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EFFECT OF NITROGEN FERTILIZER ON GRAIN WEIGHT PER SPIKE IN TRITICALE UNDER CONDITIONS OF CENTRAL SERBIA

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Abstract

Variability of grain weight spike⁻¹ was studied in four triticale genotypes: 'KG-20', 'Tango', 'Odyssey' and 'Favorit', grown over a two-year period under four mineral nitrogen fertilizer treatments, 0, 40, 60 and 80 kg N ha⁻¹. The experiment was set up as a randomized block design in four replications. Averaged across genotypes, grain weight spike⁻¹ increased with increasing nitrogen rate. On average, grain weight spike⁻¹ in both growing seasons and under N treatment was highest in 'Favorit' and lowest in 'Tango'. Nitrogen fertilization made the largest contribution to the total phenotypic variance of grain weight spike⁻¹, cultivar was a considerably smaller contributor, and a low percentage was assigned to cultivar x nitrogen interaction. The results indicate that the value of the trait is significantly dependent on cultural practices.

Key words: *triticale, grain weight, spike, nitrogen*

Introduction

The combination of the high yield potential and good grain quality of wheat with the resistance/tolerance to biotic and abiotic stresses of rye resulted in the creation of a new small grain crop named Triticale (*x Triticosecale* Wittmack). Triticale breeding programs are mostly focused on major economic traits such as grain yield, biomass yield, nutritional value, earliness and grain filling percentage.

Triticale has moderate soil requirements and a good tolerance to low pH (about 5.0), with many genotypes showing better adaptation to acid soils compared to wheat cultivars (Oettler et al., 2000). As a new promising plant, triticale can also give satisfactory yields at high altitudes (Stošović et al., 2010). Moreover, triticale is highly tolerant of unfavourable weather conditions (Nožinić et al., 2009).

In recent years, triticale yields have ranged from 4 to 10 t ha⁻¹. Grain number per spike and grain weight per spike as direct yield components are determined by gene action under the influence of the environment (Mladenov et al., 1998; Malešević et al., 2010). Triticale is characterized by a high number of grains per spike and high grain weight per spike and per plant (Benbelkacem, 2002; Milovanović et al., 2006; Kondić et al., 2013).

To obtain high yields and good grain quality in triticale, special importance should be given to cultivar choice and proper cultural practices, particularly optimum nitrogen fertilization. Increasing nitrogen fertilizer rates generally increases grain yield in triticale (Stošović et al., 2010). However, high N rates may lead to moisture deficit stress due to intensive vegetative growth drawing on soil moisture reserves to the detriment of subsequent grain fill. Increased nitrogen application rates in small grains cause more intensive vegetative growth, more spikes m⁻², fewer grains per spike and variable grain weight (Paunović et al., 2006; Madić et al., 2013). The soil moisture x nitrogen level interaction is the main determinant of grain yield (Gonzales Ponce et al., 1993).

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