**Achievements:**

Objective 1, Goal 1: As described in earlier reports, soybean aphid populations were collected and assayed from 23 locations across Minnesota, South Dakota and Wisconsin. Each of these field-collected populations and our laboratory population of insecticide-susceptible aphids was assayed to quantify resistance to lambda-cyhalothrin or bifenthrin. For lambda-cyhalothrin, 13 of the populations from Minnesota and South Dakota showed reduced mortality (evidence for resistance). For bifentrhin, 15 of the populations from Minnesota and South Dakota showed reduced mortality (evidence for resistance). Populations from Wisconsin showed no evidence for resistance. Results of this research are being written up for a scientific paper. Furthermore, we successfully leveraged these results and the investment in our efforts by MN Soybean Promotion and Research Council to secure a highly competitive USDA AFRI grant and a UMN Rapid Ag. Response Grant, which will allow us to further insecticide resistance management recommendations though examination of the mechanisms of insecticide resistance in soybean aphid and examination of grower attitudes and behaviors toward IPM and IRM for soybean aphid.

Objective 1, Goal 2: As reported on previously, field efficacy trials were established at Rosemount and Lamberton, MN to evaluate insecticides for control of soybean aphid. At Rosemount, prior to application of insecticides, aphid densities averaged 181 aphids per plant. At 6 DAT, all insecticides reduced populations of aphid compared with the untreated check; however, Warrior II reduced populations less than the other insecticides. At 13 DAT, Sivanto Prime, Sefina, and both rates of Argyle OD reduced populations of aphid compared with Warrior II and the untreated check. No yield differences were found among treatments. Results of this trial were published in Arthropod Management Tests (<https://doi.org/10.1093/amt/tsz040>).  At Lamberton, all insecticides reduced soybean aphid populations. There were significant differences in aphid control among the 22 insecticide treatments containing 14 individual compounds tested and two untreated controls. Several insecticides had similar aphid populations to the untreated controls. Insecticides providing the least control include insecticides containing only synthetic pyrethroids (lambda-cyhalothrin, bifenthrin), the pyrethroid+neonicitinoid mix (Brigadier) and flonicamid (Carbine). However, all treatments yielded similarly, although both untreated controls were numerically the lowest. Results of the trial in Lamberton were published on the SWROC website ([https://swroc.cfans.umn.edu/sites/swroc.cfans.umn.edu/files/2018\_aphid\_insecticide\_final\_r...](https://swroc.cfans.umn.edu/sites/swroc.cfans.umn.edu/files/2018_aphid_insecticide_final_report.pdf)).

Objective 2, Goal 1:  While *Aphelinus certus* parasitism was found throughout soybean growing areas of the state, analyses of field-cage experiments from the 2018 season suggested that parasitism levels of soybean aphid were not high enough to prevent local outbreaks in Glenwood, Rosemount or Waseca.  Plans are underway for another round of testing for the 2019 field season.

Objective 2, Goal 2: Data from temperature probes over the winter of 2018/2019 showed that snow cover greater than 4 inches can insulate *Aphelinus* mummies from potentially lethal cold temperatures.  Snow cover tends to be deeper in woodlots, so overwintering in the leaflitter of woodlots is likely the safest for parasitoids. Snow cover is less deep in soybean fields and when coupled with polar vortex conditions, a lack of snowcover can expose parasitoids to potentially lethal conditions within leaflitter of soybean fields.