

YIELD AND QUALITY OF EXTREMELY NON-DORMANT ALFALFA POPULATIONS WITH HIGH MULTIFOLIOLATE LEAF EXPRESSION

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The presence of multifoliolate leaves (MF) in alfalfa has been associated to the possibility of providing higher forage quality. The alfalfa breeding program at INTA Manfredi has developed, through three cycles of phenotypic recurrent selection for MF, an extremely non-dormant population (FD 10) with high expression of the trait. However, its real agronomic value needed to be evaluated. The objectives of this study were: I- to evaluate forage yield & quality and stem & leaf morphology of experimental alfalfa populations with varied MF expression under different environmental conditions; and II- to study the phenotypic correlation among traits. An experiment to compare MF selection cycles C1 to C3, using the original population (C0) as a check, was conducted under field conditions at INTA Manfredi according to a RCB design with three replications. Each population was represented by 25 spaced plants and evaluated under four environments defined by the combination of growing seasons (two) and moisture condition (rainfed or irrigated). Variables measured were: i) cumulative forage yield (Racum) in kg DM plot⁻¹; ii) number of stems (T); iii) plant height (H) in cm from ground level; iv) number of leaves per stem (NH); v) MF expression (% MF); vi) leaf/stem ratio (RHT); vii) crude protein (% PB); viii) neutral detergent fiber (% FDN); and ix) *in vitro* dry matter disappearance (IVTDMs). Variable means were compared by a multivariate analysis of variance (MANOVA) (Table 1) and the correlation among traits was determined by principal components analysis (PCA) (Figure 1). Crude protein, MF expression and leaf/stem ratio were positively and highly correlated among themselves but negatively correlated with T, Racum, H, NH and % FDN. It was concluded that three cycles of phenotypic recurrent selection for high MF expression were effective for increasing some forage quality traits; however, this was not reflected in higher *in vitro* digestibility yet. In addition, C3 plants exhibited lower dry matter yields and lower plant height than C0. MF trait was stable across the environments.

Table 1. Multiple mean comparisons among populations overall environments

Variables	Populations			
	C0	C1	C2	C3
Racum	4.38a	4.11a	3.90a	3.15b
T	75.70a	80.72a	68.00b	60.77b
H	48.34a	45.64b	43.97b	40.87c
NH	41.28a	39.64a	41.07a	37.77b
%MF	4.89d	17.08c	39.40b	67.25a
RHT	1.17b	1.30a	1.34a	1.40a
%PB	26.60b	28.25a	28.70a	29.25a
%FDN	40.47a	39.70b	39.44b	38.91
IVDMS	79.29a	80.29a	79.45a	80.72a

Means in rows with a common letter are not significantly different ($p < 0.05$)

Figure 1. Biplot from PCA.

