

HEIN, G. L. and C. D. YONTS. University of Nebraska, Panhandle Res. & Ext. Center, 4502 Ave. I, Scottsbluff, NE 69361. **Factors influencing sugarbeet root aphid populations and the aphids' impact on sugarbeet yield.**

ABSTRACT

The sugarbeet root aphid has been a major problem throughout the Rocky Mountain sugarbeet growing region over the last years. Previously, the true impact of the aphid on sugarbeet yield had not been established, and the major factors that influence aphid populations in sugarbeets in the region were not known. The influence of irrigation levels, soil type and resistant varieties on sugarbeet root aphid populations and yield impact were investigated in field trials during 1999 and 2000.

The affect of irrigation levels was studied by establishing an irrigation gradient across five plots ranging from very low to high irrigation levels. Aphid populations and yields were determined across these gradients. Water levels did impact root aphid populations with greater irrigation levels reducing root aphid populations, but this reduction was not as dramatic as previous literature has indicated. The levels of aphid populations were still significant at the higher water levels. Sugarbeet root aphids impacted yield in both years of the study. The aphids reduced sugar percentage and overall sugar yield when averaged across all gradient plots. Yield impacts were reduced but not eliminated across water gradients.

The impact of soil type on aphid populations was determined in replicated plots where three different soil types had been established. In the soil type comparisons for both 1999 and 2000, aphid populations were higher in the sandy loam soil as compared to both loamy sand and loam soils. It appears that aphids do better under certain soil conditions, and the well drained conditions that occur in a sandy loam soils may provide better conditions for aphid survival.

The impact of resistant varieties on aphid populations was determined in replicated plots where infested and uninfested plots of the same variety could be compared. Artificially infested aphids were used to bolster natural aphid populations in the infested plots, and the systemic insecticide Aphistar was used to eliminate aphids in the uninfested plots. Six varieties were tested in this study including Monohikari, Beta 4546, Beta 6863, Holly HH110, Beta 4006R and Holly Rizor. Aphistar reduced aphid populations in all treated plots to insignificant levels. Overall aphid infestation levels were only moderate. Two varieties, Beta 6863 and Holly HH110, had the highest aphid levels, and three varieties, Beta 4006R, Beta 4546, and Holly Rizor, had intermediate root aphid populations. Aphid population levels between infested and uninfested plots did not differ only for Monohikari, which is known to be highly resistant. The aphids had a variable impact on the yield of the varieties tested with only the very susceptible varieties, 8686 and HH110, showing a significant impact of the aphid on percent sugar and sugar yield. Even with only these moderate aphid levels, the aphids reduced sugar percentages from 16.5% to 14.5 % for the most susceptible varieties. Overall sugar yield was reduced about 2000 pounds per acre for these two most susceptible varieties. No significant yield reductions were seen for the intermediate varieties. This is very surprising as only Beta 4546 is known to have root aphid resistance. The two varieties, Holly Rizor and Beta 4006R, even though they have no known resistance, both had lower aphid populations and the aphids did not impact sugarbeet yield. This is the first documentation of the dramatic impact of the sugarbeet root aphid in controlled plot experiments. The large impact of the aphids where aphid populations were measured to be moderate is striking.