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Breeding small grains for forage production in the southern Great Plains of the USA

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Key words : forage yield , rye , wheat , oat

Introduction Agricultural income in the southern Great Plains of USA is largely dependent on livestock and forage production . Livestock producers in this region do not have much choice but to graze their animals during the fall and winter seasons . Thus , distribution of forage yield is as important as the total forage yield . Small grains grown under cooler conditions also have superior forage quality (Maloney et al . 1999) . The main focus of Noble Foundation's small grain breeding program is to develop improved cultivars with potential for early fall-winter forage production . The crops of our choice are rye , triticale , wheat , and oat .

Materials and methods Field experiments were conducted at the Noble Foundation's farms in southern Oklahoma , USA . Cultivars were arranged in a randomized complete block design with three replications . Seeds were sown during mid to late September and standard cultural practices were followed . Plants were grown under dryland conditions . Individual plots were clipped when the plants attained a height of 8-10 inches . Yield obtained between November and March is considered as Fall-Winter yields and later harvests are considered as Spring yields . Data were analyzed following the standard statistical procedure .

Results and discussion Maton II a rye cultivar was released in 2006 which produced 55% more fall-winter forage and 6% more total forage than Maton (Figure 1) . Rye cultivar had more uniform seasonal forage production which supports earlier finding (Bruckner and Raymer 1990) . One of each wheat (NF94120) and oat (NF27) cultivars is in the process to release . NF94120 is a soft-red winter wheat which produced more total (6.28 Mg ha^{-1}) and early fall-winter (2.80 Mg ha^{-1}) dry forage than the commonly grown wheat cultivars in southern Oklahoma trials . NF27 is a facultative winter-type oat with prolific growth habit and excellent fall-winter forage potential . During six years (2001-2006) of testing , the average fall-winter and total forage yield of NF27 was 25% and 6% higher than the check cultivar Dallas , respectively . A grazing trial has been initiated to test how these cultivars or their combinations can extend the grazing season . Initial fall grazing indicated there was no difference between entries for average daily gain , but NF27 had superior lamb grazing days .

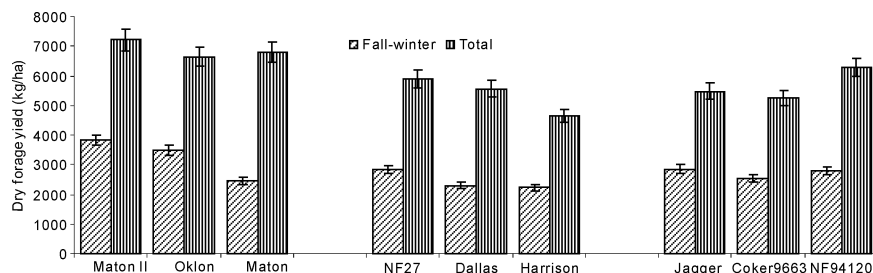


Figure 1 Fall-winter and total yield potential of small grains (rye , oat , and wheat) in the southern Great Plains . Yields were averaged across six years performance at two locations , Ardmore and Bourneville , OK , USA .

Conclusions Both fall-winter and total forage yield of rye cultivars were superior compared to oat and wheat lines/cultivars . Selection for early fall-winter forage was effective in all the small grains under investigation . Superior rye cultivar , Maton II , was released in 2006 . Wheat (NF94120) and oat (NF27) lines are in release process .

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