PECULIARITIES OF PIGMENT COMPLEX FUNCTIONING OF WINTER WHEAT PLANTS DEPENDING ON THE FERTILIZER APPLICATION METHOD

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To obtain the maximum yield of winter wheat, it is necessary to further optimize the existing cultivation technologies in order to adapt them to changing environmental conditions. One of the adaptation areas of plants to adverse abiotic factors is the active functioning of the photosynthetic apparatus, which depends on the amount of nutrients introduced.

Maintaining the active functioning of the photosynthetic apparatus of winter wheat leaves is one of the decisive factors in the formation of a high and qualitative crop yield. Optimal nitrogen supply of plants due to foliar feeding, as well as phosphorus-potassium nutrition. Photosynthetic pigments (a and b chlorophyll and carotenoids) reflect the physiological state of plants, their photosynthetic potential and capacity measurement, modeling and forecasting the effectiveness of the applied cultivation technology. Foliar treatments effectively fill the nutrient deficiency and can be used as the main method of providing plants with the necessary trace elements.

Therefore, the purpose of our study is to determine the impact of the fertilizer application method on the pigment complex condition of winter wheat plants in the Southern Steppe of Ukraine.

Two varieties of winter wheat have been used: Shestopalivka is the most common in the south-eastern region of Ukraine, which belongs to the varieties with physiologically dual nature and Mason variety is a Canadian transgenic winter wheat one, scientifically developed in 2016 on the basis of nano-technologies by transforming wheat DNA cells. The two-factor experiment scheme involved establishing the effect of pre-sowing application of potassium fertilizers (K0; K12) and foliar treatment of plants with different tank mixtures in the phase of the beginning of the tube: urea (N (control)); urea + magnesium sulfate (N + Mg); urea + magnesium sulfate + potassium monophosphate (N + Mg + LCD) for the content of basic photosynthetic pigments. Urea consumption rate is 10 kg / ha, magnesium sulfate rate is 2 kg / ha, potassium monophosphate rate is 1 kg / ha.

The pigment content has been determined by fresh leave shattering of winter wheat and grinding them in a porcelain mortar. CaCO3 and a solvent in the form of acetone have been added. The pigment content has been determined using a spectrophotometer 2800 UV / VIS SPEKTROPHOTOMETR at a wavelength of 440.5; 644 and 662 nm.

As the results of the research have shown, the analyzed varieties of winter wheat differed in the pigment content and their ratio.

Thus, before the foliar treatment, the *a*-chlorophyll content in the winter wheat plant leaves of the Shestopalivka variety was 15%, and carotenoids - 16% more compared to the Mason variety. At the same time, the *b*-chlorophyll content on the contrary was higher for the variety Mason by 17%, which may be due to the plant adaptation of this variety to lack of light.

Pre-sowing application of potash fertilizers has been led to a decrease in the pigment concentration in the BBCH 31 stage in the plant leaves of both winter wheat varieties, which can be explained by the active growth of leaf surface area and their corresponding growth dilution.

On the 3rd day after foliar treatment, a decrease in the pigment content in the plant leaves of all experimental variants was observed, which was again due to the active growth of the photosynthetic surface and a decrease in the total dry matter mass. There

was no significant difference in the pigment content between the options with sowing of potash fertilizers and without the use of such agro-methods.

Foliar treatment of plants contributed to the growth of both chlorophyll and carotenoid content for plant leaves of both studied varieties. The highest efficiency of this agricultural method has been recorded in the variants of urea complex application with magnesium sulfate and potassium monophosphate both against the background of pre-sowing application of potassium fertilizers and without it.

On the 10th day after foliar treatment, an increase in chlorophyll content was observed, which indicates the gradual adaptation of the photosynthetic apparatus of winter wheat plants to environmental conditions.

Foliar treatment of winter wheat plants with phosphorus-potassium fertilizers (N + Mg + RK) contributed to a further increase in the content of *a*-chlorophyll by 12-23%, and *b*-chlorophyll by 5-37% depending on the variety compared to the control. Moreover, the highest efficiency of this agricultural method has been observed for plants of the variety Mason, both against the background of potassium fertilizers and without them.

The carotenoid content in comparison with the previous analyzed period has not changed, which also confirms the stable operation of the leaf apparatus at this stage of plant development.

The highest LCC activity at all analyzed stages has been observed for plants of the Mason variety, which may be a consequence of adaptation to the deterioration of lighting conditions due to the active growth of the leaf surface area and is consistent with the above information.

The research results testify to the high efficiency of complex application of nitrogen-phosphorus-potassium fertilizers for foliar treatment of winter wheat plants in the BBCH 31 stage both against the background of pre-sowing application of potassium fertilizers and without it.