On-Farm Determination of the Effect of Early Termination of Irrigation and Seeding Rates on Yield and Quality of Confection Sunflower

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The Powell Research and Extension Center (PREC) has been working in close collaboration with farmers in northwest Wyoming to discover and disseminate practical as well as science-based approaches in agriculture, which could help promote sustainable farming practices. In this attempt, field experiments have been carried out on producers’ fields (on-farm) as well as at PREC (on-station). In response to the growing interest in confection sunflower among farmers, PREC has been conducting several on-station as well as on-farm experiments to learn what management practices will optimize the production and quality of confection sunflower, those grown for consumption vs. oil.

Objectives
Objectives of the studies were to understand the yield response and quality of confection sunflower to rate and type irrigation and seeding rates on fields managed by producers.

Materials and Methods
Study A: During the 2014 growing season, an on-farm study on the yield response of confection sunflower to early termination of irrigation was conducted. This study was a follow-up of a PREC study (2012–2013). The 2014 on-farm test was conducted on a producer’s field equipped with a furrow irrigation system. Treatments were withholding irrigation at R5.5 stage (when 50% of the disk flowers have completed flowering, IR1), R6 stage (when flowering is complete, IR2), and R7 stage (when back of the head changes color to light yellow, IR3).

Study B: This 2014 study evaluated the effects of seeding rates on confection sunflower yield and was conducted on a producer’s field equipped with center pivot sprinkler irrigation. This on-farm test matched a replicated 2014 PREC trial. In study B, four seeding rates were compared (P1=16,000, P2=19,000, P3=22,000, and P4=25,000 seeds per acre).

In both studies, hybrid 9579 (SunOpta Inc.) was planted in 22-inch row spacing. Both fields were located near Powell and were within the Heart Mountain Irrigation District, which is composed of 31,120 irrigable acres in the Bighorn Basin. Data on total yield and large seed yield (determined by screening the total seed on a 20/64 round-hole sieve) were collected.

Results and Discussion
I. Study A (early termination of irrigation): Previous results at PREC (reported in the 2014 Wyoming Agricultural Experiment Station Field Days Bulletin; available on pages 47–48 at http://www.uwyo.edu/uwexpstn/_files/docs/2014-field-days-bulletin.pdf) showed comparable yields from IR1 and IR3, but the results from this on-farm trial during the 2014 growing season showed 20% reduction in total yield from IR1 as compared to IR3 (Figure 1). In all treatments, large seed yield was above 90% of

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The difference in soil type and its water-holding capacity likely contributed to greater yield reduction at the on-farm site. The coarse-loamy soil at the on-farm field has lower water-holding capacity (1.7 in/ft) than the clayey-loam soil at the on-station site, which can store greater amounts of water (2.4 in/ft). Thus, confection sunflower grown in a field with a higher proportion of coarse soil might need to be irrigated until the R7 stage.

II. Study B (seeding rate): The total yield decreased slightly (denoted by the negative slope) with an increase in seeding rate at the on-farm trial (Figure 2). This suggests that higher seeding rates above 16,000 seeds per acre would not have paid off. A similar trend has also been observed at the on-station 2014 test (separate report in this Field Days Bulletin). Tests that include seeding rates below 16,000 per acre are underway this year.

Acknowledgments: We thank PREC staff members for help and appreciate the kind collaboration of three producers, Tim Duyck, Brian Duyck, and Lyle Evelo, for support and assistance. This study was funded by the University of Wyoming Agricultural Experiment Station and by PREC’s Bighorn and Wind River Basins Applied Research Fund program.

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Keywords: irrigation management, seeding rate, confection sunflower

PARP: I:2, IV