

Establishment-Year Forage Yield & Nutritive Value of Alfalfa in Northern U.S. Environments

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Alfalfa (*Medicago sativa* L.) is a forage crop valued for its nutritive value, forage yield and adaptability across diverse production environments. The establishment-year provides baseline information for subsequent assessment of adaptation to northern U.S. environments. The objective of this study was to evaluate forage yield and nutritive value during the establishment year among 8 to 10 cultivars or advanced entries (site-specific) and 23 U.S. germplasm bank accessions of *Medicago sativa* L. and *Medicago falcata* L., all selected for cold stress tolerance and/or branched root system. Field trials were established at six locations in 2025 (two in North Dakota, Fargo and Minot, two in Alaska, Fairbanks and Palmer, and in Grand Rapids, MN, and Columbia, MO). The cultivar trial had four replicates, and accessions were planted in 3.3-m rows with three replicates. Total seasonal forage yield varied significantly across locations, ranging from 680-2510 kg ha⁻¹ in Palmer, AK, 1209-5704 kg ha⁻¹ in Grand Rapids, MN, 2828-5728 kg ha⁻¹ in Fargo, ND, and 6454-10901 kg ha⁻¹ in Fairbanks, AK. In Fargo, cultivars differed in first-cut plant height and forage yield, with mean values of 64.5 cm and 2100 kg ha⁻¹, respectively. *Medicago falcata* cultivar 'Sholty' and branched-rooted AFX182001 had the lowest first-cut forage yield, 890 and 1808 kg ha⁻¹, and plant height, 58.1 and 60.9 cm, respectively. Among the 23 accessions evaluated in Fargo, four were *Medicago falcata*. At first harvest, these accessions averaged 36.1 cm in height and 21.7% bloom, compared with 31.9 cm and 11.5% bloom for the remaining accessions. Across all accessions, flowering stage ranged from early bud to late flowering. These establishment-year results showed early differences in performance among alfalfa cultivars and accessions across locations.

Keywords: Alfalfa; *Medicago sativa*; *Medicago falcata*; forage yield; nutritive value

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