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Forage Alternatives for Dry-Season Feeding of Dairy Cattle in Tropical Smallholder Farms in the Peruvian Andes

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Abstract

Results of a preliminary study demonstrated that both milk yield and milk quality of cattle are impaired during the dry season in the Peruvian Andes. One main reason for these fluctuations is the variation in quality and quantity of the available feeds. The overall aim of this project is the development of efficient feeding systems for dairy cattle during dry season in the central Peruvian Andes. The following forage species have been identified as to be most promising to overcome feed shortage during dry season: *Avena sativa* (3 introduced varieties and local seeds), *Hordeum vulgare* (2 introduced varieties and local seeds), *Triticosecale* Wittmack, *Phalaris tubero-arundinacea*, *Lolium multiflorum*, *Vicia sativa*, *Medicago sativa*. These species have been established in January 2005 in experimental plots at two sites at 3770 and 3860 m asl. Two fertilizer treatments were applied: (i) no fertilizer and (ii) fertilizer application according to soil analyses and requirements of plants. The species were established in three replicates per site and fertilizer treatment, and were arranged in a randomized complete block design. Vigour of plants, soil cover, competitiveness against weeds and resistance against frost were evaluated and dry matter yield and contents of protein and neutral detergent fibre were determined. Mean dry matter yields (kg ha^{-1}) with and without fertilizer application were 5341 and 3107 for *A. sativa*, 5749 and 2254 for *H. vulgare*, 6601 and 2472 for *Triticosecale*, 1447 and 560, for *P. tubero-arundinacea*, 2524 and 903 for *L. multiflorum*, and 1344 and 1175 for *V. sativa*, respectively. Differences in dry matter yield within species by fertilizer treatment and site were significant ($p < 0.001$) whereas crude protein contents in dry matter were significantly different only between sites ($p < 0.001$). The mean protein yields achieved for the local varieties of *Avena* and *Hordeum* were 465 and 292 kg ha^{-1}, with the crude protein contents amounting to 128 and 163 g kg^{-1}, respectively. The introduced varieties of *Avena* and *Hordeum* showed mean protein yields of 467 and 496 kg ha^{-1}, with protein contents of 113 and 126 g kg^{-1}, respectively, underlining the superior quality of the introduced varieties of *Hordeum*.

Keywords: Dairy production, dry season feeding, forage species, Peru

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