



USDA-OREI ENTOMOLOGY RESEARCH

Progress Report, February 12, 2018

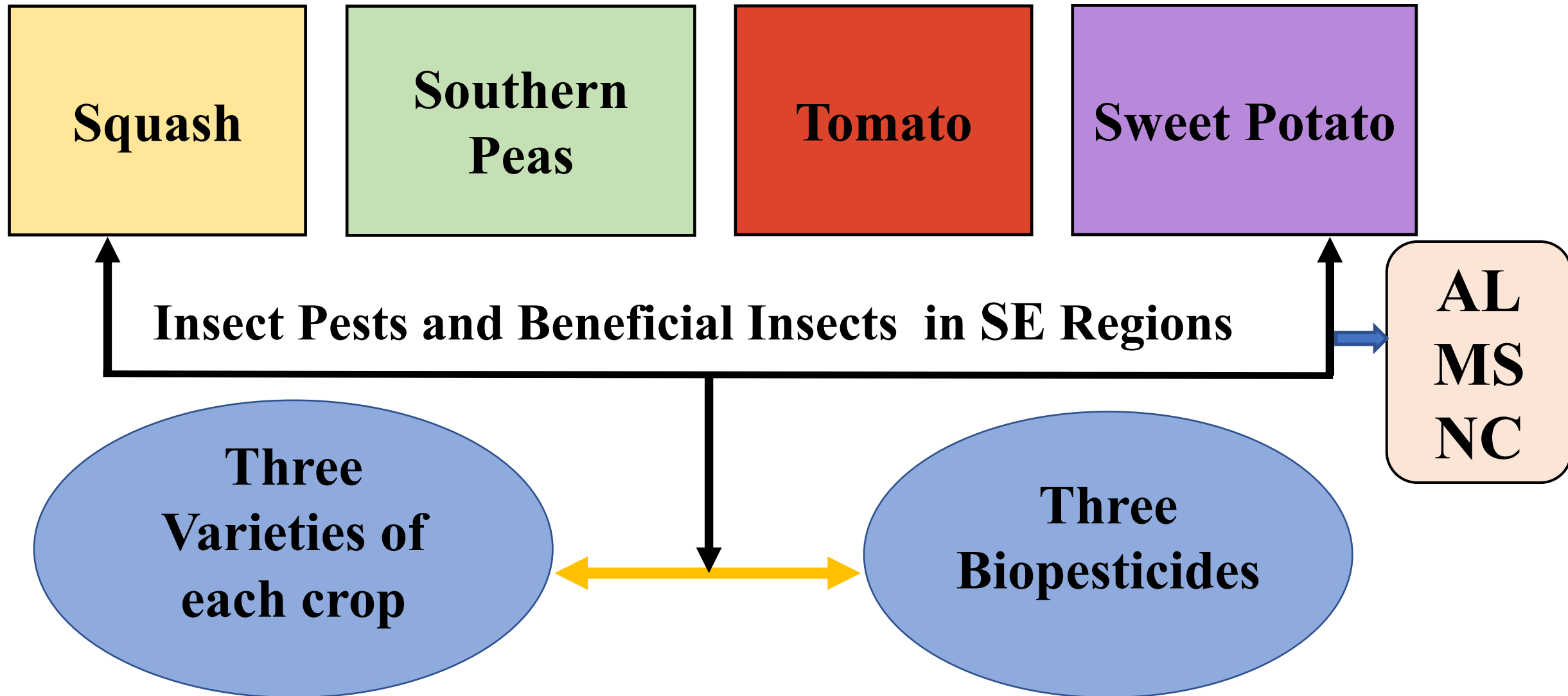
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SOUTHEAST
ORGANIC
PARTNERSHIP
AT TUSKEGEE UNIVERSITY



OVERVIEW OF THE RESEARCH PROJECT





PURPOSE OF CURRENT RESEARCH

- Southeastern US generally lags in organic food production
- Climatic conditions
 - ✓ high (insect) pest pressures
 - ✓ warmer temperatures
 - ✓ Heavy rainfall
- High pest populations —→ Indiscriminate use of pesticides



MAIN OBJECTIVES OF THE STUDY

1. To assess the insect population dynamics on selected vegetable crops in various regions in the SE
2. Evaluate the performance of selected commercially available biopesticides against major insect pests of selected vegetable crops.
3. To assess the host preference of major insects pests and the population of beneficial insects recorded on the selected crop varieties.

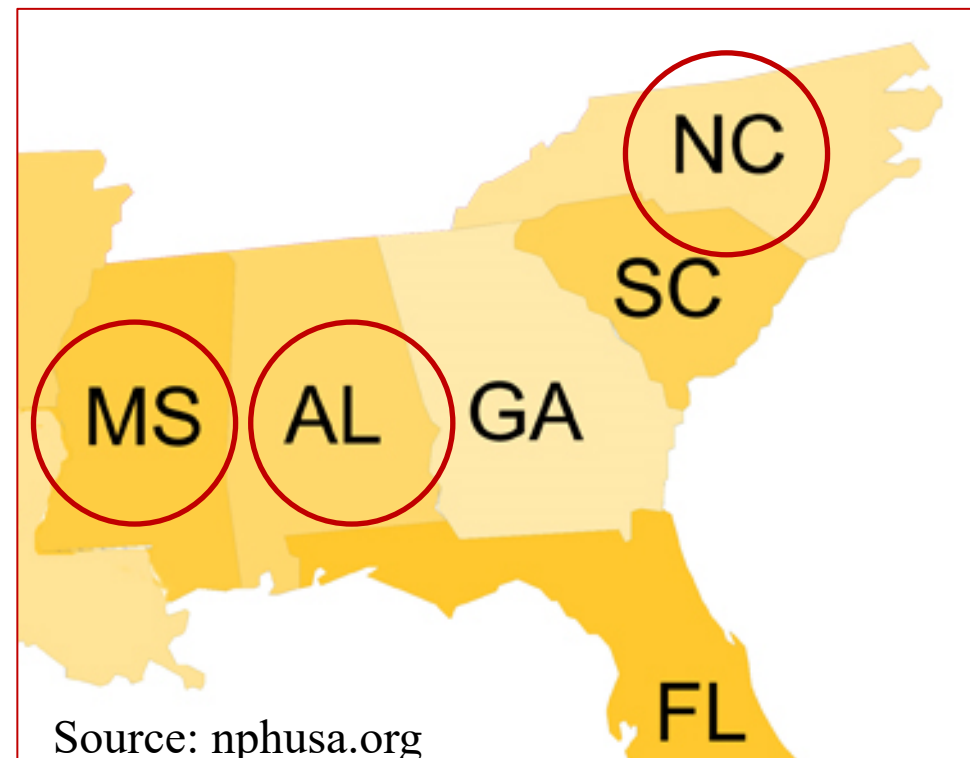


STUDY LOCATIONS

➤ Studies were conducted during Summer 2018

➤ Three locations

1. GW Carver Agricultural Experiment Station, Tuskegee University, Tuskegee, AL.
2. Mountain Horticultural Crops and Extension Center, North Carolina State University, Mills River, NC.
3. North Mississippi Research and Extension Center, Horticulture Unit, Mississippi State University, Verona, MS.





SELECTION OF VARIETIES

Crop	Varieties	Criteria
Squash	Zephyr, Spineless Beauty, Gentry	Hybrids, highly productive, 45-55 days harvest period.
Southern Pea	Mississippi Silver, Queen Anne, Pink eyed purple Hull	Flavor (strong, mild), shelling, bush type, easy to harvest with 70-85 days
Tomato	Rocky Top, Celebrity, Mountain Magic	Plant type, Disease resistance, Fruit type
Sweet Potato	Garnet, Orleans, Covington	Maturity, Disease resistance



SQUASH



Zephyr



Spineless Beauty



Gentry

TOMATO



Mountain magic



Rocky top



Celebrity

SOUTHERN PEA



Pinkeye Purple hull

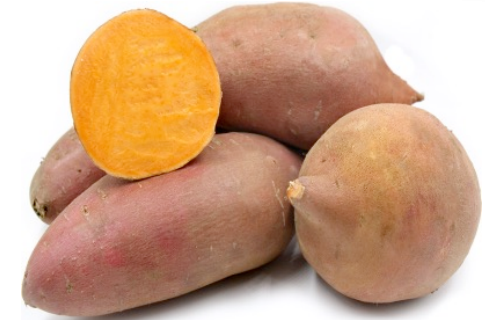


Queen Anne



Mississippi silver

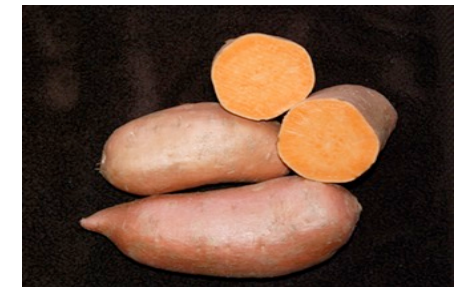
SWEET POTATO



Garnet



Covington



Orleans

Source: Sonu, B.K



BIOPESTICIDES

➤ Azadirachtin (Neem)

-Antifeedant, Ovi-deterrent (*Gill and Lewis, 1971*)

➤ Pyrethrin(Flower heads of *Chrysanthemum cinerariaefolium*)

-Affects nervous system (*Suiter and Scharf, 2015*)

-Effective against flying, crawling chewing & sucking insects

➤ Spinosad (soil bacterium *Saccharopolyspora spinosa*)

- Attacks digestive & nervous system (*Wood & Hardin 2000; Cisneros et al. 2002*)

- less toxic to natural enemies, effective against lepidopteran larva



1. Azadirachtin

16 fl.oz/acre, 1Quart=\$188.95



2. Pyrethrin

17 fl.oz/acre, 1Quart=\$143.95



3. Spinosad

8 fl.oz/acre, 1Quart=\$ 384.95

MAJOR INSECT PESTS OF SQUASH



Striped Cucumber beetle
-*Acalymma vittatum*)

Spotted Cucumber beetle
-*Diabrotica undecimpunctata*

Squash bug - *Anasa tristis*

Thrips - *Frankliniella* sp.

Aphids- *Aphis* sp.



Source: Gerald Brust 2009

MAJOR INSECT PESTS OF S.PEA

Cowpea Curculio

-*Chalcodermus aeneus*



Cowpea Curculio Ayanava et al 2016



Green Stink bug UGA1327138

Leaf footed bug

-*Leptoglossus phyllopus*



entnemdept.ifas.ufl.edu
Leaf footed bug

Aphids - *Aphis craccivora*



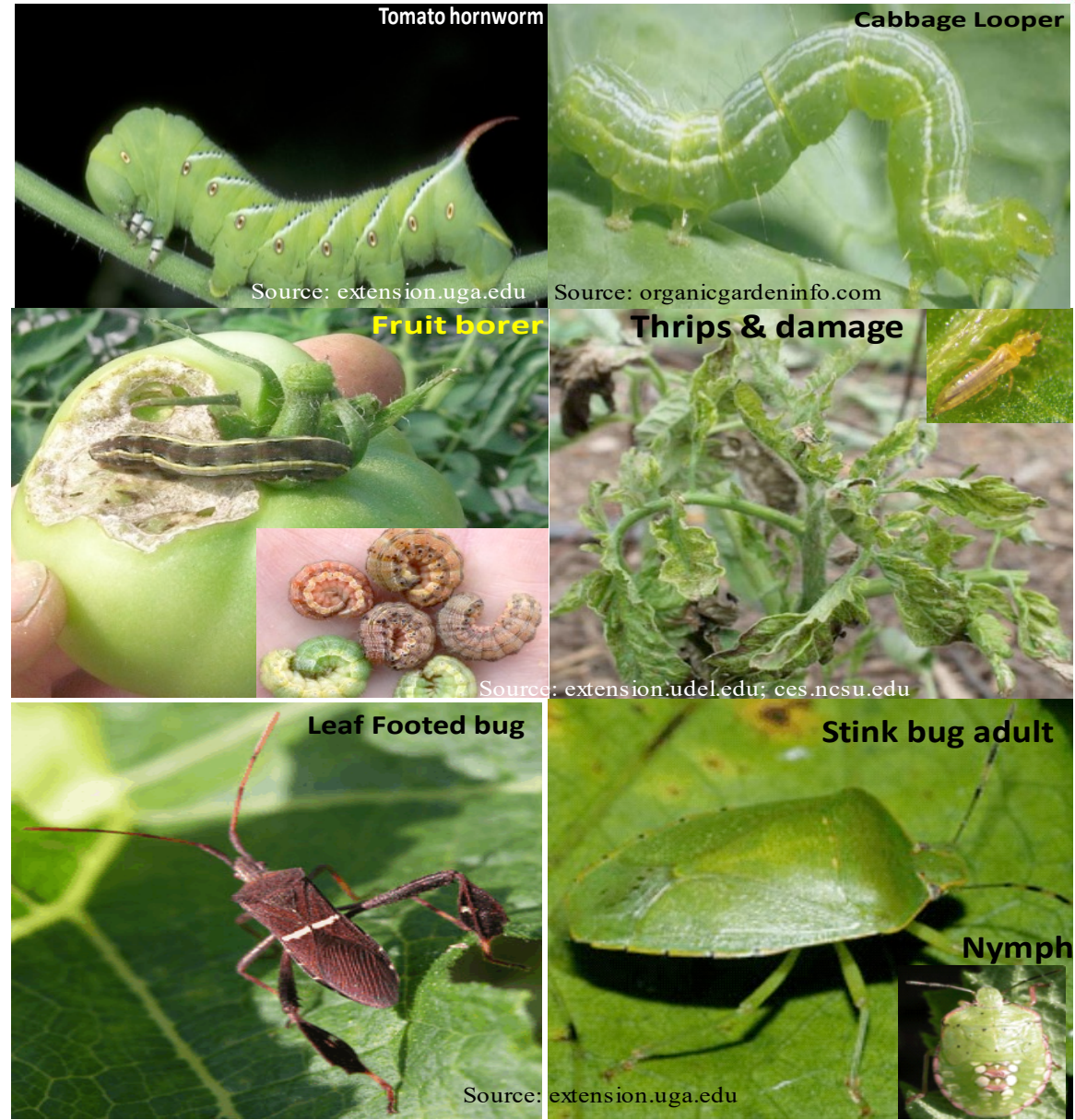
entomology.k-state.edu
Aphids

Green /Brown stink bug

Thrips - *Frankliniella sp.*

MAJOR INSECT PESTS OF TOMATO

- Tomato Horn worm
 - Manduca quinquemaculata*
- Leaf footed bug
 - Leptoglossus phyllopus*
- Tomato Fruit Borer
 - Helicoverpa armigera*
- Green stink bug
 - Chinavia hilaris*
- Thrips- *Frankliniella* sp.
- Aphids - *Aphis* sp.



MAJOR INSECT PESTS OF SWEET POTATO

Sweet Potato Foliage Feeding

Insects:

- Horn worm
- Army Worms
- Beetles
- Loopers



Horn Worm

Source: hawainaturejournal.weebly.com



Army worm (beet army worm)

Sweet Potato Soil Insects

- Weevils- White fringed beetles
- White grubs
- Wireworms
- Flea beetles



Tortoise shell beetle



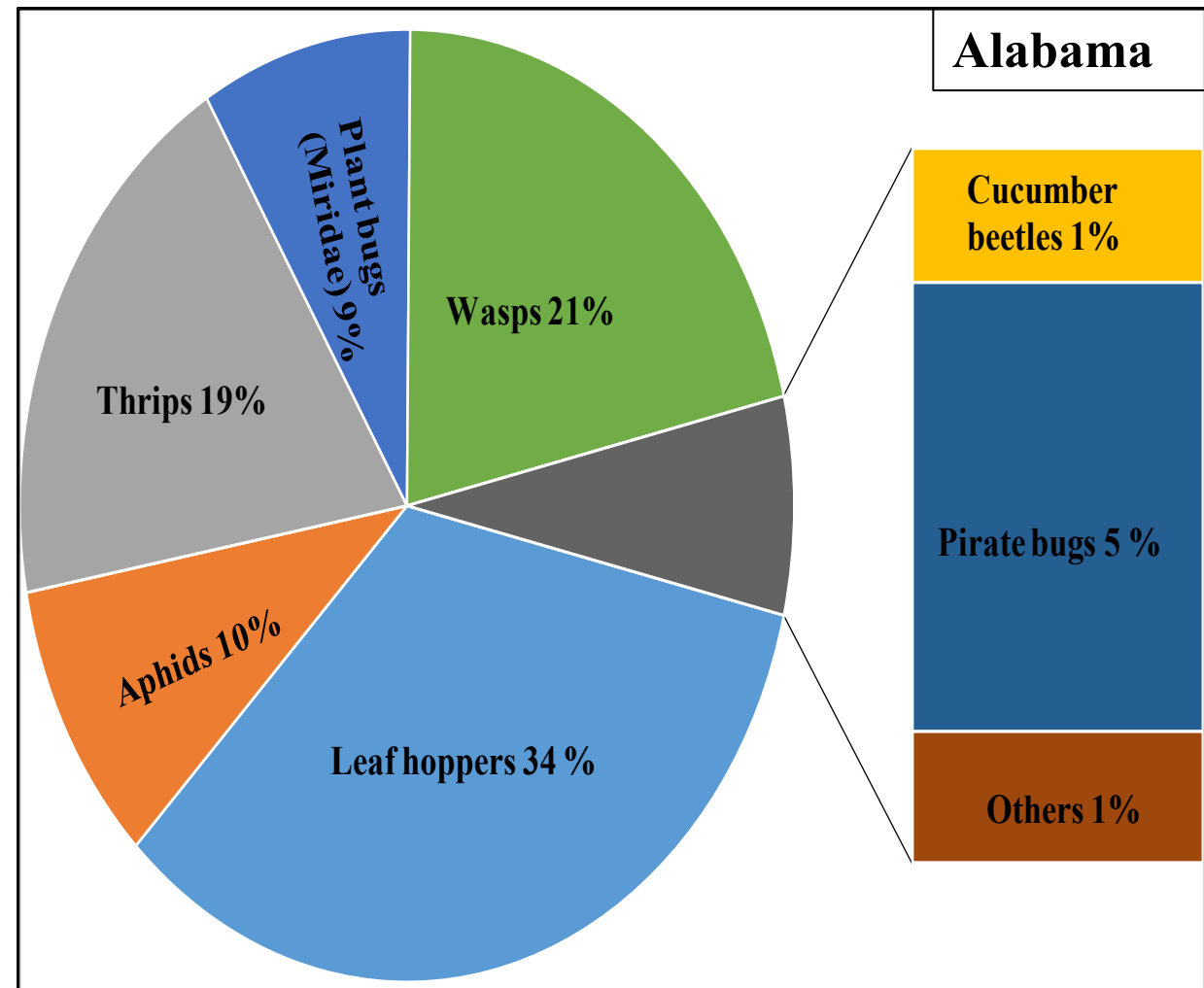
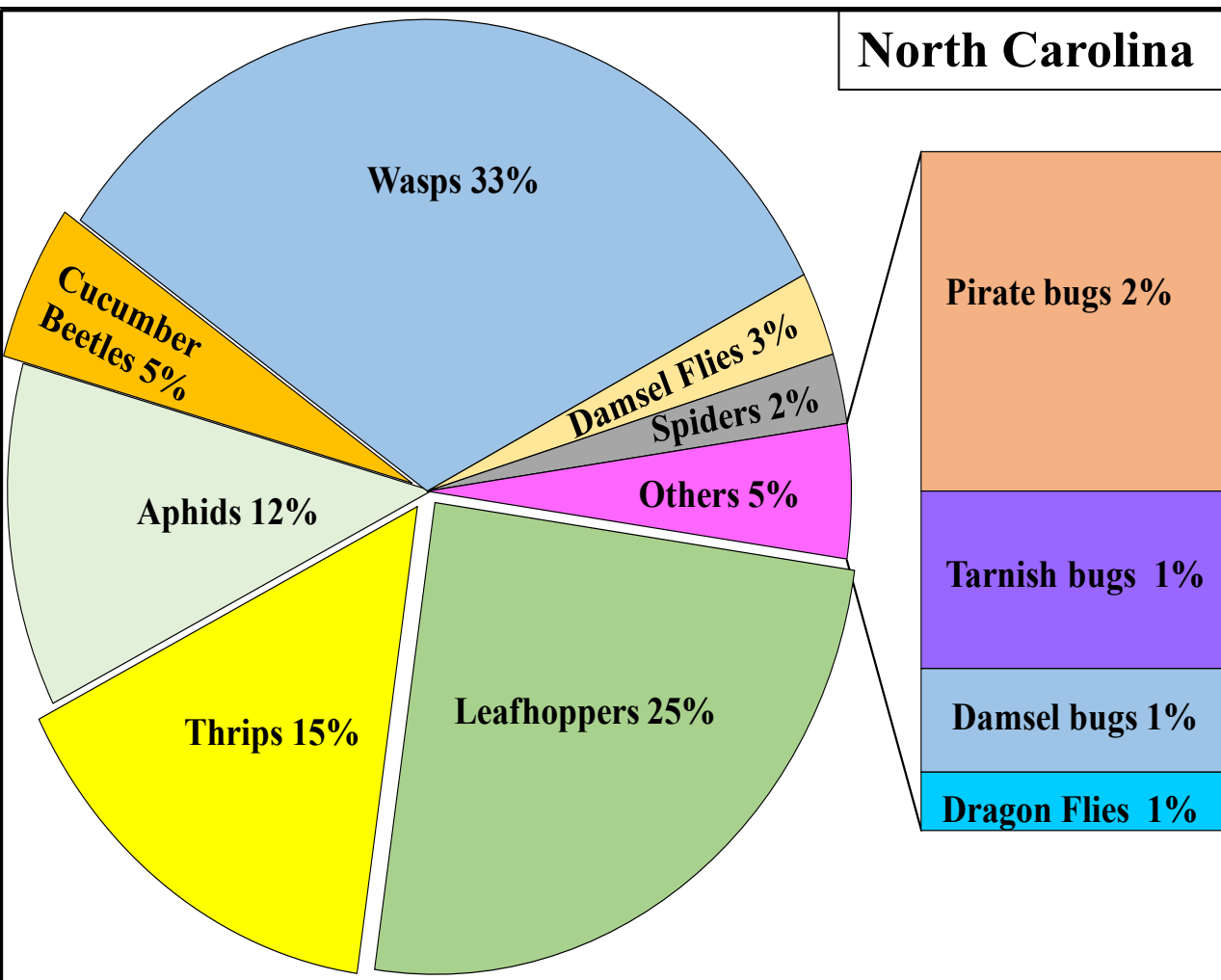
Green Tortoise beetle



White fringed beetle

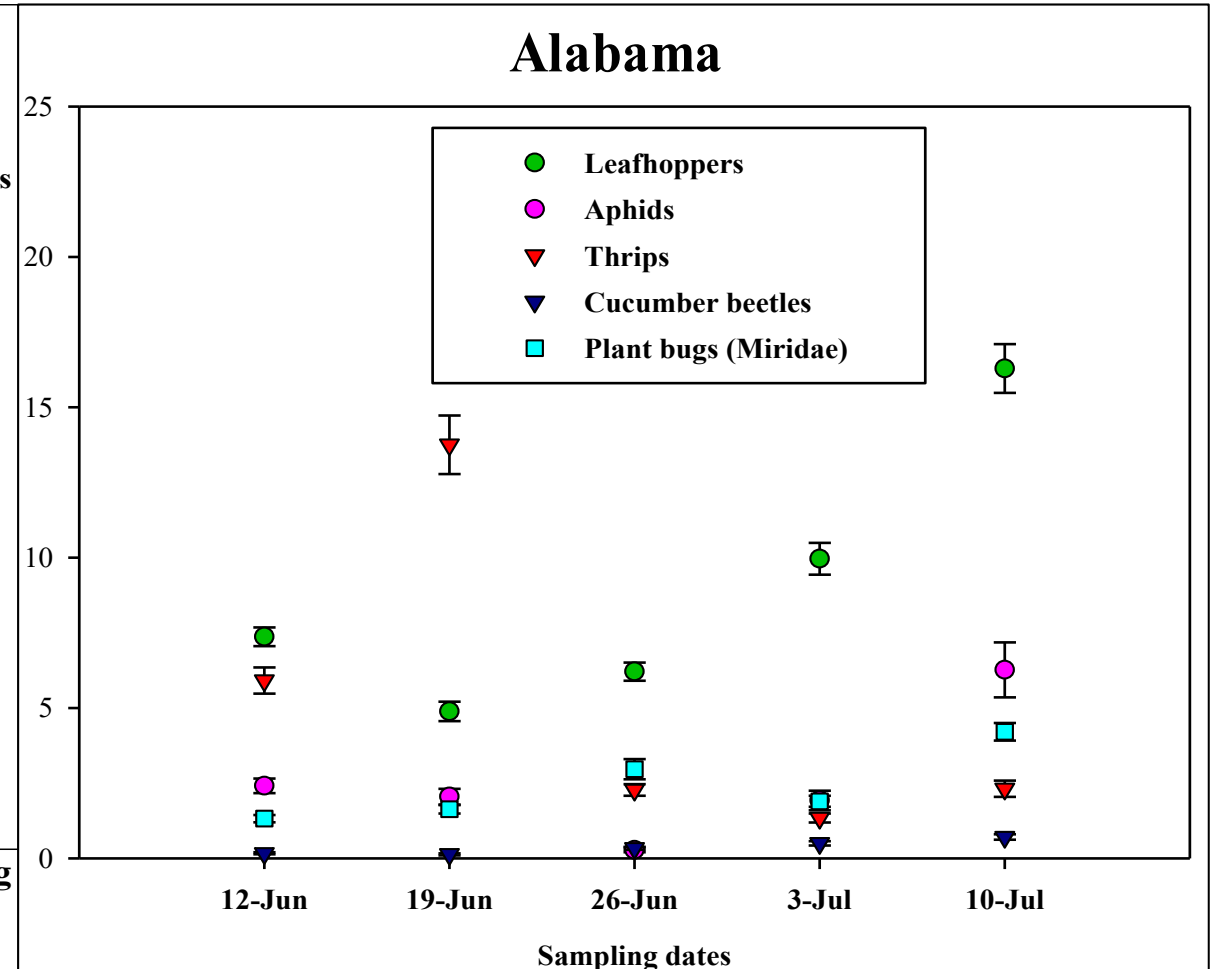
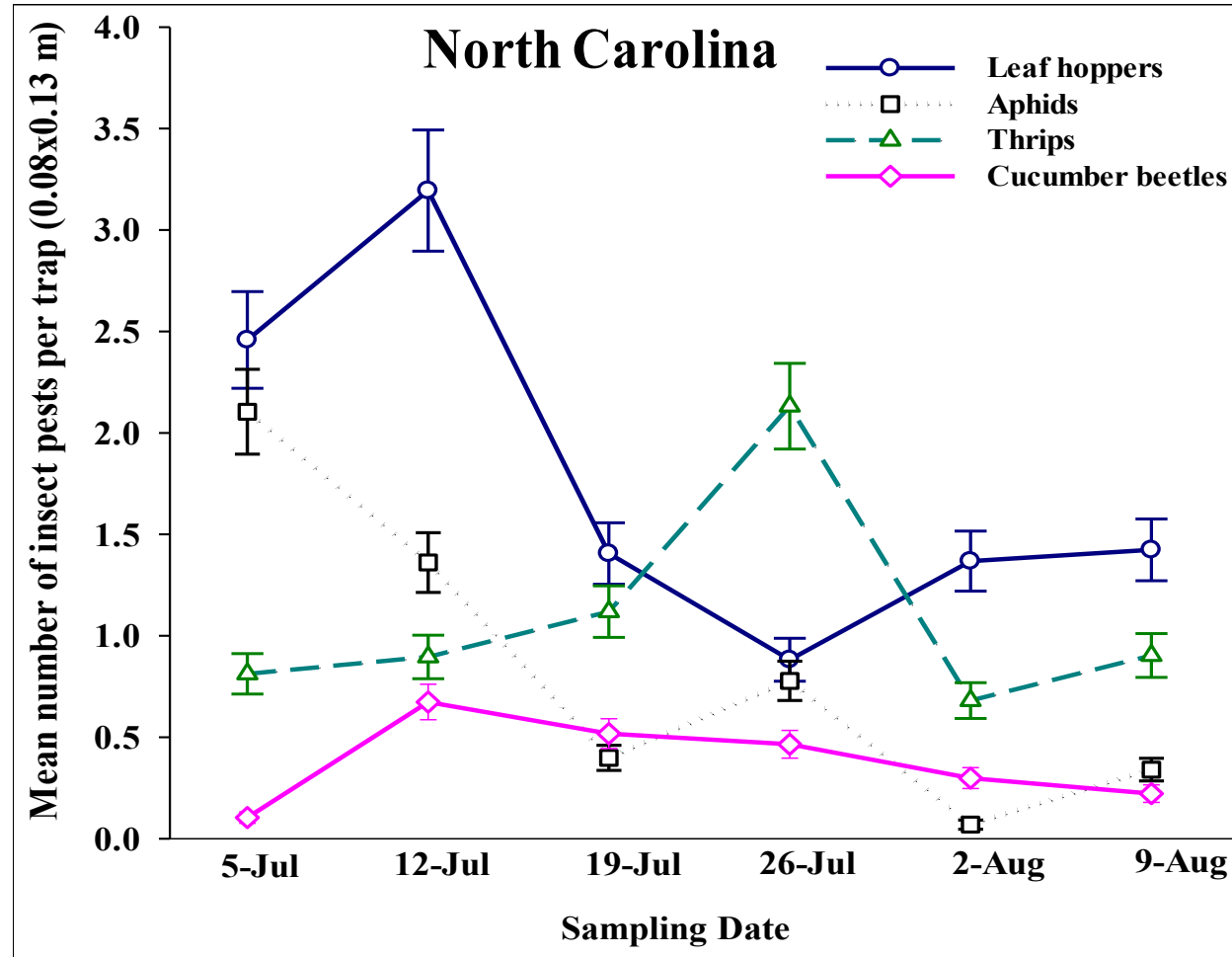


INSECT PESTS AND BENEFICIAL INSECT POPULATION IN SQUASH



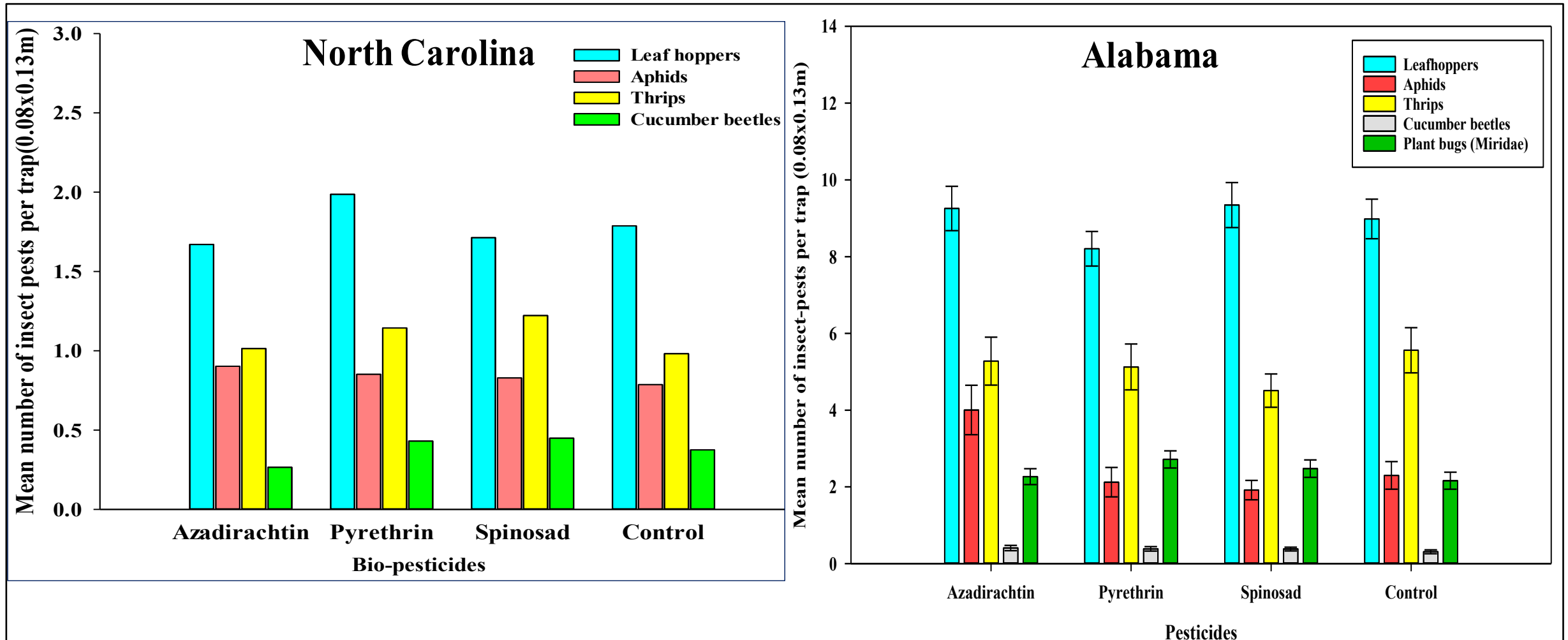


POPULATION DYNAMICS OF INSECTS PESTS ON SQUASH



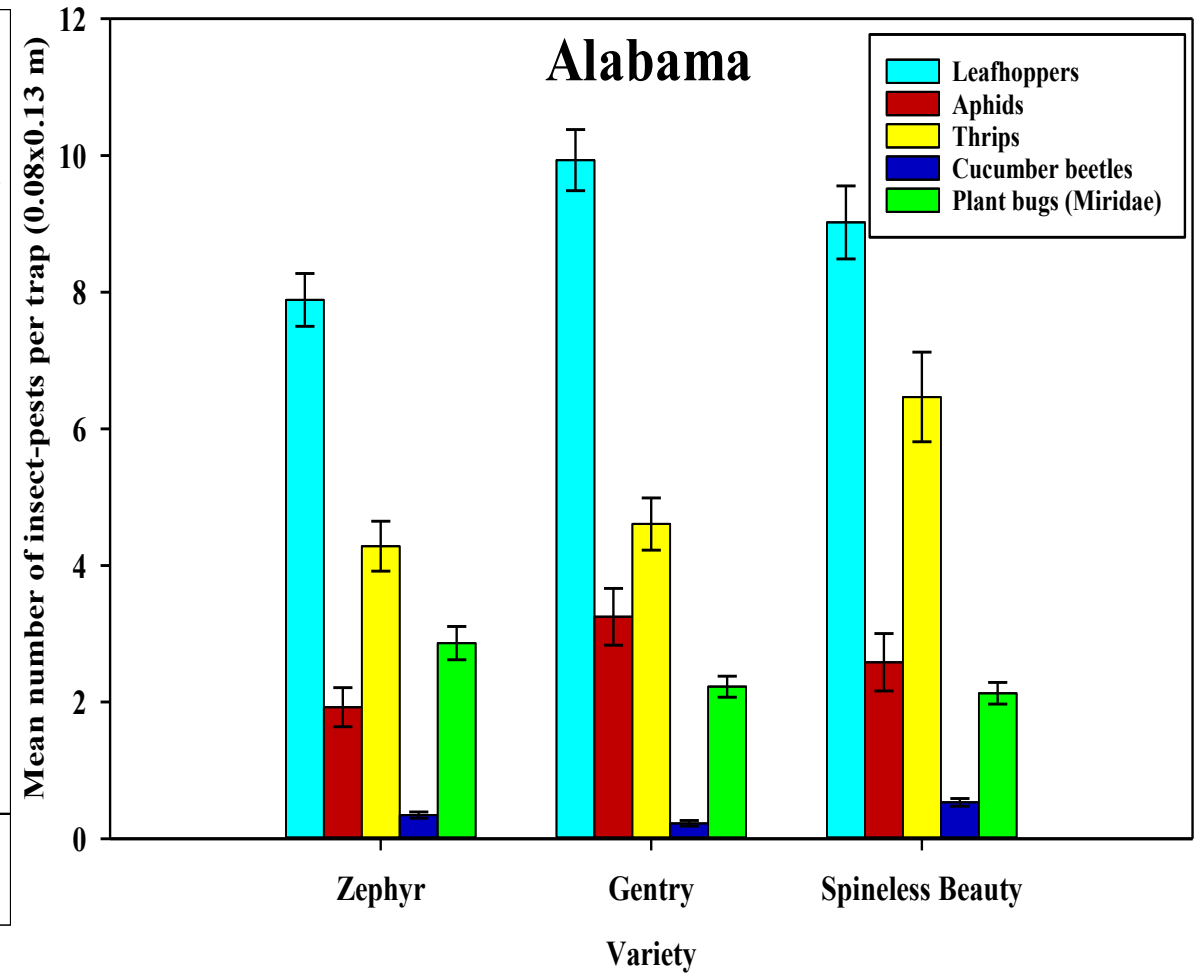
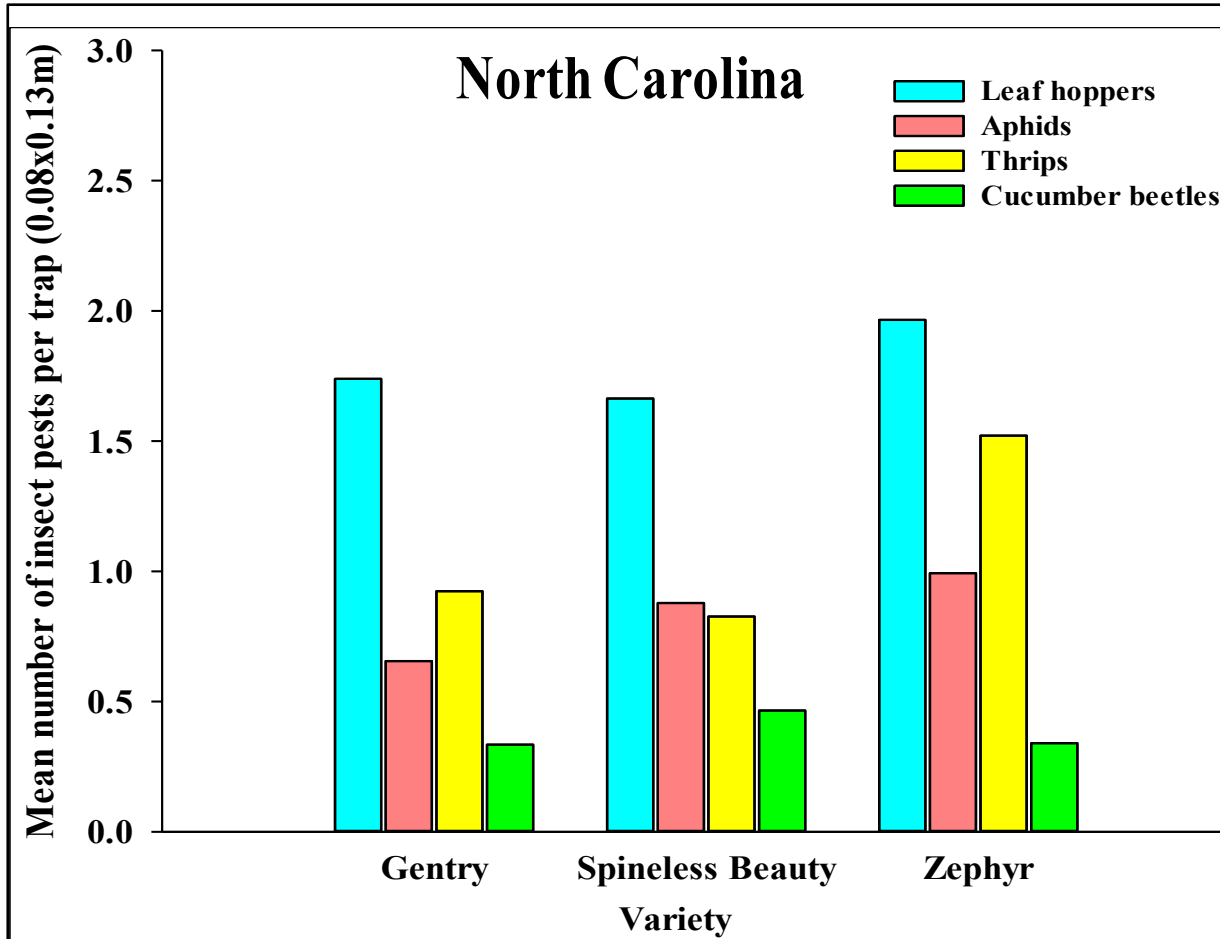


EFFECT OF BIO-PESTICIDES ON INSECT PESTS OF SQUASH





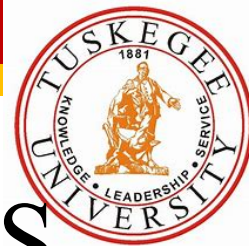
EFFECT OF VARIETY ON INSECT PESTS OF SQUASH





OVERVIEW OF THE RESULTS

- More insects pests were recorded at the experiment station in Alabama relative to that in North Carolina;
- Azadirachtin was significantly more effective than Spinosad and Pyrethrin against Leafhoppers and Cucumber beetles at the research site in North Carolina ($\alpha=0.05$);
- There were significant differences in the insect populations on the different varieties of Summer Squash in North Carolina ($\alpha=0.05$).
 - ✓ Spineless Beauty recorded the lowest number of Leafhoppers and Thrips;
 - ✓ Gentry recorded the lowest number of Aphids and Cucumber beetles;
 - ✓ Zephyr recorded the lowest number of Cucumber beetles;
- Differences in the cost of the various bio-pesticides and their similar performance against certain major insect pests point to differences in the cost-effectiveness of the different bio pesticides.



RECOMMENDATIONS FOR FUTURE STUDIES

- It is imperative that we homogenize our research methods in order to reserve the ability to make certain inferences on location effects that have a direct bearing on pests and their management.
- Need to revise the protocol to obtain a version that is more acceptable for each research station.
- Revise the action thresholds and pesticide application protocol



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Thank You

Questions?

