**Achievements:**

Objective 1: Experimental plots were set up in soybean fields in St. Paul and Rochester in summer 2019. Cages were used to manipulate insect numbers in St. Paul and insecticides were going to be used in Rochester. In St. Paul, insect (soybean aphid and Japanese beetle) data and plant spectral data were collected from the caged plots. Cages infested with soybean aphid had significantly more aphids compared to cages not infested with aphids (P<0.05). Cages infested with Japanese beetle had significantly more defoliation than those that were not infested (P<0.05). In particular, defoliation was greatest for leaves from the top of the soybean canopy (about 5%) compared to leaves from the middle or lower canopy (about 1%) (P<0.05).  Spectral (remote sensing) data are being prepared for analyses to examine the effect of aphids and Japanese beetles on the spectral reflectance of the soybean canopy. In Rochester, infestations by soybean aphid and Japanese beetle were relatively minor, so insecticides were not needed and differences in insect pressure among plots may not have been great enough to result in spectral differences.

**Challenges:**

Ambient levels of insects in the Rochester field did not ever reach economic thresholds. This means that we did not get measurements from high insect pressure scenarios in this location.

The research field in St. Paul became heavily infested with white mold. We were still able to collect aphid counts, defoliation data, and hyperspectral measurements, but for a shorter period of time than desired. We will not be collecting yield and quality data from this location as the white mold would severely confound those measurements. These plots provided specimens of the white-mold gall midge that contributed to documentation of this species in the state.