

Effect of Row Spacing and Different Harvest Stages on Oat (*Avena* spp.) Yield and Quality ⁽¹⁾

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Received: Jul. 2, 2024; Accepted: Jul. 11, 2025

Abstract

This study utilized two oat varieties, Saia (*Avena strigosa* Schreb.) and Swan (*A. sativa* L.), as the experimental materials. The trial was conducted at the Livestock Research Institute, Ministry of Agriculture, on November 18, 2016, using artificial planting. A randomized complete block design (RCBD) with four replications was employed to investigate the effects of five planting densities (row spacings of 10, 15, 20, 25, and 30 cm) and five harvesting stages (67, 87, 98, 112, and 126 days after planting) on oat yield and chemical composition changes. The crude protein (CP) content of Saia oats decreased significantly ($P < 0.05$) following the delay in harvesting stage, from 15.2% at 67 days to 6.3% at 126 days. Conversely, the average contents of water-soluble carbohydrates (WSC) and starch increased with delayed harvesting. The average contents of acid detergent fiber (ADF) and neutral detergent fiber (NDF) showed an opposite trend to CP, reaching the highest values at 126 days (64.4 and 40.2%, respectively). The changes in the nutritional composition of Swan oats followed a similar trend to those of Saia oats. The average contents of P, K, Ca, and Mg in both oat varieties decreased following the delay in the harvesting stage was delayed. For Saia oats, late harvesting significantly deteriorated the quality, and thus, the optimal harvesting period was determined to be between 87 and 98 days. In contrast, the dry matter yield of Swan oats increased significantly with later harvesting, making 126 days the recommended harvesting time. The fresh yield and dry matter yield of Saia oats increased as planting density decreased, with the highest values observed at the 30 cm spacing (35.5 and 8.59 mt ha⁻¹, respectively). The dry matter yield of Swan oats exhibited a similar trend, with the highest yield also occurring at the 30 cm spacing (40.2 and 9.18 mt ha⁻¹, respectively). The average CP content of both oat varieties was higher under lower planting densities, while the WSC content showed the opposite trend, yielding a higher content at higher planting densities. However, planting density had little impact on the average contents of NDF, ADF, starch, and mineral elements in both oat varieties. Therefore, the optimal planting density for both oat varieties was determined to be 30 cm. Additionally, the optimal harvesting period for Saia oats was 87–98 days; while for Swan oats, 126 days was recommended.

Key words: Oat, Row spacing, Forage yield, Forage quality, Harvest stage.

(1) Contribution No. 2815 from Taiwan Livestock Research Institute (TLRI), Ministry of Agriculture (MOA).

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