

INCREASED YIELD, STATIC NITROGEN? SUGARBEET NITROGEN RESPONSE TO SOURCE AND RATE IN MICHIGAN

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ABSTRACT

Improving the ecological efficiency of sugarbeet production is a key goal in developing scientifically-validated nutrient management strategies for Michigan. State average sugarbeet yields have nearly doubled over the last 30 years yet nitrogen (N) recommendations have not changed. Additionally, increases in commodity prices have growers adjusting crop rotations so that sugarbeets may now be following corn, wheat, or soybean instead of the more traditional dry bean. Michigan growers have also expressed interest in transitioning to a stale spring seed bed which has piqued interest in slow-release nitrogen for sugarbeet production. The question is do sugarbeets need more N following crops other than dry beans and what effects may slow-release N have on sugar yield and quality. This investigation was designed to: 1) determine sugarbeet N response following corn, wheat, and soybean, and 2) determine the effects of and how to fit polymer-coated urea into sugarbeet production.

All studies were arranged as a randomized complete block with four replications. Treatments included five or seven total N rates (0-160 or 0-240 lbs N per acre) in 40 lb N increments. All treatments received 40 lbs N as UAN (28-0-0) applied as a 2x2 application at planting. Remaining N treatments were applied sidedress as urea (46-0-0) at 4-5 weeks after planting. Sidedress N applications were lightly cultivated to prevent N volatilization. A separate study investigated the use of polymer coated urea at rates ranging from 40 -160 lbs N per acre as either a pre-plant or sidedress application. Environmentally Smart Nitrogen (44-0-0) was used as the source of polymer-coated urea. Sugarbeet root yield, sugar quality, and net economic returns were measured.

A strong interaction between cropping system and N rate occurred for sugarbeet root yield, recoverable sugar, and net economic return. Previously 80-100 lbs N per acre was the sugarbeet N recommendation as dry beans commonly preceded sugarbeet in rotation. Following corn or wheat, 160 lbs N per acre resulted in greater economic return. Following soybean, 120 lbs N per acre maximized return. If fertilizing at rates less than the optimum return, there appeared to be little benefit beyond 40 lbs N applied as a 2x2 application at planting. When applied at similar N rates as urea, polymer-coated urea resulted in similar yield and sugar quality but did appear to elevate levels of soluble N impurities. Polymer-coated urea did result in excessively green sugar beet tops at harvest in 1 of 2 years which may be the result of dry growing season soil conditions.