Aerial Biomass Production of Alfalfa *(Medicago sativa* L.*)* in Response to Row Spacing & Cutting Frequency

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In the case of Alfalfa (*Medicago sativa* L.) there is a tendency to increase sowing distance between rows from 15-17.5 to 20 cm creating this last a more rectangular canopy arrangement and a lower forage yield. To compensate this forage yield reduction, some farmers are promoting the crossed sowing pattern with lines at 20 cm crossed with angles at 90° or 45°. In alfalfa, an increment of cutting frequency usually leads to a reduction in leaf area expansion and radiation capture. In consequence the reduction of row spacing and crossed sowings should provide a benefit in radiation capture and, therefore, in forage production and that will be more relevant as the cutting frequency is increased. The goal of this experiment was study the interaction between spatial arrangement of sowing and cutting frequency in alfalfa. The experiment was carried out at E.E.A INTA Balcarce from November 2015 to February 2016. The experimental design was split plot arranged in a randomized complete block with four replicates. The spatial arrangement was the principal plots and the cutting frequency was the secondary plots. The spatial sowing arrangements were: 1) parallel lines at 20 cm; 2) parallel lines at 10 cm; 3) crossed lines at 90° at 20 cm 4) crossed lines at 45° at 20 cm. The cutting frequencies were: F350= cutting each 350 growing degrees days (GDD) and F700= cutting each 700 GDD, Tb=5°C. In the first spring cut, in F350, sowing at 10 cm produced more forage that the rest of sowing arrangements due to a greater radiation capture compared to the sowing to 20 cm and due to a greater radiation capture and a higher radiation use efficiency compared to crossed seeding arrangements (45° and 90°). In turn, the greater forage yield of the 10 cm sowing arrangement was explained by a higher density and weight of stems. As growing season progressed (summer and end of summer) these differences disappeared. The crossed sowing (90° and 45°) did not improve forage yield respect to the traditional sowing arrangement (20 cm between rows), neither in early spring, nor in the rest of the cycle. Regardless of the sowed arrangement, F700 showed higher forage yield production than F350 due to a higher radiation capture and a greater shoot weight. In conclusion, closer rows (10 vs. 20 cm) showed a benefit at the beginning of spring, while cross arrangements (45° and 90°) always showed a similar behavior to the traditional sowing arrangement (20 cm between rows).

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