

Tatar buckwheat in the conditions of the Western Forest-Steppe

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Purpose. To evaluate buckwheat of the Tatar variety 'Kalyna' according to morphological, productive and quality indicators in the conditions of the Western Forest-Steppe. **Methodology** The studies were carried out in the field crop rotation of the Research Center "Podillia" of the State Agrarian and Engineering University in Podilia (PDATU) in 2015–2019. The soil of the experimental field is overwhelmingly represented by low-humus, weakly silt-black earth. Bookmarks of experiments, material evaluation, analysis of plants, yield and grain quality were carried out in accordance with the generally accepted methods of state variety testing. An assessment of the buckwheat variety of the Tatar 'Kalyna' was carried out in comparison with the edible variety of buckwheat 'Victoriia'. **Results.** The growing season duration of buckwheat of the Tatar variety 'Kalyna' is 87 days (38 days vegetative and 49 days generative). In the studied variety, a larger number of the 1st order branches up to 5.5 pcs was

observed. The number of leaves on the plant was 22–28 pcs./plants. The analysis of the population of the variety under study indicates that 50% of the grains and more are located on the branches of the first order in edible buckwheat, this indicator is only 30%. Productivity is 2.28 t/ha, high grafting of inflorescences of 4.4 grains, edible buckwheat 0.72 t/ha, and 2.2 grains/inflorescence, respectively. The reaction of buckwheat of the Tatar variety 'Kalyna' to the effect of biotic and abiotic factors has been determined. The Ukrainian Institute for the Examination of Plant Varieties of Ukraine presents indicators of Tatar buckwheat (*Fagopyrum tartaricum* (L.) Gaerth.) varieties of 'Kalyna' of grain direction for use to obtain a patent for the variety. **Conclusions.** According to morphological, productive and quality indicators, resistance to biotic and abiotic factors, the buckwheat variety of the Tatar buckwheat 'Kalyna' is predominantly edible 'Victoriia' buckwheat in the conditions of the Western Forest-Steppe. To use the variety 'Kalyna' in breeding programs of the Scientific Research Institute of Cereal Crops named after A. Alekseeva PDATU and to obtain a patent.

Key words: growing season duration; morphological indicators; productivity and quality indicators.

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Plant protection and nutrient supply studies of fenugreek (*Trigonella foenum-graecum* L.)

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Purpose. The aim of our experiment was to determine the changes of fenugreek (*Trigonella foenum-graecum*) nutrient content and biomass in the two years under study as a result of nutrient

supply, plant protection and irrigation. Fenugreek is an annual herbaceous plant belonging to the legumes (*Fabaceae*) family. It is a multifunctional crop for use in domestic and farm animal feeds, wild fodder, herbs and spices. **Methods.** The experiment was carried out in open field on 100 m² plots in Kecskemét. Novatec premium fertilizer (15 N - 3 P₂O₅ - 20 K₂O - 2 MgO) was used in the research. The herbicide Pantera 40 EC (active ingredient content: 40 g / l quizalofop-P-tefuryl) was used for weed control. **Results.** In both years, after the crop emerged fenugreek seeds within a week. In 2018, the average height of plants was 30 cm for the start of harvest. On a plot of 100 m², the dry weight mean of mowed fenugreek is 13.15

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kg dry weight (300 kg / ha Mg treatment). According to our observations, the height of the fenugreek stock reached 50 cm in 2019. The dry weight mean after harvest is 28.2 kg dry weight (300 kg / ha Mg treatment). The results of the second experimental year are higher than the

first year. **Conclusions.** The magnesium fertilizer resulted in an increase in the green weight of the fenugreek.

Keywords: weed control; Fenugreek (*Trigonella foenum-graecum* L.); nutrient supply; open field experiment; yield.

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Early prediction of winter wheat (*Triticum aestivum* L.) grain yield using spatial normalized difference vegetation index

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Purpose. Early yield prediction is an important task of modern agriculture, providing great opportunities for better crop management and enhance the advantages of implementation of the systems of precision agriculture. Winter wheat is the major cereal crop in Ukraine. In order to forecast winter wheat (*Triticum aestivum* L.) grain yields prior to harvesting in the systems of precision agriculture, we developed prediction models on the basis of remotely sensed normalized difference vegetation index values at the stages of the crop tillering (stage 5) and heading (stage 10.1). **Methods.** The model of grain yield prediction has been developed on the basis of regression analysis of the field yield data of the crop, obtained during 2017-2018 at the research fields of the Institute of Irrigated Agriculture of NAAS, in connection to the spatial

vegetation index values in corresponding stages of the crop growth. Polynomial regression analysis was implemented in order to determine the link between the yields and vegetation index values at the two stages of the crop development. Statistical analyses were performed at $p > 0.05$. **Results.** The results of the study revealed the possibility of early (up to 60-70 days in advance in case of use the index values at the tillering stage) winter wheat grain yield prediction by linking the values of normalized difference vegetation index of the crop to its productivity. Approximation of the developed polynomial regression models proved that their accuracy is enough to provide reliable yielding forecasts: the mean absolute percentage error of the models is 7.76-8.53%, R^2 values for the prediction is 0.9331-0.9454. **Conclusions.** The developed polynomial regression models allow obtaining early grain yield prediction using spatial normalized difference vegetation index values. The models are easy to use and will be especially practical in the systems of precision agriculture.

Keywords: precision agriculture; regression analysis; remote sensing; yield forecasting.

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Germination seeds of millet genotypes under the influences of peg 6000 solution on the 3^d and 6th days

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Purpose. Screening drought tolerance of five varieties millet ('Omriyane', 'Kharkivske 57', 'Konstantinovske', 'IR 5', 'Slobozhanske') using as osmotic stress PEG 6000. **Methods.** Water stress was applied through six concentrations of PEG (6000 MW) (0.0% (control), 11.5%, 15.3%, 19.6%, 23.5% and 28.9%), with osmotic stress 0,0 (control) -1.9, -3.1, -4.8, -6.6 and -9.7 bars. **Results.** Results of this study revealed that water stress had significant negatively effects on seed germination,

root and shoot system of millet on the 3^d and the 6th days. Genotypes had significant differenced to water limited and new varieties with high level resistance to water stress can be created in breeding for drought resistance. Osmotic stress strongly suppressed seed germination of millet at a -3.1 bars (46.8%) and -4.8 bars (28.66%) on the 3^d day but on the 6th day, the number of germinated seeds increased 92.8%, 84.0% respectively. The minimum germination capacity was observed