Evaluation of Forage Quality Traits in Alfalfa

Yuanhong Han[1], Joseph H. Bouton[1], Ian M. Ray[2], and Maria J. Monteros[1]

[1] The Samuel Roberts Noble Foundation, Forage Improvement Division, 2510 Sam Noble Parkway, Ardmore, Oklahoma 73401
[2] Plant & Environmental Sciences Dept., New Mexico State University, Las Cruces, New Mexico 88003

Forage quality improvement is an important trait in alfalfa breeding programs because it can directly affect animal performance. The *Medicago sativa* subsp. *falcata* germplasm has a higher forage digestibility than the subsp. *sativa* germplasm (Riday et al., 2002; Julier et al., 1996). The objectives of this study were to identify quantitative trait loci (QTL) associated with forage quality traits in alfalfa grown under both irrigated and drought conditions. Two backcross populations derived from a cross between *M. sativa* var. 'Chilean' and *M. sativa* subsp. *falcata* var. 'Wisfal' were evaluated for forage quality in irrigated and rain-fed field trials at two locations (Las Cruces, NM and Burneyville, OK). Plant samples were analyzed using the NIRS system for crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro dry matter digestibility (IVDMD), and lignin content. Putative forage quality-maturity QTLs have been identified using EST-SSR markers. Primers developed from candidate genes in the lignin biosynthetic pathway and other forage quality-related traits have been developed and mapped. Selected markers will be used to screen additional populations segregating for forage quality traits.

References

Julier, B., P. Guy, C. Castillo-Acuna, G. Caubel, C. Ecalle, M. Esquibet, V. Furstoss, C. Huyghe, C. Lavaud, A. Porcheron, P. Pracros and G. Raynal. 1996. Genetic variation for disease and nematode resistances and forage quality in perennial diploid and tetraploid Lucerne populations (*Medicago sativa* L.). Euphytica 91:241–250.

Riday, H., E.C. Brummer, and K.J. Moore. 2002. Heterosis of forage quality in alfalfa. Crop Sci. 42:1088–1093.