INTRODUCTION

Objectives:
1. To analyze the effects of water and N fertilizer rates on yield and quality of sugar beets
2. To explore the potential of using aerial-based (UAV) data for sugar beet nitrogen and water content monitoring

Efficient nitrogen (N) and water management are fundamental for successful sugar beet (SB) production. In profits are based on mainly three factors: beet yield, sugar content, and sugar recovery. While N deficit soil can reduce SB root and sugar yields, N in excess leads to vigorous canopy growth with compromised root development. It also reduces sugar content due to low sugar recovery. Similarly, excess irrigation can increase SB root weight, but lower sugar content.

MATERIALS AND METHODS

- Locations: Parma R&E Center
- SB variety: ETS 2750
- Nitrogen: 100, 200, and 300 N (total soil residual + added fertilizer); applied as urea and incorporated into-the soil immediately prior to planting.
- Water: 100% ET and 50% ET; applied using subsurface drip irrigation system (7-inch depth). Daily reference grass-based ET (ETo) was calculated using data from the Parma AgriMet weather stations. Daily ETa was estimated by multiplying ETo by the SB crop coefficient (Kc).
- Data Collection: at 40 and 60 days after planting, and prior to harvest: (1) Plant height - (5 plants per plot; top leaf to the soil), (2) Plant dry matter determination (oven dried at 220 °C for 24 h and weighed) and N content - (5 leaves and tops (0.5 in of upper) were sampled and dried at 220 °C for 24 h and weighed); (3) Harvest: In October, SB was scalped to a silver dollar sized disc and harvested for yield and root sugar content determination.
- Data analysis: The response of yield and quality of SB to applied treatments were assessed.

DRIP IRRIGATION IN SUGAR BEETS

PRELIMINARY RESULTS

Sugar beet root yield was higher in 2020. Yield increase varied from almost 5% to 50%. Lowest yield was observed with treatment 100 N + 50 ET in both years.

Even though differences in the sugar content for both the years are less significant, the % is higher in the second year by a little margin.

100 ET + 200 and 300 N showed highest ERS, while 100 ET + 200 and 300 N showed highest ERS, while 100 ET + 200 and 300 N showed highest ERS. The response of yield and quality of SB to applied treatments were assessed.

PRELIMINARY CONCLUSION

Reason behind the increase in yield and sugar content in 2020 may be due to the temperature differences or the previous crop planted. Further study in different locations could be carried out (where ET could be reduced to 25% or 75% ?)

Biomass dry weight and N content in the mid season can be accurately used to predict its yield and quality parameters. Also, the UAV-based data was successfully used to estimate the ERS and yield in 2019-2020 data are yet to come.