

EARLY APPLICATION
IMPROVES PLANT
HEALTH AND
OPTIMIZES YIELD.

HERO 
INSECTICIDE

Investing in farming's future.™

FMC

Hero – Soybeans

Plant health is critical for optimized yields—and it starts with prevention.



The Dual-Action™ Technology found in Hero insecticide provides fast knockdown and longer control by combining the best of two pyrethroid families.

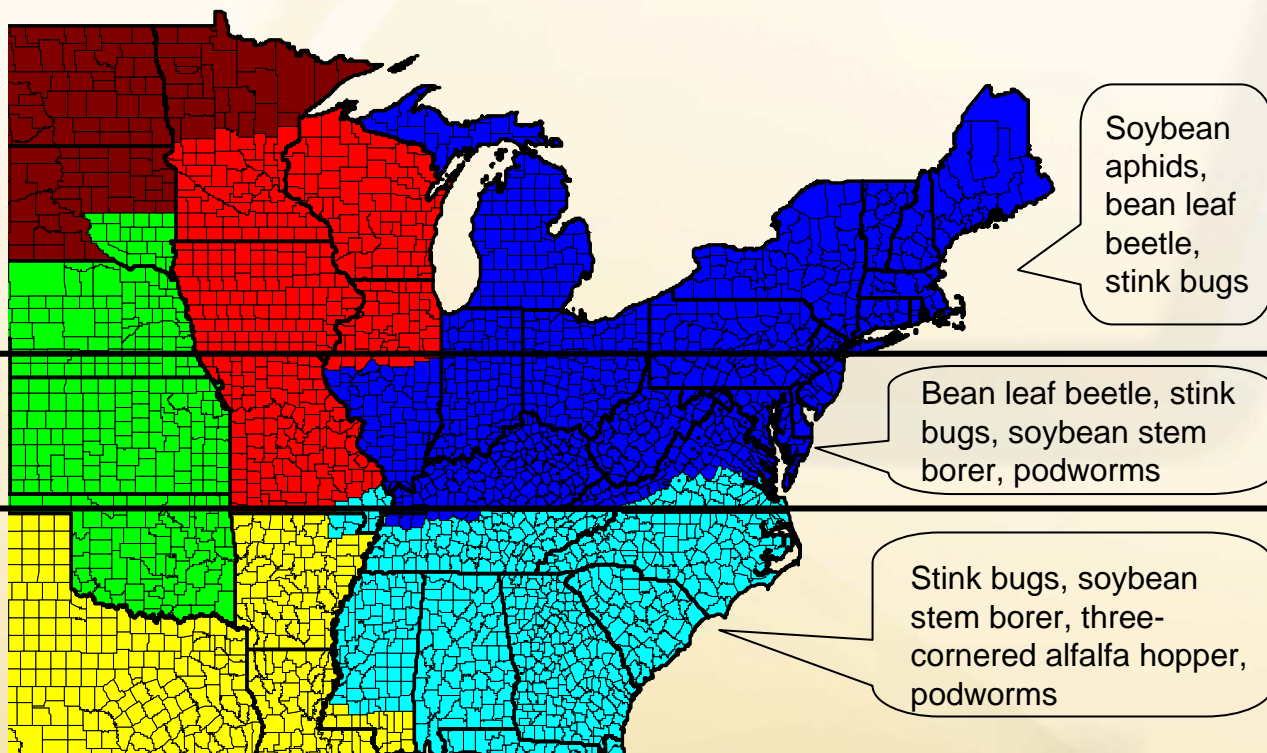


Manage Your Yields: Factors Affecting Profit Losses in Soybeans

- **Insect pressure is increasing**
 - Wider variety of insects
 - Yield losses from direct feeding, and also from disease transmission
 - No current, reliable multi-pest thresholds
- **Foliar fungicide or herbicide applications are standard**
 - No additional application cost for insecticide when mixed with fungicides or herbicides
- **Today, insecticide costs are lower**
 - When thresholds were first established, traditional costs were \$10-12/A
 - Current insecticide costs of \$5-7/A and higher soybean prices impact thresholds



Scouting for Some Key Soybean Insects:



Tomorrow's Yield Protection:

Treat for foliage feeders, stem feeders, bloom feeders, pod feeders, bean feeders and disease transmitters



What's Invading Your Soybean Fields?

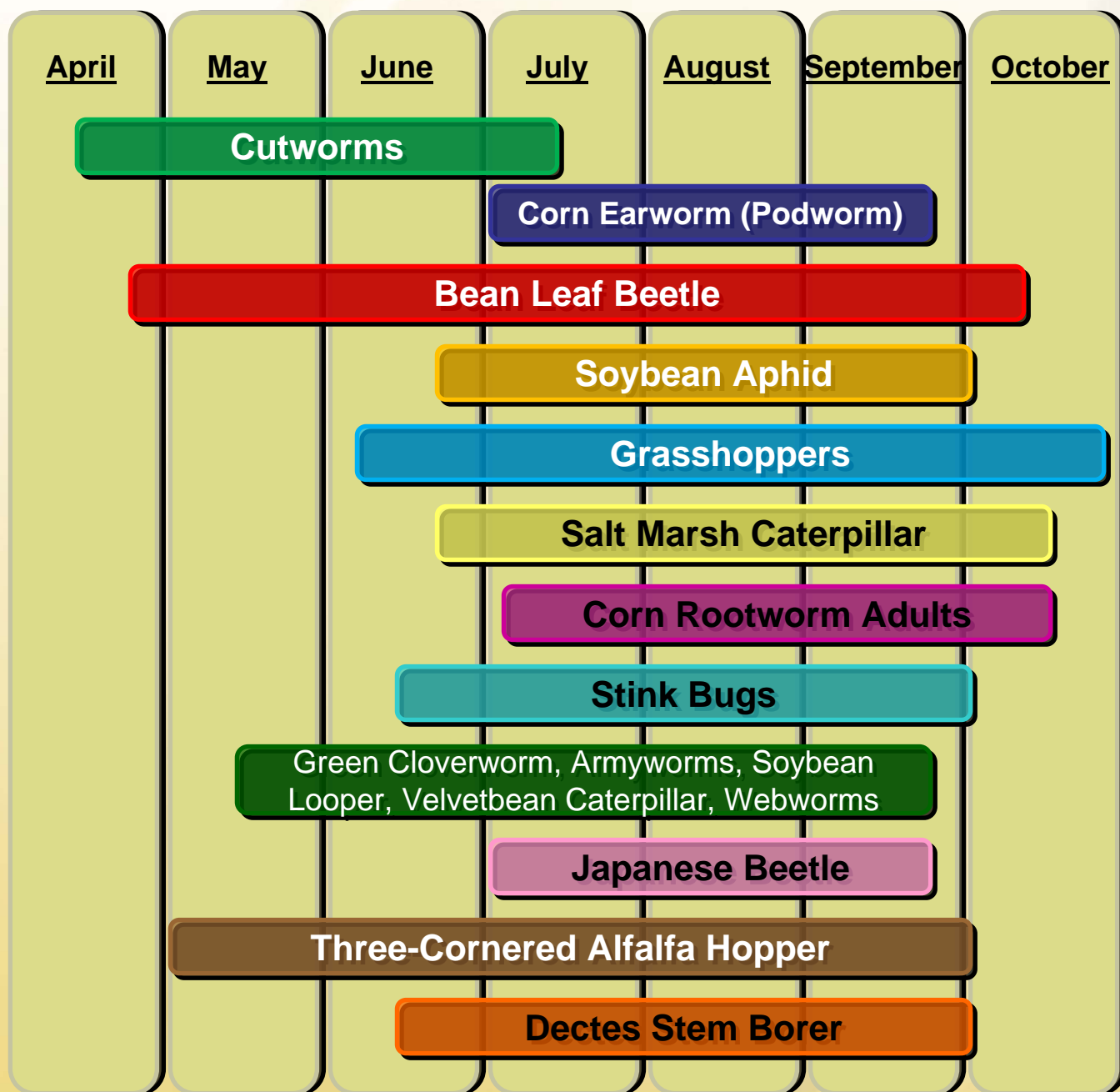


Are these Insects in your Soybeans?

Missouri Field, 20 Sweeps – July 4, 2009

Some will affect your corn next year

Soybean Insect Scouting Calendar



Control insects to maximize yield potential, applied alone or in combination with your herbicide or fungicide programs.

Soybean Insect Control

Economic Threshold: *When a treatment must be applied to avoid economic loss that would be greater than the cost of the treatment.*

Will a half bushel cost gain more than a half bushel yield?

Potato Leafhopper



General Facts:

- Overwinters near the Gulf
- Adult females insert eggs into soybean plants 2-3 per day
- Feed on phloem
- Cause distorted leaf veins, yellow-brown leaves (hopper burn) and may stunt the plant

Threshold:

- 5 leafhoppers/plant

Corn Earworm (Podworm)



Photo courtesy of NCSU

General Facts:

- Moths lay eggs in the upper canopy, 1 female can lay up to 1,800 eggs
- Caterpillars (4 pairs of prolegs) feed on leaves, blossoms, and pods

Threshold:

- 6 per 25 sweeps

Soybean Stem Borer



General Facts:

- Overwinters as a larva in the base of the stem
- Adults emerge in late June and lay eggs through August
- Control is difficult – the larva are in the stem and cause lodging, proper timing is key to adult control

Approximate Threshold:

- 2 per 25 sweeps

Japanese Beetle



General Facts:

- Adults emerge in early June and feed most of the summer
- They group feed and stay exposed to sunlight making them easier to control
- Grubs from these adults can cause problems next year in field corn

Threshold:

- 30% defoliation at pre-bloom stage
- 15% defoliation from bloom to pod-fill

Bean Leaf Beetle



General Facts:

- Overwinters as an adult
- Three in-season generations per year
- Direct damage from feeding on leaves and pods
- Indirect damage from spread of bean pod mottle virus

Threshold:

- Difficult to determine depending on direct or indirect damage. Scout earliest planted soybeans first.

Guideline:

- 6-9 beetles per 25 sweeps

Stink Bugs



General Facts:

- Move into the north from the south on weather fronts
- Females lay 10-30 eggs per cluster
- Depending on species, it takes 23 days to 2 months from egg to adult
- Feed directly on pods and seeds

Approximate Threshold:

- 6-9 per 25 sweeps

Soybean Insect Control

Two-Spotted Spider Mite



General Facts:

- During drought conditions they will move to soybeans
- Foliar coverage is critical
- Assess mite movement into fields along corners and edges to prevent heavy infestations within the field

Threshold:

- None, easier to manage the population than rescue a heavy infestation
- 5.1 oz/A of Hero for mite management, or 5.1 oz/A + dimethoate for control, or 10.2 oz/A of Hero for control

Soybean Aphid



General Facts:

- Overwinters as an egg on buckthorn
- Multiple generations per year
- Damage from feeding on sap
- Indirect damage from spread of soybean mosaic virus and alfalfa mosaic virus

Threshold:

- Varies with several factors – insecticide cost, application cost, infestation timing, current timing, expected yield and price of soybeans. Roughly 100 per plant.

Three-Cornered Alfalfa Hopper



General Facts:

- Generally cause problems on beans less than 12" tall
- Feed on main stem near the soil line
- Seedling plants may be girdled and die, larger damaged plants may lodge
- Later feeding on pod petiole will cause pod abortion

Threshold:

- 25 per 25 sweeps

Soybean Mosaic Virus/Bean Pod Mottle Virus Disease
transmitted by bean leaf beetle and other species.
May cause significant yield impacts.



Photo courtesy of Iowa State University

Multi-Pest Soybean Insect Thresholds

Soybean insect pest complexes, pressures and thresholds differ significantly from locality to locality. Soybean insect pest thresholds are based upon one insect and do not address multiple pests.

Generally, fields have more than one species of insect. At times, while waiting for the threshold to occur on one pest, yield is being lost from the entire complex. Listed below are multiple pest thresholds based on three insect groups: Stink Bugs, Defoliators, and Corn Earworms.

Multiple Soybean Insect Pest Thresholds		
	Defoliation >20% (# Insects/25 sweeps)	Defoliation <20% (# Insects/25 sweeps)
Stink Bugs	3	5
Defoliators	8	12
Corn Earworms	5	7
Threshold Total	16	24
Stink bugs: brown, green, Southern green Defoliators: salt marsh caterpillar, bean leaf beetle, green cloverworm, grasshopper, Mexican bean beetle, cabbage looper, Japanese beetle		



5%



10%



20%



30%



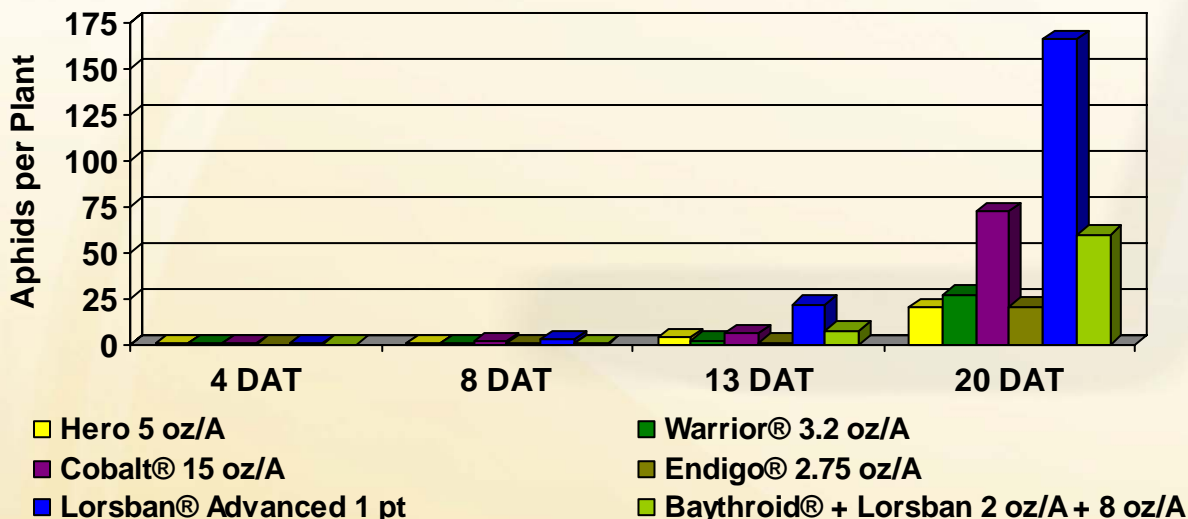
40%



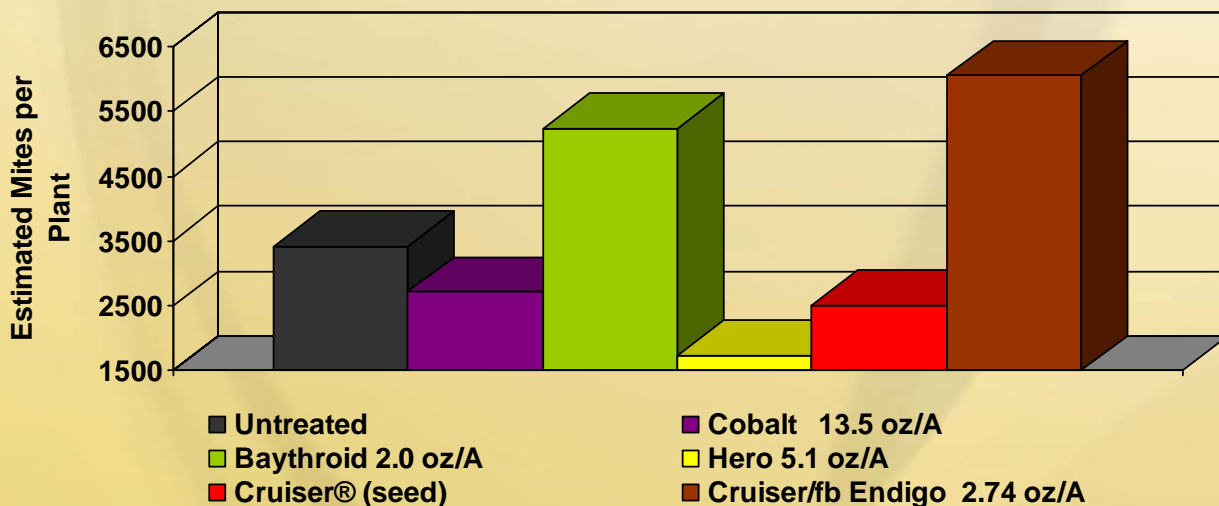
50%

Hero® - Superior Performance

2008 Hero Soybean Aphid Control
University of Minnesota (Check 930 aphids/plant)



Hero Two-Spotted Mite Control
South Dakota State University (30 DAT)



Plus, Hero reduces the risk of flaring spider mite populations in soybeans.



Proven Performance for Effective Stink Bug Management in Soybeans

Hero Commercial Field Trial – Missouri Stink Bugs (2 per Sweep in June)



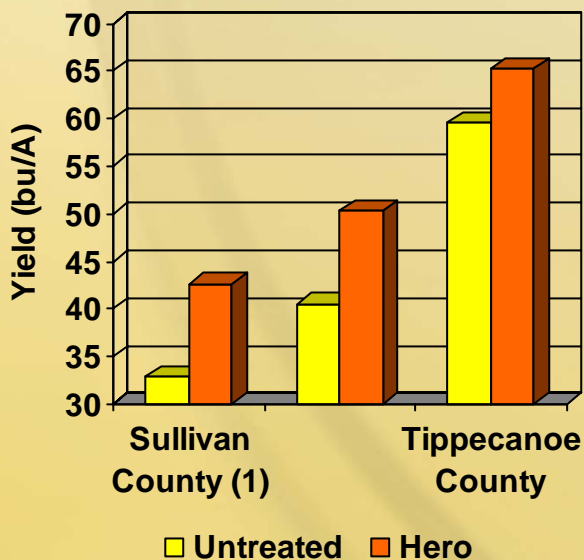
46 bu/A Untreated Check



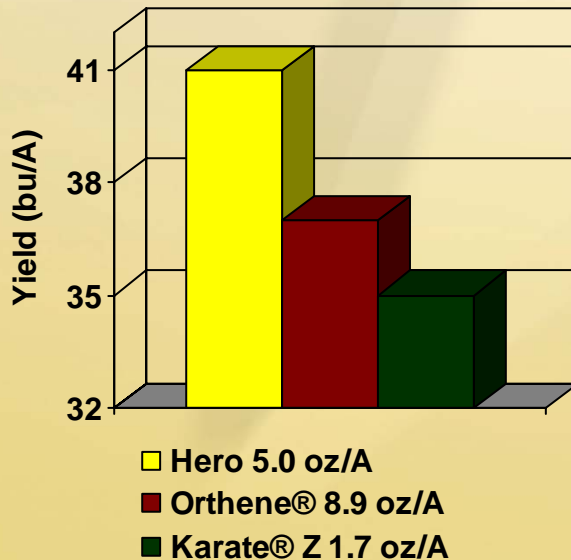
53 bu/A with Hero



2009 Hero – Stink Bug Control Indiana Commercial Trials

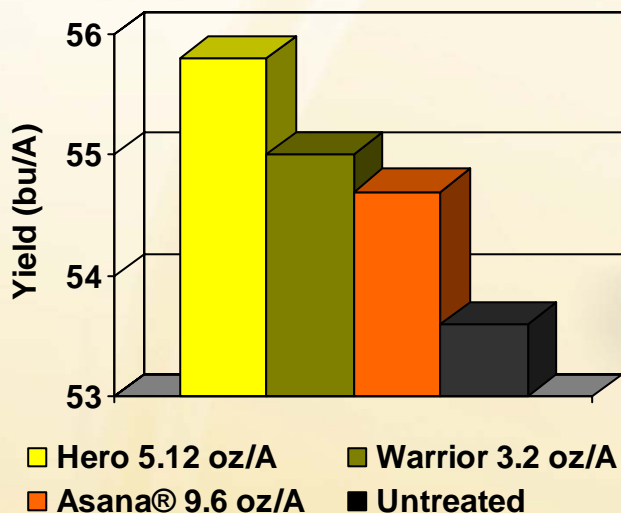


Hero - Stink Bug Control Louisiana State University

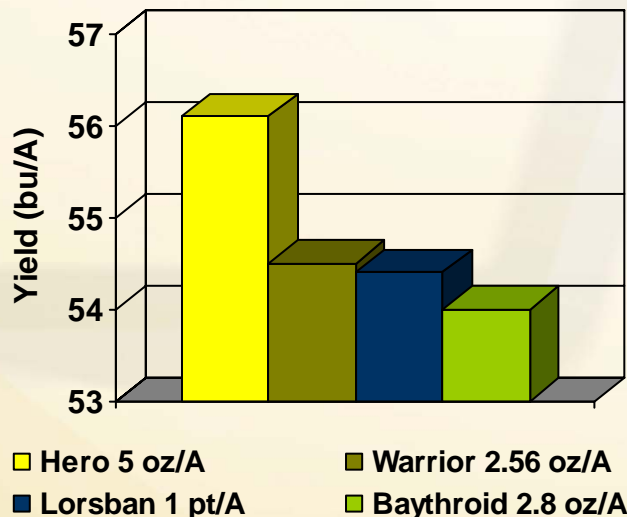


More than just insect protection and prevention...it's the final yield results that count.

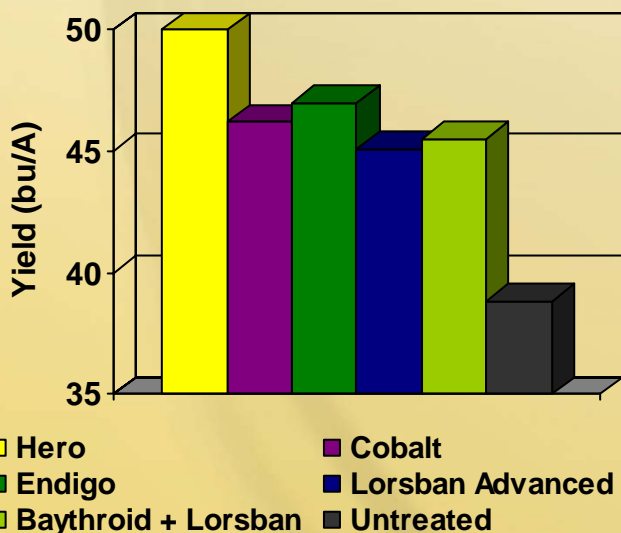
**2006 Hero Yield Data
University of Minnesota**



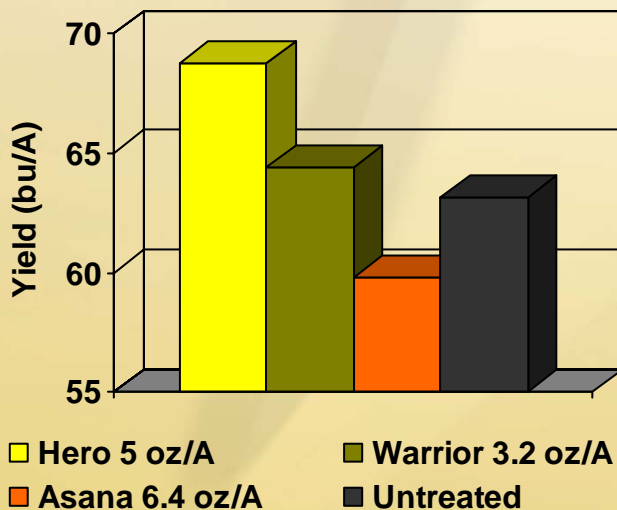
**2007 Hero Yield Data
University of Minnesota**



**2008 Hero Yield Data
University of Minnesota**



**2007 Hero Yield Data
University of Illinois**



Hero Consistently Out-Yields Other Insect Control Options



Hero – Corn



Hero provides Dual-Action™ Technology for fast knockdown and longer control. It combines the best of two pyrethroid families for pest prevention and healthy, vigorous, yield-producing plants.



Why Treat Corn?

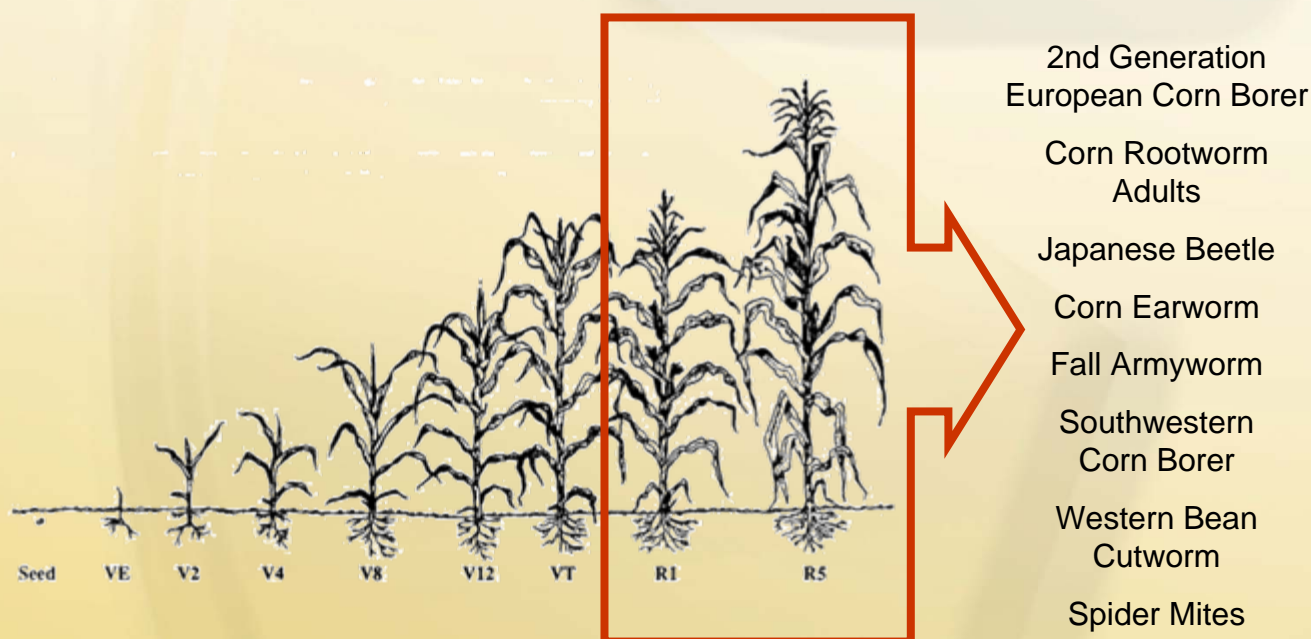
- **Non-GMO and specialty corns**
 - Need protection from cutworm, armyworm, corn borer, corn earworm, aphid, various beetles, grasshoppers
- **GMO corn**
 - Doesn't protect against all insects
 - Needs protection from aphids, grasshoppers, various beetles
- **Quality Issues**
 - Small feeding damage can cause entry sites for diseases and affect germ on seed corn
- **Aflatoxin Issues**
 - Growing concern with aflatoxin levels for feed
- **Insect pressure is increasing**
 - Wider variety of insects
 - Not only feeding, but disease transmission
 - No good multi-pest thresholds
- **Foliar fungicide or herbicide applications are standard**
 - No additional application cost for insecticide when mixed with fungicides or herbicides
- **Today, insecticide costs are lower**
 - When thresholds were first established, traditional costs were \$10-12/A
 - Current insecticide costs of \$5-7/A and higher corn prices impact thresholds



Hero Protects All Corn Yields

Seed, Sweet, Specialty, GMO, Pop, Ethanol, Yellow #2

Hero controls a wide spectrum of late-season insects that attack silks, ears, stalks, and the upper leaves of the plants. Optimal application timing is from pre-tassel through silking.



Hero helps to control the threat of aflatoxins in corn.

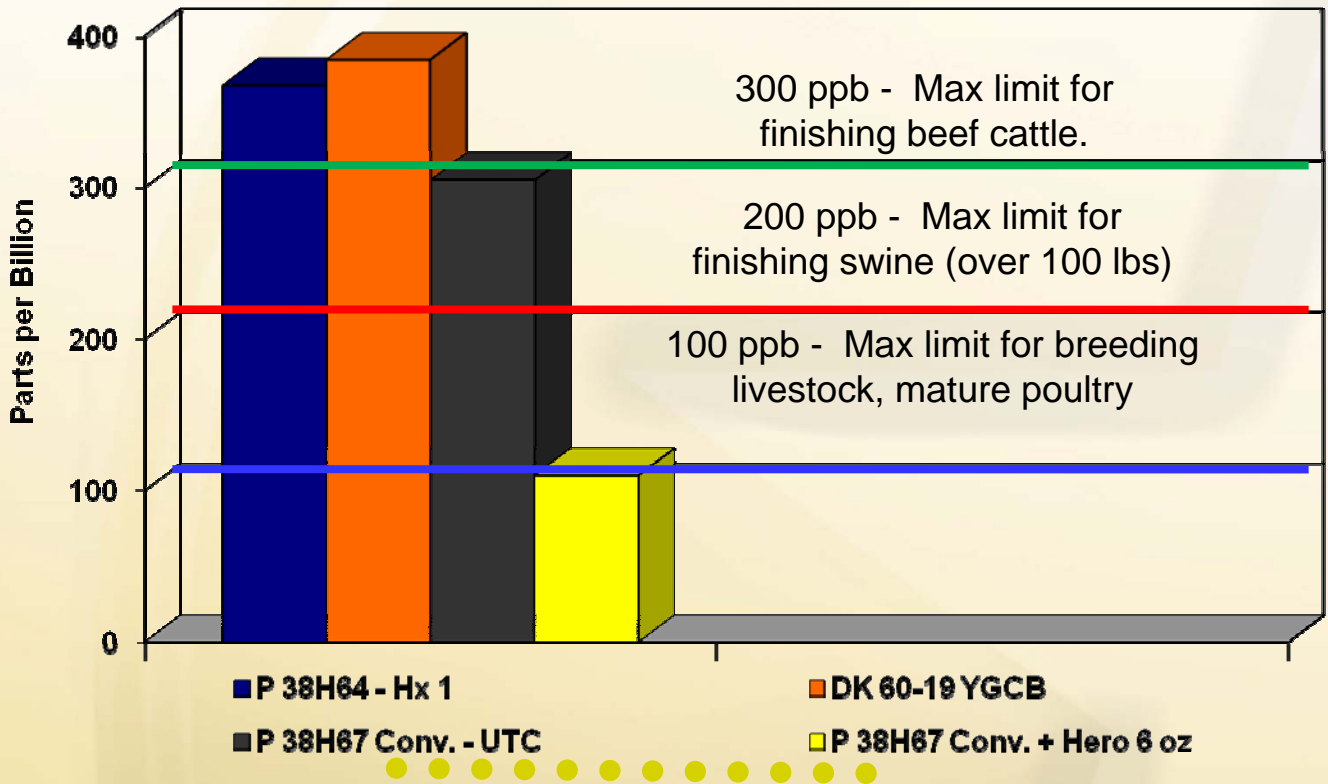
- **Hero can be an effective means of controlling dangerous aflatoxins produced by Aspergillus fungi that can be transmitted by insects. These carcinogens are one of the most common types of grain molds and can cause liver poisoning in ruminant and non-ruminant livestock, as well as humans. Insect injury to ears/kernels create wounds for easy entry of pathogen. Insects can also transport Aspergillus spores to silks and kernels.**
- **Other causes of Aspergillus growth**
 - **High temperatures, high humidity during pollination**
 - **Dry soil (drought conditions) increase spores in air**
 - **Drought, nitrogen, other stresses increase chances of plant infection**
- **Tolerance levels in grain vary by species and age of end user**
 - **Human consumption, lactating dairy, immature livestock – 20 parts per billion (ppb) maximum**
 - **Breeding cattle, swine, mature poultry – 100 ppb**
 - **Finishing swine – 200 ppb**
 - **Finishing beef – 300 ppb**
 - **Ethanol by-products can increase concentration of aflatoxins by estimates of 3-4X compared to the parent grain**

References - Aflatoxins – Hazards in Grain/Aflatoxicosis and Livestock. Pub. FS 907. SDSU, Oct, 2001. Agronomic Spotlight, Aflatoxin Management in Corn. Monsanto, 2008.

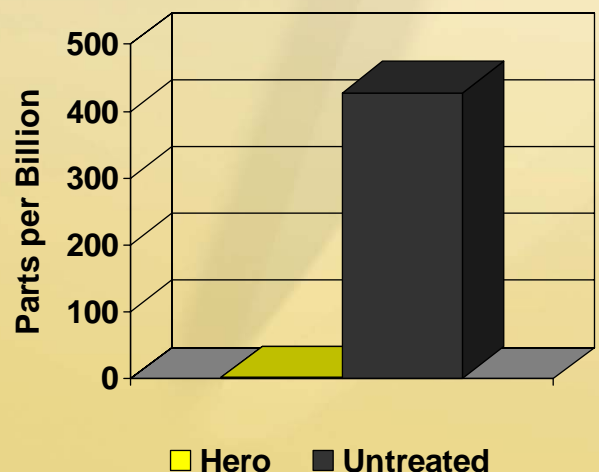
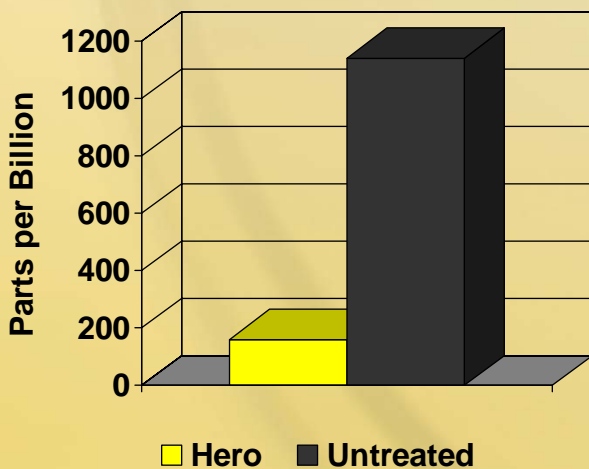


Aflatoxin Research with Hero

South Dakota State University



University of Arkansas Trials – Two Locations



Corn Insect Control

Corn Leaf Aphids



General Facts:

- Disease transmitters
- Fungal disease – sooty mold

Threshold:

- 10-30% infestation
- 25 per plant

Corn Earworm



Photo courtesy of NCSU

General Facts:

- Moths lay eggs near the ear or on the silks
- Usually 1-2 larvae per ear

Threshold:

- 10 moths per night, per trap
- 1 larvae per plant
- 3 per sweep

Western Bean Cutworm



General Facts:

- New pest across the eastern Midwest
- Now occurring in Michigan, Indiana, and Ohio

Approximate Threshold:

- 8 plants infested per 100 at 95% tassel

Japanese Beetle



General Facts:

- Adults emerge in early June and feed most of the summer
- Grubs from these adults can cause problems next year in field corn
- Mating and feeding attraction causes them to clump

Threshold:

- One-half inch or less silk clipping or tassel feeding

Corn Rootworm Adults



General Facts:

- Silk clippers
- Adults will lay eggs that cause problems in corn the following year
- Damaged kernels are disease entry points

Threshold:

- One-half inch or less silk clipping
- 1 adult per plant is threshold for rootworm treatment next year
- Manage population in fall to help larval control next spring

Grasshoppers



General Facts:

- General feeders on leaves, silks or ears
- Wide variety of species

Approximate Threshold:

- 5-8 per square yard

Economic Threshold:

In simple terms, when pests reach a population level where the cost of control is equal to or less than the dollar value of yield benefits. Will a two bushel cost gain more than a two bushel yield?

Multi-Pest Corn Insect Thresholds

Ear/Silk Feeders



Western Bean Cutworm



Corn Rootworm Adults



Corn Earworms



Japanese Beetles



Grasshoppers



Fall Armyworms

Foliage Feeders



Corn Leaf Aphids



Armyworms

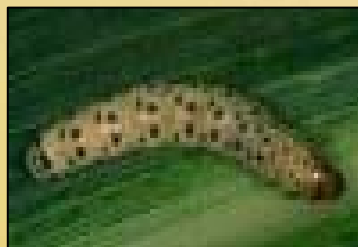


Cutworms

Stalk Feeders



European Corn Borer



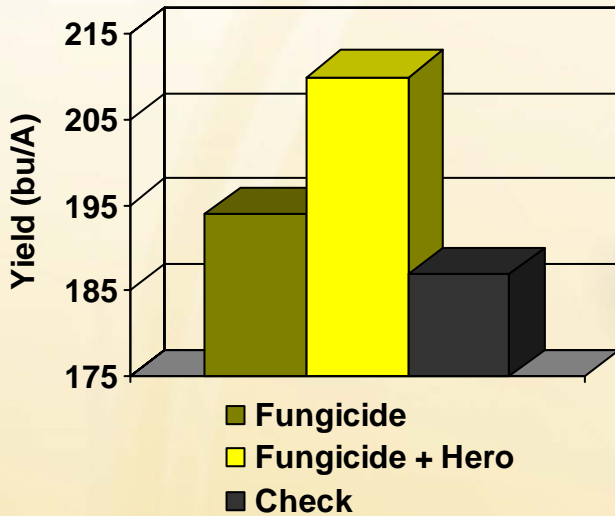
Southwestern Corn Borer

How many insects does it take to lose two bushels?

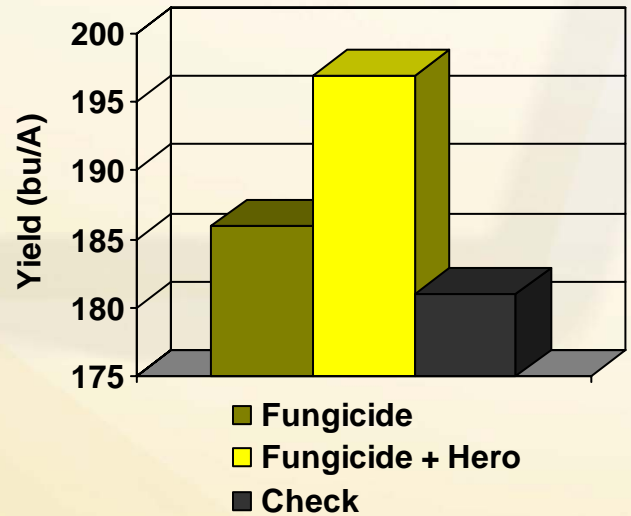
Generally, you always have more than one insect species in your field at any given time.

Hero Improves Corn Yields

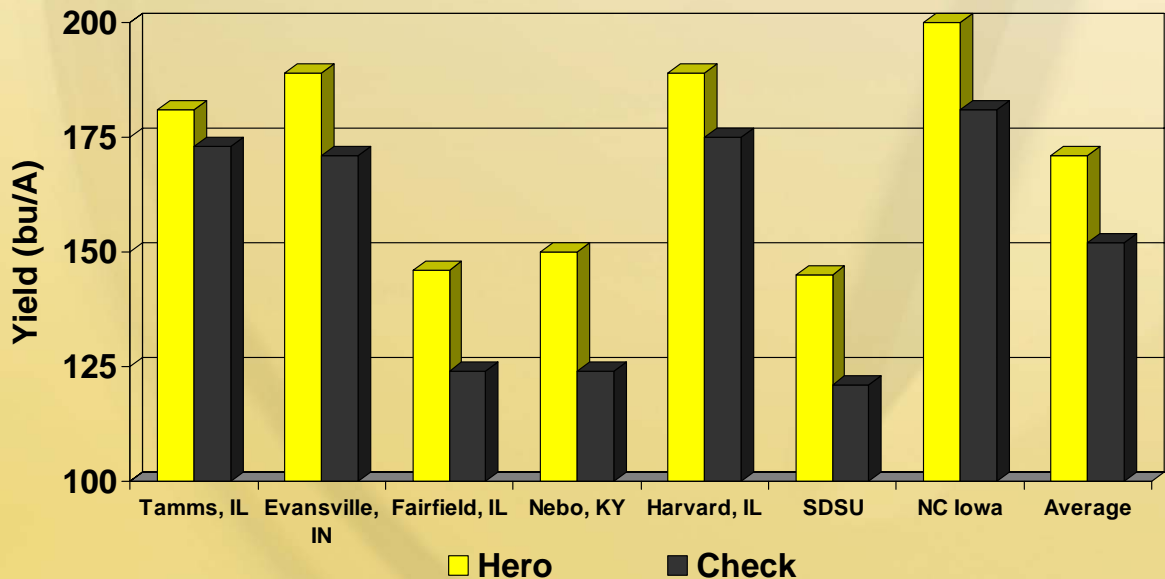
2009 Hero Yield Data
Tennessee Trials



2009 Hero Yield Data
Georgia Trials

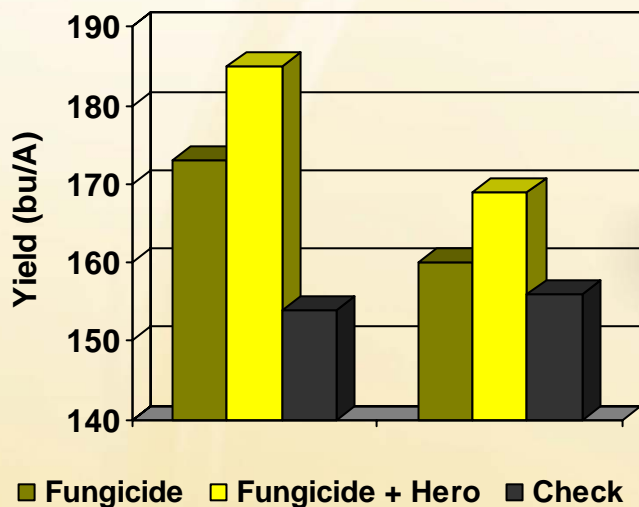


Hero Independent Corn Yield Trials
(including GMO hybrids)

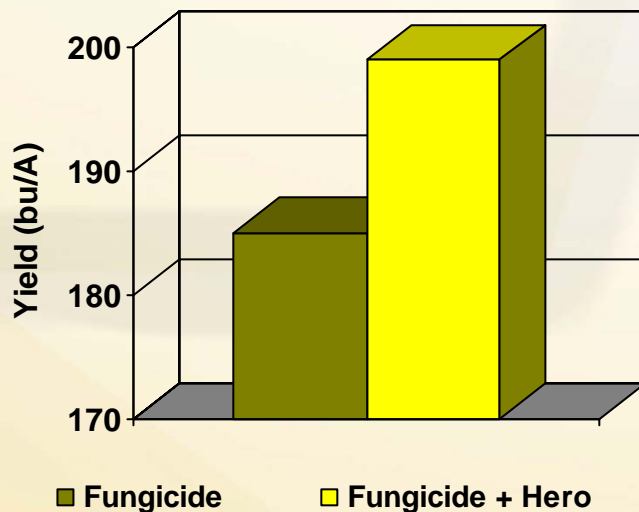


Studies Prove that Hero Belongs in Your Corn Plant Health Program

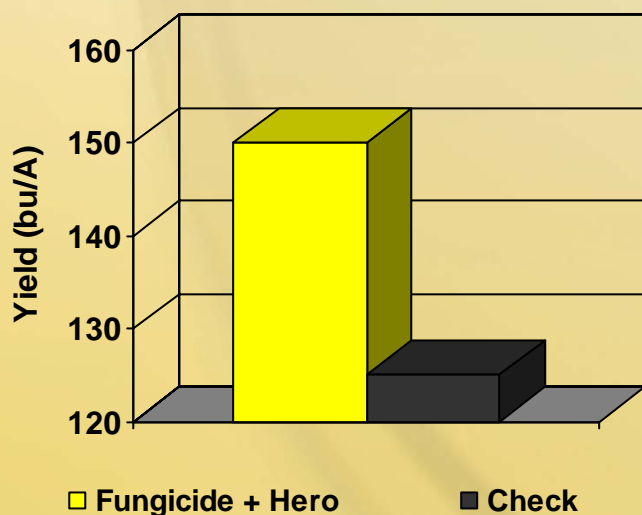
2009 Hero Yield Data
Arkansas Trials



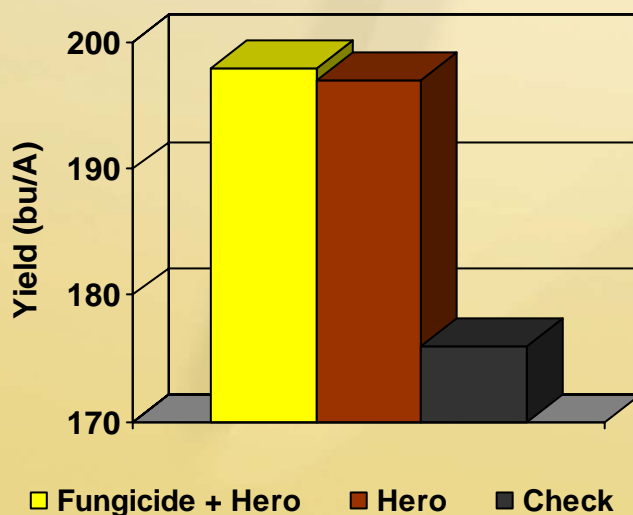
2009 Hero Yield Data
Nebraska Trials



2009 Hero Yield Data
Kentucky Trials



2009 Hero Yield Data
Georgia Trials



Hero: Fast-Acting, Long-Lasting Prevention and Control

- Combines strengths of zeta-cypermethrin (quick knockdown, insect agitation) and bifenthrin (residual control) into a single, broad-spectrum, patented product offering.
- Creates a more efficacious product on all insect pests (e.g., corn earworm, Western bean cutworm, corn leaf aphids, rootworm adults, stem borers) plus spider mites.
- More yield protection for the cost per acre spent
- Long residual activity provides quick knockdown with long pyrethroid residual and repellency
- Flexible application allows for Hero to be applied alone or in tank mixes with fungicides, post herbicides, and foliar fertilizers, via ground or aerial application
- Caution signal word with a short REI of only 12 hours and a 21 day PHI in soybeans, 30 day PHI in corn
- Fungicides protect plants from disease while Hero protects plants from insects that may have been controlled by fungal diseases

Protects Profits

Corn Foliar

- Aphids, western bean cutworm, beetles, and others
- 10 bu x \$5 = \$50 - \$6 = \$44,000 profit on 1,000 acres

Soybeans Foliar

- Stink bugs, bean leaf beetle, aphids, and others
- 8 bu x \$12 = \$96 - \$6 = \$90,000 profit on 1,000 acres

Approximate profit based on current market and chemical prices.





Fast-Acting, Long-Lasting Insect Prevention and Control to Protect Your Corn & Soybean Investment and Optimize Yields



Always read and follow label directions. Hero is a restricted use pesticide. FMC and Hero are trademarks and Investing in farming's future is a service mark of FMC Corporation. Warrior, Endigo, Karate and Cruiser are trademarks of a Syngenta Group Company. Lorsban and Cobalt are trademarks of Dow AgroSciences, LLP. Asana is a trademark of E.I. DuPont de Nemours & Co. Baythroid is a trademark of Bayer AG. Orthene is a trademark of OMS Investments, Inc.

© 2011 FMC Corporation. All rights reserved. F100-020516 06/11

