VARIABILITY CHARACTERISTIC “MULTIPLE FLORETS” IN COLLECTION SAMPLES OF WINTER RYE

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Introduction. One of the ways to increase the yield of winter rye is to create varieties and lines that can sett three or more full grains into the spikelet. In ordinary varieties of rye in the germ rye sprouts 5-6 flowers are laid, but usually two or three are developed, and the rest are atrophied. As you know, the number of grains and fertility of the ear strongly depend on the influence of environmental factors precisely during the flowering, formation and filling of grain.

Standard rye ears, as a rule, have two flowers. Therefore, in our work the emphasis is on the study of multicultural samples of winter rye, which have more than two flowers in the spikelet, which not only create additional flowers, but also tie the grain from them. At the present time it is quite actual cultivation of three-flowered varieties already present in collections of winter rye.

Analysis of recent researches and publications. The yield of winter rye is largely due to the conditions of the environment, which complicates the selection of valuable genotypes for the harvest of grain and quantitative characteristics in general. Most researchers believe that the use of cross-breeds of unique forms that have more spikelets, flowers and grains can be one way to increase the productivity of grain crops. V.S Arbuzova and others in their breeding work with soft wheat put a great deal of emphasis on the study of the characteristic “multiple florets”.

However, in the rye, this sign is practically not studied and almost no data on the influence of “multiple florets” on the productivity of the ear and the nature of its inheritance in general. At the present time it is quite relevant to find new sources of “multiple florets” in winter rye and to study this feature in the context of its genetic characteristics.

Purpose - to study the manifestation of the characteristic “multiple florets” in the collection varieties of winter rye for their further use in the process of hybridization to create new hybrids and varieties.

Methods. The research was carried out at the breeding crop rotation at the NSC "Institute of Agriculture of NAAN", Chabany settlement, Kyiv-Svyatoshinsky district, Kyiv region. Seven varieties were investigated: three

varieties of breeding of the NSC "IZ NAAN" - Siverske (grade-standard), Intensivne 95, Levitan, and four varieties of the Institute of Plant Cultivation named after Yuryeva NAAN - Pamiat Khudoierko, Zatva, Khamarka and Irina. The Levitan variety is a new multi-flowered cultivar. The sowing of winter rye collections was carried out manually in the first decade of October, three-row sections, 1 m. For 2015-2016, a structural analysis of plants has been carried out in all the characteristics, but only a few of them are presented in the work, namely: the total number of flowers in the ear, the number of basic formed and fertile flowers, the number of formed and fertile additional 3 and 4 flowers in the spikelet (pc.), the number of grains in the ear, % fertility, the weight of grain from the ear and plants, the weight of 1000 grains.

Results. The characteristic “multiple florets” was studied from the point of view of the total number of formed main and additional flowers in the spikelet and spike in general. Each of the studied varieties showed different values of the main and additional flowers in certain ranges of its “multiple flowers” nature.

The largest number of flowers was found in Irina, Levitan and Siverske (more than 100 flowers), but the highest fertility was observed in such varieties as Khamarka (95-94%), Zatva (98-82%), and Pamiat Khudoierko (96- 87%). The smallest fertility had the multi flowered varieties, namely Irina (73-78%) and Levitan (81-80%).

The multi flowered rye phenotype is very dependent on the environment, which prevents the genotype from being established by classical hybrid analysis. For two years of research, the varieties of Kharkiv breeding have been stable in terms of the number of flowers: Zatva, Khamarka and Pamiat Khudoierko. These three varieties of specimens are genetically two-flowered according to the morphological structure of the ear, however, to a certain extent, there was a manifestation of the signs of “multiple florets”.

The standard Siverske, varieties Intensivne 95 and Irina showed themselves as three-flowered varieties, because the third flower is fertile and binds the full third grain in the spikelet, as compared to non-fertile third flowers in two-flowered varieties.

One of the main elements of the rye crop structure is the productivity of the ear and the mass of grain from the ear. In 2015, spikes were more sophisticated than in 2016. Thus, on average, the total weight of grain from the ear in 2015 ranged from 2.78 g (Khamarka) to 4.29 g (Levitan). The average value for the varieties was 3.65 g. In 2016, the value of this feature varied in the range from 2.25 g (Zatva) to 3.95 g (Levitan). The average for the research year 2016 was 3.14 g, which is 0.49 g less than in 2015.

In the total weight of grain from the ear, the 3-flowered grain from the third additional flowers was added. Thus, the increase was on average 0.21 g and 0.15 g respectively, over the years. The multi-flowered variety Levitan had higher grain weight values from the ear - 3.95 - 4.29 g, which is more by 0.22 - 0.37 g than the Siverske standard. However, there was no significant effect on the increase in the weight of grain from the ear of additional fertility fourth flowers, since the grain was skinny, shallow and insufficiently filled.

The weight of the grain from the ear is an integral feature, which includes the number of grains in the ear and a mass of 1000 grains. The weight of 1000 grains from a plant is an indicator of grain size and filling, which is one of the important elements of the structure of the crop.

There was also a positive dynamics of grain weight gain from the plant and a mass of 1000 grains (Fig. 4). For 2015, the weight of the grain from the plant was in the range from 38.2 g (Khamarka) to 46.2 g (Levitan). On average, in 2015, the weight of 1000 grains was 42.2 g. In 2016, the weight of 1000 grains was slightly lower - 36.9 g. The weight of grain from the plant, respectively, was higher in those samples where the weight of 1000 grains was higher.

Conclusions. Fertility additional flowers have a positive effect on the formation of the mass of 1000 grains and the weight of the grain from the plant. During two years of research, the varieties were stable in terms of the number of flowers - Zatva, Khamarka and Pamiat Khudoierko. These three sorts are genetically two-flowered according to the morphological structure of the ear, however, to a certain extent, there was a manifestation of the signs of “multiple florets” (isolated solvent three-flowered spikelets were discovered).

The standard Siverske, varieties Intensivne 95 and Irina showed themselves as three-flowered varieties, because the third flower is fertile and binds the full third grain in the ear colts, as compared to non-fertile third flowers in two-flowered varieties.

The new variety Levitan has proven itself as a multi-flowered, capable of forming an additional third and fourth flower that is promising in the breeding of rye. The variety showed the highest values of the weight of grain from the ear - 3,95 - 4,29 g, which is more by 0,22 - 0,37 g that the standard Siverske, and one of the highest weight of 1000 grains - 38,9 - 46,2 g.