

РЕЗЮМЕТА
на научните трудове на гл. ас. д-р Мария Асенова Герджикова
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Герджикова, М. 2015. Влияние на различни предшественици и азотни торови норми върху структурните елементи на добива на обикновената пшеница (*Triticum aestivum* L.). Science & Technologies, V (6): 162 – 173.

ABSTRACT

During the period 2008-2011 on the experimental field of Plant production Department at Trakia University, the influence of the predecessors wintering peas, spring peas, sunflower and common wheat and different levels of nitrogen fertilization: 0, 40, 80, 120 kg/ha after legumes and 0, 60, 120, 180 kg/ha after the other predecessors on the yield structure characteristics of common wheat was studied.

Cultivation of common wheat following legume predecessors wintering and spring peas led to increasing the height of the stem with 2.4 %, the length of spike with 6.4 %, the number of spikelets in a spike with 1.1 %, the number of grains in a spike with 4.4 % and the mass of the grains in a spike with 12.5 % compared with other predecessors in non-fertilization variants.

Fertilization with nitrogen from 40 to 180 kg/ha increased the height of the stem with 6.9 %, the length of spike with 7.4 %, the number of spikelets in a spike with 4.4 %, the number of grains in a spike with 13.4 % and the mass of the grains in a spike of common wheat with 12.8 %.

The strongest influence on the height of stem and yield structure characteristics of common wheat had climate conditions and combination of rains and temperature during the years as a factor.

Among the height of stem and others yield structure elements, good positive correlation exists: height correlates with length of spike ($r = 0,836^*$), number of spikelets in a spike ($r = 0,746^*$), number of grains in a spike ($r = 0,809^*$) and weight of grain in a spike ($r = 0,739^*$). Number of grains in a spike correlates with length of spike ($r = 0,875^*$) and number of spikelets in a spike ($r = 0,712^*$). Weight of grain in a spike correlates with length of spike ($r = 0,770^*$), and number of grains in a spike ($r = 0,795^*$). All correlations are statistically significant at $P < 0.05$.

Gerdzhikova, M. 2017. Productivity of common wheat (*Triticum aestivum* L.) grown after various predecessors and nitrogen fertilization rates. Agricultural Science and Technology, 9, 1, 48-52.

ABSTRACT

During the period 2008-2011 the influence of the predecessors wintering peas, spring peas, sunflower and common wheat and different levels of nitrogen fertilization: 0 (N_0), 40 (N_{40}), 80 (N_{80}), 120 (N_{120}) kg/ha after legumes and 0 (N_0), 60 (N_{60}), 120 (N_{120}), 180 (N_{180}) kg/ha after the other predecessors on the productivity of common wheat was studied on the experimental field of the Department of Plant Growing, Trakia University. It was found that with cultivation of common wheat without fertilization after legume predecessors higher yields by 9.4 % were obtained compared to the other predecessors. The highest yields were obtained at fertilization

with the highest nitrogen rates: after legume predecessors 4069.8 kg/ha grain; after sunflower and wheat 3853.2 kg/ha of grain. The strongest influence on the productivity of common wheat had nitrogen fertilization as a factor with 79.80 %. The yield of wheat grain correlates very well with the level of nitrogen fertilization and can be determined approximately by regression equations based on the quantity of nitrogen as an independent variable.

Герджикова, М., М. Видева, Ст. Енева, 2008. Влияние на вида на бобовия предшественик върху продуктивността на тритикале. International Scientific Conference June 5-6, 2008, Union of Scientists – Stara Zagora, (CD) ISBN 9789549329445. Issues in Plant Studies, стр. 2.

ABSTRACT

The influence of the species of the leguminous predecessor upon the productivity of triticale was studied at the training and experimental base of Trakia University in the period 2003-2007. The predecessors used were winter forage pea and soybean. The crops were grown without irrigation. The experiment was carried out in the conditions of traditional and biological production.

It was established that with both traditional and biological production there were proven higher yields from the triticale after winter forage pea - 3359 kg/ha and 2848 kg/ha respectively – in comparison with the triticale after soybean – 2915 kg/ha and 2453 kg/ha respectively. The advantages of winter forage pea as a predecessor were more pronounced in years with a normal water supply. The higher yield from the triticale after pea was a result of the higher values of the structural elements of the yield – number of the grains per ear and weight of the grain per ear.

Герджикова, М., М. Видева, Ст. Енева, 2008. Влияние на вида на бобовия предшественик върху продуктивността на обикновена пшеница. Растениевъдни науки, 45, 442-446.

ABSTRACT

The influence of the species of the leguminous predecessor upon the productivity of common wheat was studied at the Training and Experimental Base of Tracian University in the 2003-2007 period. The predecessors used were winter forage pea and soybean. The crops were grown without irrigation. The experiment was carried out under the conditions of traditional and biological production. As a result of the research that was carried out, it was established that with both traditional and biological production higher yields from the wheat were proven after winter forage pea - 4215 kg/ha and 3329 kg/ha respectively - in comparison with the wheat after soybean - 3860 kg/ha and 2989 kg/ha respectively. The higher yield from the wheat after pea was a result of the higher values of the structural elements of the yield - number of the grains per ear, weight of the grain per ear and weight of 1000 grains. The decrease in the productivity of common wheat by prolonged draught was stronger after soybean as a predecessor.

Герджикова, М., М. Видева, Ст. Енева, М. Георгиев, Ц. Желязкова, 2009. Влияние на вида на житния предшественик върху продуктивността на зимуващ грах. International

Scientific Conference June 4-5, 2009, Union of Scientists – Stara Zagora, (CD) ISBN 9789549329452. Plant Studies, p. 9 (403-410).

ABSTRACT

The influence of the species of the cereal predecessor upon the productivity of winter forage pea was studied at the training and experimental base of Trakia University in the period 2003-2007. The predecessors used were common wheat and triticale. The experiment was carried out in the conditions of traditional and biological production.

As a result of the research that was carried out, it was established that with both traditional and biological production there were proven higher yields from the pea after wheat - 2464 kg/ha и 2106 kg/ha respectively – in comparison with the pea after triticale – 2269 kg/ ha и 1973 kg/ ha respectively. The higher yield from the pea after wheat was a result of the higher values of the structural elements of the yield – pods per plant, grains per plant and grain mass per plant.

Герджикова, М., М. Видева, М. Георгиев, 2011. Влияние на вида на бобовия предшественик върху химичния състав на зърното на обикновена пшеница. International scientific on-line journal “Science & Technologies” I, 6, Plant studies: 150-153, <http://journal.sustz.com>.

ABSTRACT

This study was conducted at Trakia University, Stara Zagora, in the years 2005 – 2007. The influence of winter forage pea and soybean as predecessors upon the chemical composition of the grain and the crude protein yield of common wheat of the Diamant cultivar was tested in the conditions of conventional and sustainable agriculture. It was established that a higher content of crude protein and a higher yield were achieved in the conditions of conventional production with application of nitrogen and phosphorus fertilization. With both methods of production, the wheat grain had higher protein content and respectively a higher protein yield after winter forage pea as a predecessor than after soybean.

Gerdzhikova, M., N. Grozeva, D. Pavlov, G. Panayotova, M. Todorova. 2015. Leaves area characteristics of *Betonica bulgarica* Degen et Neic̆. during vegetation. Agricultural Science and Technology, 7, 4, 486 – 493.

ABSTRACT

Survey for establishing the leaves area characteristics of *Betonica bulgarica* during vegetation was carried out at “Sinite kamani” Natural park, Sliven. Specific parameters per plant as number of leaves; stem leaves length, cm; stem leaves width, cm; stem leaves area, cm²; basal leaves area, cm²; and total leaves area, cm² were measured on 8 dates during vegetation from 05 April to 05 September. Measurements were performed on indicated plants in different points of four locations as follows: Ablanovo area, 540 m a.s.l. (the area of the population is 1600 m² and 440 specimens); Upper lift station, 1015 m a.s.l. (the area of the population is 150 m² and 140 specimens); Microyazovir area, 945 m a.s.l. (the population area is 950 m² and 95 specimens); Slancheva polyana area 1001 m a.s.l. (the area of the population is 724 m² and 215 specimens).

Total leaves area, basal leaves area and stem leaves area of *B. bulgarica* were the highest for Ablanovo location. The lowest parameters were measured for the Microyazovir population. Interpopulation variation of the leaves area was lower (4.04% – 32.82%) and higher for intrapopulation variation (67.18% – 95.96%). Number of leaves decreased during vegetation in all locations. Average stem leaves length increased at the beginning of vegetation up to 26 June and decreased up to 05 September. Stem leaves area of *B. bulgarica* was mainly influenced by the dates during the vegetation period (23.31%) as factor while the total leaves area and basal leaves area were influenced by population as factor. Stem leaves area, number of leaves, stem leaves length and leaves width can be approximately predicted by a regression equation with the days of vegetation as an independent variable.

Gerdgikova, M., M. Videva, D. Pavlov. 2012. Content and yield of crude protein from winter pea grain, cultivated after different predecessors in conditions of organic and conventional production. *Agricultural Science and Technology*, 4, 4, 278-281.

ABSTRACT

The effect of cultivating two predecessor varieties: (i) wheat and (ii) Triticale, on the content and yield of crude protein from winter pea variety “Mir” is tested during 2005-2007. The study is conducted at Trakia University, Stara Zagora, in conditions of organic and conventional production. It is found that both pea grain yield and crude protein yield are higher using conventional farming and after predecessor wheat. Higher pea grain yield is obtained using conventional cultivation method and after predecessor wheat. Crude protein content of winter pea grain is higher after predecessor triticale. The protein concentration in pea grain correlates with rainfall during the growing season and the critical months February, April and June, and can be modeled by regression equations. The protein yield can also be modeled by regression equations based on the amount of precipitation during vegetation and the aforementioned critical months. The determination coefficient, R^2 , is higher for protein content, $R^2 = 0.958$, compared to that for protein yield, $R^2 = 0.606$.

Gerdzhikova, M., M. Videva, D. Pavlov, A. Dobрева. 2012. Chemical composition, nutritive value, energy yield and feed units of the winter pea grain grown after different predecessors using conventional and organic production. *Agricultural Science and Technology*, 4, 3, 271-276.

ABSTRACT

During 2005-2007 the effect of two cereal varieties: (i) common wheat and (ii) Triticale, as predecessors and the choice of production methodology on the chemical composition, nutritional value, energy yield and feed units of the grain of winter pea variety "Mir" was investigated. The study was conducted at Trakia University, Stara Zagora in conditions of organic and conventional production. It was found that neither the predecessor nor the agricultural method have significant effect on the chemical composition and content of GE, ME, FUM and FUG in the grain of winter pea. Yields of GE, ME, FUM and FUG were higher in conventional agriculture and after wheat as predecessor. The most influential factor on these parameters is the agricultural method, seconded by the influence of climatic conditions. The

predecessor has the lowest effect on the parameters observed. The energy yield and feed units correlates well with the total amount of rainfall during the growing season and rainfall during the month of February.

Gerdzhikova, M., Grozeva, N., Pavlov, D., Tzanova, M. 2017. Effect of nitrogen fertilization in triticale (X *Triticosecale* Wittm.), cultivated after different predecessors. Nitrogen uptake and efficiency. *AGROFOR International Journal*, 2(3), 147-156. DOI: 10.7251/AGRENG1703147G. <http://www.agrofor.rs.ba/paper.php?id=159>

ABSTRACT

The study is conducted at the experimental base of Department of Plant production at Trakia University, Stara Zagora. Triticale is grown after five predecessors and different nitrogen fertilization rates. The predecessors are wintering peas, spring peas, sunflower, common wheat and triticale. Nitrogen fertilization rates are 0 (N0), 40 (N40), 80 (N80), 120 (N120) kg ha⁻¹ after legumes and 0 (N0), 60 (N60), 120 (N120), 180 (N180) kg ha⁻¹ after the other predecessors. The influence of the predecessors and nitrogen fertilization on the nitrogen uptake, assimilated nitrogen from fertilization, nitrogen utilization and nitrogen required for 100 kg produce of triticale is established. Nitrogen assimilation from fertilization increases with the increase of the nitrogen fertilizer rates. With the obtained yield from triticale an average of 96.53 kg ha⁻¹ N is extracted from the soil with the grain, 18.97 kg ha⁻¹ N with the straw or a total of 115.50 kg ha⁻¹ N. When growing triticale after leguminous predecessors the utilization of nitrogen is 35.39% and after predecessors sunflower, wheat and triticale - 28.76%. Nitrogen required for 100 kg yield of grain of triticale is 1.9 kg of nitrogen when growing after legume predecessors and 2.8 kg of nitrogen after the other predecessors.

Gerdzhikova, M., D. Pavlov, N. Grozeva, M. Tzanova, D. Dimanov, S. Terzieva, J. Krastanov. 2017. Chemical composition, mineral content, “*in vitro*” gas production and relative feed value of *Stevia rebaudiana* Bertoni. *Bulgarian Journal of Agricultural Science*, 24 (Suppl. 1): 40-46. **SJR = 0,223**

ABSTRACT

The aim of present study was to determine the chemical composition, digestibility, gas production, energy nutrition, relative feed value, and the use of *S. rebaudiana* as a forage crop. The chemical composition and mineral content of biomass from *Stevia rebaudiana* Bertoni were determined. The average crude protein content in the biomass was 86.33 g/kg of dry matter (DM); crude fat – 11.79 g/kg DM; crude fibre – 284.68 g/kg DM; ash – 96.56 g/kg DM and nitrogen free extracts (NFE) – 520.64 g/kg DM. The mineral content in the biomass of *S. rebaudiana* was similar to that of meadow grasses. Structural fibre components were on average for neutral detergent fibre (NDF) 35.52% and acid detergent fibre (ADF) 31.18% which are close to that of alfalfa and legume grasses. New data were obtained concerning *in vitro* gas production of *S. rebaudiana* biomass at 24 hour period – it was 225.83 dm/ml average, and at 48 hour period – 246.70 dm/ml (CO₂ and CH₄), which is close to the group of legume and cereal meadow grasses. The relative feed value (RFV) of *S. rebaudiana* biomass is close to that of perennial legumes. Regression equations were developed for advanced determination of: the quantity of

metabolizable energy (ME), through the gas production at 24 hour period; and the relative feed value (RFV) and acid detergent fibre through the neutral detergent fibre.

Grozeva, N. H., **Gerdzhikova, M. A.**, Pavlov, D. H., Panayotova, G. D., & Todorova, M. H. 2016. Morphological variability of the Bulgarian endemic *Betonica bulgarica* Degen et Neič. (Lamiaceae) from Sinite Kamani Natural Park, Eastern Balkan Range. *Acta Botanica Croatica*, 75(1), 81-88. **IF = 0.734**

ABSTRACT

Four populations of *Betonica bulgarica* Degen et Neič. at Sinite Kamani Natural Park were morphologically tested. Intrapopulation and interpopulation variabilities were established. The relationship between morphological variability, number, area and ecological appurtenance of the studied populations were explored. The results demonstrated that the main source of phenotype variation is intrapopulation variability, mainly due to the age structure of populations. The most variable traits are height of stem and dimensions of leaves. The registered interpopulation variability was affected by the differences in altitude, soil type and differences in environmental conditions and soil properties. Indumentum and morphology of generative organs had taxonomic significance for distinguishing *B. bulgarica* from the other species in the genus, including the species that were morphologically most similar to it – *Betonica officinalis* L.

Tzanova, M. T., N. H. Grozeva, **M. A. Gerdzhikova**, M. D. Argirova, D. H. Pavlov & S. R. Terzieva. 2018. Flavonoid content and antioxidant potential of *Betonica bulgarica* Degen et Neič. *Bulgarian Chemical Communications*, 50 C. Под печат **IF = 0.238**

ABSTRACT

The Bulgarian endemic *Betonica bulgarica* Degen et Neid (syn. *Stachys bulgarica* Hayek) is a protected plant by the Biological Diversity Act and it is included in Red Data Book of Bulgaria under the category "endangered". The aim of this study was to determine the flavonoid content and antioxidant activity of different plant organs of this species (leaves, flowers, roots, stems and seeds), from four populations. Three flavonoids were found in significant amounts: rutin, quercetin and hispidulin. Rutin was in the largest quantity, followed by quercetin and hispidulin. The largest total flavonoid content was measured in leaves, followed by roots and flowers. The antioxidant activity extracts was tested by DPPH-method. The total polyphenol was also assayed. The correlation between flavonoid content and antioxidant activity of the studied plant organs were established.

Zhelyazkova, Ts., **M. Gerdzhikova**, D. Pavlov. 2012. Effect of some plant growth regulators with retarding activity on spring pea for grain. *Journal of Central European Agriculture*, 13(4), 837-849. **SJR = 0,238**

ABSTRACT

A field experiment was conducted at Trakia University - Stara Zagora to establish the effect of some growth retardants on morphological and productive parameters in spring pea for

grain variety Bogatir. Three combined preparations: Trisalvit (phenylphthalamic acid + chlorocholine chloride + chlorophenoxyacetic acid + salicylic acid) at doses of 300 and 400 $\text{cm}^3 \cdot \text{ha}^{-1}$; SM-21 (phenylphthalamic acid + chlorocholine chloride) at doses of 300 and 400 $\text{cm}^3 \cdot \text{ha}^{-1}$ and PNSA-44 (phenylphthalamic acid + naphthaleneacetic acid + chlorophenoxyacetic acid) at doses of 200 and 300 $\text{cm}^3 \cdot \text{ha}^{-1}$ were applied in the early growth phase of the plant up to a height of 15-20 cm. The study showed that the greatest reduction in the stem height (by 12.8% compared to untreated plants) was achieved by applying SM-21 (400 $\text{cm}^3 \cdot \text{ha}^{-1}$). The application of growth regulators Trisalvit and SM-21 had no appreciable effect on the production of spring pea grain. Maximum values of yield structure components (number of pods and grain per plant, grain mass per plant and mass of 1000 grain) and the yield were obtained after application of PNSA-44 (300 $\text{cm}^3 \cdot \text{ha}^{-1}$) - up to 5.6% (117.2 $\text{kg} \cdot \text{ha}^{-1}$) more grain than the control. The investigation of the influence of tested factors (retardant, dose and year) demonstrated that the conditions of the year as a factor had the strongest effect on plant height and grain yield.

Grozeva N, Pavlov D, Petkova N, Ivanov I., Denev P, Pavlov A, **Gerdzhikova M**, Malina Dimanova-Rudolf. 2015. Characterisation of Extracts from *Stevia Rebaudiana* Bertoni Leaves. International Journal of Pharmacognosy and Phytochemical Research; 7(6); 1236-1243. **SJR = 0,147**

ABSTRACT

Stevia rebaudiana Bertoni is widely used as a source of natural sweetening agent in human nutrition. The aim of present study was to characterise the leaves extracts as evaluate the polyphenol and carbohydrate contents. The effect of different particle size and various solvents on the antioxidant activity of leaves extract were also studied. The content of fructans, polyphenols, radical scavenge activity (DPPH), metal reducing activity (FRAP) in the extracts were established. It was found that the fructans amount did not depend significantly from the size of grinding (2.8 % DW). The type of the solvent had a highest effect only to the yields of the extract (from 254 mg/g DW to 377 mg/g DW). Additionally, the total polyphenols content (from 12.7 mg GAE/g DW to 15.6 mg GAE/g DW), radical scavenge activity - DPPH (from 135.8 mM TE/g DW to 221.4 mM TE/g DW) and metal reducing activity-FRAP DPPH (from 117.7 mM TE/g DW to 149.5 mM TE/g DW) were influenced mainly from the particle size and degree of grinding. The highest values of the presented parameters concerning to antioxidant activity were obtained when the dried leaves of stevia were finely ground and water were used as extracting solvent. Radical scavenge activity and metal-reducing activity correlated very well with total polyphenol content.

Видева, М., **М. Герджикова**, 2004. Сравнително проучване на нови хибридни сортове сорго за зърно. Научна конференция, Стара Загора, том II, 72-77.

ABSTRACT

During the period 2000-2001, a comparative evaluation of new grain sorghum hybrids, selection of Rustica Prograine Genetique were performed in the Department of Plant Growing, Faculty of Agriculture, Trakia University – Stara Zagora. The field trials were performed in the experimental departmental field, located to the south of the city on a meadow-cinnamon soil

type. The hybrids Keras, Verdone, Garonne, Vanoise and Bianco were included in the study and were compared to the Hungarian hybrid Alfeldi 1.

It was found out that hybrids differed with respect to the duration of their vegetation period by 8-13 days. The vegetative masse (stems and leaves) and grain productions were different for the two years of the study. A higher yield was obtained in 2001 when the climatic conditions were more favourable. Differences in yields also observed among the hybrids themselves. For both years, the highest average production was obtained from the early hybrid Keras – 476.5 kg/dka, followed by the Vanoise, Garonne, Alfeldi 1, Bianco and Verdone hybrids.

Салджиев, И., **М. Герджикова**, 2005. Влияние на азотното торене върху добива на памука в зависимост от типа на сеитбообращението. *Field Crops Studies*, Volume II-2, 267-272.

ABSTRACT

В полски опит през периода 1999-2004 г. бяха изпитани ефектите от торенето (N_0P_0 , N_6P_6 , $N_{12}P_6$, $N_{18}P_6$) върху добива на памука при условията на двуполно и четириполно сеитбообращение. Бяха получени следните резултати: включването на памука в четириполно сеитбообращение в сравнение с двуполното увеличава чистия ефект на сеитбообращението с 8.1 kg/da. Азотното торене увеличава добива от памука с 20.5-48,8 при условията на двуполно сеитбообращение и с 23.8-53.3 kg/da при четириполно сеитбообращение.

Желязкова, Ц., Д. Павлов, **М. Герджикова**, 2008. Влияние на някои растежни регулатори върху биопродуктивността, листната площ и чистата продуктивност на фотосинтезата при зимуващ грах. *International Scientific Conference June 5-6, 2008, Union of Scientists – Stara Zagora*, (CD) ISBN 9789549329445. *Issues in Plant Studies*, стр. 10.

ABSTRACT

During the period of 2003 – 2006 in Trakia University – Stara Zagora influence of some plant growth regulators on bioproductivity, leaf area and net assimilation rate (NAR) of winter pea variety Mir was investigated. Experiment was conducted with 3 complex preparations as follows: N-40 (naphthaleneacetic acid - NAA) – 200 and 300 cm^3/ha ; HP-55 (chlorophenoxyacetic acid) – 100 and 200 cm^3/ha and G-31 (chlorophenoxyacetic acid + naphthoxyacetic acid - NOA) – 300 cm^3/ha in 300 l/ha solution.

As a result of the survey was established, applied at flowering stage growth regulators have positive effect on bioproductivity, leaf area and NAR of winter pea variety Mir. The highest yield of dry matter (grain + straw) and leaf area were obtained after treatment with N-40 in dose 200 cm^3/ha – up to 16,81% more dry matter and up to 14,02% most high leaf area. Maximum value of the NAR was obtained by using the preparation HP-55 (100 cm^3/ha) – increasing with 5,85%.

Combined application of N-40 in dose 200 cm^3/ha with insecticide for control of weevil *Bruchus pisi* L. do not decrease the bioproductivity, leaf area and NAR compared to alone application.

Грозева, Н., **М. Герджикова**, 2008. Лечебните растения в Старозагорска област III. Етерично-маслени, хранителни и медоносни видове – В: Сб. Доклади на научната конференция с международно участие, Съюз на учените, Стара Загора 2008”, 6-7.VI. 2008 г., CD-формат.

ABSTRACT

The diversity of medicinal plants in Stara Zagora region have been studied. The populations of 103 honey plants, 73 essential-oil plants and 49 food plants have been registered. In very good condition and opportunity for trade use are populations of *Tilia* sp., *Cotinus coggygia* Scop., *Agrimonia eupatoria* L., *Teucrium chamaedrys* L. and *T. polium* L. Especially alarming is the situation with populations of *Chamomilla recutita* (L.) Rauschert and *Melissa officinalis* L.

Грозева, Н., **М. Герджикова**, 2008. Лечебните растения в Старозагорска област IV. Фуражни, багрилни, отровни и съдържащи дъбилни вещества видове – В: Сб. Доклади на научната конференция с международно участие, Съюз на учените, Стара Загора 2008”, 6-7.VI. 2008 г., CD-формат.

ABSTRACT:

The diversity of medicinal plants in Stara Zagora region have been studied. 29 forage, 15 colouring, 59 poisonous and 38 containing tanins plant species have been registered. Wide propagated are: *Aesculus hippocastanum* L.; *Artemisia absinthium* L.; *Geum urbanum* L.; *Rumex acetosa* L.; *R. crispus* L.; *Aristolochia clematidis* L.; *Conium maculatum* L.; *Consolida regalis* S.F.Gray; *Ranunculus polyanthemos* L.; *R. repens* L.; *R. sceleratus* L.; *Agrostemma githago* L.; *Marrubium vulgare* L.; *Solanum nigrum* L.; *Salvia pratensis* L.; *Teucrium chamaedrys* L.; *T. polium* L.; *Trifolium arvense* L.; *T. pratense* L.; *Lathyrus pratensis* L.; *L. sylvestris* L.; *L. tuberosus* L.; *Vicia cracca* L.; *V. grandiflora* Scop. and *Plantago media* L. In opportunity for trade use is only *Aesculus hippocastanum*. Decreasing of numbers into the population and reestablishing ability were registered for populations of *Persicaria maculata* (Rafin.) S.F.Gray, *P. hydropiper* (L.) Opiz. and *Iris pseudacorus* L.

Георгиев, М., Ц. Лалев, **М. Герджикова**, 2009. Влияние на някои дву и трикомпонентни торове върху формирането на структурните елементи на добива и добива при ечемик сорт Обзор. International Scientific Conference June 4-5, 2009, Union of Scientists – Stara Zagora, (CD) ISBN 9789549329452. Plant Studies, p. 9 (428-435).

ABSTRACT

During the period 2004-2007 in experimental field of the Department of Crop science was taken two factor field experiment with barley (*Hordeum vulgare*) variety „Obzor” to examine the influence of certain combined NP and NPK fertilizers on growth, development and productivity of barley variety „Obzor”.

The experiment was taken on leached cinnamon forest soil in block method. The study was established: The tested NP and NPK fertilizers in all cases increased the number of classes forming the area. Impact on length of class, formed classes and the number of grains in the class

is negligible, but has a significant impact on the mass of grain in the class, which is the highest in a single fertilization $N_{12}P_8$. Use of N_4P_8 and $N_4P_8K_2$ fertilizer in autumn, combined with a spring feeding N_8 resulted in an increase the yield, respectively at 18.3% and 15.8%, and with N_4P_8 number one in the fall to 11.4 percent versus without fertilized control. The leaf feeding in terms optimal climate in years with high efficiency in combination with N_4P_8 (autumn) + N_8 (spring), $N_4P_8K_2$ (autumn) + N_8 (spring) and $N_{12}P_8$ (autumn).

Todorova, M., Atanassova, St., **Gergikova, M.**, Ilieva R. 2010. Rapid prediction of available K content in soil using near-infrared spectroscopy. *Anadolu Journal Agricultural Science*, 25, 199-203.

ABSTRACT

Soil NPK testing has been widely used for fertilizer recommendation of annual crops. Soil analyses of available K content by chemical methods are sufficiently accurate, but they are expensive, time consuming and labour intensive. Recently, fertilization recommendation to the farmers is based on reduced number of soil samples due to high price of analyses. For this reason a rapid and cost-effective soil analysis is needed for soil quality assessment. Near infrared spectroscopy (NIRS) could provide a possible alternative. The objective of this study was to investigate the possibilities of NIRS for prediction of available potassium content in different soil units. A total 191 samples from four soil type-Chernozems, Vertisols, Luvisols and Fluvisols were analyzed for available K by conventional chemical method. NIR spectra of all samples were obtained by using an InfraAlayzer 450 spectrophotometer within the range 1445-2348 nm and portable FQA-NIRGun scanning spectrophotometer in shortwave NIR range from 600 to 1100 nm. SIMCA- soft independent modeling of class analogy was performed to classify samples, according to soil type. MLR and PLS regression were used for calibration models development for available K determination. The best model was obtained for samples of Chernozems with correlation coefficient $R=0,94$, standard error of calibration $SEC=2,30$ mg/100g, and the ratio of the standard variation of the reference data to the SEC, indicating the performance of the calibration $RPD=3,1$. Accuracy of determination of K content for models for separated soil units, developed by spectral data in short-wave NIR region, was better to accuracy of models, based on filter-type instrument in classical NIR region. Correlation coefficients for the global calibrations containing the samples of all soil units' decrease and SEC or SEP increase compared to calibrations for separate soil units. The values of R were between 0,76 and 0,79 and RPD were between 1,5-1,7 for the both calibration and test set. Calibration models for each soil type increase accuracy of determination of available potassium content.

Georgiev, M., D. Pavlov, G. Beev, **M. Gerdzikova**, R. Bazitov, 2011. Species composition of weeds in wheat and barley. *Agricultural Science and Technology*, 3, 2, 143-149.

ABSTRACT

During the period 2008-2009 investigation was performed to determine the species composition and density of weeds in the main cereals (wheat and barley). The aim of study was to establish the weed species diversity and the background of weed infestation in wheat and barley in the region. The number of weeds in wheat and barley was established in three regions

west, east and south from Stara Zagora by itinerary method in 10 points for each region. Weed infestation and domination of weed species was established by Statistica for Windows. In the eastern region of Stara Zagora (the land of Dalboky) the most propagate weed was *Veronica hederifolia* L. - 37,2 and *Convolvulus arvensis* L. - 10,3 plants per m². In the western area of the municipality (the land of Bogomilovo) prevail mainly *Avena fatua* L. - 16,4; *Veronica hederifolia* L. - 12,8 and *Galium aparine* L. - 6,6 plants of m². In the southern region (the land of Malko Kadievo) winter cereals have higher weed infestation compared to the other 2 regions. The most propagated weeds in this region were *Chenopodium album* L. - 36,2; *Convolvulus arvensis* L. - 7,3 plants per m² etc. The type of weed infestation of wheat and barley in the investigated areas was as a whole the typical for these crops.

Dobрева, A., **M. Gerdzhikova**. 2013. Content and composition of the essential oil of *Rosa alba* L. during flower development. *Agricultural Science and Technology*, 5, 1, 83-85.

ABSTRACT

In 2010 the content and composition of the essential oil from *Rosa alba* L. in the different phases of the development of blossom is examined. Quantitative and qualitative changes of the essential oil are traced. Flowers from the population of white rose in 6 phases were investigated. The study was conducted at the Institute of roses and essential oil plants Kazanlak. It was found that optimum for the quantity and quality of the essential oil is not exactly at one time, but there is a correlation between the two indicators. The maximum content of essential oil is in phase IV – in semi-opened petals (in %). Optimal composition was recorded in (IV) and (V) phase, where the fundamental terpene alcohols: citronelol + nerol and geraniol are within limits, respectively 21,33 ÷ 22,19% and 8,11 ÷ 8,02% and the values of the ratio of terpene alcohols/hydrocarbons are the largest. White rose must be picked in semi-opened and opened flowers stage. After detachment of flowers processes of biosynthesis in the tissues continue and in storage both phases are matched. Thus optimal conditions for accumulation of maximum quantities of quality essential oil are created.

Dobрева, A., **M. Gerdzhikova**. 2013. The flavonoid content in the white oil-breeding rose (*Rosa alba* L.). *Agricultural Science and Technology*, 5, 1, 134-136.

ABSTRACT

In 2011 the content of flavonoids (such as quercetin) in the flower of *Rosa alba* L. in the different phases of its development was examined. Their distribution in the different parts of the flowers was traced. Flowers from the population of white rose were examined. The study was conducted at the institute of roses and essential oil plants Kazanlak. It was found that the white rose contains significant quantities of flavonoids (commensurate with those of other oil types). The basic quantity is concentrated in the petals (11 mg/g). With the opening of the flower the content of flavonoids increases and reaches the maximum in fully diluted flowers (18 mg/g). the substance does not decompose under the conditions of distillation (high temperature, presence of moisture) and remains in the same amount in the rose flowers after the separation of the essential oil. It can also be used as a source for the extraction of flavonoids.

Panayotova, G., Grozeva, N., Pavlov, D., Todorova, M., **Gerdzhikova, M.** 2014. Seed Germination, Growth and Morphological Parameters of *Betonica bulgarica* Deg. et Neic. Cultivated under Different Conditions – Turkish Journal of Agricultural and Natural Science, 2: 2006-2013.

ABSTRACT

Betonica bulgarica Degen & Nejceff is a Bulgarian endemic species protected under the Biological Diversity Act and included in the Red Data Book of the Republic of Bulgaria, vol.1. Plants and fungi. Harvested seeds of the plants were collected by using insulators to assist the natural reproduction of the populations. The seeds germination and growth of *B. bulgarica* were studied in three soils: soil from natural habitat; in California red worms Lombricompost (CRWL) and in soil mixture of 2/3 soil + 1/3 CRWL in laboratory conditions. Leaf characteristics - length, width, petiole length, number of leaves and leaf area were studied. It was found that *B. bulgarica* was characterized by a prolonged period of germination and low rate of germination - 35.0 %. Best plant growth was seen in a soil mixture of 2/3 soil + 1/3 CRWL. The soil strongly influenced leaf length, leaf width and leaf area - 46.1 to 58.6 % of the total variation.

Grozeva, N., Dohchev, D., **Gerdzhikova, M.**, Tsutsov, K., Todorova, M., Panayotova, G., Getova, N. 2014. New data for protected plants of Sinite kamani Natural park Sliven. Trakia Journal of Sciences, 12, 1: 13 - 20.

ABSTRACT

The distribution of four protected species - *Anemone sylvestris* L., *Bromus moesiacus* Velen., *Cyclamen coum* Mill., *Quercus coccifera* L. on the territory of “Sinite kamani” Natural Park has been studied. A second locality of *Quercus coccifera* has been registered for Eastern Balkan Range in the park. New populations of *Cyclamen coum* have been established. The presence of *Bromus moesiacus* for the park flora has been confirmed. The condition of all registered populations has been assessed and measures outlined for their protection.

Grozeva, N., Todorova M., **Gerdzhikova M.**, Panayotova G., Getova N., Dohchev, D. 2014. New data for Bulgarian endemic *Betonica bulgarica* Deg. et Neic. of Sinite Kamani Natural Park Sliven. J. BioSci. Biotech. 2014, SE/ONLINE: 205-210.

ABSTRACT

The distribution of *Betonica bulgarica* on the territory of Natural park Sinite kamani has been confirmed. Four localities of the species have been registered. An assessment of the status of populations and soil fertility of the territories occupied by them has been made. The factors with adverse effect have been pointed out and recommendations for their more efficient conservation have been made.

Todorova, M., Grozeva, N., Pleskuza L., Yaneva Z., **Gerdgikova M.** 2014. Relationship between soil salinity and *Bassia hirsuta*, *Salicornia europaea* agg. and *Petrosimonia brachyata*

distribution on the territory of Pomorie lake and Atanasovsko lake. Agricultural science and technology, № 4, 465 – 470.

ABSTRACT

In the Black Sea biogeographical region on the territory of Bulgaria there are only two Salinas – Atanasovsko lake and Pomorie lake. Since 1980 the north part of Atanasovsko lake has been declared nature reserve. Since 1999 the northern a part of the lake has been re-categorized as Managed Nature Reserve according to the new Protected Areas Act. Since 2001 Pomorie lake has been declared Protected Site. The aim of the study was to assess the relationship between soil salinity and halophyte plants distribution – *Salicornia europaea* agg., *Bassia hirsuta* (L.) Asch. and *Petrosimonia brachiata* (Pall.) Bunge on the territory of both protected areas. The period of investigation was between September and October, 2013. A total of 22 soil samples were taken from a depth of 0 – 20 cm. In each sample taking point vascular plants of *Salicornia europaea* aggr., *Bassia hirsuta* and *Petrosimonia brachiata* existing there, were also collected. The collected soil samples were analyzed for electrical conductivity (EC), pH, Cl^- , CO_3^- and HCO_3^- content. The soil from the studied territory of Atanasovsko lake Manage Nature Reserve was characterized with alkaline to strong alkaline reaction and high level of salinity. The alluvial deposit from Pomorie lake Protected Site was characterized with neutral to alkaline reaction and light to high salinity. *Salicornia europaea* forms populations on alkaline soil, with salinity from 2 to 44 mS/cm, but dominates on high salinity soil, above 14 mS/cm. *Bassia hirsuta* forms populations on soil with neutral to moderate alkaline reaction and from light to high salinity, with EC up to 14 mS/cm. *Petrosimonia brachyata* forms populations on alkaline soil, from light to moderate salinity, with values of EC from 2 to 6 mS/cm.

Грозева, Н., Тодорова, М., Панайотова, Г., **Герджикова, М.**, Дохчев, Д., Гетова, Н., Цуцов, К. 2014. Данни за популациите на *Tulipa urumoffii* от територията на Природен парк „Сините камъни“. Science & Technologies, IV (6): 267 – 273.

ABSTRACT

The data about the spread of *Tulipa urumoffii* on the territory of Sinite Kamani Nature Park have been updated. Four populations of the species have been registered. Their current condition and main soil properties in the studied territories have been assessed. The factors with negative impact have been explored and recommendations for more efficient preservation of the species have been made.

N. Grozeva, Todorova M., **Gerdzhikova M.**, Panayotova G., Dohchev D, Tsutsov K. 2015. Studies on *Cyclamen Coum* in Sinite Kamani Natural Park, Bulgaria. 2nd International Symposium for Agriculture and Food, 7 - 9 October 2015, Ohrid, Macedonia.

ABSTRACT

Sinite kamani Natural Park is located on the southern slopes of the Eastern Balkan range. Over 1060 species of vascular plants have been established for its territory until now, 42 species are protected under the Biological Diversity Act. The object of the present study is one of them - *Cyclamen coum* Mill. This work aims to make an assessment of the status of *Cyclamen coum*

Mill. populations after undertaking *in-situ* measures for their preservation and for soil fertility of the territories inhabited by them. The study was conducted during the vegetation period of 2013 - 2015. The populations were observed during each of the phenophases of their development. Soil samples of 0-20 cm layer were collected from every studied area. The samples were analyzed for: pH; mineral nitrogen, available potassium and available phosphorus content. As a result of the studies could be concluded that in Sinite kamani Natural Park *Cyclamen coum* Mill. forms populations on Eutric Luvisols and Regosols. It grows successfully both in acidic soil reaction, and in slightly acidic to neutral reaction. The soils are with low mineral nitrogen content, well stocked with available forms of potassium and phosphorus. The undertaken during 2013 - 2014 *in-situ* measures for preservation of *Cyclamen coum* Mill., including assistance in its natural reproduction, control of *Pteridiunt aquiline* (L.) Kuhn, erosion control mesh, have led to an increase from 93.8% to 142.8% in the number of the populations in the natural park.

Грозева, Н., **Герджикова, М.**, Панайотова, Г., Тодорова, М., Дохчев, Д., Цуцов, К. 2015. *Ex-situ* опазване на популациите на *Tulipa urumoffii* Hayek – урумово лале от територията на природен парк „Сините камъни“, Източна Стара планина, България Science & Technologies, V (6): 151 – 156.

ABSTRACT

Bulgarian endemic *Tulipa urumoffii* Hayek. is protected under the Biodiversity Act, included in the Red Book of Bulgaria, vol. 1. Plants and mushrooms in category "vulnerable". The aim of the study is to develop a technology for growing plant bulbs in a laboratory, which is consistent with the environmental requirements of *Tulipa urumoffii*, and to complete the populations in the areas Buchvata, Kuru Dere and Karandilska polyana with the newly grown species. Vast amount of literature was studied to realize the objective and biennial field research of the populations in the Sinite kamani Natural Park was done.

The developed technology is successful and fully complies with the environmental conditions of the natural habitat of the species in the park. By its applying, the plants has been successfully propagated in the scientific laboratories of the Faculty of Agriculture at Trakia University for replenishment of populations. The technology can be used for filling other natural populations of *Tulipa urumoffii* in Bulgaria.

To establish the effectiveness of the application of this measure for *ex-situ* conservation the observations after introduction of the plants grown in the laboratory need to be continued, their adaptation – followed, care for their protection ought to be taken and, if necessary, their status should be stabilized.

Grozeva, N., Todorova, M., **Gerdzhikova, M.**, Panayotova, G., Getova, N., Dohchev, D., Tsutsov, K. 2015. New data about *Crocus olivieri* J. Gay on the territory of Sinite Kamani Natural Park, Bulgaria. Agricultural Science and Technology, 7(2): 264-268.

ABSTRACT

The aim of the study is to establish the current distribution of *Crocus olivieri* in Sinite Kamani Natural Park, to assess the state of its populations and to define its requirements to soil

fertility. Eleven populations of the species were registered, ten new for its territory. It has been established that the species forms populations in grass communities dominated by *Sesleria latifolia* and *Festuca valesiaca*; on open areas and on the outskirts of deciduous forests and bushes at an altitude from 415 to 1018 m on acid and neutral soils, well stocked with organic carbon and assimilable forms of potassium and less stocked with mineral nitrogen and assimilable form of phosphorus. Its populations number from 17 to 70 specimens at an area from 72 to 1200 m². Main threats for the populations of the species in the Natural Park are anthropogenic impacts hindered seed propagation, ongoing erosion processes, penetration of *Pteridium aquilinum*. The status of all populations is relatively good, but for their preservation in-situ measures must be applied, including clearing the dead forest and grass mass, reseeding in appropriate areas with pre-collected mature seeds, transferring of vulnerable plants to better protected areas of the populations, mechanical control to prevent the generation of *Pteridium aquilinum*.

Panayotova G., N. Grozeva, M. Todorova, **M. Gerdzhikova**, 2015. Seed Germination of *Betonica bulgarica* Deg. et Neic under the Influence of Different Treatments and Seed Quality. The International Conference of the University of Agronomic Sciences and Veterinary Medicine of Bucharest “AGRICULTURE FOR LIFE, LIFE FOR AGRICULTURE”, 04-6.06.2015, Bucharest. Romania. Scientific Papers. Series A. Agronomy, Vol. LVIII, 2015: 284-290.

ABSTRACT

Betonica bulgarica Degen & Nejceff is a Bulgarian endemic species protected under the Biological Diversity Act and included in the Red Data Book of the Republic of Bulgaria, vol.1. Plants and fungi in the category “endangered“. The aim of this research was to study seeds germination of endemic species *Betonica bulgarica* Deg. et Neic, as well as 1000 seeds weight of four natural habitats from the Nature Park Sinite Kamani, Bulgaria. Harvested seeds from plants in the Sinite Kamani Nature Park were collected by means of insulators to assist the natural reproduction of the populations. The seed germination was studied in petri dishes after different temperature treatments - in a laboratory at 15°C, in a thermostat at 20°C and 25°C, at a temperature of 5°C, treated with water at 35°C, and direct sowing in the soil without any treatment. It was found that *B. bulgarica* is characterized by a prolonged period of germination and emergence. The best results were achieved after direct sowing in soil - 35.0 %, followed by seeds placed for germination in laboratory conditions at 15°C - 25.0 %. Treatments of stratification and hot water at 35°C did not give good results for seed germination. The 1000-seed weight of four populations was an average of 0.971 g, from 0.840 to 1.055 g.

Grozeva, N., **Gerdzhikova, M.**, Panayotova, G., Todorova, M., 2016. Opportunities for ex-situ conservation of *Cyclamen coum* Mill. in Sinite kamani Natural Park, Eastern Balkan range, Bulgaria. *Scientific Papers-Series B, Horticulture*, (60), pp. 233-238.

ABSTRACT

The protected species *Cyclamen coum* Mill. is found on the territory of Sinite kamani Natural Park in Ablanovo, Chukata and before Enyova bulka areas. Main threats for its populations in the Park are the anthropogenic impact and the difficult seedling regeneration. For

their conservation and for stabilizing their state, according to the assessments made, it is necessary to include both in-situ and ex-situ conservation measures. The objective of the present study is to develop a technology for growing *Cyclamen coum* from ripe seeds under laboratory conditions. To implement the objective numerous literary sources have been studied and biannual terrain studies of the population in Sinite kamani Natural Park have been conducted. The developed technology is successful and totally compliant with the ecological conditions of the natural habitats of the species in the Park. By applying it the species has been successfully reproduced in the scientific laboratories of the Faculty of Agriculture at Trakia University from ripe seeds to replenish the populations. The technology can be used for replenishing other natural populations of *Cyclamen coum* in Bulgaria as well. To establish the effectiveness of the implementation of this measure for ex-situ conservation, we need to continue observations after introducing the plants grown in laboratory conditions in order to trace their adaptation and further development and, if necessary, to take care of their conservation and stabilization of their state.

Grozeva N., **M. Gerdzhikova**, M. Todorova, G. Panayotova, D. Dohchev, K. Tsutsov. 2016. The Balkan Endemics *Moehringia jankae* Griseb. ex Janka and *Moehringia grisebachii* Janka in Sinite Kamani Natural Park, Bulgaria. Trakia Journal of Sciences, 14, 2: 163-170.

ABSTRACT

The aim of the study is to establish the current distribution of *Moehringia jankae* Griseb. ex Janka and *Moehringia grisebachii* Janka in Sinite Kamani Natural Park and to assess the state of its populations. Nine populations of *M. jankae* and fourteen populations of *M. grisebachii* were registered. It has been established that the Balkan endemic *M. jankae* inhabits quartz porphyry rock formations, conglomerates and limestones in Karandila, Haidushka pateka, Kaloyanovi kuli, Kamilata areas at an altitude of 590 to 972 m. Its populations number from 10 to 72 specimens at an area of 0.5 to 796 m². The Balkan endemic *M. grisebachii* inhabits quartz porphyry rock formations and conglomerates in Haidushka pateka, Mollova kuria, Kaloyanovi kuli, Karandila, Gornaka, Karkyutyuk, Kamilata and Golyama Chataalka at an altitude from 641 to 1049 m. Its populations number from 11 to about 347 specimens on an area of 1.7 to 1720 m². Main threats to the populations of both species in the Natural Park are anthropogenic impact and adverse weather conditions during fruiting.

Zhelyazkova, T., D. Pavlov, **M. Gerdzhikova**. 2017. Influence of environment on yield structure characteristics and grain yield of peas grown in south-central Bulgaria. Book of proceedings "Agrosym 2017", 188-195.

ABSTRACT

Pea is a valuable leguminous crop essential for the balanced nutrition of men and animals. The aim of study was to establish the relationship between yield and yield characteristics of grain legumes spring pea (*Pisum sativum* L.) and wintering pea (*Pisum arvense* L.) and impact of climate factors of Central South Bulgaria on peas yield. The survey was conducted during 2004–2013 in the experimental base of the Plant Growing Department at Trakia University, Stara Zagora. The experiment was conducted by the block method in 4

repetitions. The plants were grown according to the conventional technology. Results obtained for the grain yield and structure components were statistically processed by ANOVA and regression equations among the yield and climatic parameters were developed. It was established that in the environment conditions of Bulgaria *P. sativum* were high productive, compared to *P. arvense*. Good correlations were found between the morphological characteristics. Interpopulation variation (94.48 – 99.90%) of the grain yield and yield characteristics was significantly higher compared to the intrapopulation. The values of the yield and yield structure characteristics depend in a great extent of climatic parameters. Regression equations were developed on this base, which allows preliminary assessment of peas grain productivity with approximate accuracy for practical purposes. Studies to determine the effect of pea variety and year showed that climate conditions over the years as factor had the highest impact on the yield (68.72%). The type of pea as factor had a higher effect on the morphological parameters and yield structure elements (42.54 – 96.28%).

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