

Five Irrigation Approaches for Improving Alfalfa Yield & Quality

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Drought is common in the West and producers need research-based irrigation strategies to stretch limited water supplies. Strategies such as regular maintenance of irrigation systems, reducing irrigation rates, and advanced irrigation scheduling, may be helpful options but have not been tested with experimental rigor. The objective of our study was to identify which inexpensive water management strategy may maintain yield with less water. An experiment was conducted at 12 alfalfa (*medicago sativa* L.) fields in southcentral Utah in 2019-2021. Alfalfa was cut and harvested 2 to 4 times each year. Existing sprinkler equipment (regulators, nozzles, sprinkler bodies) on these pivots ranged from 3 to over 20 yr old. Three equipment (existing, new, new with 10% rate reduction) treatments were implemented on one span of the pivot at each site. Four irrigation scheduling treatments (grower schedule, irrigation scheduler application, soil moisture-based, and a commercial model [FieldNET Advisor[®]]) were also implemented on 16 adjacent sectors (each ~50 ft wide). Results showed that new irrigation equipment did not consistently improve alfalfa yield at any of the fields in 2019 and 2020. In a wet year, there were some farms that were able to reduce irrigation by 10% without reducing yield, but other farms experienced significant yield reductions, particularly with maintaining the reduced irrigation rate across consecutive years of drought. The irrigation scheduling strategies affected yield on 5 of 46 cuts across fields and years, with an average alfalfa yield increase of 0.3 tons/acre, but these five cuts were not consistently at the same fields. At some fields, up to 15% less water was applied with the advanced scheduling methods, but at most farms these methods increased the water application above the grower recommendation due to drought and limited irrigation supply. Alfalfa feed quality was rarely affected by any of the treatments. The results demonstrated that irrigation scheduling tools have some of the greatest potential among options tested to reduce water use while maintaining alfalfa yield.