Summary

This paper presents the results of a three years field experiments on winter triticale conducted during the 2011/2012, 2012/2013 and 2013/2014 growing seasons. These experiments were located on good wheat soil complex, quality II soil class in Boguchwała (21^{o}57 'E, 49^{o}59' N). The trials were carried out as two factors in a split-block system, with 4 replications.

The aim of this study was to assess the impact of production technology on vegetative growth, yield, components of its structure, grain quality and selected physiological processes (photosynthesis) as well as canopy architecture indicators of ten winter triticale cultivars (Agostino, Alekto, Algoso, Baltiko, Borowik, Elpaso, Fredro, Maestrozo, Pizarro, Todan). Production technology were diversify on nitrogen and pesticides doses.

These study results have shown that vegetation process in winter triticale including its lenght depended on the technology and cultivars from stem elongation. Production technology had no impact on the chlorophyll content and gas exchange in flag leaves and canopy architecture indicators, but had significant influence on increase maximum efficiency of PSII ratio in BBCH 32 and BBCH 51-54 phases. The highest chlorophyll content in BBCH 32, BBCH 51-54 and BBCH 73 phases distinguished cultivares Elpaso, Borowik, Alekto, Agostino and LAI index stood preferably in the cultivares Baltiko, Elpaso and Alekto. The highest values of the Fv/Fm and PI parameters was characterized by the cultivar with the highest yield – Agostino. The highest intensity of net photosynthesis had Agostino and Fredro cultivares, the intensity of transpiration – in Alekto, stomatal conductance - in Agostino, Alekto cultivars and the intracellular concentration of CO_2 - in Todan. The most effective water use efficiency had Pizarro and Maestrozo cultivars. Intensification of production technology resulted in a decrease in plant height and increase spike density per $1m^2$, grain weight of the spike, 1000 grains weight and test weight and significantly reduced plants diseases caused by fungi.

In high input technology has been a significant increase in grain yield (27.5%), straw (11.5%), protein (31.2%) and the energy value of grain yield (27.5%) compared to low-input technology. The highest grain yield in low-input technology has released in Agostino cultivar and in high-input technology tested cultivars yielded similar. In both technologies, the production of grain yield was positively correlated with the mass of grains per spike, 1000 grain weight, spike lenght, spike density per 1 m^2, yield of straw and gas exchange parameters (Pn, Gs) but negatively correlated with LAI.

Increasing production technology resulted in a significant increase in content in the grain triticale total protein and P, Fe and Mn but not modified the relationship between the elements. Grain cultivars of winter triticale characterized by too low in relation to the nutritional needs of animals the values of the proportion of Fe : Mn, Ca : P and high K : Na. Closest to the optimum ratio K : (Ca + Mg) have a cultivars Todan and Baltiko, the proportion of Ca : P - Elpaso and Baltiko, Fe : Mn - Elpaso, Mn : Zn - Algoso.