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Effect of nitrogen fertilization on the yield and grain quality of new varieties of oat and naked oat

Summary

The compilation includes the results of research about variety of oats hulled and naked oats. The data obtained in outdoor experiment, taken in 2014-2016 on the brown soil produced from loess soil, the composition of which is granulometry ordinary dust. According to agronomical categories, that soil was included to the middle complex of wheat, the class bonitation IIIa. The experiment was located in the Teaching-Research Station in The Faculty of Biology and Agriculture in Krasne near Rzeszów (50° 03' N; 22° 06' E). The experiment was executed as two-factors; these factors were: I factor the level of nitrogen fertilization and II factor the variety of oats hulled (Bingo and Gniady) as well as naked oats (Nagus and Maczo).

The nitrogen was applied in the amount of; 40 kg:ha, 80 kg:ha, 120 kg:ha. During the supervision the fertilization was not applied.

The researches that were taken proved the existence of differences in the reaction of given varieties for the nitrogen fertilization according to the course of growth, crop of grain and its chemical composition as well as the course of physiological processes. It was shown that the nitrogen fertilization did not have any important influence on the course of plant growth. Higher doses extended the growing season only to 1-2 days. The growing season was quicker in the naked forms than not naked ones, which were turned out to be more resistant on lodging. Better in crops were normal varieties (even after the hull was taken), however fertilization increased the crop of grains. The nitrogen fertilization increased the mass the thousand of grains and the mass of grains from panicle. It shows the increase of general protein content under the influence of nitrogen fertilization but the decline of raw fat content. The increase of the level of nitrogen fertilization caused the increase of protein in the crop in general and ash as well as the decline of raw fat content, fibre and the compound of nitrogen-free compounds. The hulled varieties contained less protein and fat and more fibre. The content of macroelements in the grain did not change importantly under the influence of increasing doses of nitrogen fertilization, except

for sulphur, that the amount was increasing with the rise of nitrogen doses. The significant differences were observed in the individual forms of oats. Examined forms of oats differed in the content of macro- and microelements in the grain. Naked varieties had higher, in contrast to the hulled forms, content of assimilable forms of K, P, Mg, S, and lower Ca. They were characterized higher content of microelements like Cu, Fe and Zn, and Lower Mn. The growth of nitrogen fertilization from 80 to 120 kg-h in the examined varieties, resulted in the increase of the content of S, Mn and Zn in the grain. The nitrogen fertilization had the positive impact on the index of the greenness of the leaf. The most chlorophyll in the leaves had the plants of oats, in addition to which the highest growth proved taking the dose between 40 and 80 kg-ha. The naked oats was characterized by higher content of chlorophyll in contrast to hulled oats.

The nitrogen fertilization influenced on the rise of the value indicator intensity of photosynthesis. The highest parameters of performance PSII and the time of gaining the maximum fluorescence of the chlorophyll in the oats plant were achieved by the nitrogen fertilization 120 kg-ha. Hulled oats showed similar indicators of performance PSII, in contrast to naked oats. The variety of Gniady was characterized by the longest time of growth of the maximum fluorescence of the chlorophyll in comparison to the variety of Bingo and the naked form of oats.

The increasing nitrogen fertilization caused the growth of the index of the leaf surface (LAI) and the diminution of the gradient angle (MTA). Hulled oats was characterised by the higher value indicator LAI in contrast to naked oats. The nitrogen fertilization did not influence on the fuel value of the grain of oats. The naked varieties, due to less amount of ash and higher fat content, were characterized by the better fuel parameters.

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