Research summary 2019:

Title of project: Determining biocontrol options for peanut pests: a molecular approach

Principal investigator(s)
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During the 2019 project period, we expanded our prior year study to first design a large scale on-farm partnership with GA peanut growers. The goal was to select a spatially balanced design of sites containing low to high levels of peanut production in the landscape. We successfully selected and sampled 42 peanut fields across the state of GA within 21 counties. We collected a total of 191 suction samples these fields to provide information on pests and natural enemies in these landscapes and in relation to irritation practices, in field location (edge or interior), and landscape context.

In total, we collected over 13,000 herbivorous (plant feeding) insects (aphids, thrips, caterpillars, plant bugs), and over 4,000 natural enemies (parasitoids and predators). The most common herbivorous insects were thrips (Fig. 1). For natural enemies, we identified 27 groups of natural enemies, and the most numerically abundant were parasitoids, spiders and Orius (minute pirate bug) (Fig.2). The parasitoids are an interesting find because in other systems we've observed in GA, parasitoids are often quite rare. We have identified a parasitoid specialist to help work on what parasitoids are present, but this will take some time. We initially have just identified these as small Hymenoptera, likely in the group Braconidae. Braconidae are a very diverse and challenging group to identify, but it's an exciting result. These parasitoids are important for natural caterpillar control, aphid control, and thrips. We are currently working our way through screening the predators for the presence of pest DNA to determine which are having activity out in GA landscapes and attributes of the farm and landscape contributing to their natural pest control services. We've extracted DNA from over 800 predators now, and have screened a total of 327 for 9 prey targets including burrower bugs.. We began with screening the most common predators, Orius and Lynx spiders (Oxyopidae; green lynx and stripped; Fig. 3). The lynx spiders are contributing to caterpillar (lept) and thrips. Therefore, both of these predators are providing pest control services on common pests. We only observed a few burrower bugs in all of our samples and, unfortunately we didn't find evidence of predation on burrower bugs current molecular screening. We need to finish screening predators and relate our findings to land-use land-cover indices. The cropland data layer from USDA was just release last weekend.

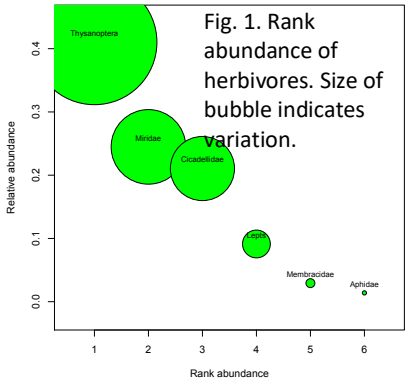

Fig. 1. Rank abundance of herbivores. Size of bubble indicates variation.

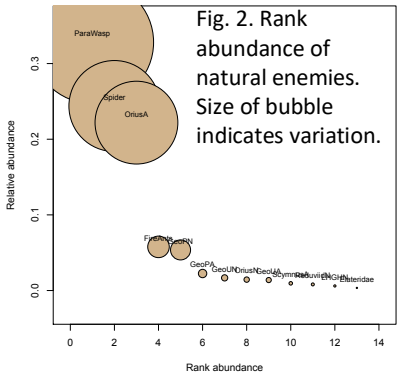

Fig. 2. Rank abundance of natural enemies. Size of bubble indicates variation.

Fig. 3. Initial look at predation by *Orius* and two lynx spider species (*Oxyopes, Peucetia*) on pets and