Effects of Water Stress on Alfalfa Yield & Nutritive Values

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Alfalfa (*Medicago sativa* L.) is among the top four field crops in Kansas in terms of acreage harvested and economic value. To the best of our knowledge, dry matter yield and forage nutritive value of various commercial alfalfa varieties that have been grown under different water regimes, have not been studied in Kansas. In this context, the objective of our study was to evaluate the forage dry matter yield and forage nutritive value of field-grown alfalfa cultivars exposed to a range of water-deficit stress conditions under 3 different stages of maturity (i.e., late bud, early flowering, and 7 days after early flowering). An experiment has been set up in an open field and inside rainout shelters at Kansas State University Agronomy Research Farm with 3 water treatments (drought imposed, irrigated and rainfed) and 5 commercial varieties (reduced lignin and conventional) replicated 4 times. The first production year's result showed that the available water, varieties and harvesting stages have significant influence on DMY. The highest DMY was observed in the conventional variety followed by reduced lignin alfalfa grown under irrigation and harvested 7 days after early flowering. Overall, irrigated plots had the highest DMY followed by rainfed and drought imposed when harvested 7 days after early flowering. The forage nutritive value will be analyzed this year. We are also examining carbon isotope discrimination (CID) in alfalfa leaves to estimate water use efficiency and photosynthetic rate under different water regimes.