



EXPERIMENT STATION

College of Agriculture,
Biotechnology & Natural Resources

A highly water-use efficient and productive biomass feedstock for semi-arid lands

The project aims to improve the development of biomass feedstocks for renewable bioenergy production with extremely low water and nutrient use requirements, while leveraging existing public plant germplasm and breeding resources, and reducing barriers for future investments by private industry stakeholders.

Given the present climate crisis brought about by global warming, there are clear and present needs to diversify our biomass feedstock portfolio and adopt bioenergy feedstock crops that will be resilient to global warming and that will use limited water resources more efficiently. When grown under agronomic conditions with adequate fertilizer and irrigation, *Opuntia* spp. (Cactaceae) require up to five-fold less water input than C₃ or C₄ bioenergy feedstocks, while maintaining above-ground biomass productivity which rivals that of C₃ and C₄ photosynthesis crops.

The expanded use of a water-wise, perennial bioenergy feedstock will permit biomass cultivation on abandoned agricultural lands and likely reduce land-use impacts relative to biomass production on currently used croplands. The global potential for bioenergy production using abandoned agricultural lands is large with an estimated global potential of 385–472 Mha and represents an opportunity to expand the production of dedicated bioenergy crops.

This integrated research and extension project is supported by the Nevada Agricultural Experiment Station (NEV-00380) and the USDA NIFA (2018-68005-27924).



Opuntia spp. at the USDA-ARS National Arid Land Plant Genetic Resource Unit in Parlier, CA.