Irrigation Effects on Nitrogen Efficiency in Energy Beet, Carrington, 2014

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In 2014, a trial was initiated at the NDSU Carrington Research Extension Center to evaluate nitrogen efficiency in energy beets across three different irrigation regimes. Experimental design was a randomized split-plot with three replicates. The field trial was established on a conventionally-tilled Heimdal-Emrick loam soil with 3.7 percent organic matter, 48 lbs of nitrogen, and 7.9 pH. Three different irrigation regimes were established under center-pivot irrigation. BetaSeed X401 Roundup Ready feed beet seed was planted on May 27 with a 4-row John Deere 71 Flex Planter on 22" rows at 54,000 seeds/acre. The nitrogen treatments were broadcast applied as urea on June 16 to 2-true-leaf beets and incorporated by 1" of rainfall. A weed control system was established using glyphosate at 30 oz/ac and clopyralid at 8 oz/ac. Herbicide was applied on June 25. The trial was harvested using a two-row lifter on October 17.

The 2014 growing season at the CREC was average in terms of level of rainfall received thus causing less irrigation water to be applied than in 2013. A total of 10.79" of rain fell between May and September. The 100 percent irrigation plots received an additional 5.82" of water through center-pivot irrigation. The 50 percent plots received an additional 2.5" of irrigation water. Growers raising beets for sugar production under irrigation are applying enough nitrogen to the plants to target the early and middle part of the growing season and allowing the plants to exhaust reserves in the soil towards the end of the growing season. Though no significant differences were observed in root yield across the trial, early-season growth and canopy closure was excelled through increased nitrogen and irrigation.

Table 1. Irrigation effects on nitrogen efficiency in energy beet.

	Treatment		Green Seeker[1]	Sugar Content	Root Yield
	Nitrogen	Irrigation	0-1	%	ton/ac
1	No Additional	0	0.57	25.2	27.1
2	100 lbs	0	0.65	22.5	27.5
3	150 lbs	0	0.63	22.5	28.5
4	No Additional	50%	0.64	22.9	25.9
5	100 lbs	50%	0.69	22.9	25
6	150 lbs	50%	0.63	22.2	26.1
7	No Additional	100%	0.68	19.4	28.4
8	100 lbs	100%	0.72	21.8	28.9
9	150 lbs	100%	0.76	20.9	27.1
	Mean		0.66	22.2	27.2
	C.V. (%)		10.40	NA	10.3
	LSD (0.05)		0.10	NA	5.5

Planting Date = May 27; Harvest Date = October 17

[1] Green Seeker taken July 18.