



UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM Timisoara
**Multidisciplinary Conference on
Sustainable Development**
21 – 22 May 2026



INFLUENCE OF NITROGEN APPLICATION ON THE YIELD AND QUALITY OF BARLEY AND TRITICALE FEED GRAINS

Teofil Gavrić*, Dženan Hadžić, Muamer Bezdrob, Merima Makaš, Emina Sijahović
University of Sarajevo, Faculty of Agriculture and Food Sciences, Bosnia and Herzegovina

*correspondence: t.gavric@ppf.unsa.ba

• Introduction

Cereals are used in livestock nutrition because of their high dry-matter yield and low production costs. Various types of grain are used as animal feed. The quality and yield of cereals depend on the application of different agronomic practices. Therefore, this study aimed to investigate the effects of different nitrogen doses on the yields and quality of barley and triticale in the central Bosnia and Herzegovina (B&H) environment.

• Material and method

The field experiment was carried out during the 2024 and 2025 growing seasons at Sarajevo, B&H. The experiment was set up using a split-plot design.

The treatment consisted of two nitrogen supplementation doses (60 and 80 kg N ha⁻¹) and two cereal species (Barley cv. LG Zebra and Triticale cv. Bikini). The size of the basic plot was 50.0 m². Samples were collected in four replicates in each treatment. The sampling area was 1 m².

The tested traits were yield, 1000-grain weight, test weight, protein (ISO 5983-2: 2009), starch (ISO 6493: 2001), ash (ISO 5984: 2002) and crude fiber (ISO 5498: 1981).

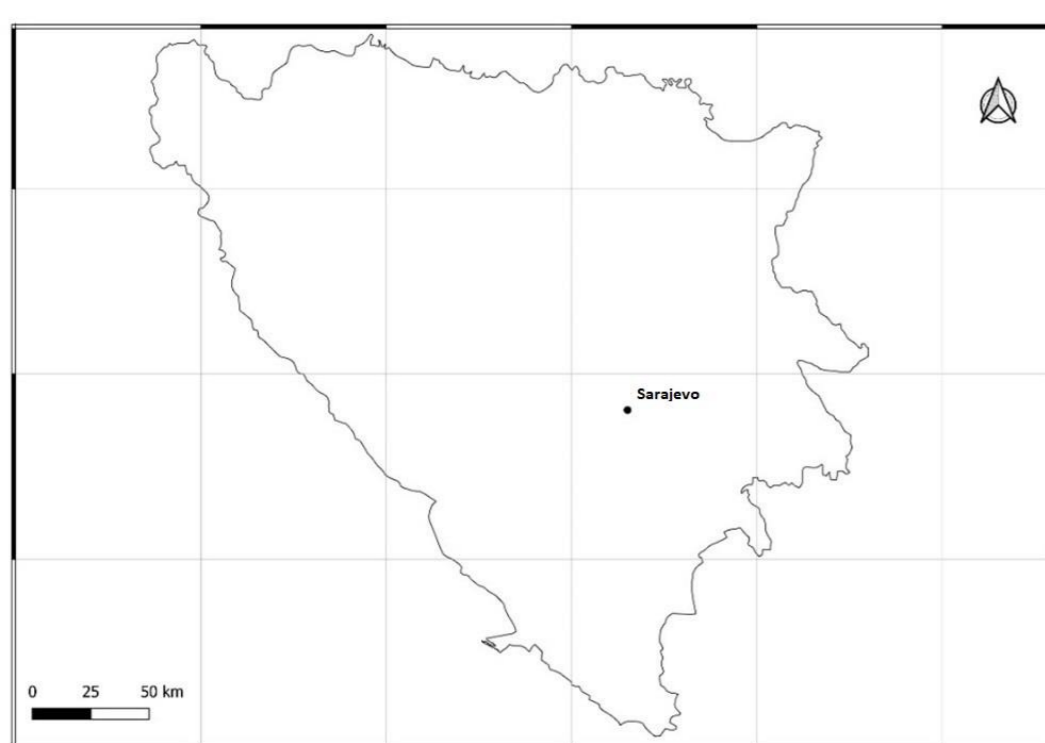


Figure 1. Field experiment location



Figure 2. Triticale sample collection



Figure 3 and 4. Cleaning of the sample



Figure 5. Nitrogen content determination

• Results

Table 1. Average monthly air temperature and precipitation from October 2024 to July 2025

Months	X	XI	XII	I	II	III	IV	V	VI	VII
Average monthly air temperature, °C	13.7	3.8	1.4	3.4	2.8	9.2	12.3	14.7	22.8	23.0
Amount of precipitation, mm	73.9	62.6	90.4	149.6	30.4	18.4	165.2	79.5	1.9	82.2

Table 2. Effect of fertiliser application on mass of 1000 seeds, test weight and yield

Fertiliser	Barley			Triticale		
	Mass of 1000 seeds -g-	Test weight -kg-	Yield -t ha ⁻¹ -	Mass of 1000 seeds -g-	Test weight -kg-	Yield -t ha ⁻¹ -
F1	41.2 ^{ns}	53.5 ^{ns}	5.1 ^b	42.2 ^{ns}	73.6 ^{ns}	5.0 ^b
F2	42.5 ^{ns}	54.7 ^{ns}	5.5 ^a	42.0 ^{ns}	73.9 ^{ns}	5.5 ^a
Average	41.9	54.1	5.3	42.1	73.8	5.3

F1- 60 kg N ha⁻¹; F2- 80 kg N ha⁻¹; Different letters indicate significant differences at the 0.05 level; ns: nonsignificant difference.

Table 3. Effect of fertiliser application on the content of protein, starch, fiber and ash, %

Fertiliser	Barley				Triticale			
	Protein -%-	Starch -%-	Fiber -%-	Ash -%-	Protein -%-	Starch -%-	Fiber -%-	Ash -%-
F1	11.7 ^b	51.0 ^b	6.2 ^{ns}	3.2 ^{ns}	10.6 ^b	68.3 ^a	2.0 ^b	2.0 ^{ns}
F2	12.3 ^a	50.2 ^a	6.2 ^{ns}	3.1 ^{ns}	11.9 ^a	64.7 ^b	2.3 ^a	1.9 ^{ns}
Average	12	50.6	6.2	3.15	11.25	66.5	2.15	2.0

F1- 60 kg N ha⁻¹; F2- 80 kg N ha⁻¹; Different letters indicate significant differences at the 0.05 level; ns: nonsignificant difference.

• Conclusions

The results of the experiment showed that the nitrogen fertiliser used can affect the yield and quality of barley and triticale under the environmental conditions of B&H. A higher dose of nitrogen had a positive effect on yield and on the protein content of the grains. On the other hand, a higher amount of nitrogen fertiliser lowered the starch content in the grain. To improve fodder production in B&H, future similar research should continue to examine different types and doses of fertilisers.