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CREATION OF WINTER TRITICALE VARIETIES FOR DIFFERENT PURPOSES

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Aim. To create a model of the winter triticale variety for a special direction of use and select new raw material according to the parameters of this model. **Methods.** Field (evaluation of winter hardiness and resistance against diseases), laboratory (determination of grain quality indicators), and variational statistics (processing the obtained research results). **Results.** At the NSC “Institute of Agriculture of NAAS” they studied winter triticale varieties for bread-making and alcohol-distilled use (2019–2022). The varieties Poliskyi 7, Maietok Poliskyi, and Solodiuk were most suitable for the bakery sector, characterized by high protein content (11.3–12.9%), gluten (15.9–17.6) and low starch content (66.3–68.1%). Arystokrat, Liubomyr, Molfar, and Kotygoroshko, which had a high starch content (69.5–70.6%) and a low protein content (9.3–11.3%), were the best for the alcohol distillate direction of use. **Conclusions.** The parameters of the variety model for the bread-making and alcohol-distillation areas of using winter triticale were developed. According to these models, the varieties and lines that best met production requirements were selected. It was established that the varieties Arystokrat, Liubomyr, Molfar, and Kotygoroshko belonged to the alcohol distillation direction of winter triticale. New promising lines of competitive variety testing 191192/16, 149152/16, 8792/16, and 141144/16 were selected, which most

closely met the requirements of the alcohol distillate type of use. Varieties of bread-baking use Poliskyi 7, Poliskyi Maietok, and Solodiuk were selected. New promising lines of competitive variety testing 135140/16, 199200/16, and 161164/16 were selected, which most closely met the requirements of the bakery variety.

Key words: *selection, alcohol distillate and baking areas of use, variety model.*

In the world, triticale is grown on the square almost 4.2 million hectares with a gross harvest more than 20 million tons of grain [1]. Sown area triticale in 2022 in Ukraine was 11,000 hectares, the harvested crop is almost 40 thousand tons [2]. Breeding work on creation new varieties of winter triticale that correspond given parameters and requirements production, widely and successfully carried out in 70 countries of the world [1]. As of 2023 "State register of suitable plant varieties for distribution in Ukraine", entered 52 winter and 20 spring triticale varieties. Triticale breeding is carried out by various scientists institutions, educational institutions, medium which institutes, research stations and private ones enterprises in the following areas: grain and fodder varieties (with high grain yield); fodder for green mass (tall plants, with significant foliage); bakery and technical (suitable for processing into alcohol) varieties [3–5].

Triticale has been used for a long time mainly as a fodder crop, which contains a large amount of nutrients, necessary for feeding agricultural animals [6]. Through the low bakery grain quality previously created varieties triticale was not considered a promising raw material for bakery production and confectionery products. Thanks for now persistent and fruitful work of breeders new varieties of triticale have been created that correspond production requirements [7]. Modern varieties of triticale in many countries of the world quite widely used in various directions processing

Taking into account the economic circumstances production is gaining great importance in the world bioethanol (as fuel) from agricultural crops, in particular grain triticale, which is one of the best starch-containing raw materials suitable for

production alcohol [8]. Due to high enzymatic activity of triticale malt it is used in beer and kvass brewing [9]. Nowadays, in different countries of the world, scientists and manufacturers continue research on issues of the most appropriate use possibilities of triticale.

When creating triticale varieties for different directions of use, except high yield and resistance to diseases and adverse conditions, breeders decide other specific tasks [10]. For use for food purposes is required varieties with increased grain quality and high bakery characteristics, approaching the best varieties wheat When creating triticale varieties alcohol distillate or fermentation direction – with reduced protein content and high starch content.

The purpose of research is to create a model of special winter triticale variety use and select a new output material according to parameters of this model.

Research materials and methods. Experimental works on winter triticale breeding was carried out in selective crop rotation NSC "Institute of Agriculture of the National Academy of Sciences" in 2019–2022. The soil of the experimental site – forest gray, the predecessor – buckwheat. 30 kg/ha was applied under the main cultivation phosphorus and 30 potassium, in spring feeding crops – 45 kg/ha of nitrogen. System protection provided for the fight against weeds, pests and plant diseases from by applying Triathlon herbicide (0.05 kg/ha), Korvizar fungicide (0.8 l/ha), insecticide Presto (0.3 l/ha).

During the growing season of triticale the phases of plant development were noted in winter, evaluated winter hardiness, resistance to diseases, lying down using generally accepted research methods for field and laboratory experiments [11, 12].

Analysis of protein and starch content indicators in triticale grain was carried out in the laboratory conditions by the infrared method spectrometry on the Infratec 1241 device. Mathematical and statistical processing of the obtained research results were carried out for by the Statistica 8 program [13].

Research results. Varieties were studied winter wheat triticale and alcohol distillate directions of use. Varieties of special purpose must meet certain

requirements. So, for varieties of distilled spirits direction of use grains need to create a new one source material that would be characterized high yield, high content starch, with reduced protein content, as well as resistance to adverse environmental factors. Having analyzed the available varieties and production needs, we have developed model of the winter triticale variety distilled alcohol direction of use (Table 1). Winter triticale is undemanding to soils, however, like wheat, responds well for fertilizer application. Potential without them the yield of winter triticale was 4–5 t/ha, in the best years – 5–8.7 t/ha. With input fertilizers, it also increased in years with better weather conditions was 12 t/ha (Molfar variety).

Among those entered in the State Register varieties of plants suitable for propagation in Ukraine, created at the NSC "Institute of Agriculture of the National Academy of Sciences", models of the distillate alcohol variety direction of use correspond to the varieties Aristocrat, Lubomyr, Molfar, Kotygoroshko (Table 2). These varieties have a high starch content (69.5– 70.6%), reduced protein content (9.3– 11.3%) and high yield per application mineral fertilizers. In the best varieties spirit distillate direction of use the yield was 10.0–10.8 t/ha, the best lines – 10.2–10.7 t/ha.

Selected in the competitive variety test lines 191-192/16, 149-152/16, 87-92/16, 141-144/16, which most meet the requirements type of spirit distillate direction using. Starch content in these lines – 69.7–71.7%, protein – 9.1–10.2%. The productivity of the best lines was 10.2– 10.7 t/ha.

Varieties for baking purposes are characterized by a high protein content and gluten, resistance to adverse environmental factors. According to bakery requirements for grain quality we have developed a model of the triticale variety winter bakery direction of use (Table 3).

From those created at the NSC "Institute of Agriculture NAAS" and entered into the State register of varieties of plants suitable for distribution in Ukraine, models of the bakery variety correspond to the direction of use varieties Polisky 7, Mayetok Poliskiy, Solodyuk (Table 4). They are characterizedhigh protein content (11.3–12.9%) and gluten (15.9–17.6%), reduced starch content (66.3–68.1%). The

highest yield from bread varieties usage is noted in the standard Poliskyi 7 (10.8 t/ha), Mayetok Poliskiy (10.4), Solodyuk (10.2 t/ha).

Based on the parameters of the variety, which must be achieved when creating a new one source material, we in the competition in the variety test, lines were selected which most meet the requirements of the variety bakery direction of use. Lines 135-140/16, 199-200/16, 161-164/16 have protein content (10.8–12.5%), gluten (15.8–17.3), starch (67.6–69.3%). The productivity of these lines was 10.4– 10.9 t / ha.

Conclusions

The parameters of the model were developed that for bakery and alcohol distillate directions of use winter triticale. According to these varieties and lines of models were selected, which most meet the requirements of production It was established that to varieties alcohol distillate direction used winter triticale belongs to varieties Aristokrat, Lubomyr, Molfar, Kotyhoroshko New promising ones are highlighted lines of competitive variety testing 191- 192/16, 149-152/16, 87-92/16, 141-144/16, which most meet the requirements of the that of the alcohol distillate direction used becoming Selected varieties of bread-baking th direction of use Poliskyi 7, Mayetok Poliskiy, Solodyuk. New ones are highlighted promising lines of competitive variety production events 135-140/16, 199-200/16, 161-164/16, which most meet the requirements of the variety bakery direction of use.

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