

Reaction of different winter triticale varieties on application of retardant

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Wide introduction on fields of Belarus of highly productive culture winter triticale demands application of highly effective technologies. In the conditions of an optimum level of nitric fertilizers, fast growth of the stem and water accumulation are observed during VI stage of organogenesis that leads to considerable decrease in mechanical durability of a stem. About 80-90 % of cases of drowning of grain crops occurs during the period between VI stage of organogenesis and VIII stage of organogenesis that is connected with ear weighting [1, 2].

Losses of a crop from drowning are about 30% [3].

In Belarus, retardants are widely applied. However, it is a lot of disagreements concerning application terms of retardants and degrees of their influence on morphological and anatomic properties of plants.

Materials and Methods

Field experiments were realized on some of the fields of the Belarussian state agricultural academy. Soil of the fields was sward-podzolic lightly loamy with the maintenance in arable horizon humus 1,98-1,95 %, P₂O₅ - 154-159 mg/kg of soil and K₂O - 178-183 mg/kg of soil. pH - 6,6-6,9. Norm of seeding was 4,0 million grains per hectare. For researches, the varieties of Belarus selection have been chosen as follows: Mikhas, Dubrava and Run. Dubrava is a long stem variety. Mikhas and Run are short stem varieties.

For our research, retardant clormecvatlorid 460 BASF (Germany) has been chosen. It was brought in various terms of plant vegetation (IV stage of organogenesis - 2 kg/h; IV stage of organogenesis - 1 kg/h + V stage of organogenesis - 1 kg/h; V stage of organogenesis - 2 kg/h) with different levels of nitric fertilizer (N₉₀, N₁₂₀ - in the spring in a IV stage of organogenesis and N₄ in the spring in V stage of organogenesis + N₅₀ in a VI stage of organogenesis). The anatomic structure analysis was realized on the time preparations of cross-section of stems of the central part of internode.

Results and discussions

The variety Mikhas has highest responsiveness on application of retardant. So, on the average results for years of researches, the greatest increases of productivity have been noted on variants for which the combined processing retardant with nitric fertilizers have been applied at IV and V stage of organogenesis. That can be explained by the morphological features and the variety potential. The changes of productivity level by years on a variety Run have the most leveled character with application of retardant. On varieties Mikhas and Dubrava, the efficiency of retardant was depending on the weather conditions.

The big consumption of nitrogen by a plant at the growth initial stages leads to increase the number of productive stems, to an insufficient food of the main stem and, as consequence, to the formation of a long and thin stem.

Development of plants directly proportionally depends on level of a nitric food. The increase of dose of brought nitrogen in a combination with retardant promoted the best accumulation of a biomass. less drowning and, as consequence, to great increases of productivity.

The plants were the steadiest against drowning in variants for which retardant was applied at IV stage of organogenesis. On these variants, stability to drowning was at the level of 8-9 points.

It is necessary to notice that the biggest level of drowning stability was obtained with the reduction and the thickening of bottom internode. The first internode decreased more than 50 %. At a variety of Mikhas with single entering 120-kg of nitrogen, that internode had decreased from 4,0 sm to 1,2-

1,3 sm with processing of retardant at the IV stage of organogenesis. The similar tendency was observed on the varieties Dubrava and Run.

The biggest crop of grains has been obtained under influence of retardant in years with a lack of moisture. However, influence of retardant was stronger in years with superfluous humidifying, while the general level of productivity was more low, but for which an additional crop was obtained from application of retardant, with considerable result above the usual value.

Entering of retardant only at V stage of organogenesis has appeared untimely to shift balance phytohormones in the plant towards strengthening inhibitors that has affected the rates of increase, the linear sizes and, as consequence, the productivity.

Change of a thickness of a wall and diameter of a stem reflects an indicator of the area of the executed part of the stem. For the variety Mikhas, in last internode to the ear area, the value of the executed part has been fluctuating from 0,43 to 0,52 mm² on variants without application of retardant, and increasing from 0,53 to 0,67 mm² on variants with retardant. With reduction of level of stem, the area of the executed part was increased. The mechanical tissue was better developed at the bottom internode for the plants that had been growing up with retardant at IV stage of organogenesis. Compared to the variety Mikhas, the variety Dubrava gives plants with a stem of bigger diameter according to level of nitric food, but with stem walls thinner. Responsiveness on the retardant is similar to the variety Mikhas. The most successful combination of indicators is noted on variants with double entering of retardant. The plants of variety Dubrava processed with retardant on variant N₁₂₀, have a wall stem more thin than the variety Mikhas for similar variants.

On a variant where processing of retardant was combined with fractional entering of N₁₂₀, it was not possible to reach an even thickening of a ring of sclerenchyma from the top to the bottom.

Processing of retardant on the plants at the V stage of organogenesis, the width of a peripheral ring of sclerenchyma essentially has not changed.

Influence of retardant on quantity of spending bunches is not essentially.

Clormecvatclorid prevents drowning of winter triticales varieties Mikhas, Dubrava and Run, without reducing its productivity. Application of retardant increases a thickness of the wall of the stem and increases a ring of sclerenchyma. The greatest shortening effect is noted in variants with application of retardant in the IV stage of organogenesis. The optimum combination of anatomic, morphological and productivity indicators is reached in variants where joint entering of nitrogen with retardant in an IV stage of organogenesis (N₉₀ with 1 kg/hectare Clormecvatclorid 460 BASF) and in a V stage of organogenesis (N₃₀ with 1 kg/hectare Clormecvatclorid 460 BASF).

References

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