

Protocol for IPNI Sugar Beet Nutrient Uptake Project, 2014

- I. Experimental Design
 - a. South field of Long term manure study
 - b. Fertilizer plots only (plots 506, 602, 702, and 804)
 - i. Fertilizer applied on April 17th, incorporated with roller harrow on April 17th (same day)
 - ii. Low fertility, needed N, P, and K (we have soil tests on file)
 - iii. Based P and K on UI recs, based N on field history
 1. Applied 67 lb N/acre as urea
 2. Applied 30 lb N/acre as 11-52
 3. Applied 135 lb P₂O₅/acre as 11-52
 4. Applied 75 lb K₂O/acre as 0-0-60
 - c. Sugar beet production
 - i. Variety BTS-21RR25
 1. Round up ready
 - ii. Planted on 4/28/14 (tentative, may be later if windy on Monday)
 - iii. 22 inch rows, 5.5 inch spacing, ?? seeding depth (will find out next week)
 - iv. Planted to stand (as opposed to planting for thinning)
- II. Plant tissue sampling
 - a. Sample biweekly from early June to mid-October harvest
 - i. Five foot harvest lengths
 - ii. Sample at ~16 day interval from June 9th to September 29th
 1. June 9
 2. June 25
 3. July 11
 4. July 28
 5. August 12
 6. August 28
 7. September 15
 8. September 29

- b. Sampling protocol
 - i. Dig all beets in designated 5 foot length
 - ii. Shake off dirt (do we need to wash off?)
 - iii. Separate into tops and roots
 - iv. Fresh weight for tops, fresh weight for roots
 - v. Take subsample
 - 1. May be whole sample early in season to get enough biomass for analysis
 - 2. May have to do this by weight moreso than number of beets
 - a. Amagulated recommend 20 lbs
 - b. Will play this one by ear
 - 3. Minimum of three beets per plot, maybe more depending on observed growth variability
 - vi. Root nutrients
 - 1. Wash roots and send through ARS brei machine (Check with Tarkalson to see if we could use this multiple times over the growing season)
 - a. Weigh mashed sample
 - b. Place on drying screen and dry at 93 C (Why 93 C instead of 60 C? I am concerned about burning off nitrogen)
 - i. Dry for minimum of 3 days
 - c. Weigh dried sample (not sure how to do this, any advice? Need to get a wet/dry weight somehow)
 - d. Pulverize dried sample with steel roller pin
 - e. Store to be analyzed in November
 - vii. Top nutrients
 - 1. Get another fresh weight for tops subsample
 - 2. Dry at UI or ARS dryer at 60 degrees, minimum of 3 days
 - 3. Get dry weight
 - 4. Grind in ARS Wiley Mill to pass 2 mm sieve
 - 5. Store to be analyzed in November
 - viii. Mail samples in November to Agvise laboratories for analysis (check with Rob Mikkelsen on which analytes he wants done)