

Scaling Up the Use of Trap Crops for Insect Control in Mechanized Squash



Production

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2012 SARE Farmer Rancher Grant



Pin Oak Rd

Pin Oak Rd

Pin Oak Rd

Pin Oak Rd





Description

- 30 acres vegetable production
- Typical field block size – 2 acres
- Direct-seeded winter squash
- Row spacing – 5 ft
- In-Row plant spacing – 3ft

Problem/Opportunity

- Increasing sales of Winter Squash
- Desire less pesticide usage
- Maintain high vegetable quality
- Reduce scouting labor



Research

- Fostering Adoption of IPM by Vegetable Farmers in Missouri- Dr. Jaime Pinero
- Field use of trap crop plant species as a lure to prevent feeding on cash crop.
- Are trap crops effective as field size increases?
- Must total perimeter be trap crop species?

2012 Summer Planting

- Direct seed 24 rows of winter squash
- Blue Hubbard transplants from 72 cell trays
- No-flowering plants
- Transplanted same day as direct seeding

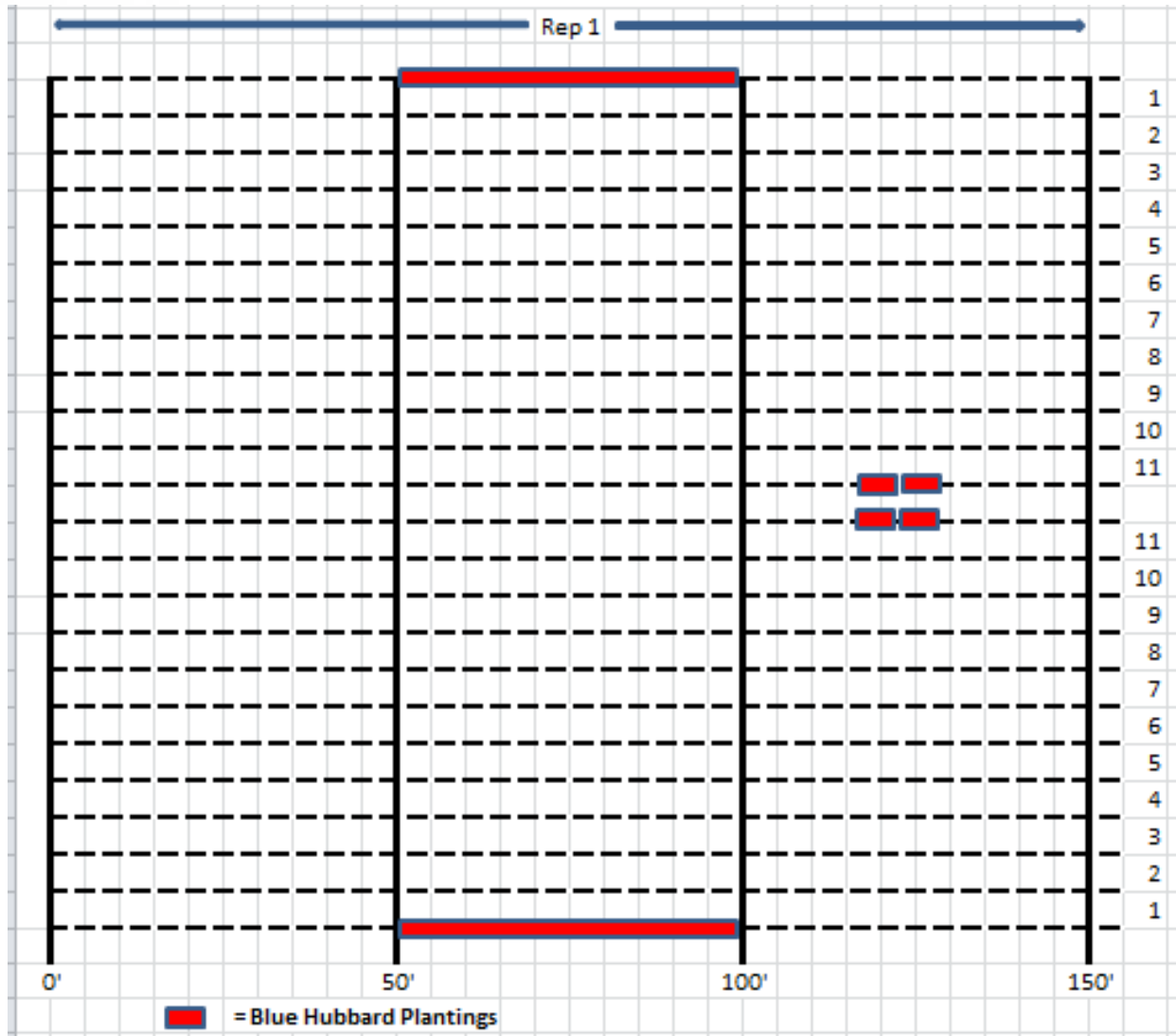


Four Replicate Plot Design

Field Road/Terrace

East

West



Irrigated Field Corn



2012 Observations

- Early season heavy pressure with loss of some Blue Hubbard plants
 - Spotted Cucumber Beetle (SCB)
 - Squash Bug (SB)
- Causes
 - Adjacent to 2011 squash crop
 - Adjacent to field corn

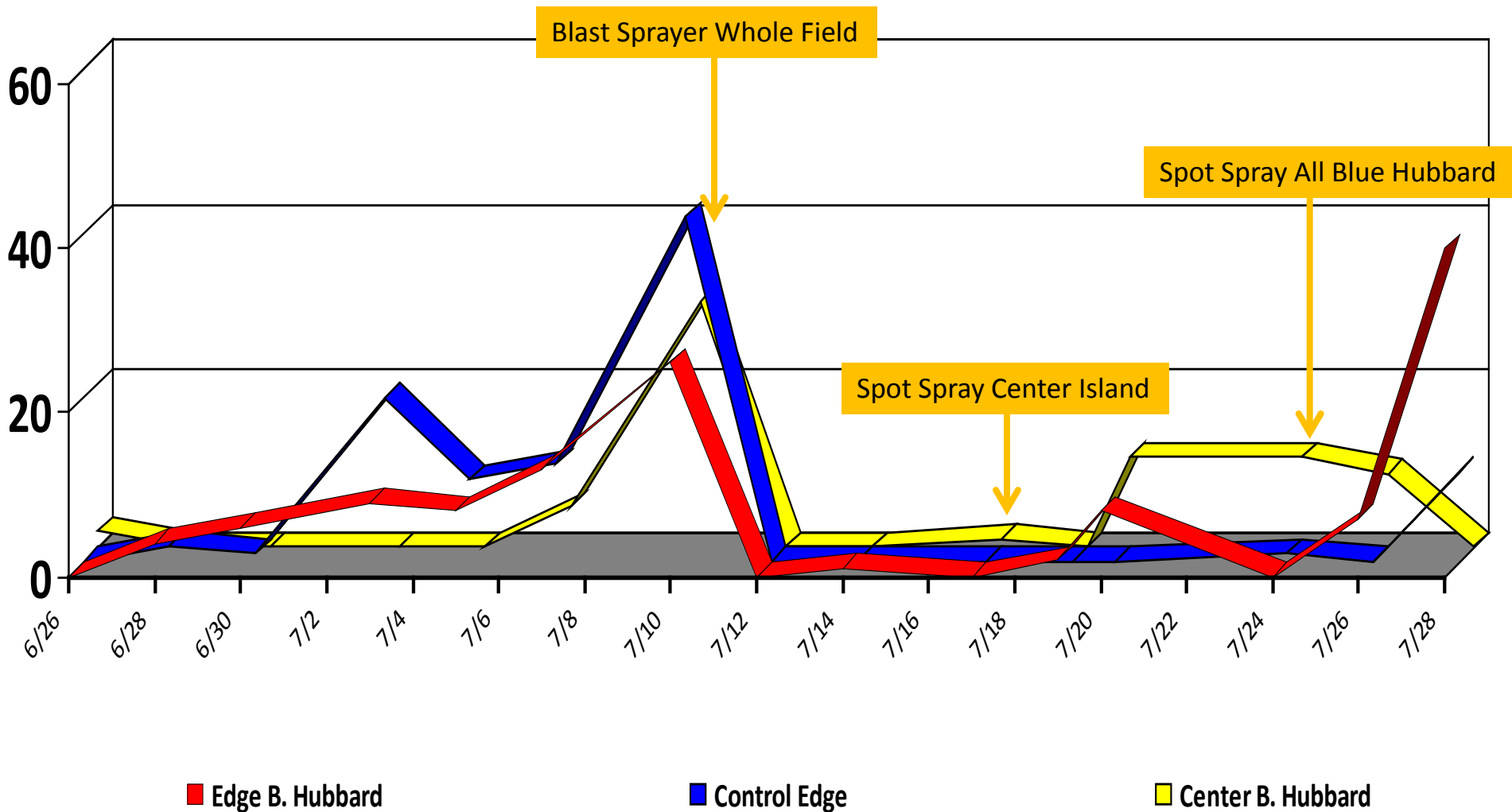


Response

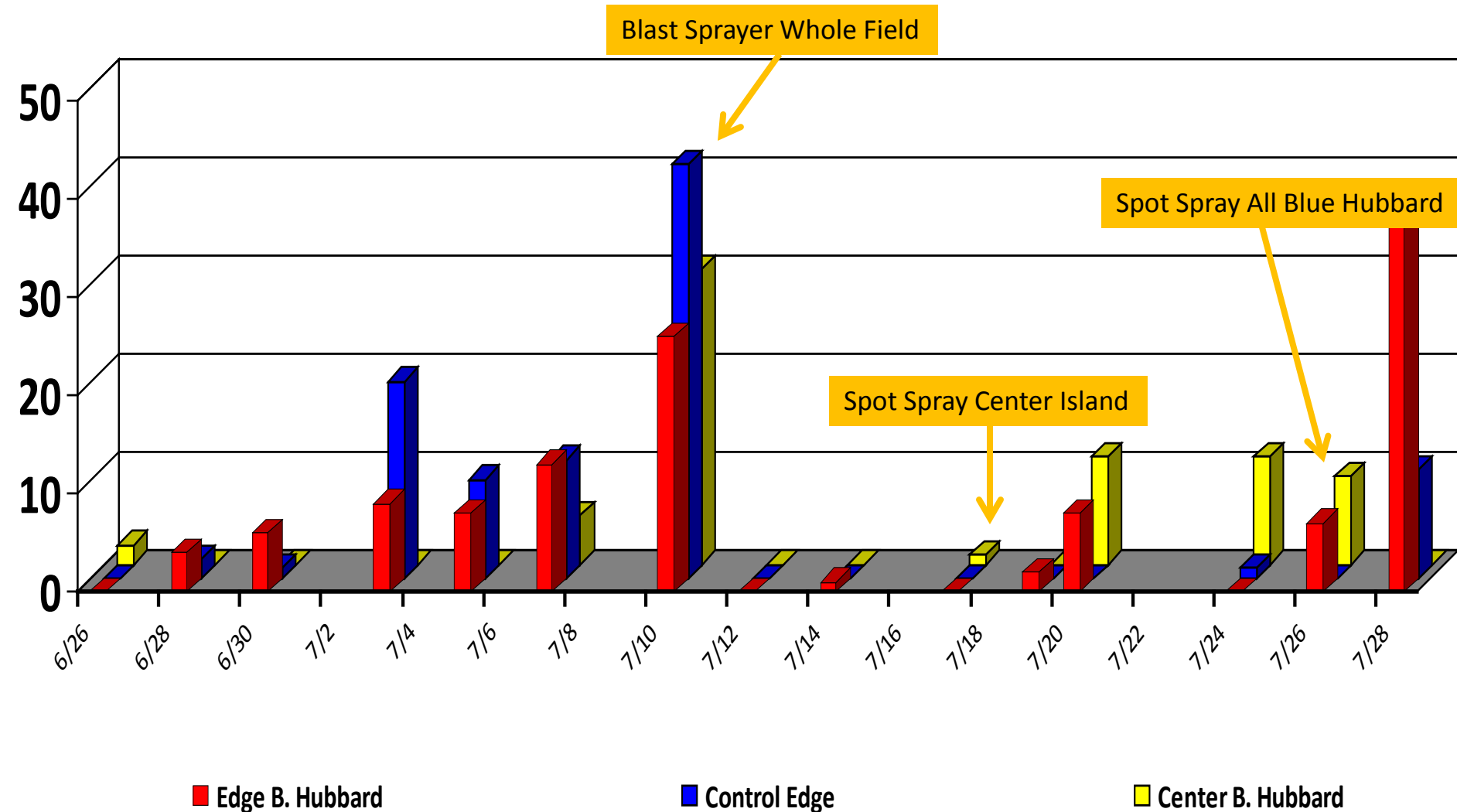
- Total field area with Artic @ 8 oz./ac; 17 gal/ac carrier air blast sprayer, 7/10/12
- Excellent control – Created a clean slate
- Continue scouting



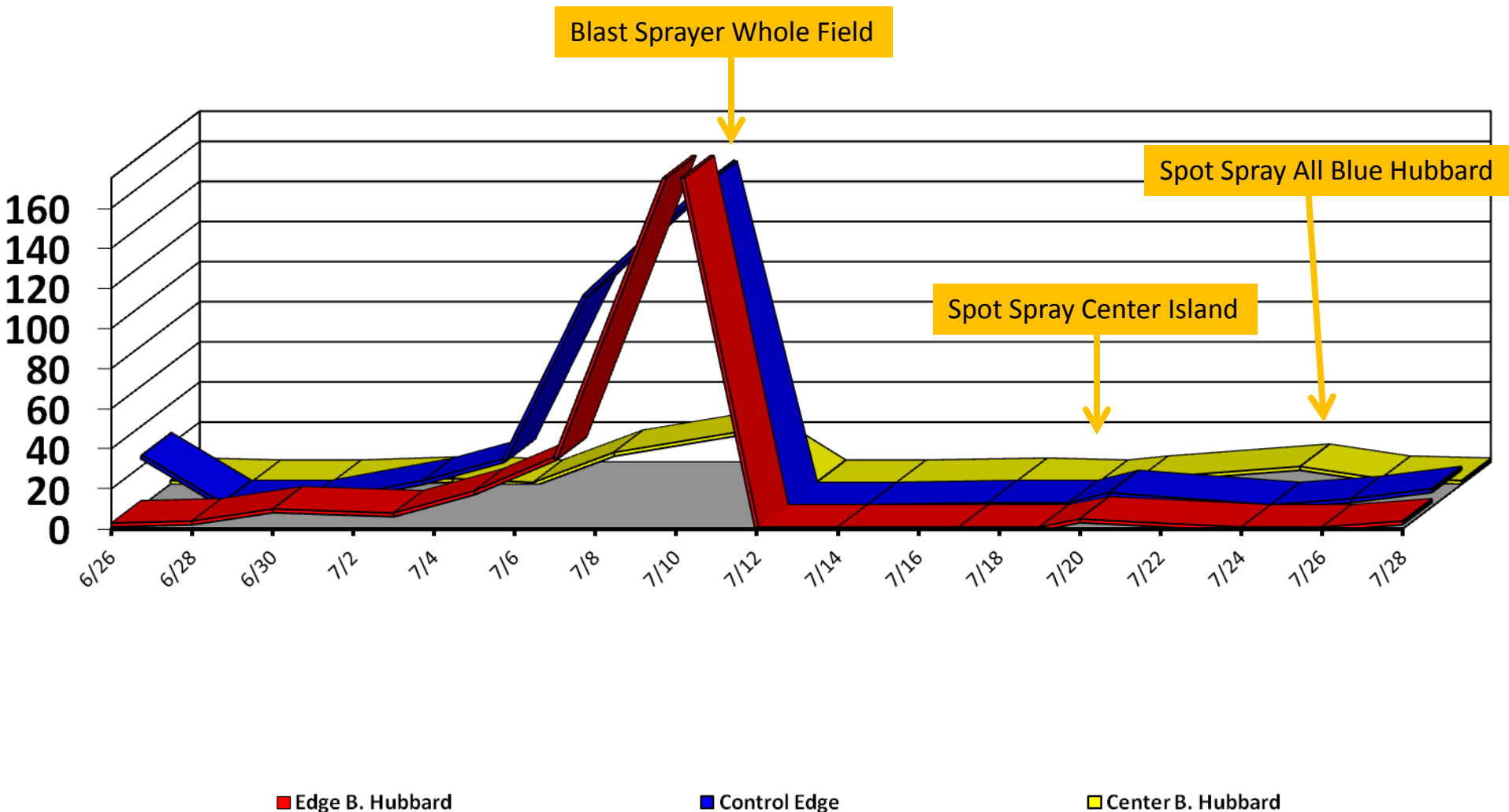
2012 Spotted Cucumber Beetle Treatment Comparison



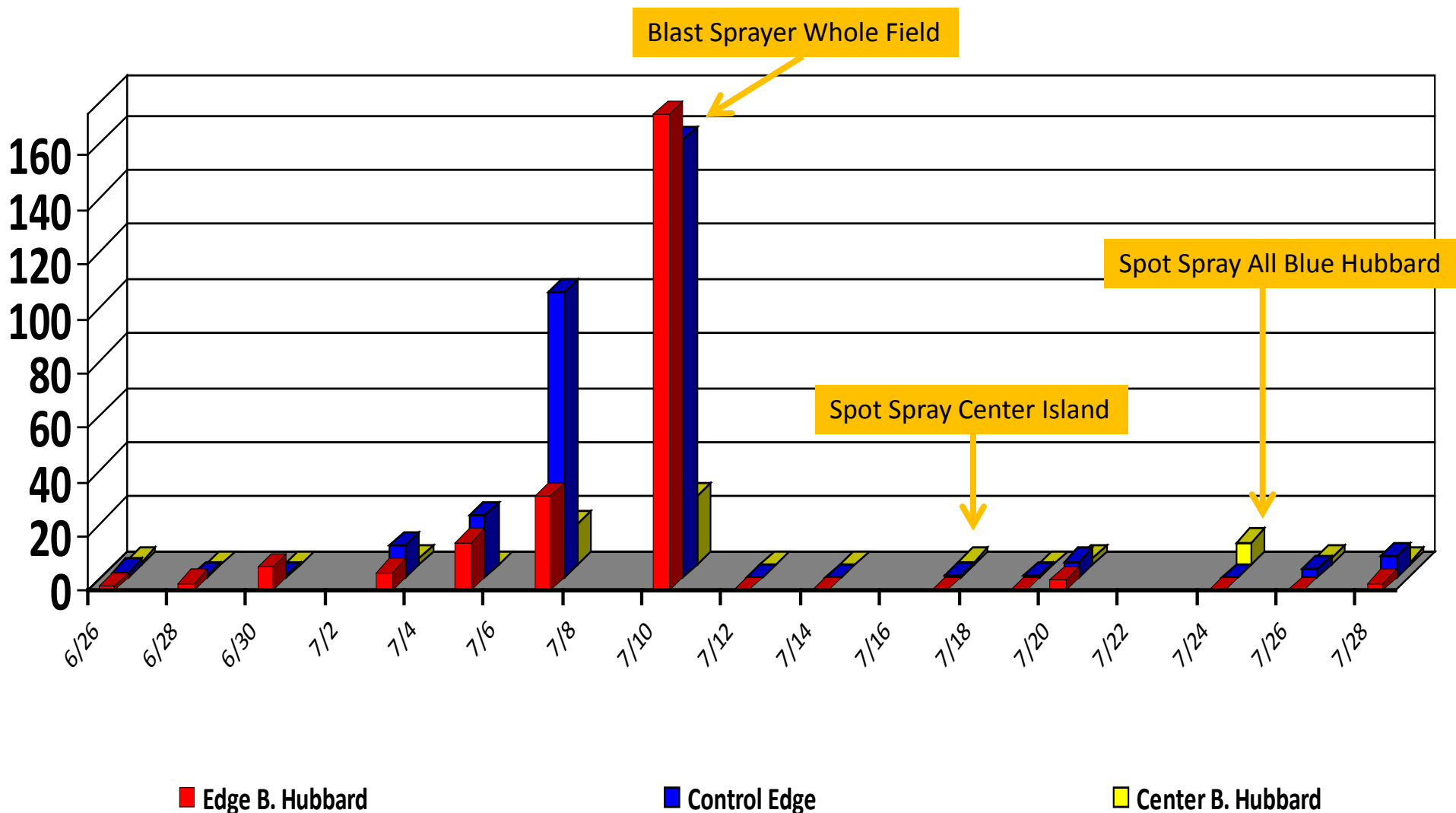
2012 Spotted Cucumber Beetle Treatment Comparison



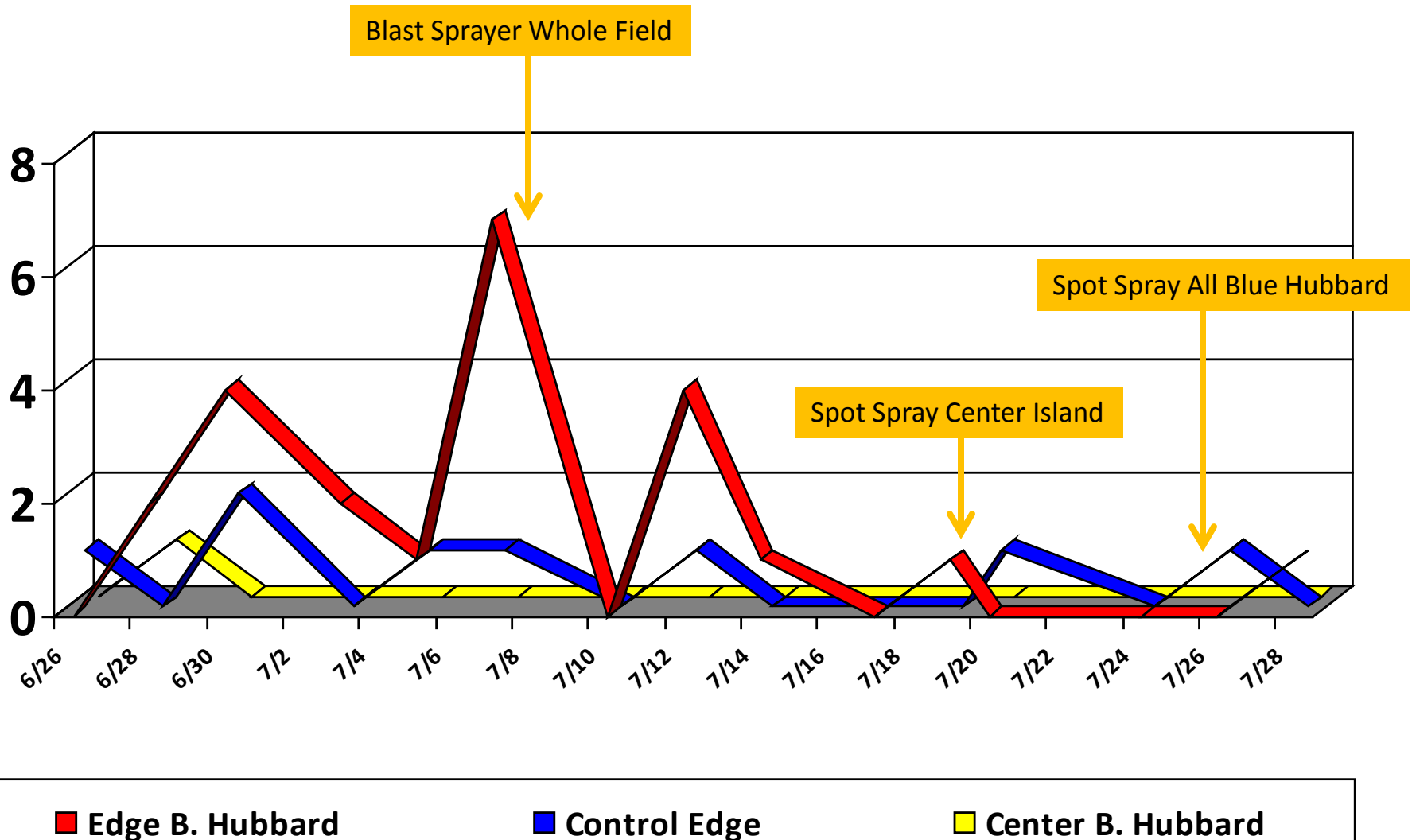
2012 Striped Cucumber Beetle Treatment Comparisons



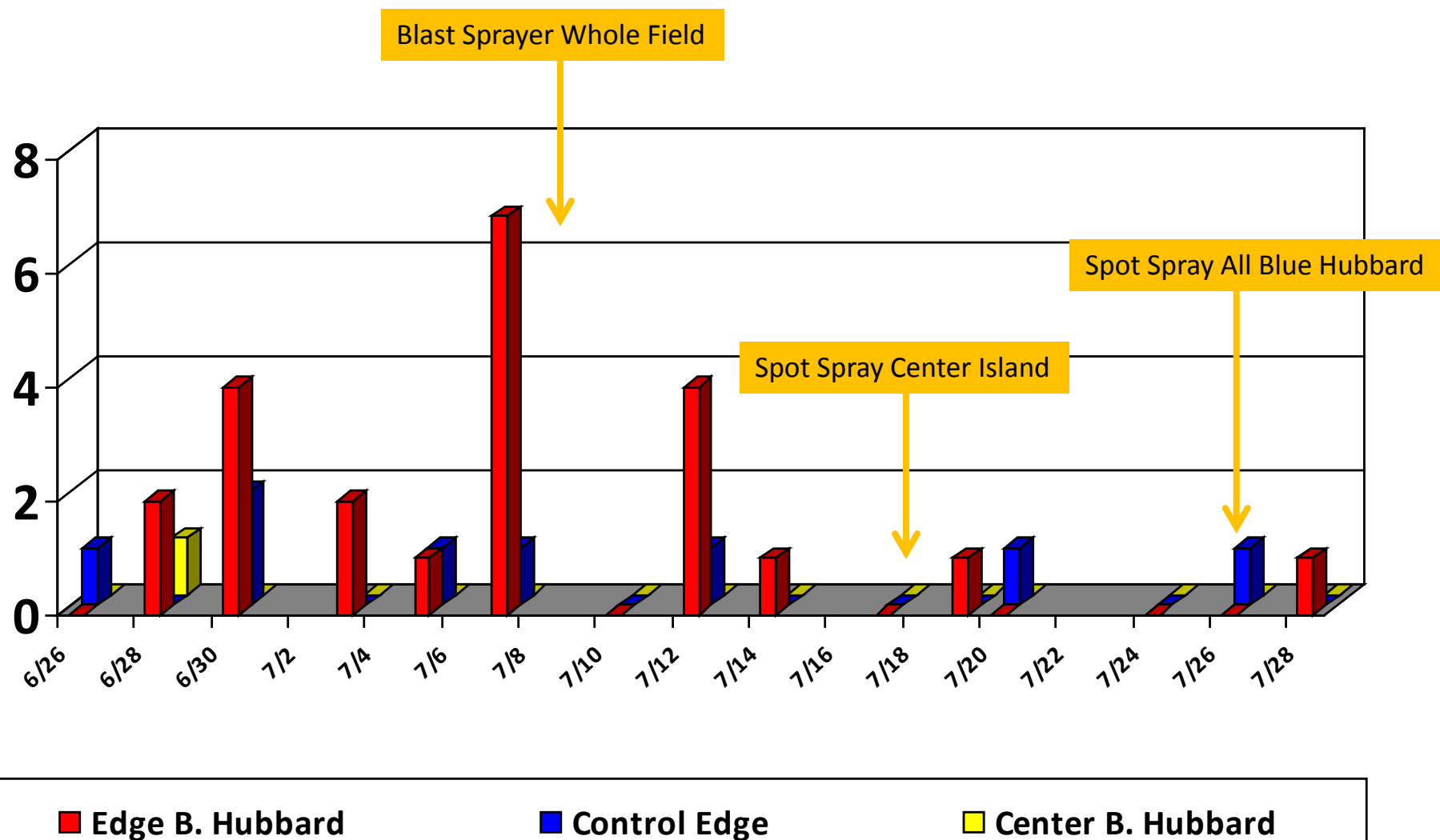
2012 Striped Cucumber Beetle Treatment Comparisons



2012 Squash Bug Treatment Comparison



2012 Squash Bug Treatment Comparison



Results

- 1 targeted back-pack spray of center island Blue Hubbard on 7/18
- 1 targeted back-pack spray of all Blue Hubbards on 7/25
- **Eliminated 2 field scale sprayings**

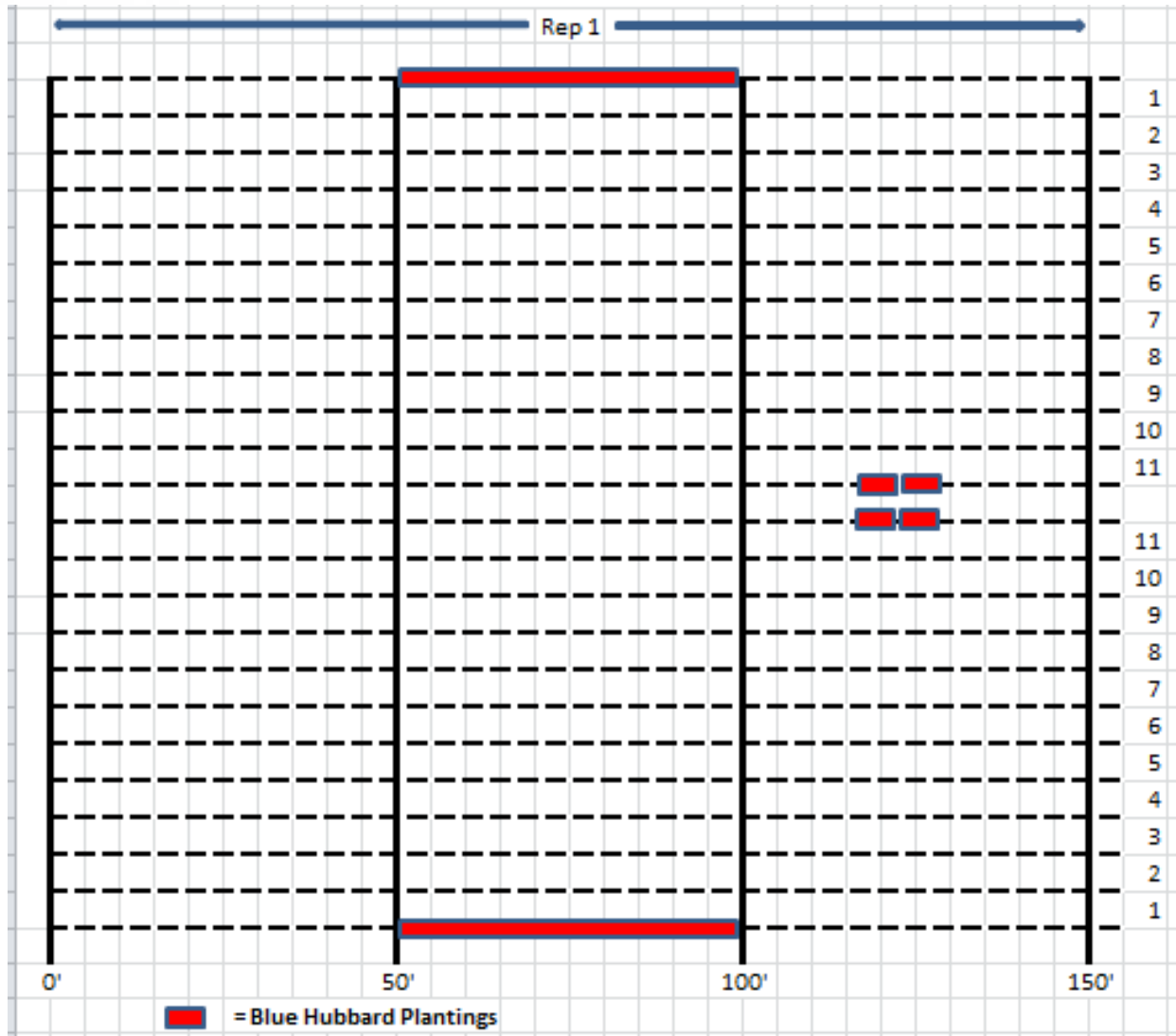


Four Replicate Plot Design

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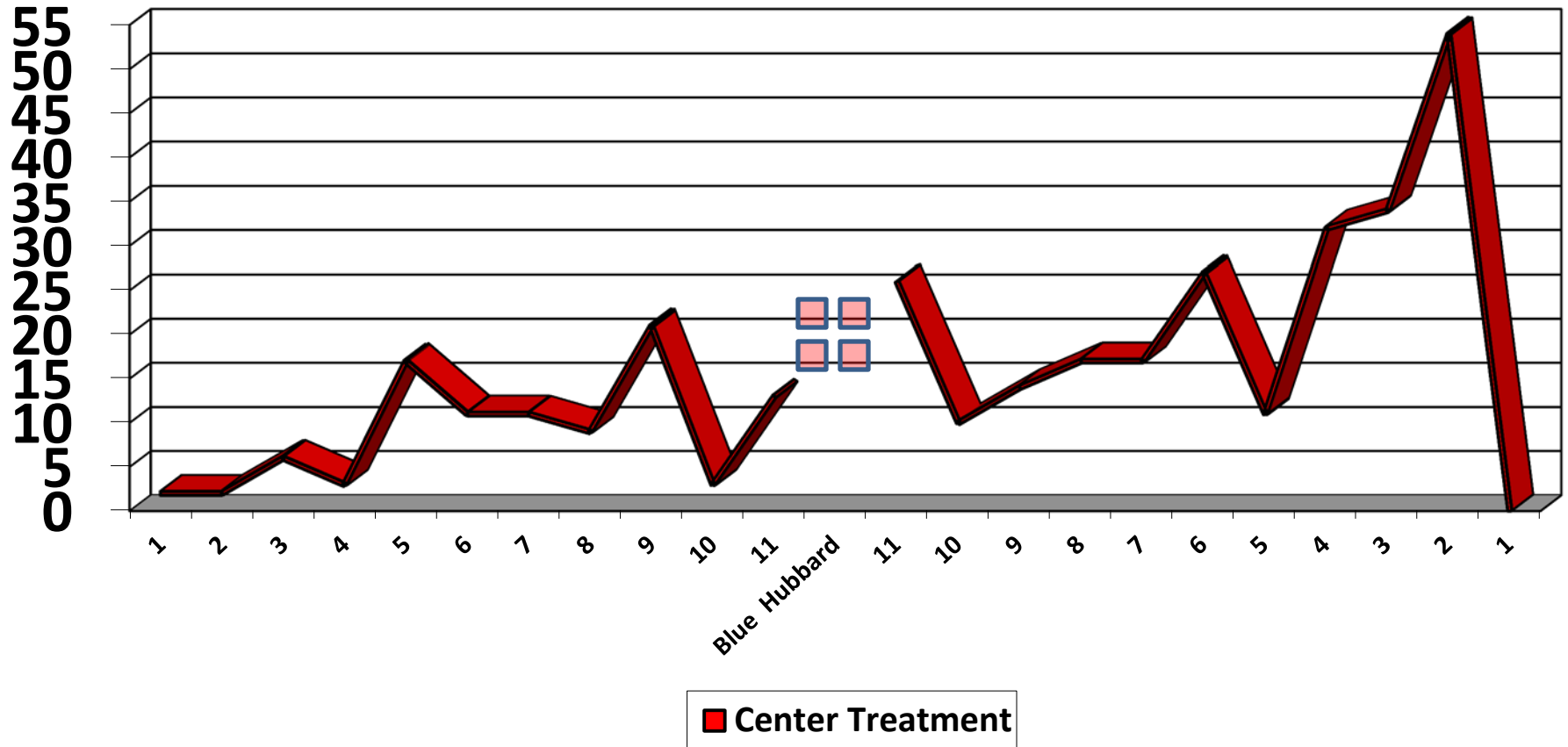
Irrigated Field Corn



2012 Pest Spatial Distribution: Influenced by Surrounding Crop

Non-host Crop

Alternative Host Crop



2013 Changes

- Adjacent land use – No host crop species
- All zucchini on black, plastic mulch beds
- Increased Blue Hubbard transplant size-36 cell
- Imidacloprid – Drench of all transplant trays





2013 Results

- Larger Blue Hubbard plants at transplanting reached bloom sooner
- Imidacloprid worked – Live insect counts remained low for 4 weeks.
- Finished year with 3 field-scale applications

Opinions

- Previous & Adjacent land use is a big deal
- Imidacloprid works
- Trap crops can reduce total pesticide useage
- Trap crops can be cash crop plant species
- Perimeter trap crops trump island centers
- Perimeter needs to bloom before field interior
- Time spent scouting is not wasted

2011 Cover Crop Demonstration

White Millet

Hairy Vetch

Crimson Clover

Appin Turnip

Gulf Ryegrass

Groundhog
Radish

Winter Oats

Mixture



2011 Cover Crop Demonstration

Broadcast 3 pt Seeder 9/3/11

- Bob Oats (winter), 40' spread
 - 32#/ac, 3.5 mph/setting 24
- White Millet, 40' spread
 - 8#/ac 2x, 3.5 mph/setting 10
- Hairy Vetch, 40' spread
 - 10#/ac, 3.5 mph/setting 14
- Crimson clover 32' spread
 - 10#/ac, 3.5 mph/setting 9
- Appin Turnip 32' spread
 - 3#/ac, 3.5 mph/setting 4
- Groundhog Radish 40' spread
 - 8#/ac, 3.5 mph/setting 12
- Gulf Ryegrass 20' spread
 - 20#/ac, 3.5 mph/setting 18
- Mixture, 32' spread
 - 30#/ac, 3.5 mph/setting 38

Plot size in Acres

- Oats ~0.5 ac (66'*325')
- Millet ~0.4 ac (25'*648')
- Vetch ~0.6 ac (40'*648')
- Clover ~0.6 ac (40'*648')
- Turnip ~ 0.4 ac (25'*648')
- Radish ~ 0.5 ac (33'*325')
- Ryegrass ~ 0.5 ac (66'*350')
- Mixture ~ 0.5 ac (33'*350')

Opinions

- Spring Oats that winter kill are a good thing
- Favor legumes ahead of Winter Squash
- Slow Fall growth of Hairy Vetch requires companion planting with Spring Oats
- Crimson Clover with low rate of Spring Oats
- Annual Ryegrass is hard to control, can quickly become a nuisance

Favorite Combinations

- White Potato
- Late Summer seeding Vetch or Clover
- Early Summer incorporation
- Plant Winter Squash/Pumpkins



More Favorites

- Tillage Radish
- Good Scavenger w/Excellent Winter Kill
- Complete Early Spring Incorporation
- Fine seedbed prep for carrots, lettuce, etc



