

TRAP CROPS AND ROW COVERS AS MANAGEMENT TOOLS FOR CUCUMBER BEETLE

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Introduction

- ▣ Striped cucumber beetle is a major pest on cucumber in many areas in US
 - A top priority of Michigan organic growers
- ▣ Overwintered adults feed on new growth and emerging cucurbits, defoliate leaves and scar fruit.
- ▣ Larvae develop in the soil
And feed on roots



Possible Management Strategies

- ▣ **Trap Crop** -Blue Hubbard squash seems a promising candidate (Pair 1997)
- ▣ **Plant diversity** increased in cucumber fields (Bach 1980)
- ▣ **Biological attractants** to enhance trap crop effectiveness using cucurbitacins (Hokkanen 1991)



Field Site Descriptions

Treatments 4 reps 112 ft rows

- ▣ Polyculture & Trap Crop hypotheses testing
 - Cucumber + tomato
 - Cucumber + Blue Hubbard
 - Cucumber alone
 - Cucumber covered with row cloth

- ▣ Attractant hypothesis testing
 - Cucumber + Blue Hubbard
 - Cucumber + Blue Hubbard w/ cucurbitacins
 - Cucumber + row cover + Blue Hubbard (5 ft)
 - Cucumber + row cover + Blue Hubbard (30 ft)...

Analysis

- **Polyculture & Trap Crop:** Randomized complete block of 6 treatments
- **Attractant:** randomized complete block of 4 treatments

Field Site Descriptions (Continued)

Measurements

- Visual counts of beetles/plant, 8 plants/rep 2x/wk
- Visual estimate of % defoliation, 8 plants/rep 2x/wk
- Check for fruit scaring to adjust yield (marketable fruit) 6 picks

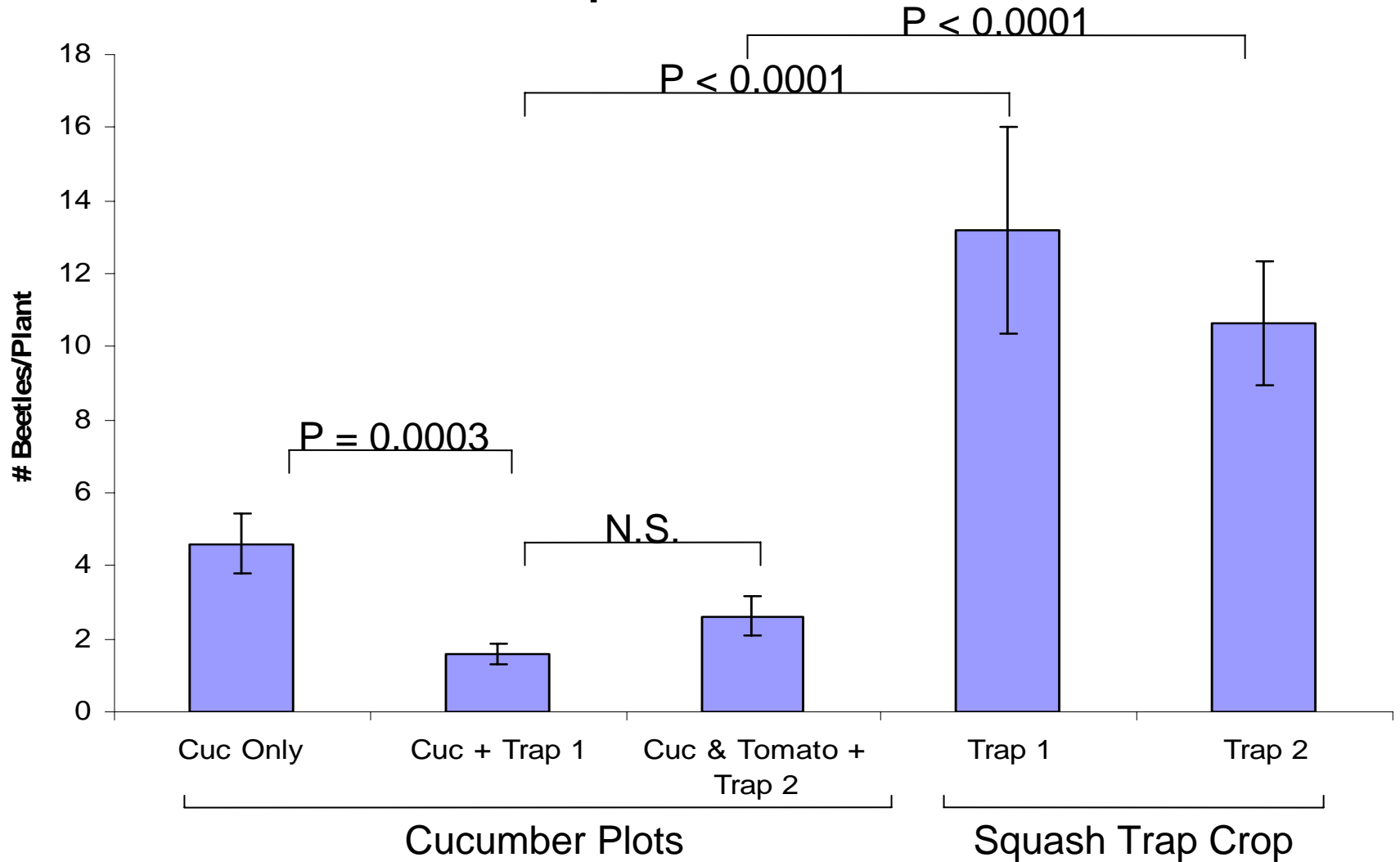
Poly & Trap Hypothesis (1st Field Site)

Plant growth June 30:

Cucumber beginning to vine, squash larger than cucumber, not flowering



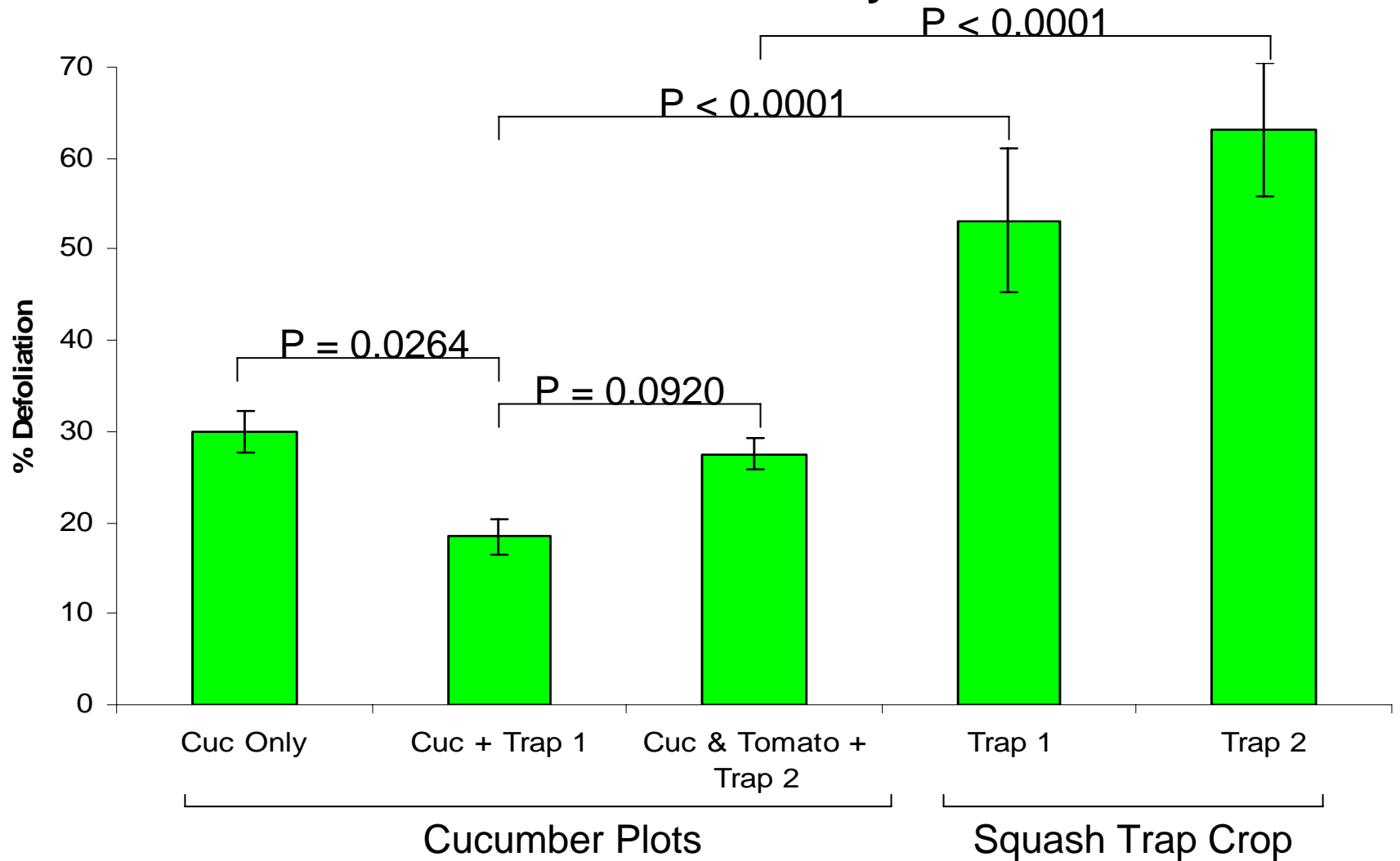
Occurrence of Striped Cucumber Beetles June 30



Results: The squash trap crop protected the surrounding cucumber crop from beetles, adding tomatoes provide no additional protection.

- Cucumber only plots had more beetles than cucumber plots with squash trap crop
- Row covers w <1 beetle /plant

% Defoliation July 6



Results: The squash trap crop did reduce defoliation of the surrounding cucumber crop from beetles (defoliation accumulates).

- Defoliation of cucumber plots was only slightly lower when protected by trap crop.
- The squash trap crop had higher defoliation than on the surrounding cucumber



Cucumber protected by trap crop

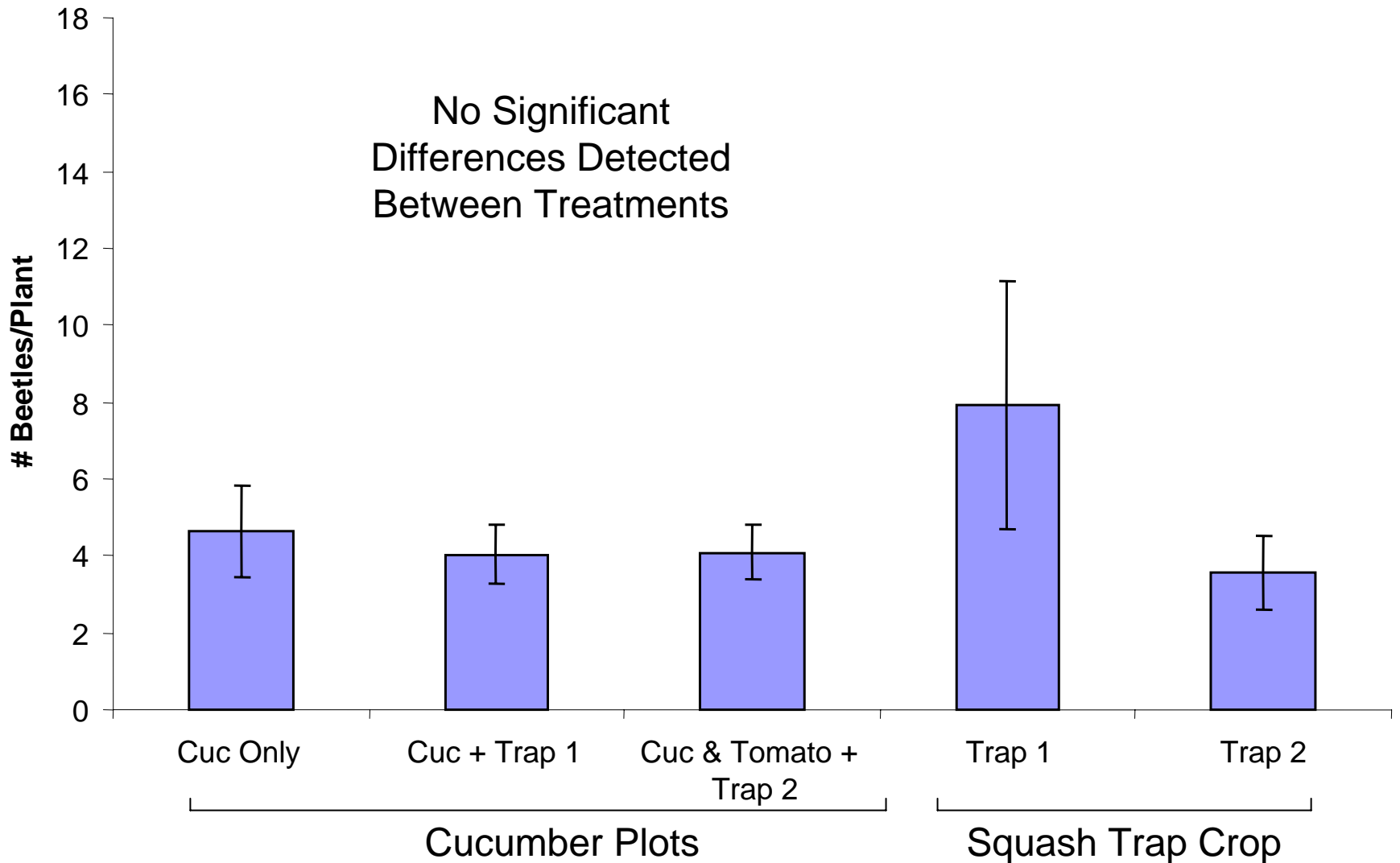


Cucumber monoculture



Hubbard squash trap crop

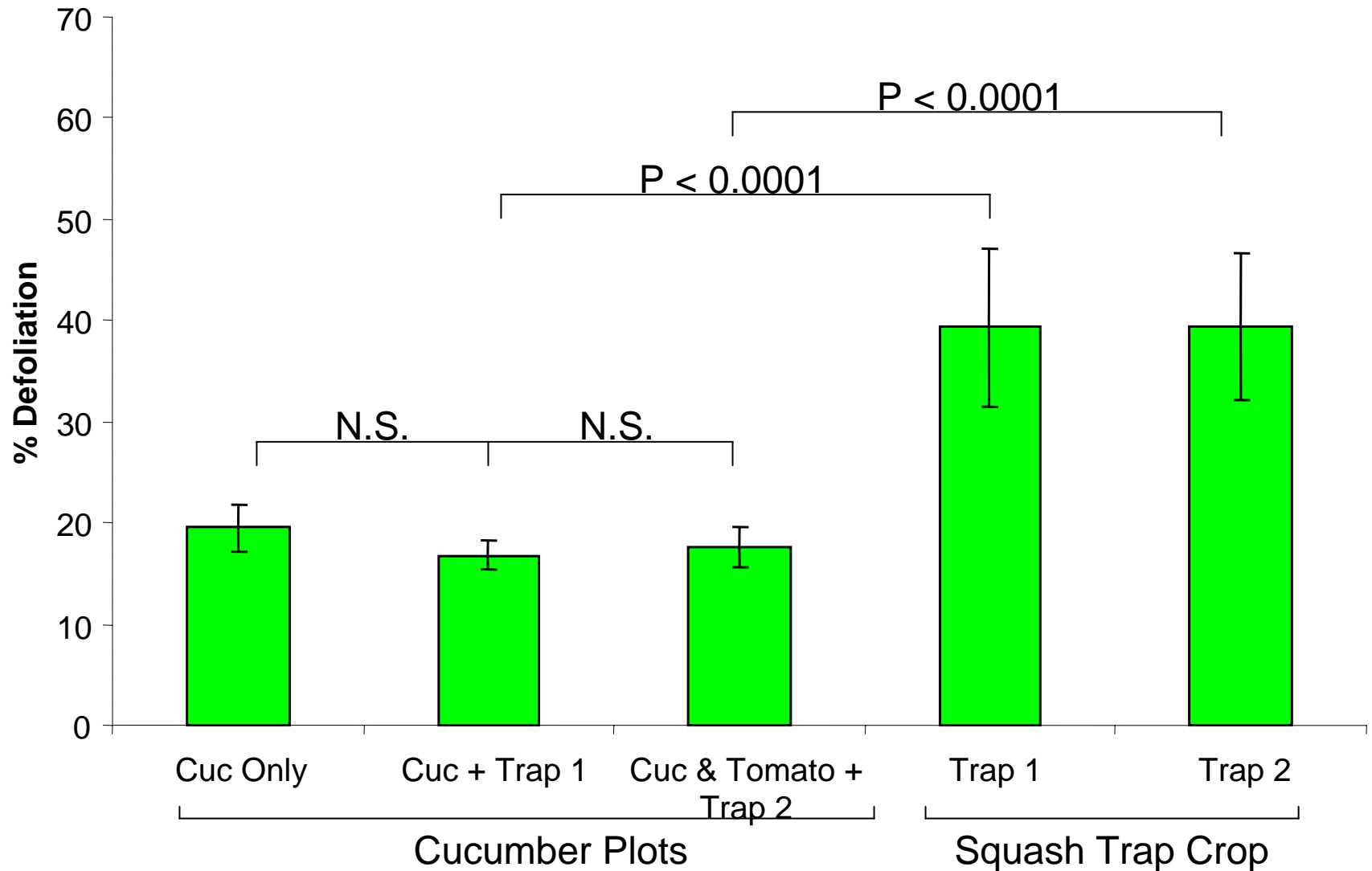
Occurrence of Striped Cucumber Beetles July 17



Results: Protection of the trap crop breaking down.

- Beetles counts similar in cucumber only, cucumber with trap crop, and squash trap crop.

% Defoliation July 17



Results: Protection of the trap crop breaking down.

- Cucumber only plots had similar defoliation than cucumber with squash trap crop.
- The squash trap crop had higher defoliation and some replanting needed.

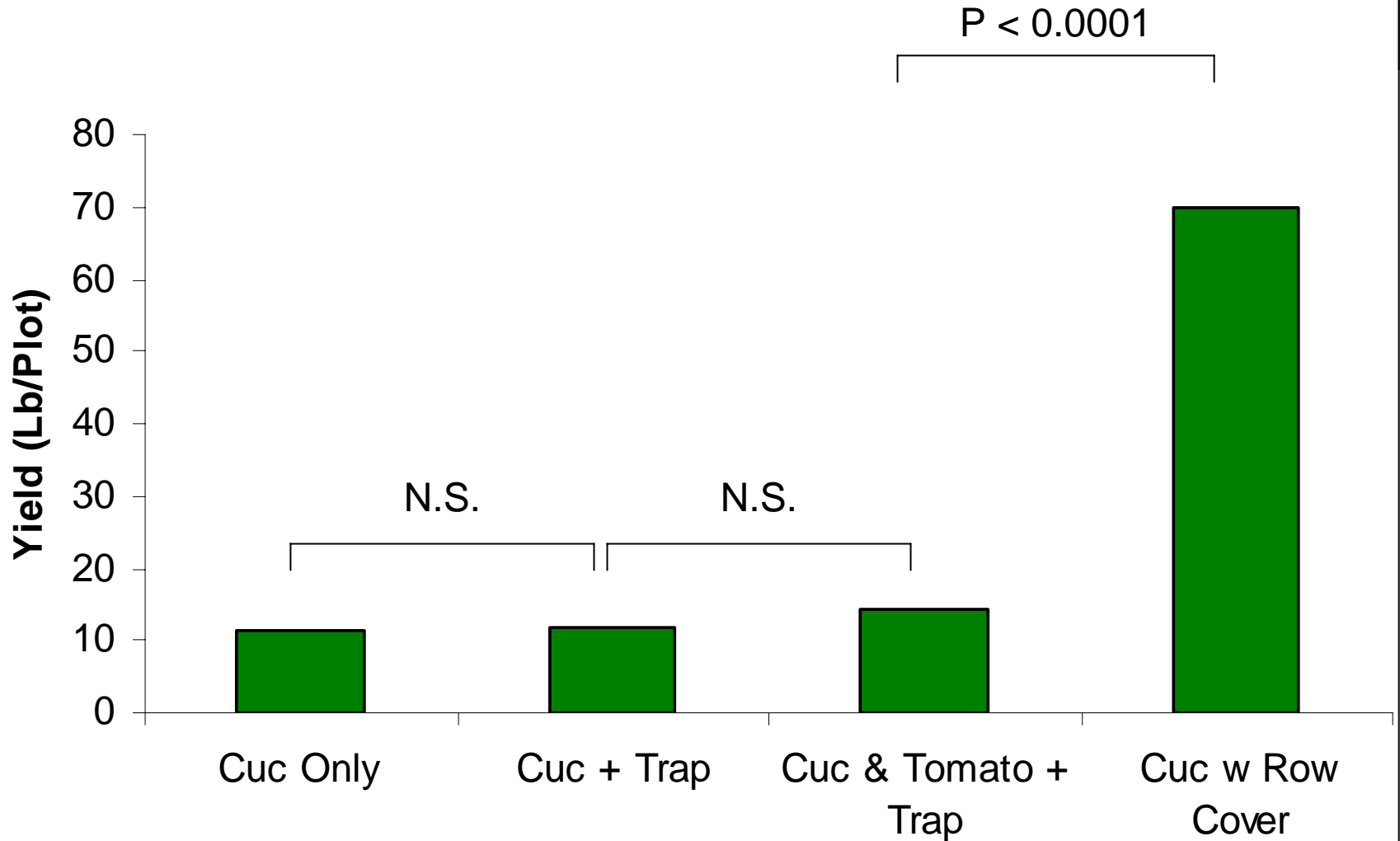


Cucumber growth reduced

Hubbard squash trap crop
beetles and plant size
variable



Marketable Cucumber Yield



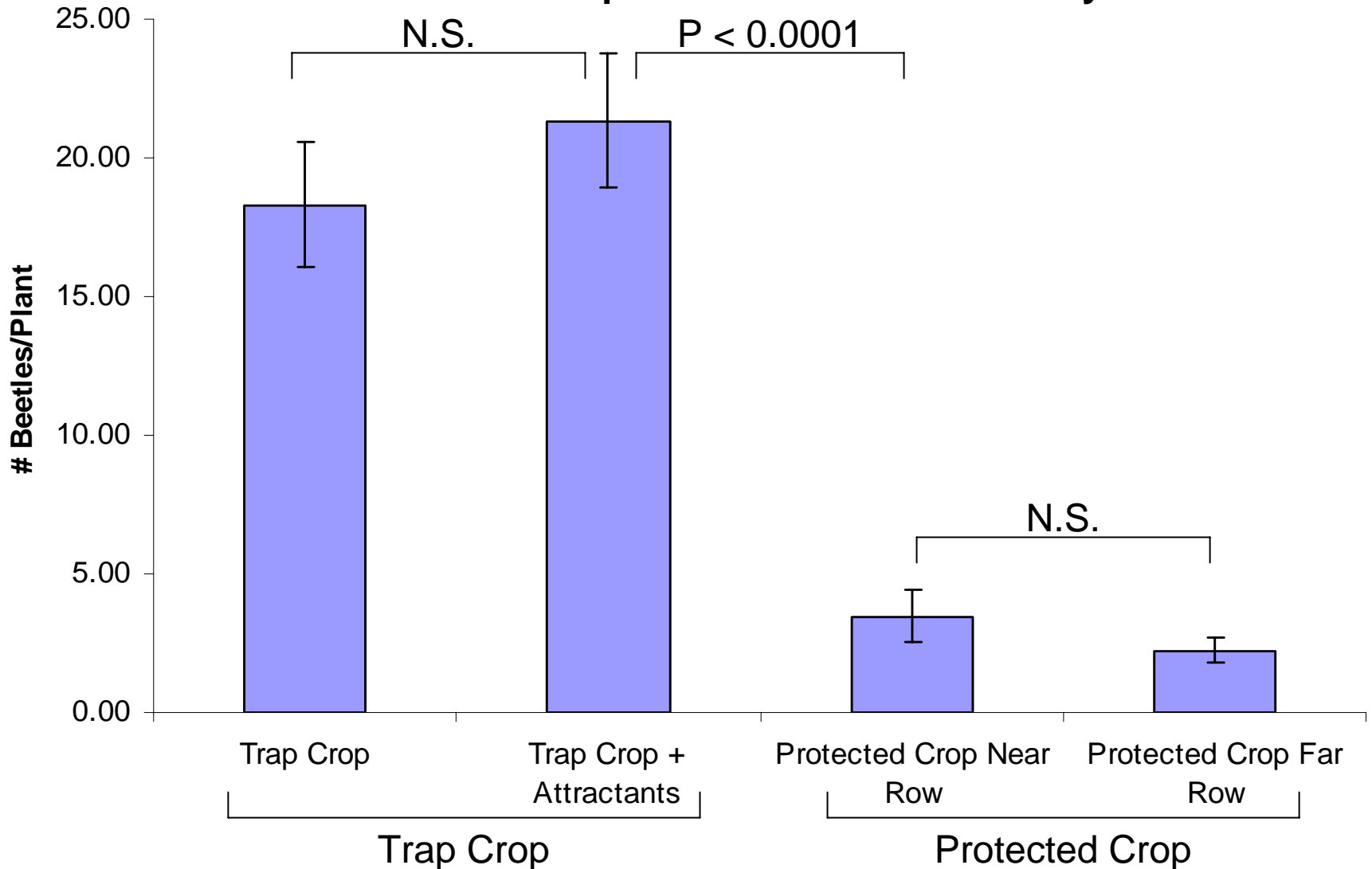
Results: Protection of the trap crop not able to reduce fruit scarring
•Fruit scarring resulted in sharp decline of marketable yield in all cucumber plots (except the positive control of cucumber under row covers).

Attractant hypothesis (2nd Field Site)



- ▣ Less than 1 mile from our first field site

Occurrence of Striped Cucumber Beetles July 14



Results: Protection of the trap crop maintained when older/larger.

- Addition of cucurbitacins does not significantly enhance trap crop
- Cucurbitacins alone (sprayed on grass) did not attract beetles (data not shown).

Summary of Findings

- ▣ **Trap Crop:** shows promise for early season protection
 - benefit can break down later as beetles spread from the trap crop
 - Fruit scarring was bad (except inside row covers), coinciding with break down of trap crop protection
- ▣ **Polyculture:** Adding tomato provided no additional benefit to trap crop protection
- ▣ **Attractants:** Cucurbitacins cannot replace and do little to improve trap crop.

Future Plans

- **Trap Crop:**
 - Increase size of squash trap crop plants by planting earlier or larger transplants
 - Add protection of an organic pesticide, triggered when/if beetles move onto cucumber from the squash trap crop
- **Polyculture:**
 - No change, include next year
- **Attractants:**
 - Eliminate this treatment
- **Additional Considerations:**
 - Consider row cover economics & application for organic growers

Acknowledgements

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