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Profitable production of forage crops -sweet sorghum and oat II. Evaluation of forage yield and quality with different crop rotation modes (1)

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Abstract

The objective of this experiment was to evaluate the forage yield and quality of sweet sorghum and oat grown with differed crop rotation modes in various regions in Taiwan. The 6 crop rotation modes were proposed as follows: Changhua region, A. Rice (*Oryza sativa* L.) - Sweet sorghum (*Sorghum bicolor*) - Precocious Oat 'Saia' (*Avena strigosa* Schreb.) and B. Manure soybean (*Glycine max* L.) - Sweet sorghum - Late maturing Oat 'Swan' (*Avena sativa* L.); Tainan region, C. Sweet sorghum - Manure soybean - Silage corn (*Zea mays* L.) and D. Manure soybean - Sweet sorghum - Late maturing Oat 'Swan'; Taitung region, E. Manure soybean - Rice- Precocious Oat 'Saia' and F. Manure soybean - Sweet sorghum - Late maturing Oat'Swan'. The averaged dry matter yield of sweet sorghum for 5 modes in the three regions was 12.8 mt /ha, while the averaged contents of water-soluble carbohydrate (WSC), crude protein (CP), neutral detergent fiber (NDF) and acid detergent fiber (ADF) at harvest were 13.2%, 7.1%, 53.9%, and 30.3%, respectively. The fresh yield of sweet sorghum in modes A, B, C and D, ranging from 51.7 to 60.8 mt /ha, were significantly higher than that of mode F, with 29.7 mt /ha ($P < 0.05$). There was no difference in the contents of WSC, NDF and ADF among the different modes. The results indicated that the forage yield and quality of sweet sorghum were quite good and stable, making it suitable as a summer forage crop. The dry matter yield of late-mature oat 'var. Swan' in average was 8.9 mt/ha, and the average contents of CP, NDF and ADF were 8.8%, 60.3% and 34.9%, respectively. The dry matter yields for oat 'Swan' of mode B and D (8.9 mt/ha and 9.2 mt/ha) were higher than that of mode F (7.8 mt/ha). The CP contents of oat 'Swan' in modes B and F (9.3, 9.4%) were significantly higher than that of mode D (7.7%). There was no difference in the contents of NDF and ADF among the different modes. The results above showed good forage yield and stable quality in oat 'Swan,' making it suitable as a winter forage crop in Taiwan. On the other hand, the dry matter yield of early oats 'var. Saia' in average was 4.6 mt/ha at harvest on the 75th day, and its average content of CP, NDF and ADF was 13.3%, 56.2% and 34.2%, respectively. Although the forage yield of oat 'Saia' was much lower than that of oat 'Swan', Saia may be used as a winter forage crop with high forage quality. It is suggested that both sweet sorghum and oat 'Swan' with high forage yield and quality might be suitable for profitable production of forage under different crop rotation modes in various regions in Taiwan.

Key words: Oat, Sweet sorghum, Forage yield, Forage quality, Production mode.

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