Insect and Mite Management

Dominic Reisig
Department of Entomology and Plant Pathology
David Jordan
Department of Crop and Soil Sciences
North Carolina State University

919-810-611
david_jordan@ncsu.edu

General Production Practices

- Apply nutrients based on soil test (pH 5.8 to 6.2)
- Avoid excessive Mg and K
- Avoid fields with zinc
- Establish good rotations (cotton, corn, sorghum)
- Plant a disease-resistant variety in May at a 2-inch depth
- 5 plants per foot of row on 36-inch rows
- Conventional tillage
- Inoculate with *Bradyrhizobia* for BNF
- Apply calcium at pegging
- Apply boron and manganese as needed
- Dig based on pod mesocarp color
- Control pests using IPM practices

Major Insects in Peanut

- Tobacco thrips
- Southern corn rootworm
- Potato leafhoppers
- Fall armyworms
- Corn earworms
- Tobacco budworms
- Spider mites
- Lesser cornstalk borer
- Burrower Bug


Figure caption. Corn earworm or Tobacco Budworm

Figure caption: Thrips injury (right)


Figure caption. Southern corn rootworm injury

Figure caption. Injury potato leafhopper (top), injury caused by the herbicide 2,4-DB (middle), and injury caused by thrips (bottom)

Burrower Bug

Adult Burrower bug. Photo by dan40165, BugGuide.net (Creative Commons: https://creativecommons.org/licenses/by-nd-nc/1.0/).

This close up photo shows discolored, sunken lesions caused by burrower bugs on a peanut seed. (Photo by Mark Abney)

Figure caption: images of damage from burrower bug (left and right images) and the insect (center)

Figure caption. Damage caused spider mites

Components of Insect Management

- Insect identification/Scouting
- Economic thresholds
- Crop rotation
- Cultivar resistance
- Treat insects that are active
- Cultural practices

Sampling Procedures and Thresholds

- Thrips (25% leaflet damage for POST sprays but assume populations will exceed threshold
- Leafhopper (25% leaflets with “burn”
- Rootworm (see Risk Index)
- Foliar Feeders (12 worms/foot of row)
- Spider mites (Key questions before treating)

Economic Injury Level (EIL)

Cost of control = Damage inflicted

$$\mathbf{EIL = (C \times N) \div (V \times I)}$$

Where:

C = cost of control

N = number or insects injuring the commodity

V = commodity value

I = percentage of commodity injured

Economic Injury Level (EIL)

Example:

C = $10/acre

N = 600 insects/acre

V = $300/acre

I = 10% loss if 600 insects/acre

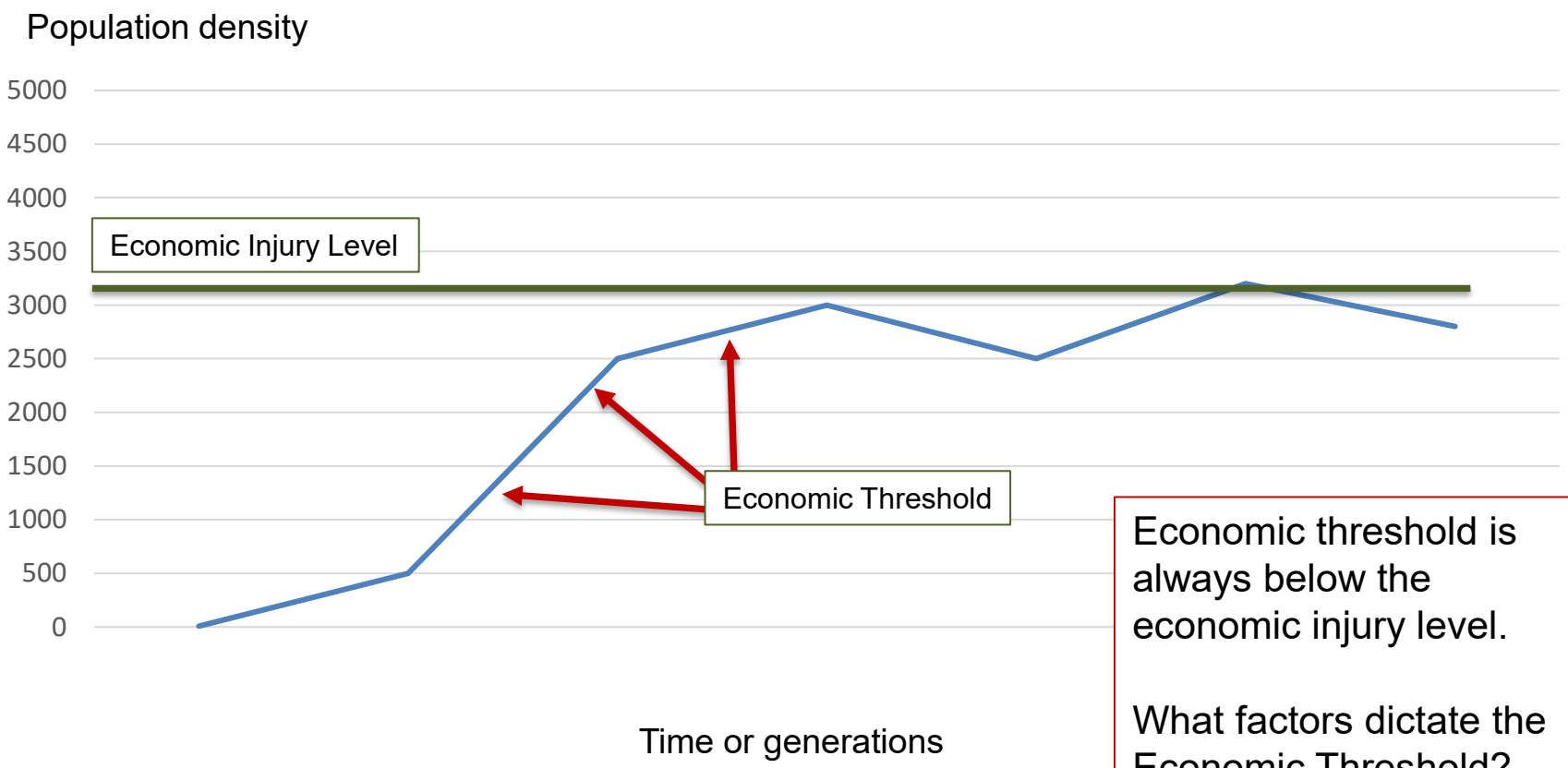
This relationship requires research conducted over space and time

EIL = (C × N) ÷ (V × I)

EIL = (10 × 600) ÷ (300 × 0.10)

EIL = 200 insects/acre

Economic Injury Level and Economic Threshold



Economic threshold is always below the economic injury level.

What factors dictate the Economic Threshold?

Cultivar Resistance

- With the exception of the cultivar NC 6, all Virginia market type peanut cultivars are susceptible to southern corn rootworm, thrips, potato leafhoppers, corn earworms, fall armyworms, and spider mites

Thrips Management
In-Furrow Treatments

- Acephate
- Admire Pro (generics)
- Thimet
- AgLogic
- Vydate

Thrips Management
Foliar Treatments

- Acephate
- Malathion
- Baythroid XL
- Brigade
- Radiant SC

Figure caption. Injury from thrips (top left) and healthy peanuts (top right). Regrowth several weeks after severe injury from thrips (bottom left) compared with peanuts protected from thrips injury by systemic insecticide applied at planting.

Corn Earworm, Tobacco Budworm and Fall Armyworm Management

- Sevin, Lannate, Acephate
- Karate, Asana
- Danitol
- Baythroid
- Belt
- Besige
- Entrepid, Diamond, Prevathon

Spider Mite Management

- Portal, POST
- Comite, POST
- Omite, POST
- Beseige POST
- Danitol, POST

Southern Corn Rootworm, Lesser Corn Stalk Borer, and Burrower Bug

No chemical options

Southern Corn Rootworm

Figure caption. Spotted cucumber beetle (left), larvae that feed on developing pods (middle), and scarring of pods (right)

Figure caption. Application equipment used to apply the insecticide chlorpyrifos

Southern Corn Rootworm Index

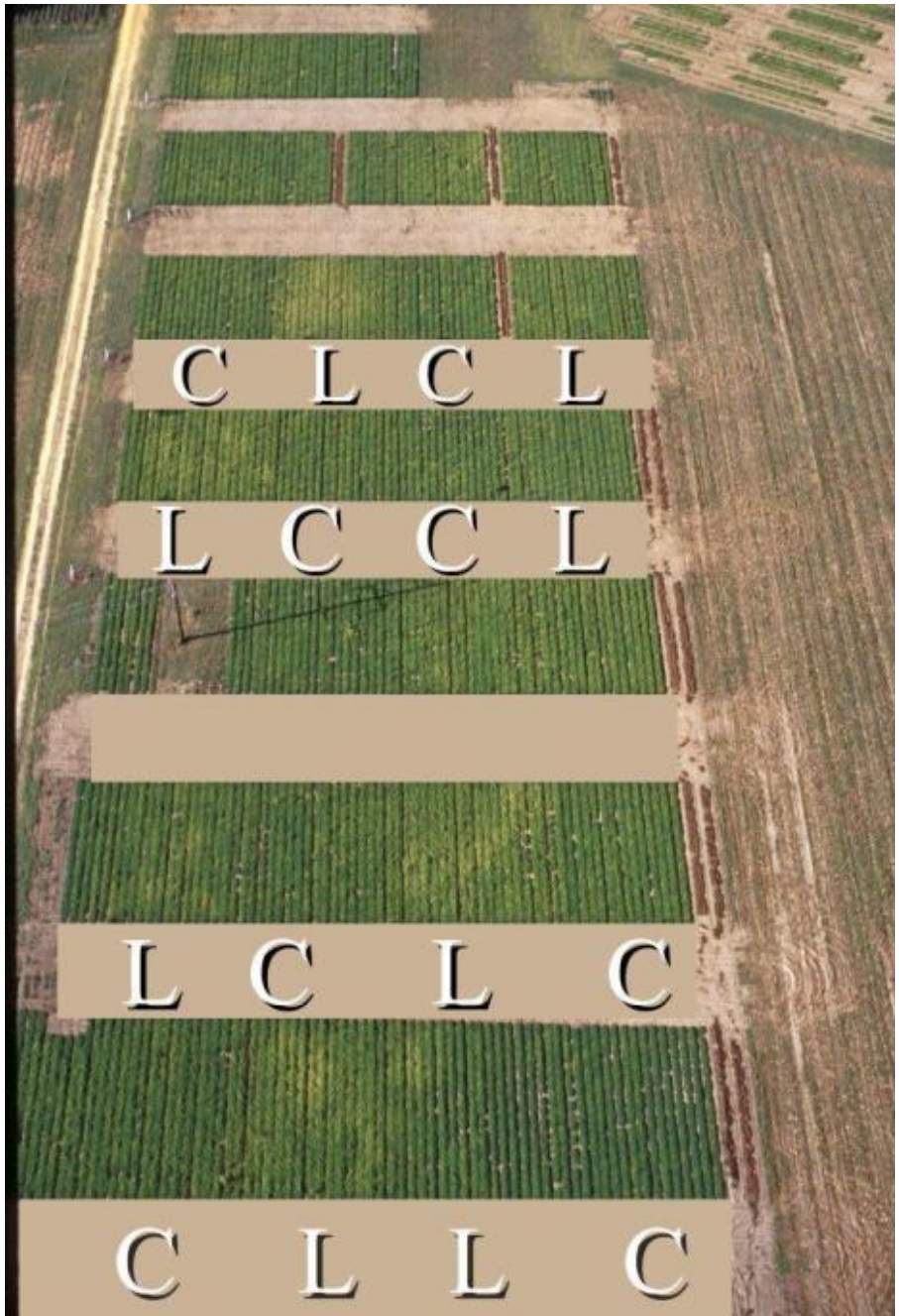
- Variety selection
- Soil texture
- Drainage class
- Planting date
- Field history
- Irrigation

IPM and Secondary Pest Outbreaks

- **Overuse of fungicides can flare spider mites**

  weather-based advisories can limit potential for this to occur
- **Applications of insecticides for southern corn rootworm control can flare spider mites**

  carefully selecting fields for insecticide applications only where it is needed can limit potential for this to occur



L = Lorsban
C = Control

Figure caption. Field trial with peanuts treated with Lorsban (chlorpyrifos) compared with non-treated peanuts (control). Photo provided by Jay Chapin, Clemson University

Figure caption. Field trial with peanuts treated with Lorsban (chlorpyrifos) compared (right) with non-treated peanuts (left). Photo provided by Jay Chapin, Clemson University

No Lorsban
Minor amount of spider mite damage

Lorsban
Lots of spider mite damage

*Most likely there would be no rootworms to control when you have conditions favorable for spider mites. BUT, burrower bug, a dry-weather insect that is controlled by Lorsban caused yield loss in the healthy peanuts.

CLEMSON UNIVERSITY

Entomology, Soils, and Plant Sciences

Burrower Bug on Peanut

Pangaeus bilineatus (Say)

Description: Adult burrower bugs are oval-shaped and about 1/4 inch long. They are dark brown to black except for the ends of the wings, which form a transparent, silvery diamond shape at the rear of body. Nymphs are smaller, dark brown, and have the same general body shape. Other species of burrower bugs found on peanut have a different appearance, but this description fits the major pest species.

Immature and adult burrower bugs. (J. Chapin)

Biology: Winter is spent as an adult in peanut fields and other crops. When the soil warms up in March, adults move up in the soil, mate and lay eggs. There are two generations per year in South Carolina peanut. Populations increase during pod fill in August and September. Both adults and nymphs feed on peanut kernels with their needle-like mouthparts. Injury is not noticeable on the hull or seed coat, but shows up as light yellow lesions to dark brown pits on the kernels when the seed coat is removed. Burrower bug feeding causes grade reductions by reducing kernel weight. Severe infestations can result in damaged kernel grade penalties and significant yield loss.

Management: Damage is much more likely in reduced tillage production systems and appears to be correlated with drought stress. When fall tillage is used to plant cover crops, damage potential is significantly reduced compared to no-till planting of the cover crop. Chlorpyrifos applied in July controls burrower bug, but the best defense is irrigation or tillage. Volunteer peanuts in corn or cotton rotational crops increase the risk of economic injury on the following peanut crop.

Burrower bug feeding sites. (J. Chapin)

Figure caption. Website from Clemson University that includes information on burrower bug

Figure caption. Healthy peanut plants (top left) and plants with moderate thrips damage (lower left) and severe thrips damage (lower right)

Figure caption. Peanut leaves expressing symptoms of tomato spotted wilt. This virus is transmitted by thrips.

Tomato Spotted Wilt Virus Index

- Variety selection
- Plant population
- Insecticide
- Planting date
- Tillage

Insect Management
Typical Grower Program
Considerable variation in programs

- Systemic insecticide applied in the seed furrow
- Acephate applied postemergence
- Insecticides applied mid- and late-season for foliar-feeding insects

Restrictions on Feeding Insecticide-Treated Vines to Livestock

See *Peanut Information* and product labels