direct relevance to productivity. Data were processed mathematically by correlation and Path- analysis. Positive correlation it was found between the grain weight per spike and following components: total tillers per plant (r = 0.62) and number of productive tillers per plant (r = 0.64). The character spike length correlated positively with number of spikelets per spike (r = 0.47). The results in the investigation indicated that direct influence on the grain weight per spike hade the characters: total tillers per plant and plant height. The total tillers per plant had direct positive effect (0.613) and the plant height direct negative effect (-0.502) on the character grain weight per spike.

Key words: common winter wheat, correlations, phat analysis, somaclonal lines

27. **Дешева Г., Е. Вълчинова, К. Узунджалиева**. 2016. *Ex situ* съхранение на видове от семейство *Poaceae* в Националната колекция при ИРГР-Садово. Младежки форуми „Наука, технологии, иновации, бизнес - 2016", 14 - 15 Април 2016 г, Пловдив, 90-95.

Резюме:
Запазването на разнообразието от културни растителни видове и техните диви родственици от сем. Poaeceae чрез методите на ex situ съхранение в Националната генбанка и ботаническа градина при ИРГР-Садово е един от основните приоритети на Програмата по РГР в рамките на ECPGR и в координираното направление за опазване на биоразнообразието на национално ниво. В базовата колекция на Националната генбанка се съхраняват 28 022 образци от 25 рода и 164 растителни видове. В ботаническата градина се поддържат 43 растителни вида, от които 4 редки, 2 застрашени, 1 български ендемит и 1 балкански ендемит. Колекционираните образци представляват разнообразен материал от зародишна плазма, която предоставя възможности за многостранно използване. Представени са данни и модели за дългосрочно съхранение в генбанката чрез семена. Не са установени съществени промени в жизнеността на семената, които да водят до загуба на образци, при дългосрочното съхранение на 33 вида. Това доказва високата надеждност на възприетата технология и на модела за контрол в Националната генбанка.
Ключови думи: Poaceae, *ex situ, in vivo*, съхранение, генбанка, ботаническа градина.

28. **Дешева Г., П. Чавдаров.** 2016. Реакция на сортове обикновена хлебна пшеница към причинителя на фузариоза по класа (Fusarium culmorum). XI Национална научно-техническа конференция с международно участие „ЕКОЛОГИЯ И ЗДРАВЕ 2016“, 9-10 юни, 2016, Пловдив, 69-74.

Abstract:
The Fusarium head blight (Fusarium culmorum) is very damaging disease which in suitable meteorological condition can to produce near 100% loses. The disease is caused from complex of fungus from genera Fusarium, as the most widespread are the species F.graminearum and F.culmorum. During the period 2014-2015 in the Institute of Plant Genetic Resources-Sadovo was estimated the reaction of 50 foreign winter bread wheat cultivars to The Fusarium Head Blight agent (Fusarium culmorum). Immune varieties were not recorded. In the group of the mean sensitive accessions were Ardica (Spain), Estrella (Spain), Bakfis (Chech Republic),Turnia (Poland), Litera (Romania) и Delabrad (Romania) varieties. It was determined that Mahissa-1 and Dimas varieties from Spain and Muza from Poland were resistant to Fusarium culmorum. These genotypes are suitable to use in the breeding programs as sources of genes for resistant to the Fusarium head blight.

Key words: common winter wheat, Fusarium culmorum, resistant, varieties

29. **Дешева Г., Б. Кьосев**. 2016. Морфологична и стопанска оценка на образци еднозърнест лимец (Triticum monococum L.). XI Национална научно-техническа конференция с международно участие „ЕКОЛОГИЯ И ЗДРАВЕ 2016“, 9-10 юни, 2016, Пловдив, 75-81.

Abstract:
The study was carried out in the experimental field of IPGR-Sadovo during the period 2013-2015. Twenty two accessions of *Triticum monococcum* L. stored in the National genebank of IPGR-Sadovo were investigated. Samples were evaluated on morphological and agronomic traits according to international descriptor list. It was determined that BGR 19061, BGR 19063 and BGR 30022 had the shortest stem. The highest total tillers had BGR 19063, while BGR 11001 are characterized with the highest productive tillers. Three accessions combined the longest and productive spike (BGR 19065, BGR 30035 and BGR 28720). BGR 11001 and Bulgarian landraces B2E0417 possessed the highest grain yield from plant. The largest thousand grain mass had BGR 19063, BGR 30030, BGR 19061 and BGR 28717. A cluster analysis was applied for grouping the accessions by genetic similarity based on studied 11 agronomic characters. Genetically most similar by complex of investigated characters were BGR28720 with BGR30036, BGR 28717 with BGR 30030, BGR 30012 with BGR 19055, BGR 19078 with B3E0025 and BGR 12386 with BGR 30028. The most genetically distant were BGR 28720 и BGR 11001. The results of this study allow increasing the opportunities for using of einkorn wheat collection in different directions associated with breeding improve activities of common wheat, direct introduce into the production and international exchange.

Key words: einkorn, morphological characters, agronomic characters, cluster analysis