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Enhancing canola yield and quality through nitrogen and sulfur fertilization: an analysis of cultivar traits and grain elements

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Abstract

Canola cultivation is highly dependent on nutritional management. This study was conducted in 2016-2017 and 2017-2018, as a factorial experiment with three factors, based on a randomized block design. The experiment was established in the Shast-Kalate region of Gorgan city, Iran. The experimental treatments included nitrogen (N) application (25, 50, 75, and 100 kg ha⁻¹), sulfur (S) fertilization (0 and 200 kg ha⁻¹), and three canola cultivars (Hyola 50 hybrid, Hyola 401 and ARG 003). The results revealed that the highest grain yield (2701 kg ha⁻¹) was obtained with 100 kg ha⁻¹ of N + 200 kg ha⁻¹ of S fertilization applied to the Hyola 50 variety in the second year (Y). Conversely, the lowest seed yield was harvested in the same year from ARG 003 and Hyola 401 cultivars (1577 and 1580 kg ha⁻¹, respectively) with 25 kg ha⁻¹ of N and without S fertilization. Besides, Hyola 50 and Hyola 401 cultivars produced higher grain yields than ARG 003 cultivar. Notably, the grain yield increased at higher N concentrations. The results showed that cv. ARG 003 contained a higher seed oil percentage than Hyola 50 and Hyola 401 cultivars. Furthermore, an increased percentage of seed oil was observed at higher N fertilizer application. The seed oil percentage of rapeseed cultivars increased with the S fertilizer treatment. Furthermore, increasing the dose of nitrogen from 25 to 50 kg ha⁻¹ in both years enhanced N percentage, whereas exceeding the latter amount decreased the seed N content. Overall, it can be concluded that N and S play an essential role in enhancing the quality performance of canola cultivars.

Keywords: canola, seed elements, oil yield, protein yield, saturated fatty acids

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