

2019 USAFRI Research Project Objectives

Five Irrigation Approaches for Improving Alfalfa Yield and Quality Utah State University - Yost

Project Award: \$97,994

Justification:

- Drought is often one of the greatest yield and quality-limiting factors of alfalfa and forage production – even in irrigated production areas like the Intermountain west. Irrigation is one of the most challenging inputs to manage in alfalfa production because it requires real-time adapting to the weather conditions, and making at least 8-10 decisions each season about timing and amount of irrigation to apply. In addition, alfalfa sometimes does not receive the “irrigation attention” that it needs, perhaps due to focus on other crops perceived as more lucrative, or the perception that alfalfa tolerates drought and difficult growing conditions well. Consistent feedback from several recent workshops and field days with irrigation professionals confirm these challenges, and suggest that concentrated effort on irrigation maintenance and innovation should be a high priority for alfalfa and forage production.

Irrigation management can be quite complex. Multiple technologies and strategies for advanced irrigation exist, but investments and skill required for these strategies vary widely. Current research in Utah and other states are evaluating new pivot irrigation technologies such low-energy precision application (LEPA) nozzle systems and mobile drip irrigation (MDI) (Amossen et al., 2011; Peters et al., 2016; Kisekka et al., 2017). These technologies show promise and have documented increases in alfalfa yield through improve uniformity, along with water savings. However, the investment in new pivot technologies is currently too large for many alfalfa producers in the Intermountain West to adopt these practices.

Several other less expensive strategies to improve irrigation management exist (Hatfield et al., 2001; Ali and Talukder, 2008). Some of these include regular maintenance of irrigation systems (i.e., replacement of worn irrigation nozzles, pressure regulators, and other equipment), reducing irrigation rates, and advanced irrigation scheduling based on soil moisture sensors or evapotranspiration (ET) estimates from weather stations, or other advanced irrigation programs (Leib et al., 2002). While these strategies can be simple and straightforward, many growers in the Intermountain West still hesitate to use them. Part of grower’s hesitation in adopting some of these advanced irrigation practices might be related to sparse information on economic gains that might be realized from these practices. It could also be because growers lack the knowledge of skill required to use new methods or technology for setting the schedule or rate of irrigation. Prioritizing which method(s) of irrigation and irrigation equipment management might improve alfalfa yield and quality will help growers improve their profits, and deal with diminishing water supplies that are prevalent across the Intermountain West.

Objectives:

- The objectives of this project are to 1) test how five irrigation improvements influence both alfalfa yield and quality on 12 alfalfa fields in south central Utah. Improvements include: a) new vs old pivot equipment; b) reducing irrigation rates by 10%; and c) comparing three innovations in irrigation scheduling technology: 1) irrigation scheduler; 2) soil moisture sensor; and 3) FieldNet Advisor.