Reporting period May 1, 2022, to July 31, 2022

Objective I. **Evaluate insecticide and fungicide efficacy in an ongoing and systematic way**
(Team: Bruce Potter, Dr. Dean Malvick, and Dr. Robert Koch with additional University and Industry collaboration).

a) This project continues standardized foliar fungicide trials in soybean across southern Minnesota. Three 2022 study sites were established at University of Minnesota Southwest Research and Outreach Centers located in southern Minnesota. Sites at the Southwest Research and Outreach Center (Lamberton, Redwood County), the Southern Research and Outreach Center (Waseca, Waseca County), and the Rosemount Research and Outreach Center (Dakota County) were planted with three diverse soybean varieties (DSR 1505E, Stine 19EC12, S20-LLGT27). At all sites, planting was delayed by cold, wet spring soil conditions. Insect and disease evaluations were made during June (seedling) and late July (R3 stage). Fungicide treatments were applied to R3 stage soybeans and consisted of Miravis Neo, Delaro 325, and untreated control.

b) This project supports the continued evaluation of insecticide compounds on soybean pests. An area for a soybean aphid insecticide study site was planted at the UMN Southwest Research and Outreach Center. Soybean aphid populations at this site were established by aphids from nearby buckthorn and neighboring fields. Fourteen treatments were planned.

Objective II. Define the distribution and host range of the soybean gall midge within Minnesota.
(Team: Bruce Potter and Dr. Bob Koch)

This project will **a)** Track changes in the distribution of soybean gall midge (SGM) across Minnesota environments and **b)** Examine alternative hosts and determine if additional Minnesota crops are at risk. This funding is requested as a second year to the project funded by the Minnesota Soybean Research and Promotion Council. It will complement other work funded work previously funded by the NCSRP.

a) Minimal survey of soybean was conducted this quarter. A field day was held on July 13th at a soybean gall midge research site in Rock County. Similar, and perhaps reduced from 2021, damage from 1st generation larvae was low.

b) Survey of dry beans (Phaseolus vulgaris) and sweet clover in several West Central Minnesota Counties with a history of SGM infestations began in July. Larvae from the overwintering generation of SGM were at very low levels in Minnesota and no larvae were observed on corn and soybeans in this area.

Eighteen annual legumes, including three soybean varieties (Table 1) were greenhouse grown for placement in a soybean gall midge-infested field (Rock County) during the periods that overwintering and first-generation midge adults were believed to be active. While several of these legumes (e.g., lentils, mung) have small diameter stems and were not expected to be suitable hosts, they were included to broaden the diversity of legume genetics and geographic area of origin. Stem diameters and the presence of growth fissures were recorded several times before the plants were placed in the field.

Pots with sentinel were placed in the field on June 14, for the overwintering generation. Approximately ½ of the stems were slit with a razor knife to provide a wound. The plants were removed from the field and replaced in the greenhouse on June 20, and the stems were dissected for the presence of SGM

larvae on June 28. Soybean gall midge larvae were observed in the stems of all three soybean varieties but not on any other legumes. The potted sentinel soybean plants were larger than the soybeans in the field and despite moisture/wind stress, were infested at a rate as high or higher than soybeans in the field.

Sentinels for the first-generation adult oviposition were placed in the field July 18, removed to the greenhouse July 25, and dissected August 1. Some interesting alternate host observations will be reported with Q2 activities.

TRT NO	Family	Subfamily	Tribe	Genus	Species			Variety	Cultivar	Origin
1	Fabaceae	Faboideae	Glycinineae	*Glycine*	*max*	Soybean		Ag 20X7		East Asia
2	Fabaceae	Faboideae	Glycinineae	*Glycine*	*max*	Soybean		Pio P28A42		East Asia
3	Fabaceae	Faboideae	Glycinineae	*Glycine*	*max*	Soybean		S20 LL GT27		East Asia
4	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Dry-half-riunner	Pinto	Meso/South America
5	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Dry-Bush	"Hidatsa Red Indian"	Meso/South America
6	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Dry-Bush	Black Turtle	Meso/South America
7	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Tiger eye	'Tiger's eye'	Argentina/Chile
8	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Dry-Bush	Small Red	Meso/South America
9	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Dry	Dry -Half runner	Great Northern'	Meso/South America
10	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*vulgaris*	Bean	Snap-Pole	Bush	Stringless Blue Lake S-7	Meso/South America
11	Fabaceae	Faboideae	Phaseolineae	*Phaseolus*	*lunetus*	Lima bean	Lima	Lima-Bush	"Henderson 's"	Meso/South America
12	Fabaceae	Faboideae	Fabeae	*Vicia*	*fava*	Fava/Broad bean			' Robin hood'	Near East
13	Fabaceae	Faboideae	Cicereae	*Cicer*	*aristinum*	Chick pea/Garbonzo				Mid East
14	Fabaceae	Faboideae	Phaseolineae	*Vigna*	*unguiculata*	Cowpea			'California Black Eye 46'	Africa
15	Fabaceae	Faboideae	Fabeae	*Pisum*	*sativaum*	Pea	Snap		'Super sugar snap'	Near east
16	Fabaceae	Faboideae	Phaseolineae	*Vigna*	*radiata*	Mung bean				East Asia
17	Fabaceae	Faboideae	Phaseolineae	*Vigna*	*angularis*	Adzuki bean				East Asia
18	Fabaceae	Faboideae	Fabeae	*Lens*	*culinaris*	Lentil				Near east

Table 1. Annual legume sentinels for detection of soybean gall midge oviposition preferences.