



Keep Your Spring-Applied Nitrogen In Check...

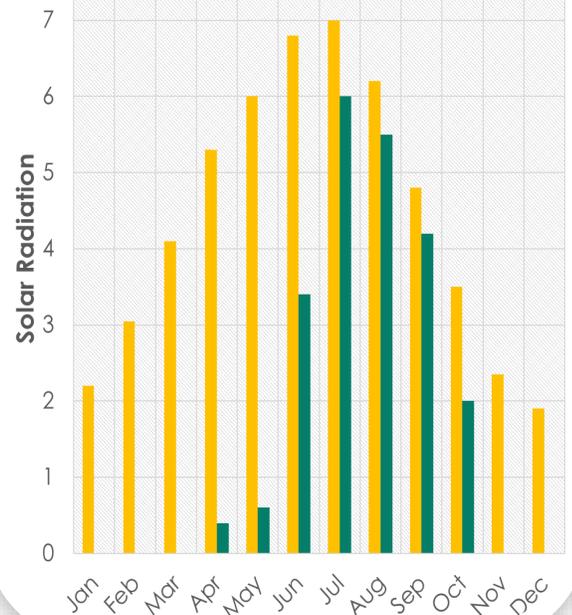
It isn't a secret that nitrogen management is critically important to producing a high yielding and high quality sugarbeet crop. As such, no other aspect of sugarbeet production has been more evaluated in university and extension research trials. What is unique about this type of research is that regardless of researcher, institution, trial year or location, there is one common theme that can always be included in the summary of the generated datasets - if a little nitrogen is good, **more is NOT better**...

Unlike many of the other rotational crops within the Red River Valley, sugarbeets cannot regulate the amount of nitrogen they take in. Just like pigs at a trough, the beets will take up as much nitrogen as possible, regardless of their own needs. This is where the problem lies. Sugarbeets that are subject to excess levels of nitrogen are generally of poorer quality (sugar percentage and purity) than those that have been managed properly. There are several reasons for this 'quality drag.' First off, since nitrogen promotes tissue hydration in the sugarbeet root, excess levels of N cause the root to become saturated, with all of the extra weight being water, thereby 'diluting' (for lack of better term) the beet's percent sugar on a fresh weight basis. This dilution also decreases the purity levels in the plant, which makes it much more difficult for the factory to extract the sugar. In fact, **for every pound of non-sugars that enter the factory, 1.5 lbs. of sucrose is lost to molasses.**

Another reason for the decrease in sugarbeet quality due to excess nitrogen is the late-season promotion of canopy growth. Nitrogen is a key component of enzymes, vitamins, chlorophyll and other cell constituents, which are all essential for canopy growth and development. Excess levels of nitrogen cause the beet to utilize its available sugar (energy) for leaf growth rather than 'banking' it into cellular storage.

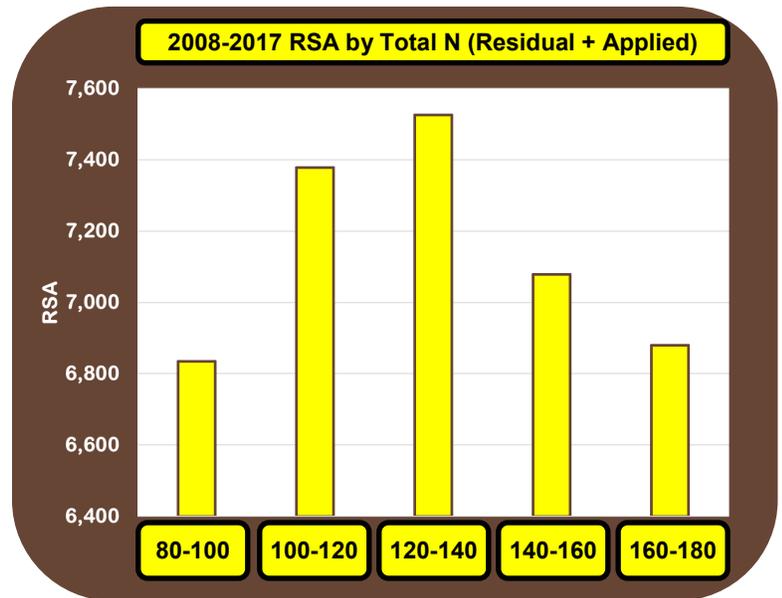
Nitrogen management and quality sugarbeets is a balancing act...The main purpose of applying N is to increase foliage cover during early development to maximize light interception and photosynthesis. Our factory does not make sugar - the beets do utilizing sunlight as their feedstock. The graph above takes a look at the relationship between the available solar radiation (yellow bars) and the light that is intercepted by the sugarbeet canopy (green bars). As you can see, canopy interception is greatest in July, but take note of separation between the yellow and green bars during the months of August and September (when the beets are 'putting on' sugar) - the separation between the two is the same. This means that once the canopy has fully developed, N has done its job - any additional N doesn't increase light interception, but rather serves as a detriment for the reasons listed above.

Solar Radiation vs. Light Interception



So What Should Be My Top End For Nitrogen?

Weather patterns have a significant impact on soil temperature and moisture content. Soil temperature and moisture affect many nitrogen cycle processes including; mineralization, denitrification, volatilization, and leaching - simply put, there are a lot of moving parts when it comes to how much nitrogen will be available as well as when it will be available to the plant. Taking all of these factors into consideration, university and extension data utilized to develop the nitrogen recommendations for Minn-Dak (120-140 lbs. total - residual + applied) are spot on with what we are seeing for sugarbeet yield performance. The graph to the right represents a 10-year average of recoverable sugar per acre from Minn-Dak commercial fields. There are two parameters that merit serious attention. First, it doesn't matter if the nitrogen was fall- or spring-applied, the highest revenue per acre was achieved when the total nitrogen per acre (residual + applied) was



between 120-140 lbs/A. This targeted range should be followed regardless of previous crop. Secondly, draw your attention to how sharply the recoverable sugar per acre declines for usage rates exceeding 140 lbs per acre. **Nitrogen usage rates exceeding 140 lbs/A are only hurting your bottom line and the Cooperative as a whole.** It almost seems backwards to approach fertility with a 'less is more' type attitude, but when it comes to nitrogen management on sugarbeets, it will pay big dividends...

Correct Plant Population = Higher Quality

Establishing exceptional stands early in the spring greatly enhances the profit potential for any sugarbeet field and as such, analysis of the Minn-Dak grower practice records indicate that plant population is one factor that is highly correlated with sugarbeet quality. A trial conducted by Dr. Larry Smith (2009 - U of MN) evaluated the effect of plant population on both yield and quality. As you can see in the chart below, maximum RSA and Rev/A was achieved at 175 beets/100' row (22" rows) and that 200 beets/100' of row had only a slight detrimental effect. It also indicates that it may be necessary to thin fields with higher established plant populations.

It is typically this time of year where our Ag Staff is asked about stretching out the seed spacing to cut back on input costs. While this may seem like a good idea on the surface, it may actually be costing you more than you realize. Let's take a look at the math: Increasing your seed spacing from 4.75 to 5.25" (10%) - If seed costs \$200/acre you can save yourself \$20/acre. However, the value of 10 beets/100' of row is roughly \$35/acre. The subsequent loss of 20 beets/100' of row is worth \$70/acre. **Net change is a loss of \$50/acre.** With this in mind, keep the planter gears tightened up...

