BREEDING FOR EARLINESS/LATENESS IN ALFALFA TO IMPROVE FORAGE QUALITY

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Medicago sativa, stem phenological stage, fiber fractions, NIRS analysis

Stem age and phenological stage in alfalfa (\textit{Medicago sativa} \textit{L.}) are negatively correlated with stem protein content and positively correlated with fiber fractions content (Kalu and Fick, 1983; Rotili \textit{et al.}, 1997). Besides, we consistently found a positive correlation between dry matter yield (DMY) and earliness in several alfalfa populations and families. The uncoupling of vegetative growth and development is likely to have positive influences on forage quality by reducing the lignification of stems and the senescence rate of leaves. In order to verify these hypotheses, a positive selection for DMY and a divergent selection for the phenological stage at cutting (earliness/lateness) was applied on two different alfalfa populations, SxC, non dormant, and SynT, with intermediate fall dormancy, during two selfing generations. The S2 selected plants were then manually crossed within the ‘early’ subgroup to produce simple hybrids (SH) S2xS2: seven and ten SHs respectively for ‘early’ and ‘late’ subgroup were grown in miniplots 80 cm high x 20 cm diameter (20 plants/plot; density 400 plants \text{ m}^{-2}) in a randomized block design with 4 replications (4240 plants in total). Irrigation was non limiting.

DMY, earliness and mortality were recorded at individual plant basis along cuttings 2 to 5 in the sowing year, and in cutting 2 in the 1\textsuperscript{st} productive year. Plants exceeding the mean \pm 0.75s within each SH progeny were chosen for the analysis of the fiber fractions by NIRS in cuttings 3 (August) and 4 (September) of the sowing year.

The selection applied in the selfing generations has been effective, as the ‘early’ and ‘late’ subgroups were comparable in terms of annual DMY, but significantly differed for earliness estimated by the percentage of plants attaining the reproductive stage at cutting, and the number, length and phenological stage of the reproductive nodes on the two main stems/plant. Interestingly, at the 5\textsuperscript{th} cutting (October) the ‘late’ subgroup showed DMY and stem height values lower than the ‘early’ subgroup, suggesting a common genetic control for lateness in flowering and reaction to fall conditions.

The relationships between earliness and stem fiber concentration will be discussed.