

Mgr inż. Michał Noworól

The reaction of winter wheat varieties on the level of intensity of production technology.

Summary

The following research on selected winter wheat varieties' reaction to different levels of production technology intensity, was conducted in the Empirical Field of Subcarpathian Agricultural Consultancy Centre in Boguchwała, near Rzeszów (N 49°59' E 21°57'), in the years 2012 - 2015. Field experiments were carried out in a split-block design, in four iterations. Variable factors: I) the levels of production technology intensity: low input technology, high input technology, II) winter wheat varieties: Tonacja (A), Bogatka (B), Figura (A), Muszelka (B), Smuga (A), Batuta (B), Akteur (A), Ostroga (A), Komnata (hard), Jenga (B), Mulan (B), Naridana (A).

Neither production technology nor the variable factors had any influence on the plants' growth and development until stage BBCH 21. The high input technology crops entered the next stages 1-2 days later than their low input technology counterparts. Intensifying production technology to a high input level caused a considerable increase in chlorophyll content, chlorophyll *a* fluorescence parameters (F_v/F_m , PI) and gas exchange (P_N , E , g_s) in a flag leaf in stage BBCH 55, as well as an ear length, quantity of spikelets in an ear, ear quantity per 1 m² the bulk density of grain, wet gluten content in grain, total grain and protein yields, the energy content of yield, and considerable decrease in plant height. High input technology cultivation limited the presence of pathogenic fungi on plants.

Noticeably, the Komnata variety had the lowest grain yield, while the other varieties did not differ substantially in terms of yield. In both tested production technologies, the grain yield was correlated positively with the ear length, the mass of grain from an ear, ear quantity per 1 m², and physiological process occurring in a plant: P_N (Intensity of photosynthesis net), E (Intensity of transpiration), chlorophyll content, F_v/F_m (Maximal quantum yield of PSII), F_v/F_0 (Ratio of the variable to minimal fluorescence), PI (Performance Index) i WUE (Water-use efficiency). The grain yield was correlated negatively with C_i (Substomatal CO₂ concentration). Moreover, the low input technology grain yield was positively correlated with LAI (Leaf area index) in stage BBCH 55 and the quantity of grain in an ear. The high input technology grain yield was positively correlated with quantity of spikelets in an ear, while negatively correlated with the surface area and the mass of a flag leaf.