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Pest Management of Peanut and Soybean Pests

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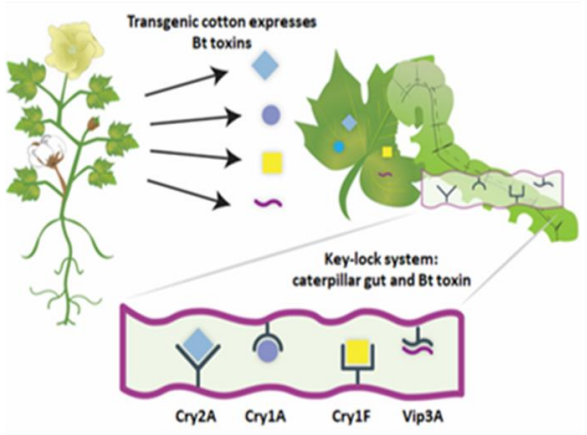
IPM of Peanut and Soybean Pests

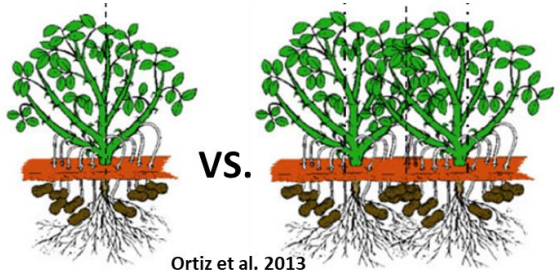
- Integrated Pest Management
  - the use of **ALL** available control tactics so that economic losses and harmful environmental side effects are minimized.
    - Biological: Conservation of beneficial insects
    - Cultural practices: optimize growing conditions and variety selection.
    - Mechanical: conservation tillage, cultivation
    - Chemical: Insecticides

- IPM Approach: What, When, Where and How?
  - What: Detection and Pest ID
  - When: Economic Thresholds
  - Where: Pest Biology
  - How: insecticide selection



Design by S. Rodriguez

Fungal Pathogens



Ortiz et al. 2013

Single Row **Twin Row**

Planting into residue

Caterpillar parasitoid

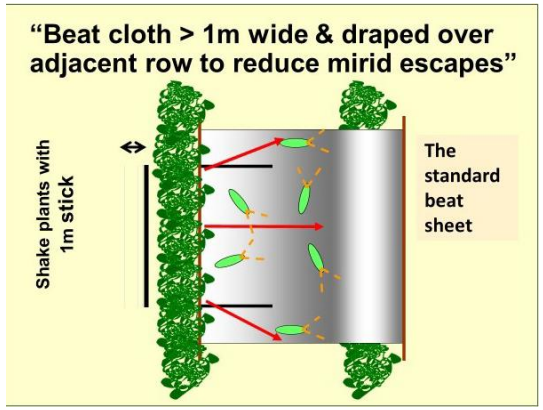
Egg parasitoid

What? Pest Detection: You Must Scout Your Fields

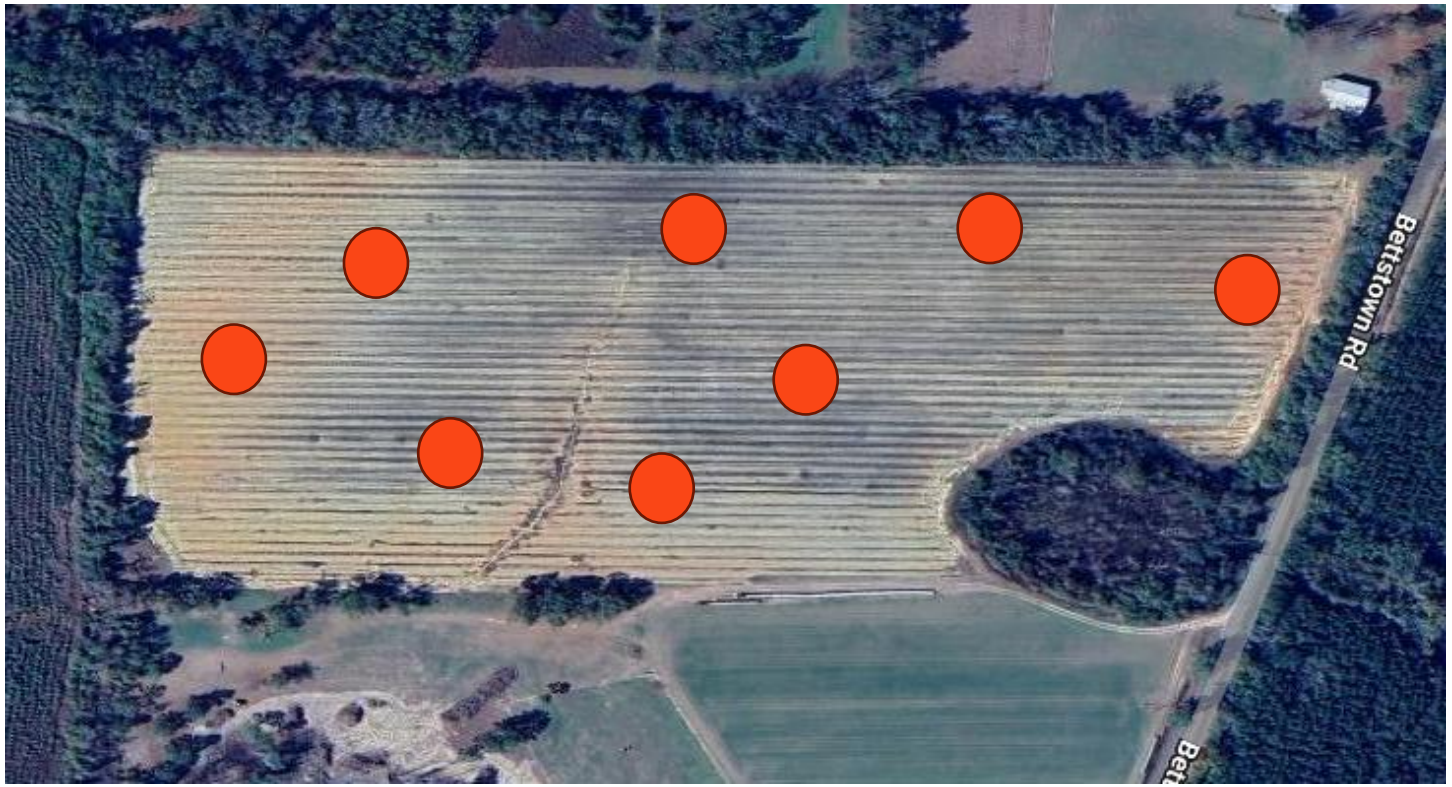
How do we know what's going on?

- DON'T wait until visible signs of pest activity
- Minimum 8-10 spots per field
- Don't make decisions on a hot spot
- Identify and understand your pest
  - Can be important for control decisions.

Sweep Net



Beat sheets



Avoid staying at the edge → walk in > 25m

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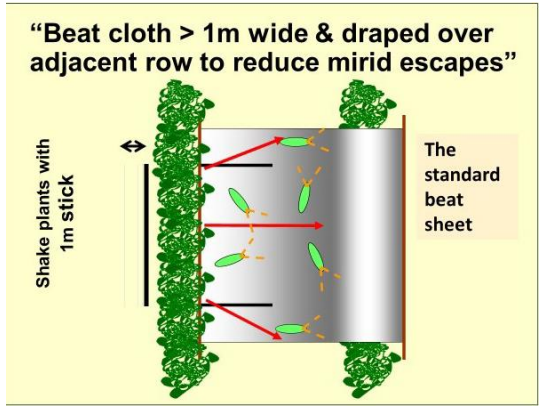


Beat sheets

Not Ideal: 4 spots all on the edge

Avoid staying at the edge → walk in > 25m

What Happens When You Don’t Scout

Velvet bean Caterpillar

Voracious feeders
can defoliate quickly

Easy to kill but…

Know Your Pest

Why?

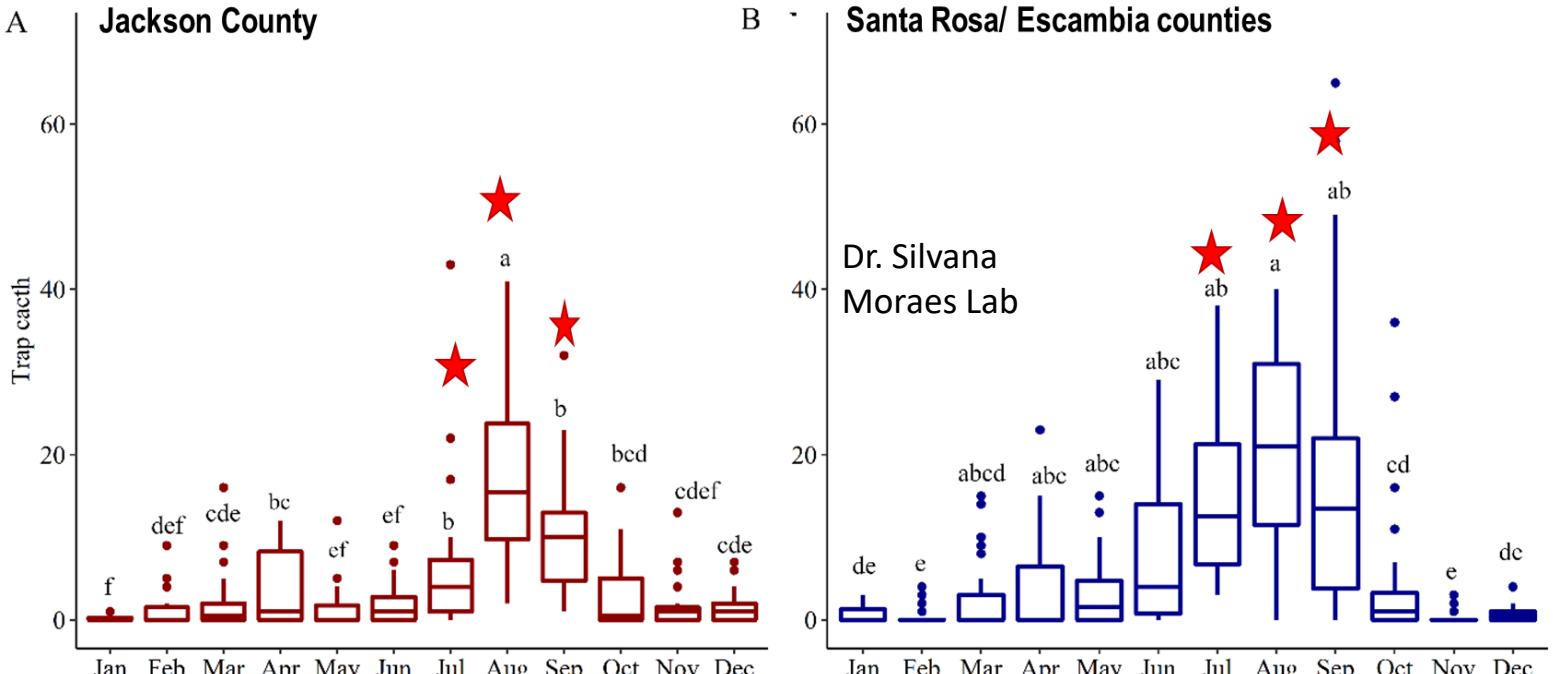
- Diverse natural history and behavior
- Different times of the year
  - W/in same crop
- Insecticide resistance
- Landscape influences

Leps

Thrips

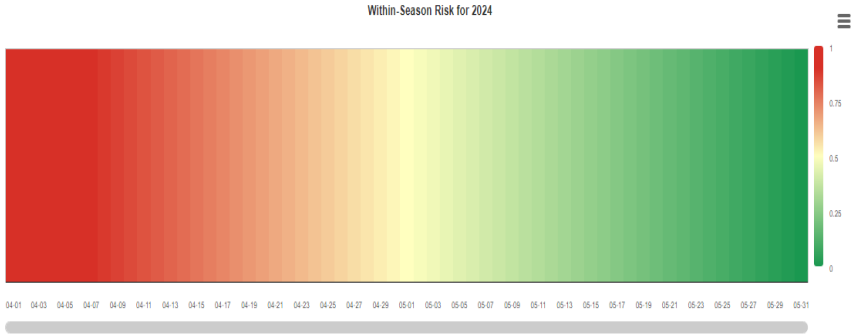
Stink Bugs

Mites



Products | North Carolina State Climate Office

Thrips Infestation Predictor



March → June

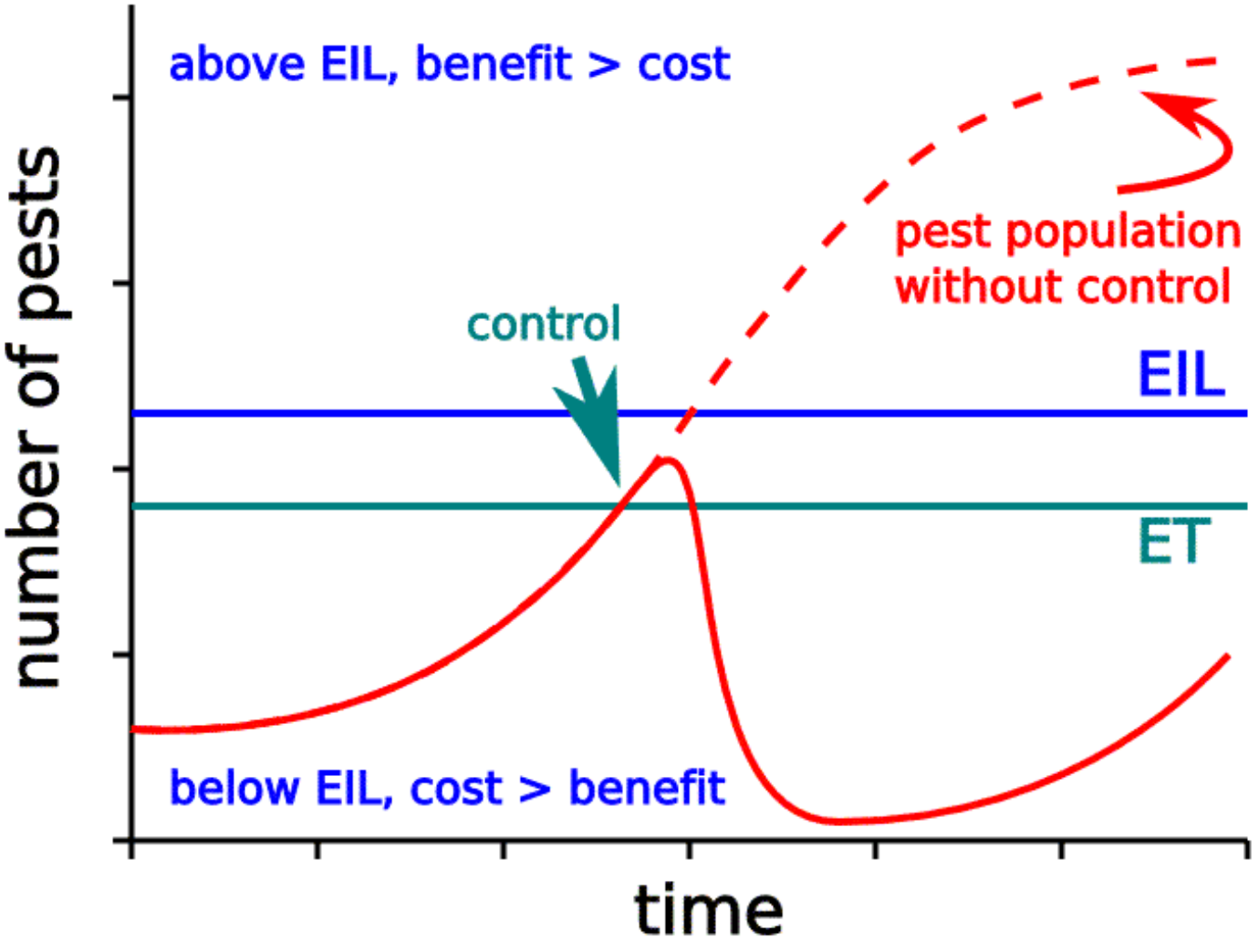
When? Economic Injury Levels: Concept

Economic Injury Level (EIL):

- The lowest number of insects that will cause economic damage or reduce yield **AT** or **ABOVE** control costs
- Injury: effect of pest on plant
- Damage: measurable response of crop to injury: yield, quality etc.

Economic Threshold (ET):

- Indicates the number of insects to **trigger** management action → AT
- Accounts for population growth of pest. Set **BEFORE** EIL levels



Peanut Pest Management

Thrips	TCAH	Leaf Hopper	LCBs	Worms	Spider Mites

Three Cornered Alfalfa Hopper

Leaf Hopper

Tobacco Thrips

Beet Armyworm

Fall Armyworm

Soybean Looper

Velvet Bean

Corn Earworm

Southern Armyworm

Wire Worm

Lesser Cornstalk borer

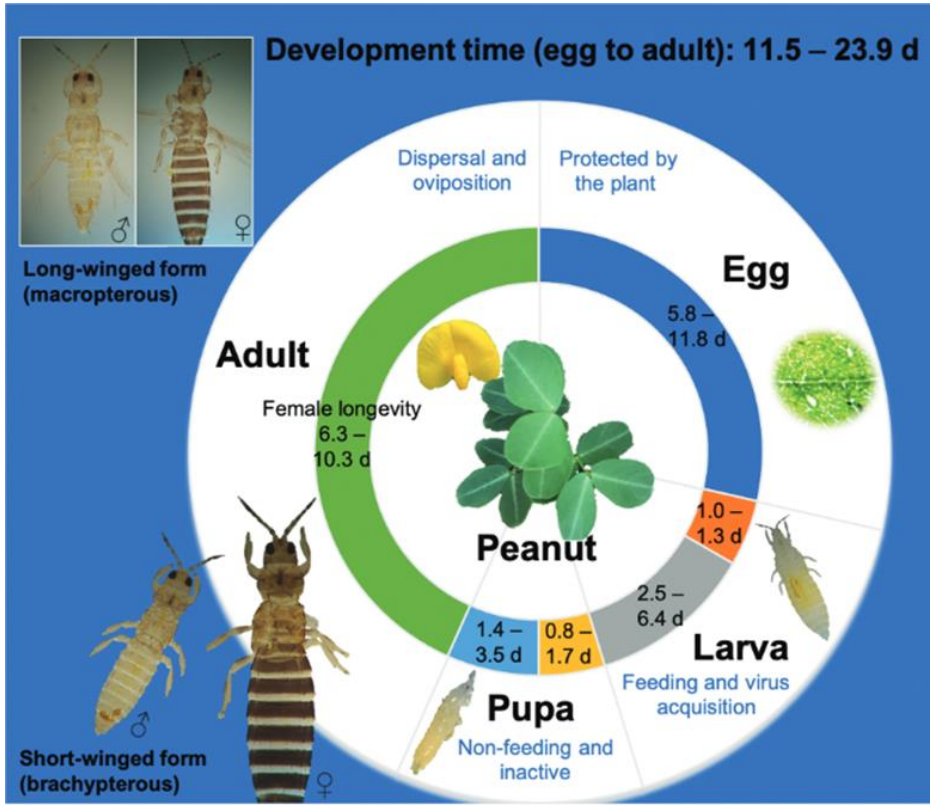
Spider Mite

Redneck Peanut worm

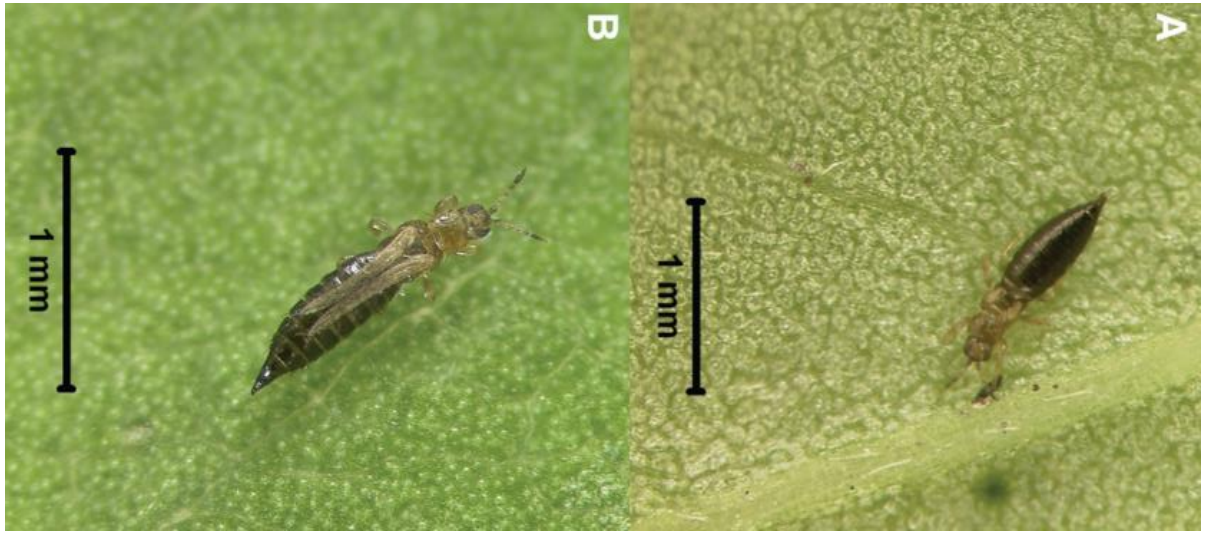
Insect Pests of Peanuts

Thrips: Tobacco thrips (*F. fusca*)

- Thrips feeding can cause direct injury and stress to plants
- Potential stunting and terminal damage
- Plants outgrow injury quickly
- BUT transmit TSWV



Feeding Injury



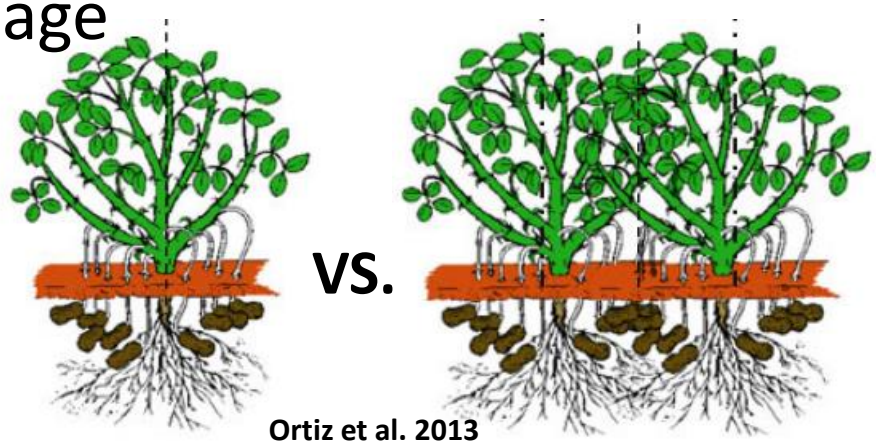
Practices to Reduce Thrips Pressure TSWV Risk

- High-quality seed
- TSWV-Resistant cultivars
- Planting dates after May 10
- Strip/conservation Tillage
- Twin row patterns

PEANUT Rx

Planting into grain residue

USDA-ARS



VS.

Ortiz et al. 2013

Single Row Twin Row

Cultivar Susceptibility

Thrips…What to Do?

In Furrow:

- Admire Pro (Imidacloprid)
- Kills Thrips? YES
- Prevents TSWV? ***NO***

- Thimet (Phorate)
- Kills Thrips? YES
- Prevents TSWV? **YES!!**

Here: Just imidacloprid in-furrow 90% incidence

Untreated **VS.** **Thimet**

Is a foliar needed? Usually, no, but in certain cases, maybe.

Potato leafhopper (*Empoasca fabae*)

Identification:
Small wedge-shaped green insects about 1/8 to 1/4 inch long. Nymphs similar in shape but W/O wings.

Injury:

Feed on the underside of leaflets on the midrib causing leaflets to turn yellow → Hopper Burn

Hopper Burn

Thimet Burn

Potato leafhopper (*Empoasca fabae*)

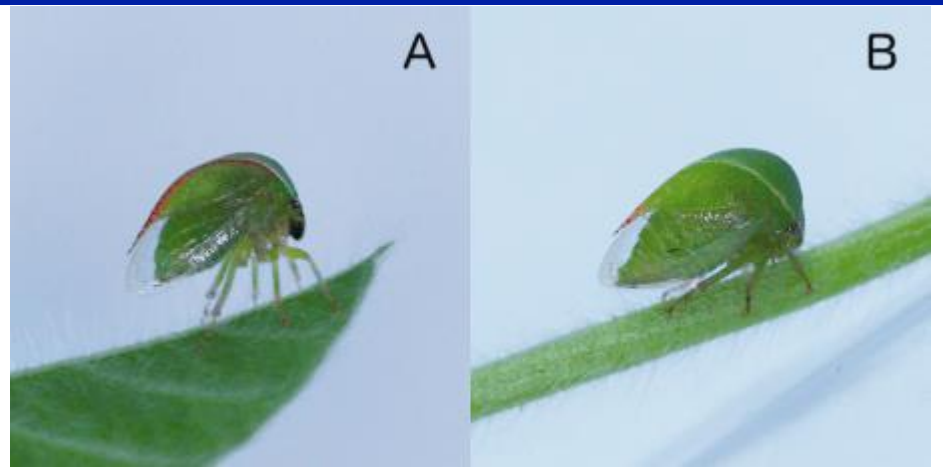
Favorable Conditions:
Not in all fields, infestations start along field margins.

How to scout: Adults are small but can be seen flying when disturbed. Look for yellowing from leaf tips. Hopper burn persists but doesn't mean insects are present.

Thresholds:
When 30% of plants show hopper burn symptoms and leafhoppers are **ACTIVE**.

- Pyrethroids work well but think about beneficials and spider mite risk

Three-Cornered Alfalfa Hopper (*Spissistilus festinus*)



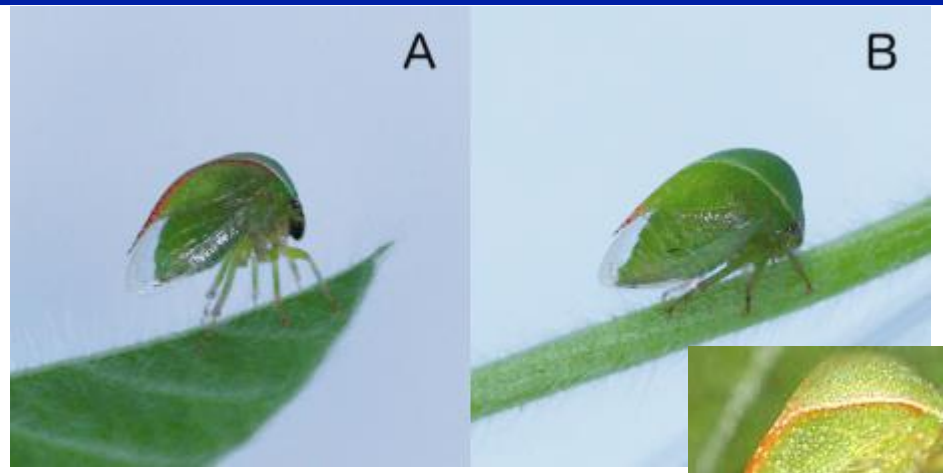
Identification:

Robust triangular shape, red tip at the point of the “triangle”.

Injury:

Nymphs feed on plant stems and cause girdling, stunted growth, and maturity delays.

Three-Cornered Alfalfa Hopper (*Spissistilus festinus*)



Favorable Conditions:

Found in most fields. Highest when optimal growing conditions. Adults in spring and increase as the season progresses.

How to Scout:

Highly mobile, can be caught in sweep net or use a beat sheet and look for girdling.

Thresholds:

Decisions to treat TCAH populations should consider the relative abundance of adults, nymphs, stem injury, and the risk of flaring secondary pests.

Rednecked Peanut Worm (*Stegasta bosquella*)

Identification:

Cream to green in color with a brown head and a narrow red band or plate just behind it.

Injury:

Larvae feed within young, unfurled leaflets in terminal buds. Symmetrical holes on unfurled leaflets.

Rednecked Peanut Worm (*Stegasta bosquella*)

Favorable conditions:

Not known, usually present and sometimes in high numbers

How to scout:

Beat sheets do not work, requires visual inspection of terminal buds and feeding injury.

Thresholds:

When present and ~80% of plants sampled have injury. Don’t usually need treatment.

Spider Mites-Two Spotted SM (*Tetranychus urticae*):

- Favor hot and dry conditions (*July 23*)
  - Stressed plants, dryland
  - Start at field margins, dirt roads and move inward.
- Need to catch populations early!
  - Don’t assume drought stress
  - Small patches of yellowing
  - Population growth, exponential
- But what to do:
  - Wait for rain?
    - Sure, rain will greatly reduce populations
    - Cant make it rain

(Mark Abney, UGA)

(Mark Abney, UGA)

Spider mite infestation in non-irrigated (Mark Abney)

Spider Mite Control

- Only two miticides registered for peanut:
  - Comite II (36oz/A): nymph and adult efficacy only. 2x/season
    - May need a second app
  - Portal (2pt/A): **All** stages. 2X/season
  - Apply at 20 GPA!
- Effective when applied properly and early
- **NO PYRETHROIDS!**
- **Can flare spider mite populations**

Spider Mite injury resembling drought stress (Mark Abney UGA)

Dryland peanut after a pyrethroid spray (Mark Abney UGA)

Insect Pests of Peanuts

Lesser Cornstalk Borer (*Elasmopalpus lignosellus*):

Identification:

Dark head, blueish green to reddish brown. Move violently when disturbed. Adults: little brown moth.

Injury:

Feed and bore into plant stems near ground. Silk tubes used to move around. Wilted stems, pod feeding.

Provides pathway for pathogens.

Mature LCB larvae

LCB Female Moth

(Mark Abney UGA)

Insect Pests of Peanuts

Lesser Cornstalk Borer (*Elasmopalpus lignosellus*):

Mature LCB larvae

Favorable conditions:

Hot and dry condition in sandy soil. Poor stands, isolated plants.

How to scout:

Moths may be a sign of infestation.

Look for wilted stems, check for silk tubes. Pull up plants and inspect taproot, pods, and stems for feeding and larvae.

Thresholds:

Check 3ft of row at 10 locations throughout the field. If you find LCBs, LCB damage, or silk tubes in 30% of spots checked, it's time to spray

Control:

Vantacor and **Besiege*** work well

Diamond as a growth regulator also works well.

Worm Complex: Little Brown Moths

Corn Earworm

Fall Armyworm

Beet Armyworm

Velvet Bean Caterpillar

Soybean Looper

Diverse array of defoliating worms feed on peanut

Worm Complex

Thresholds

- 4-8 worms per **FOOT** of **ROW**
- Use a beat sheet or beat foliage into the dirt and count all worms
- **Stressed plants** = 4/ft of row
- **Vigorous growth** = 8/ft of row

- What to spray? A lot of options
- Dimilin and Vantacor work well.
- Sometimes pyrethroids are ok but **NOT** in dryland.

Important to know species:

Beet Armyworm: Resistance to Diamides **Chlorantraniliprole** and Bifenthrin in FL. Dr. Moreas will speak more to this.

Soybean Pests

TCAH

Lesser cornstalk borer

Kudzu Bug

Brown Stink Bug

Southern Green Stink Bug

Green Stink Bug

Red-Shouldered Stink Bug

Red Banded Stink Bug

Three Cornered Alfalfa Hopper (*Spissistilus festinus*)

Identification:
- Robust triangular shape, red tip at the point of the "triangle".

Injury:
- Lateral branch, main stem and leaf petiole girdling.
- If not caught early, may see effect later: lodged plants.

Thresholds:
- **Avg of 2/sweep**. 20 sweeps = 40 hoppers.
- **ONLY** when stands are threatened, and insects are seen. Until plants are **10-12 inches tall**.
  - Pyrethroids all you need → may cause increase other pests

Damage was done early but effects are seen later

Lesser Cornstalk Borer (*Elasmopalpus lignosellus*):


Mature LCB larvae

LCB Female Moth

Identification:
Larvae brownish green to blackish purple→ move violently when disturbed

Injury:

- Bore into young stems, weakening them and causing plants to lodge or die.

Threshold

- 10% of seedlings have present larvae/injury.
  - Similar to peanut control
  - Chlorantraniliprole: Vantacor & Beseige*
  - Diamond: Growth regulator
  - Good control and residual

Kudzu Bug

(*Megacopta cribraria*)

Identification:

- Small rotund stink bug like. Hairy nymphs

Injury:

- Feed on main stem and leaf petioles and can reduce number of pods /plant, seeds/pod and seed size.
- Colonize edges

Thresholds:

- Prior to first bloom: Avg. **5 Adults/plant**
- After FB-R6: Avg. **10 Adults/sweep** or **1 Immature/sweep**
- Pyrethroids work well

Stink Bug Complex

Injury:

- Both nymphs and adults feed on developing beans up to maturity.
- Unfilled, deformed and shrunken pods
- Aborted pods
- Feeding site acts as a pathway for potential pathogens

Brown Stink Bug

Brown Marmorated Stink Bug

Southern Green Stink Bug

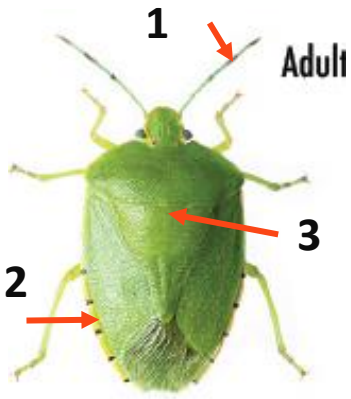
Green Stink Bug

Red-Shouldered Stink Bug

Red Banded Stink Bug

The Greens

Green Stink Bug
(*Chinavia hilaris*)



Eggs

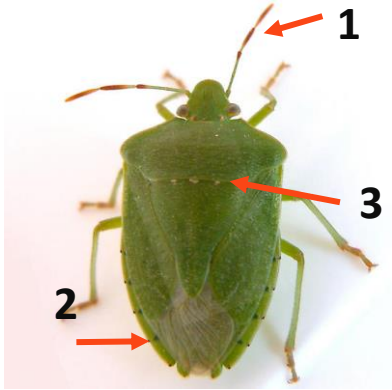
3rd instar

4th instar

Key Features:

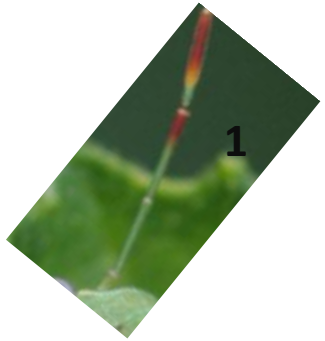
- Large
- Dark bands on antennae (1)
- Dark marks on the abdomen (2)
- 5 pale spots on base of scutellum (3)
- Late instars have orange patches on "shoulders"

Southern Green
(*Nezara viridula*)



1st instar

2nd instar



3rd instar

4th instar

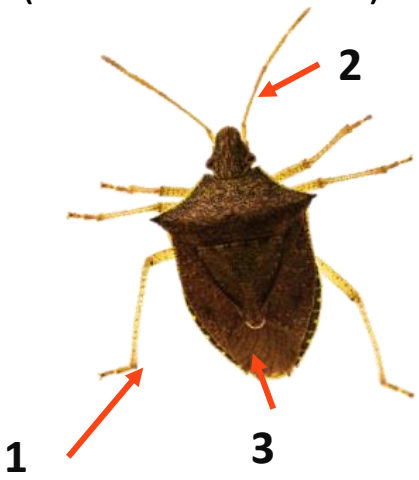
5th instar

Key Features:

- Also large
- Orange bands on antennae (1)
- No marks on the abdomen (2)
- 3 pale spots on base of scutellum (3)

The Browns

Brown Stink Bug
(*Euschistus servus*)




1st instar


Eggs


2nd instar

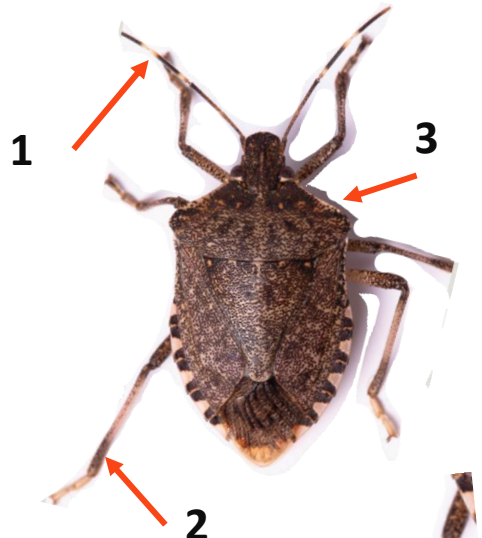

3rd instar


4th instar


5th instar

Key Features:
- Smaller
- Antennae w/no white band (1)
- No white band on legs (2)
- Wings w/ dark spots (3)

Brown Marmorated
(*Halyomorpha halys*)




1st instar


2nd instar


3rd instar

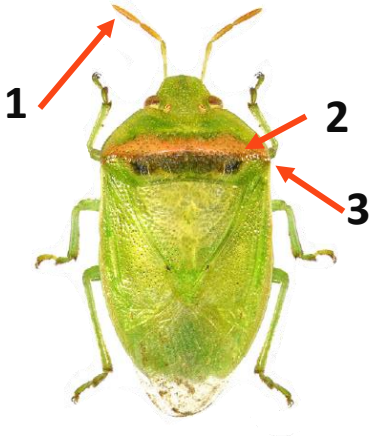

4th instar


5th instar

Key Features:
- Antennae w/ white bands (1)
- Legs “stripped” white/brown (2)
- No serrations on pronotum (3)
- Often confused with Brown

The Reds

Red Banded
(*Piezodorus guildinii*)




1st instar


2nd instar


Eggs

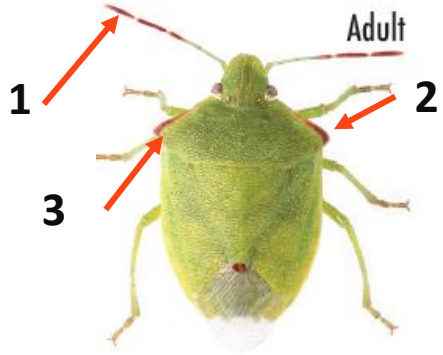

3rd instar


4th instar


5th instar

Key Features:
- Antennae w/ red-orange bands(1)
- Orange/Red band across thorax (2)
- Shoulders rounded(3)

Red Shouldered
(*Thyanta custator*)




1st instar


2nd instar


Eggs


3rd instar


4th instar


5th instar

Key Features:
- Antennae redder than RBSB (1)
- Pronotum red outline on sides (2)
- Shoulders somewhat pointed (3)

Stink Bug Thresholds:

Brown Stink Bug

Brown Marmorated Stink Bug

Southern Green Stink Bug

Green Stink Bug

Red-Shouldered Stink Bug

Red Banded Stink Bug

Greens & Browns:

Bloom to mid pod fill:

- 1 stink bug per 3 row feet or 3/25 sweeps

Mid pod fill to maturity:

- 1 stink bug per 3 row feet or 5/25 sweeps

Red Banded:

Bloom to Pod fill:

- 1 stink bug per 3 row feet or 3/25 sweeps

Control:

- Any pyrethroid works well for all species EXCEPT Brown Stink Bug.
- IF majority is Brown stink bug use Bifenthrin at higher rate.

Wrapping it up…

A lot of insects feed on our peanut and soybean

Scout:

- 8-10 spots per field.
- Catch pests early before visible injury

Know:

- Pest ID and injury are essential! → leads to decisions
- Pest biology will help predict when to expect certain pests

Beet Armyworm | Fall Armyworm | Soybean Looper

Velvet Bean | Corn Earworm | Southern Armyworm

Thresholds:

- Use proper thresholds
- Spray too early, may need another trip to the field

BSB

Lesser Cornstalk borer

Red Banded Stink Bug

Spider Mite

Redneck Peanut worm

Thank You! Contact info:

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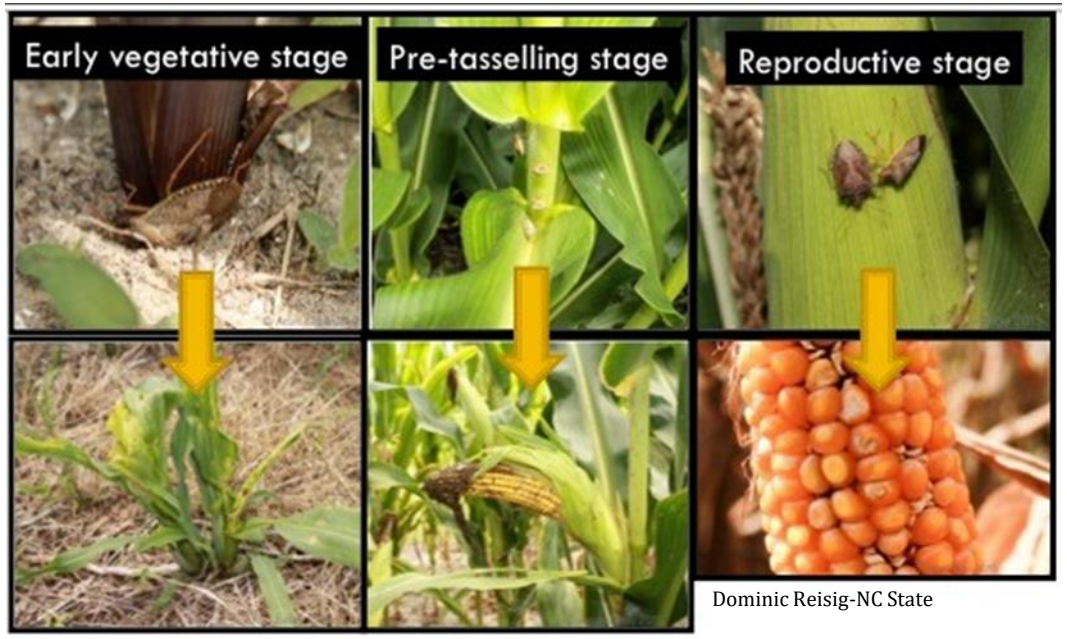
Stink Bugs In Corn

- Stink bugs can cause 3 different types of damage during corn development
- **Injury When?**
  - V1-V6: plants can be stunted, yield-robbing tillers can be formed, or plants can be killed.
  - V14 to VT: Crooked ears and kernels can be missing.
  - R1 to R4: Reduction in kernel size and weight and secondary pathogens can be introduced that lead to *aflatoxin* or *fumonisin* contamination.

Brown stink bug feeding on kernels of developing ear.

Injury Types



Dominic Reisig-NC State

Stink Bugs In corn

Brown Stink Bug (*Euschistus servus*)

Southern Green (*Nezara viridula*)

Green Stink Bug (*Chinavia hilaris*)

B. Marmorated (*Halyomorpha halys*)

Thresholds:

Whole plant count:

- V1 to V6: 1 per 10 plants
- V14 to VT: 1 per 4 plants
- R1 to R2: 1 per 2 plants

Options:

Pyrethroids work well for stink bugs. If mainly brown, Bifenthrin @ **.1 lbs ai/acre** is recommended compared to lower rates than other pyrethroids.

Brown stink bug feeding on stalks, no injury here. Often hide at the base of leaves

Notes on Stink bug

Brown Stink Bug (*Euschistus servus*)

Southern Green (*Nezara viridula*)

Green Stink Bug (*Chinavia hilaris*)

B. Marmorated (*Halyomorpha halys*)

Where to look:

- Corn fields planted in no-till fields or in a heavy cover
- Next to wheat or small grains being harvested
- Next to Tree lines, stink bugs overwinter on trees in the off season
- Clumped distributions on edge of the field

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