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GRAIN YIELD, YIELD COMPONENTS AND MALTING QUALITY TRAITS OF SPRING BARLEY ON ACIDIC SOILS

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Abstract

A varietal trial involving six genotypes of spring barley (‘Jastrebac’, ’Dinarac’, ’Dunavac’, ’NS-404’, ’Jaran’ and ’Lider’) was conducted over a three-year period at the farm estate of the Secondary School of Agriculture and Chemistry, Kraljevo (Serbia) (the experimental field of the Faculty of Agronomy, Čačak) on an acidic soil (pH_{H2O} 4.5). The following traits were analysed: stem height, spike length, grain number per spike, thousand-kernel weight, grain yield, total germination capacity, grain protein content and extract content. Regardless of year, stem height was significantly higher in ’Dunavac’ and ’Jaran’ than in the other cultivars. The highest stem height in all cultivars was obtained in the second year. Spike length, grain number per spike and 1000-kernel weight were significantly higher in ‘NS-404’ compared to the other cultivars. Variations in grain yield across years were the lowest in ‘Jaran’ and ‘Dinarac’. Total germination capacity was significantly higher in ’Jastrebac’ than in the other cultivars in the first and second years. The significant increase in protein content in both years on average for all cultivars was accompanied by a significant decrease in malt extract, and vice versa. The high protein content in some cultivars along with the high malt extract content suggests that the strength of correlation between the traits is dependent on environmental conditions. Although the soil had poor physical and chemical properties, all cultivars had their 1000-kernel weight, total germination capacity, protein content and malt extract content within the standardised limits.

Key words: *barley, grain yield, yield components, malting quality traits*

Introduction

The proper choice of cultivar is of special importance in obtaining high grain yields in good-quality malt barley. In addition, different soil and climate conditions, notably temperature and moisture content during grain fill (Passarella et al., 2005) can largely contribute to variations in major yield components and, hence, total yield and grain quality of malting barley (Atlin et al., 2000; Paunović et al., 2007; Madić et al., 2009). Pržulj et al. (2014) stressed that temperature and rainfall do not play the leading role in determining grain yield and quality of malting barley since grain quality is often poor when these factors approach optimal values. Moreover, grain yield and quality attributes in barley are affected by certain cultural practices such as nitrogen fertilisation (Pržulj and Momčilović, 2008; Marconi et al., 2010). As stressed by Pržulj and Momčilović (2002), realising the full yield and quality potential in barley necessitates strict adherence to production technology, given the precise quality requirements of the brewing industry for barley grain and malt. To ensure high quality of raw materials, new cultivars should be analysed for their traits and introduced into the production system, and cultivar choice made for a specific region. Grain quality i.e. malt extract content is largely dependent on growing conditions (temperature, available moisture, available N, fertilisation)