Western Nebraska Perennial Grass Production under Variable Water for Ethanol Production

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Abstract.
Nebraska is a large grain-based ethanol producer, but many suggest cellulosic materials as a longer term solution. Western NE faces reduced irrigation amounts due to drought, reduced reservoir supplies and ground water allocations. There is limited information on effects of different irrigation levels on cool and warm-season grasses. Warm-seasons are more water-use efficient than cool-season species and may have excellent potential under limited irrigation. There is also limited information on grass mixtures versus monoculture or grasses that fit more humid versus drier areas. Switchgrass is a good alternative for eastern NE, but may not be the best choice for western NE. One advantage of grasses is that conventional grasses pose little risk to become invasive species. The proposed experiment will determine the production potential of a variety of warm and cool-season grasses receiving different allocations of irrigation water. To start, we must establish plots now to pursue national grants. Good production data will require at least 18-24 months from planting and establishment. Many factors can and need to be studied: water use and water use efficiency, ET-yield relationships, nutrient (N) needs, N leaching/N balance, effects on soil quality and C sequestration, forage species selection and management, a possible fit for retiring CRP acres, the value of byproducts for livestock and last but not least, a complete economic analysis of costs and returns of forage production for cellulose and for ethanol from cellulose versus corn. Data will also have value for crop simulation models (Water Optimizer and associated economic models).