

# Učinkovitost gnojidbe ozime pšenice dušikom

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## Sažetak

Cilj rada je bio utvrditi učinkovitost gnojidbe ozime pšenice dušikom na temelju prinosa zrna ozime pšenice, iznošenja dušika prinomom zrna i pristupačnosti mineralnog dušika u tlu s ciljem optimizacije gnojidbe dušikom. U sezoni 2013/2014. proveden je poljski pokus gnojidbe pšenice dušikom u četiri razine: 0 kg N ha<sup>-1</sup> (kontrola), 140 kg N ha<sup>-1</sup> (optimalna gnojidba), 105 kg N ha<sup>-1</sup> (smanjena gnojidba) i 175 kg N ha<sup>-1</sup> (povećana gnojidba). Pokus je postavljen na dva lokaliteta Josipin Dvor i Ernestinovo, te su uzgajane dvije sorte ozime pšenice Srpanjka i Renata. Gnojidba dušikom je prema rezultatima prosječnih prinosa zrna za oba lokaliteta i obje sorte rezultirala značajnim povećanjem prinosa u odnosu na kontrolni tretman. Raspon visine prinosa zrna pšenice je iznosio od 3,94 t ha<sup>-1</sup> (kontrola) do 5,96 t ha<sup>-1</sup> (povećana gnojidba). Iako su primjenom gnojidbe dušikom povećane prosječne koncentracije dušika u zrnu pšenice na oba lokaliteta, utvrđene razlike između koncentracija dušika nisu bile statistički značajne. Između dvije sorte pšenice je zabilježena značajna razlika prosječnih koncentracija dušika u zrnu, koja je za sortu Srpanjka iznosila 1,09 %, a za sortu Renata 1,27 %. Značajna promjena pristupačnosti dušika u tlu uslijed primjene gnojidbenih tretmana zabilježena je za amonijski dušik na lokalitetu Ernestinovo za dubinu tla od 0 do 60 cm. Rezultati ukazuju da je optimalna gnojidba na lokalitetu Ernestinovo rezultirala značajno najvećim povećanjem pristupačnosti amonijskog dušika u tlu prije prve prihrane (25,36 mg N-NH<sub>4</sub> kg<sup>-1</sup>), dok je prije druge prihrane značajno najvećim povećanjem pristupačnosti amonijskog dušika rezultirala povećana gnojidba (40,74 mg N-NH<sub>4</sub> kg<sup>-1</sup>). Učinkovitost ozime pšenice u korištenju dušika bila je prema prosječnim vrijednostima za obje sorte najveća za smanjenu gnojidbu (28,23 %), a najmanja za povećanu gnojidbu (18,94 %). Ostvareni prinos po jedinici hraniva dodanog gnojidbom (agronomska učinkovitost) također je obzirom na prosjek obje sorte bio najveći za smanjenu gnojidbu (49,51 kg kg<sup>-1</sup>) i najmanji za povećanu gnojidbu (30,58 kg kg<sup>-1</sup>). Prema tome, agronomska učinkovitost gnojidbe ozime pšenice dušikom je opadala s porastom doze gnojidbe.

Ključne riječi: gnojidba dušikom, ozima pšenica, učinkovitost korištenja dušika, agronomska učinkovitost

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# The efficiency of winter wheat nitrogen fertilization

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## Abstract

The aim of the study was to determine the effectiveness of winter wheat nitrogen fertilization based on grain yield of winter wheat, nitrogen removal by grain yield and the availability of mineral nitrogen in the soil in order to optimize nitrogen fertilization. Field experiment of winter wheat nitrogen fertilization was conducted in four levels: 0 kg N ha<sup>-1</sup> (control), 140 kg N ha<sup>-1</sup> (optimal fertilization), 105 kg N ha<sup>-1</sup> (reduced fertilization) and 175 kg N ha<sup>-1</sup> (increased fertilization) in the season 2013/2014. The experiment was set up at two sites Josipin Dvor and Ernestinovo, and two cultivars of winter wheat Srpanjka and Renata were grown. Nitrogen fertilization resulted in a significant increase of grain yield compared to the control treatment according to the average results of the grain yield for both sites and both cultivars. The average grain yield ranged from 3,94 t ha<sup>-1</sup> (control) up to 5,96 t ha<sup>-1</sup> (increased fertilization). Although the application of nitrogen fertilization increased average nitrogen concentrations in wheat grain at both sites, determined differences between the nitrogen concentrations were not statistically significant. A significant difference in average concentrations of nitrogen in wheat grain was recorded between the two wheat cultivars, which for the cultivar Srpanjka was 1,09 %, and for the cultivar Renata 1,27 %. A significant change in the nitrogen availability in soil due to the application of fertilization treatments was observed for ammonium nitrogen at the site Ernestinovo for soil depth 0-60 cm. The results indicated that the optimum fertilization on the site Ernestinovo resulted with significantly the highest increment in the availability of ammonium nitrogen in the soil before the first top dressing (25,36 mg N-NH<sub>4</sub> kg<sup>-1</sup>), while before the second top dressing, increased fertilization resulted with significantly the highest increment of ammonium nitrogen availability (40,74 mg of N-NH<sub>4</sub> kg<sup>-1</sup>). The nitrogen efficiency use of winter wheat was according to the average values for both cultivars, the highest for reduced fertilization (28,23 %), and the lowest for increased fertilization (18,94 %). Yield per unit of added nutrient by fertilization (agronomic efficiency) was according to the average values for both cultivars also the highest for reduced fertilization (49,51 kg kg<sup>-1</sup>) and the lowest for increased fertilization (30,58 kg kg<sup>-1</sup>). Accordingly, the agronomic efficiency of winter wheat nitrogen fertilization was decreasing with increase of fertilization doses.

Key words: nitrogen fertilization, winter wheat, nitrogen efficiency use, agronomic efficiency

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