

Moth's Mating Disruption Overview



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Mating Disruption Dispenser



Label Recommendations:

- Critical area: 1 per 30 cubic meters
- Effective for 90 days
- Avoid getting on clothing or skin

REGISTRATION

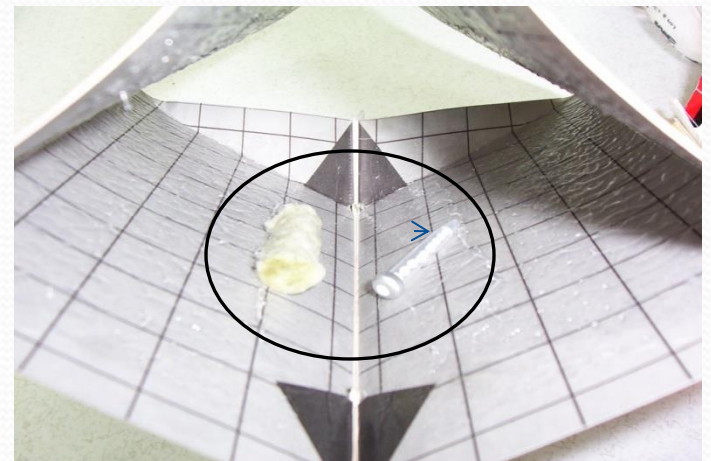


- Z,E- 9,12- tetradecadienol acetate, the pheromone for *Plodia* and *Ephestia* moths, registered by US EPA as a bio-insecticide
- US EPA # 52991-18

3.5 grams ai / 30m²/ year

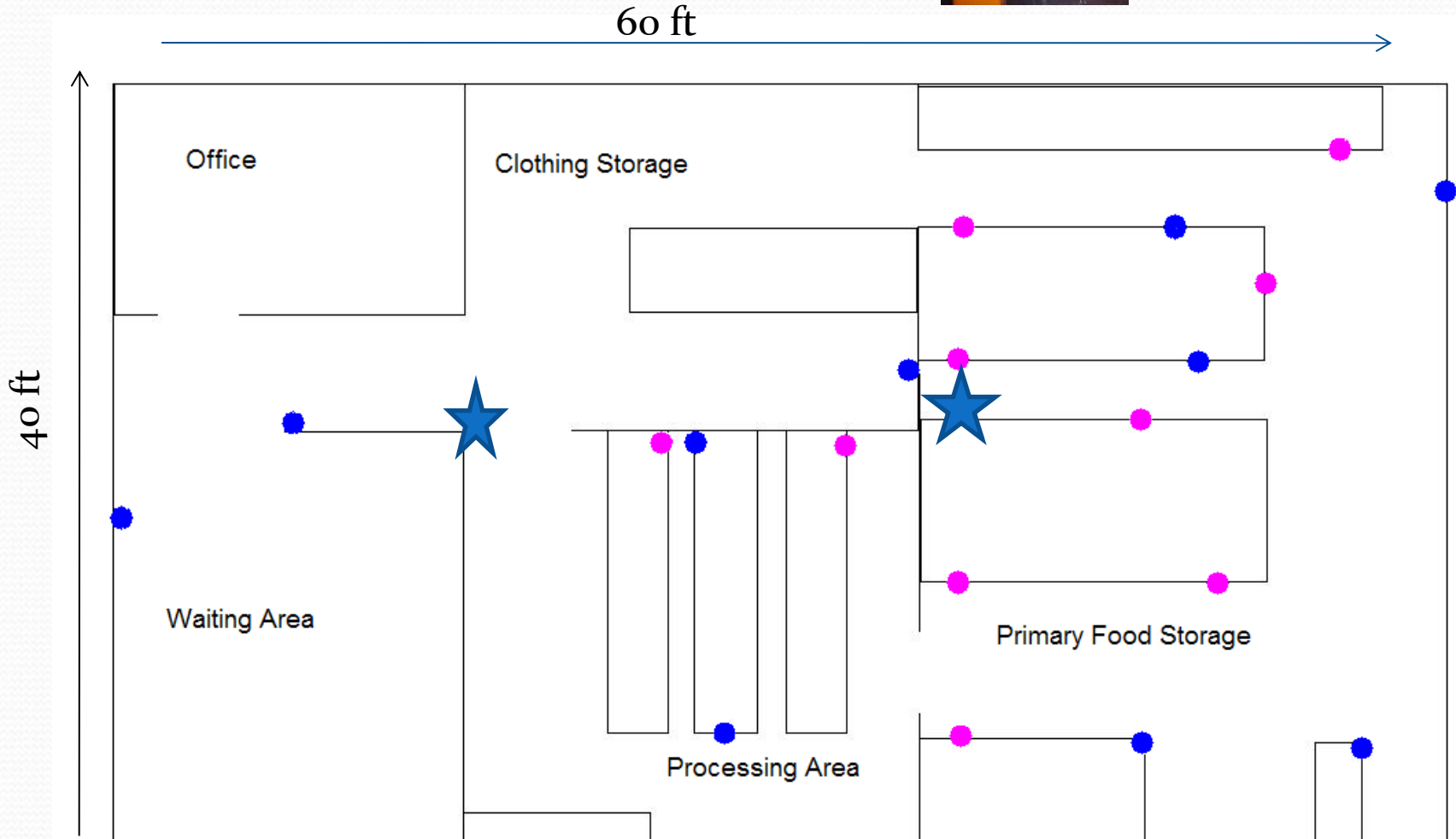
Method: Field Testing

- 20 traps containing:
- 10 male moth pheromone lures (TDA)
- 10 lures for female moths



Food Pantry

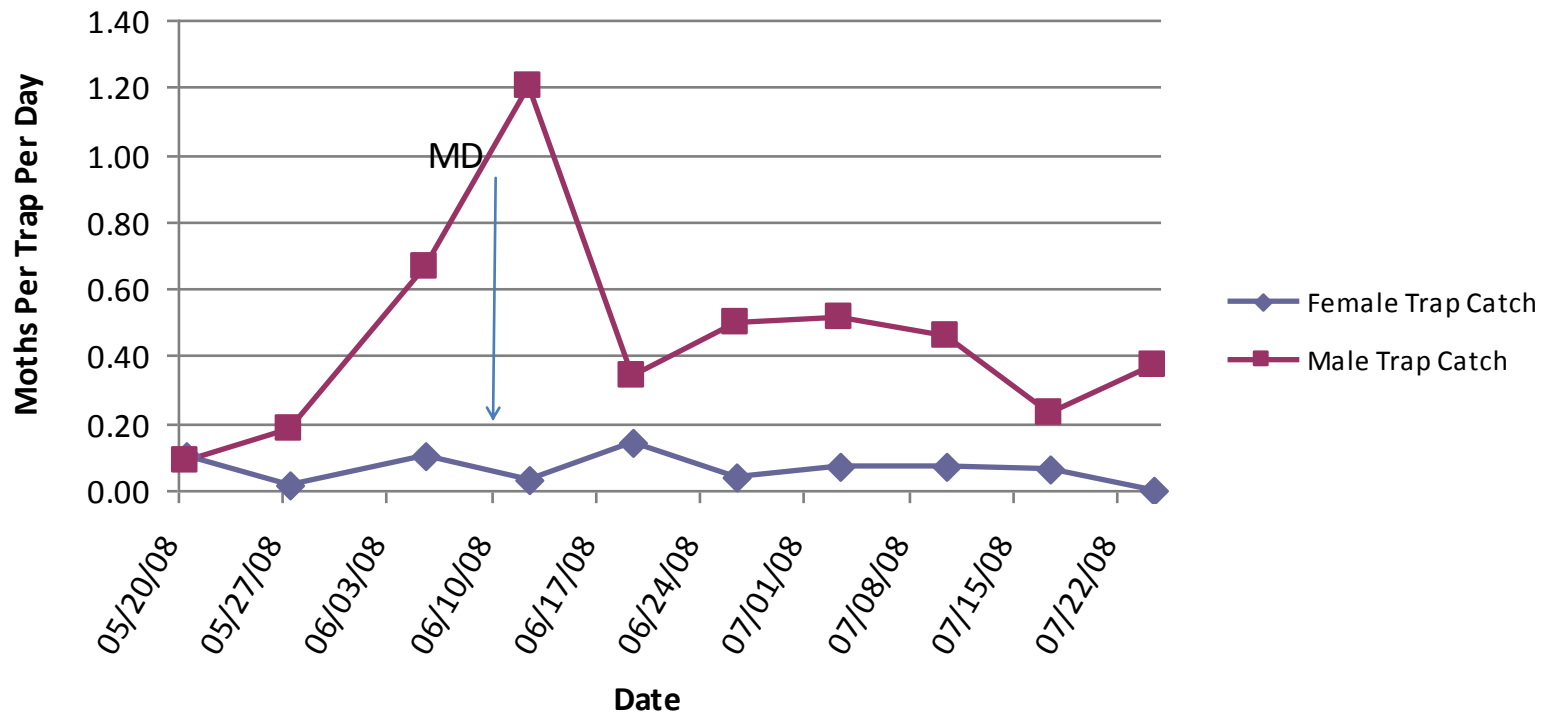
(80 cu.m.; 2 pouches)



RESULTS



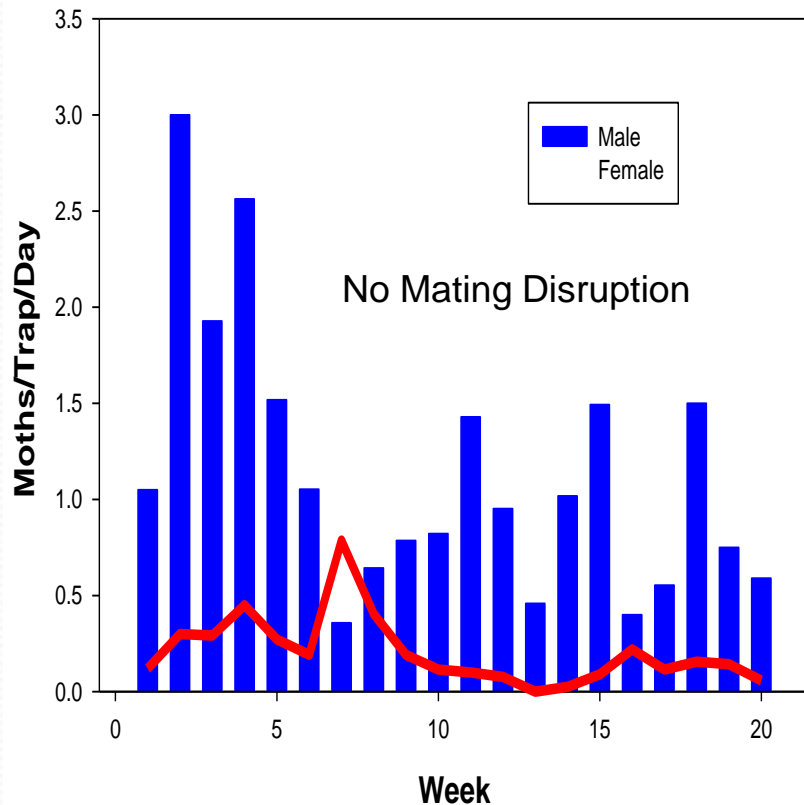
Mating Disruption Of Food Pantry



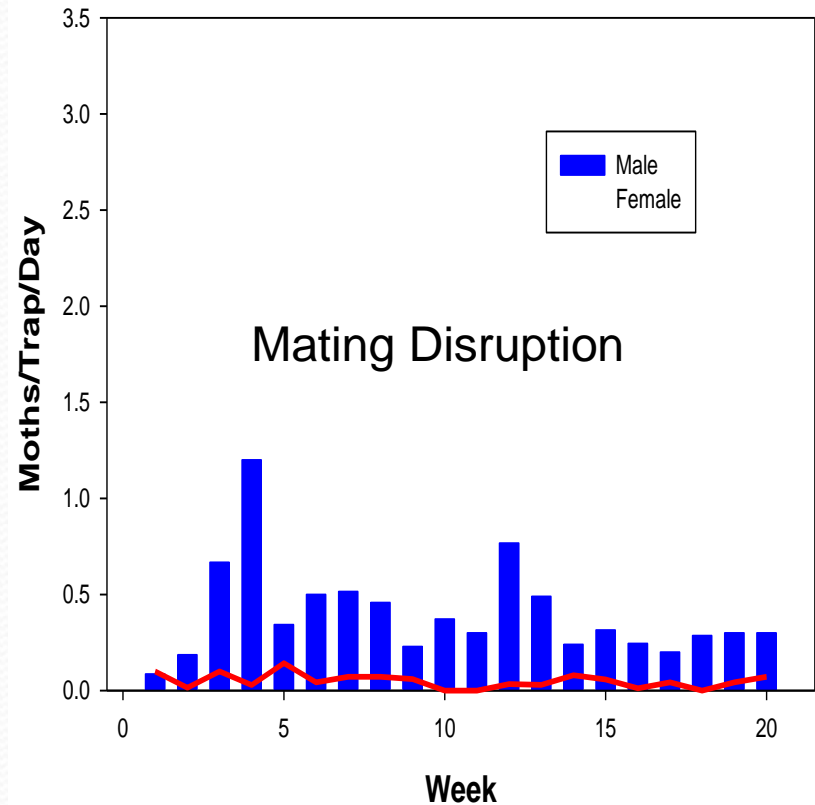
Comparison of Male and Female Plodia



Food Pantry Moth Distribution
No Mating Disruption
2007



Food Pantry Moth Distribution
Mating Disruption Present
2008



Sexing Plodia and Ephestia Moths



Male



Female

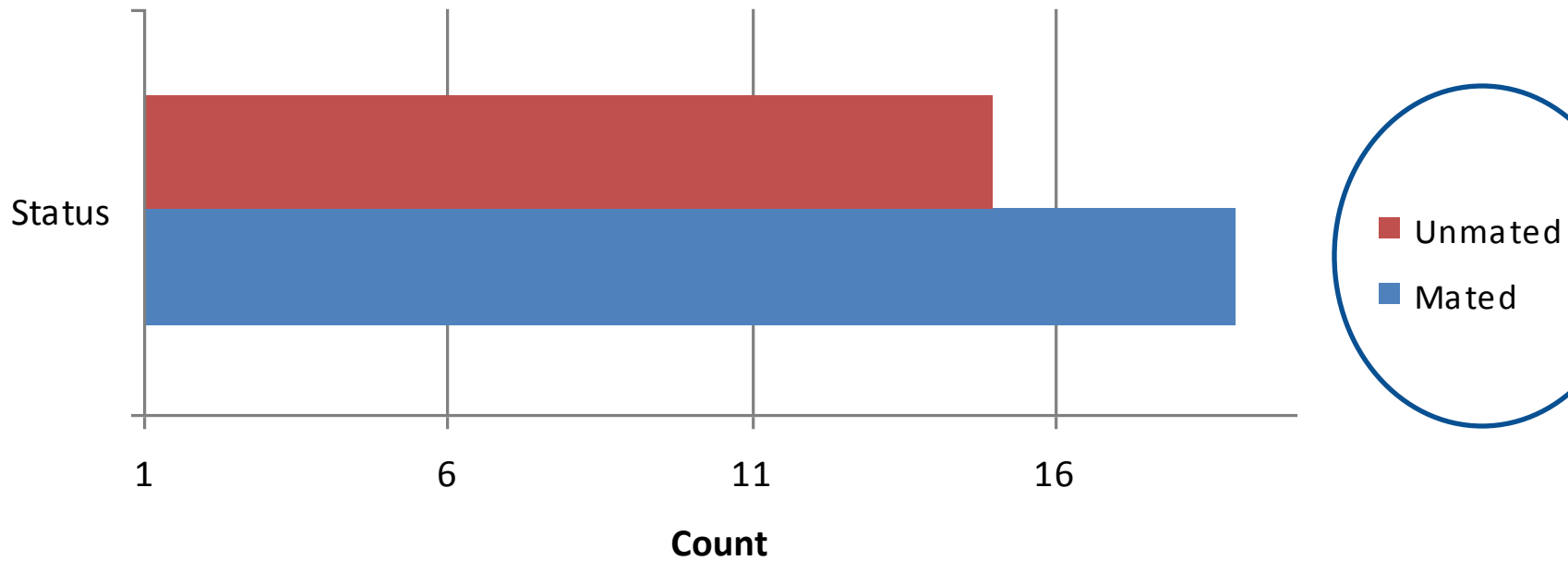


Bursa sac with spermatocyte

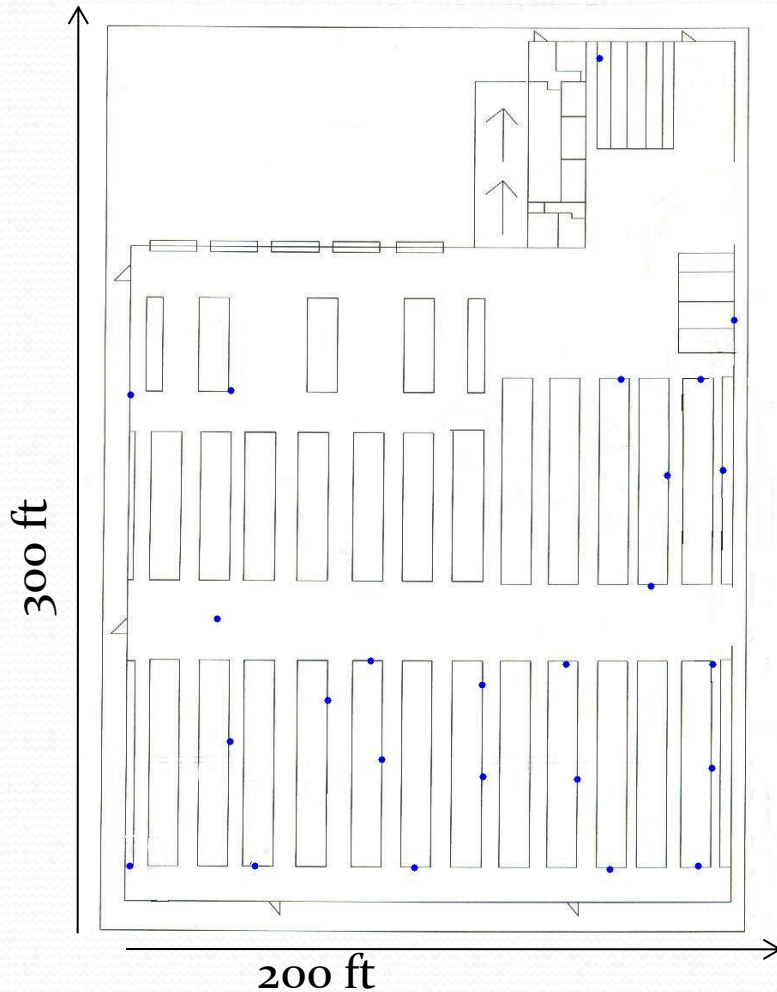
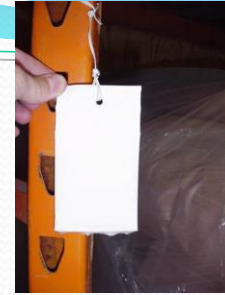
Plodia Mating Disruption



Comparison Of Mating Status



Food Warehouse

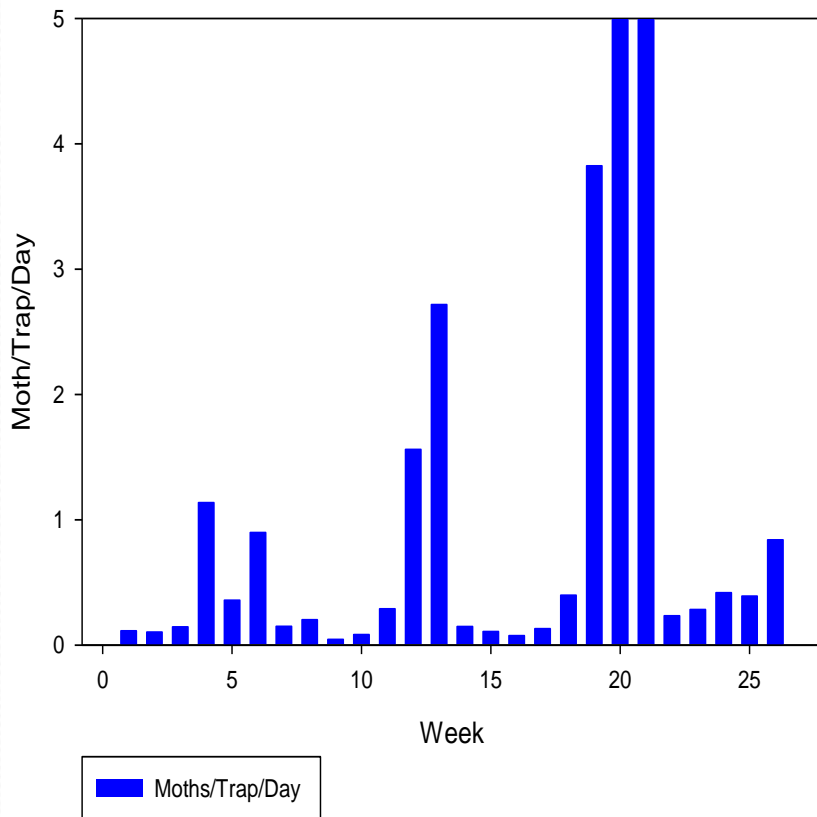


- 40 dual baited traps to evaluate MD effect
- 125 MD pouches
- MD pouches replaced every 90 days
- 2,000 m³ food processing plant and warehouse



Warehouse Prior to MD

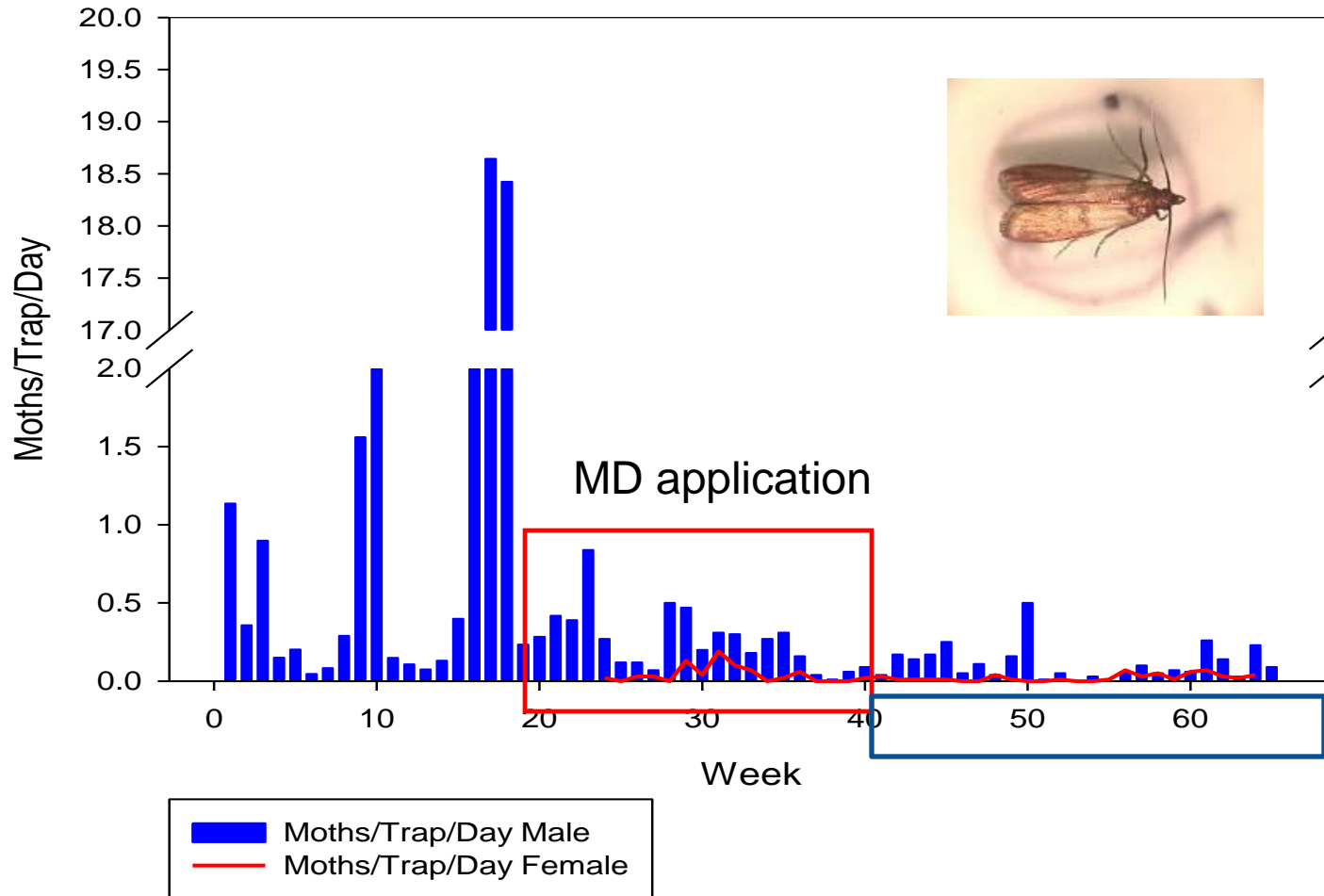
Moths per Trap per Day over Time (2007)



- **Before Mating Disruption:** Recorded over 1000 Plodia moths per wk.
- 5 shutdowns and foggings needed to bring moth population under control
- Fogging cost: US\$35,000



Moths per Trap per Day Over Time Nut Processing 2007-2009



Homeowner Application

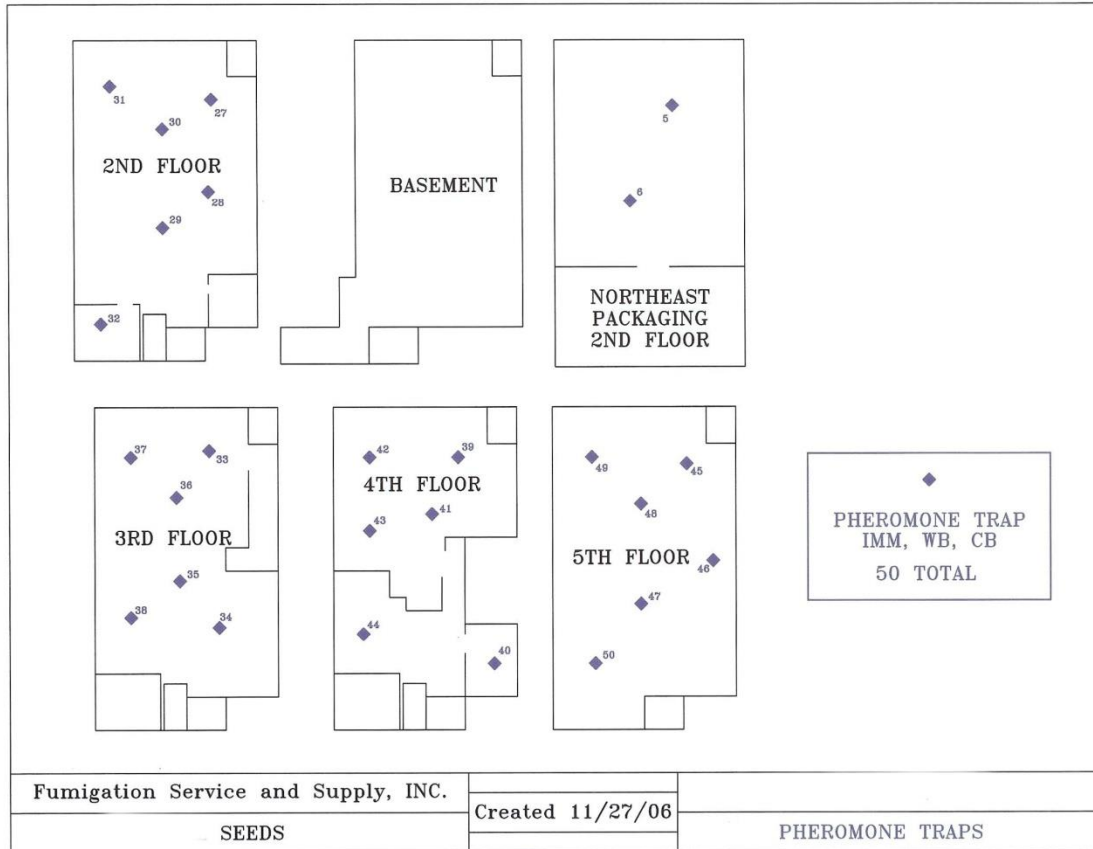
- 1.) Clean pantry, discard infested materials
- 2.) Freeze all cereal and nut based materials
- 3.) Place 1 MD pouch per level of residence
- 4.) Place 1 pheromone trap per level
- Wear gloves when handling pouches and lures



“We’re seeing fewer moths than we’ve seen in the past.”

Plodia captured per trap, per week

Organic Warehouse



| | 2007 | 2008 | 2009 |
|----------|------|------|------|
| JUN WK 2 | 443 | 28 | 5 |
| JUN WK 3 | 446 | 7 | 11 |
| JUN WK 4 | 446 | 2 | 2 |
| JUL WK 2 | 34 | 9 | 5 |
| JUL WK 4 | 82 | 6 | 2 |
| AUG WK 1 | 52 | 18 | 18 |
| AUG WK 2 | 42 | 14 | 16 |
| AUG WK 4 | 36 | 13 | 52 |
| SEP WK 1 | 56 | 17 | 31 |
| SEP WK 2 | 67 | 7 | 28 |
| SEP WK 3 | 53 | 1 | 71 |
| SEP WK 4 | 38 | 0 | 28 |
| OCT WK 1 | 34 | 0 | 2 |
| OCT WK 2 | 24 | 0 | 15 |
| OCT WK 3 | 21 | 0 | 20 |
| OCT WK 4 | 25 | 0 | 20 |
| NOV WK 1 | 15 | 0 | 3 |
| NOV WK 2 | 0 | 0 | 2 |
| NOV WK 3 | 9 | 0 | 0 |
| NOV WK 4 | 8 | 0 | 0 |
| DEC WK 1 | 5 | 0 | 0 |
| DEC WK 2 | 0 | 0 | 0 |

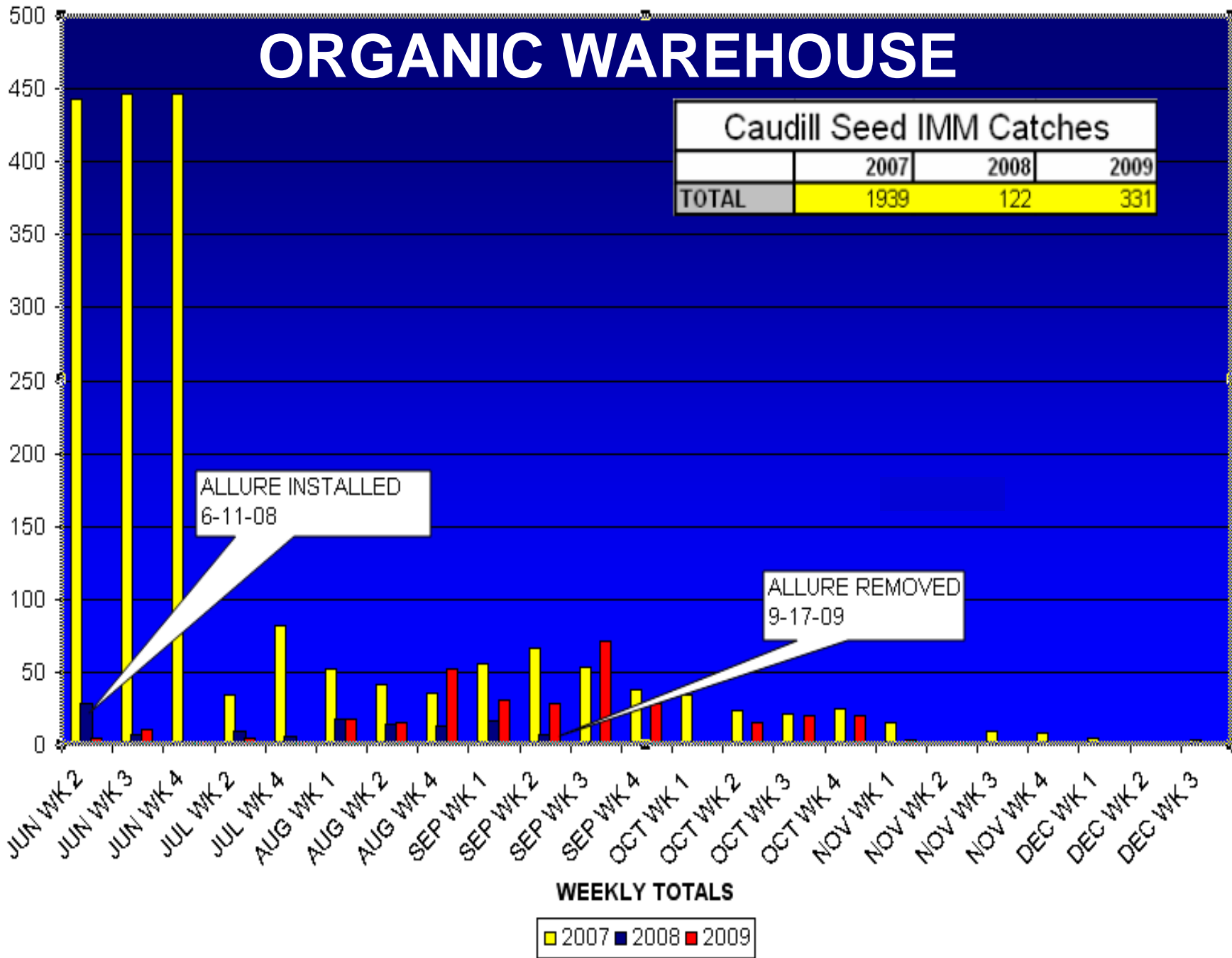
TOTAL 1939 122 331

ORGANIC WAREHOUSE

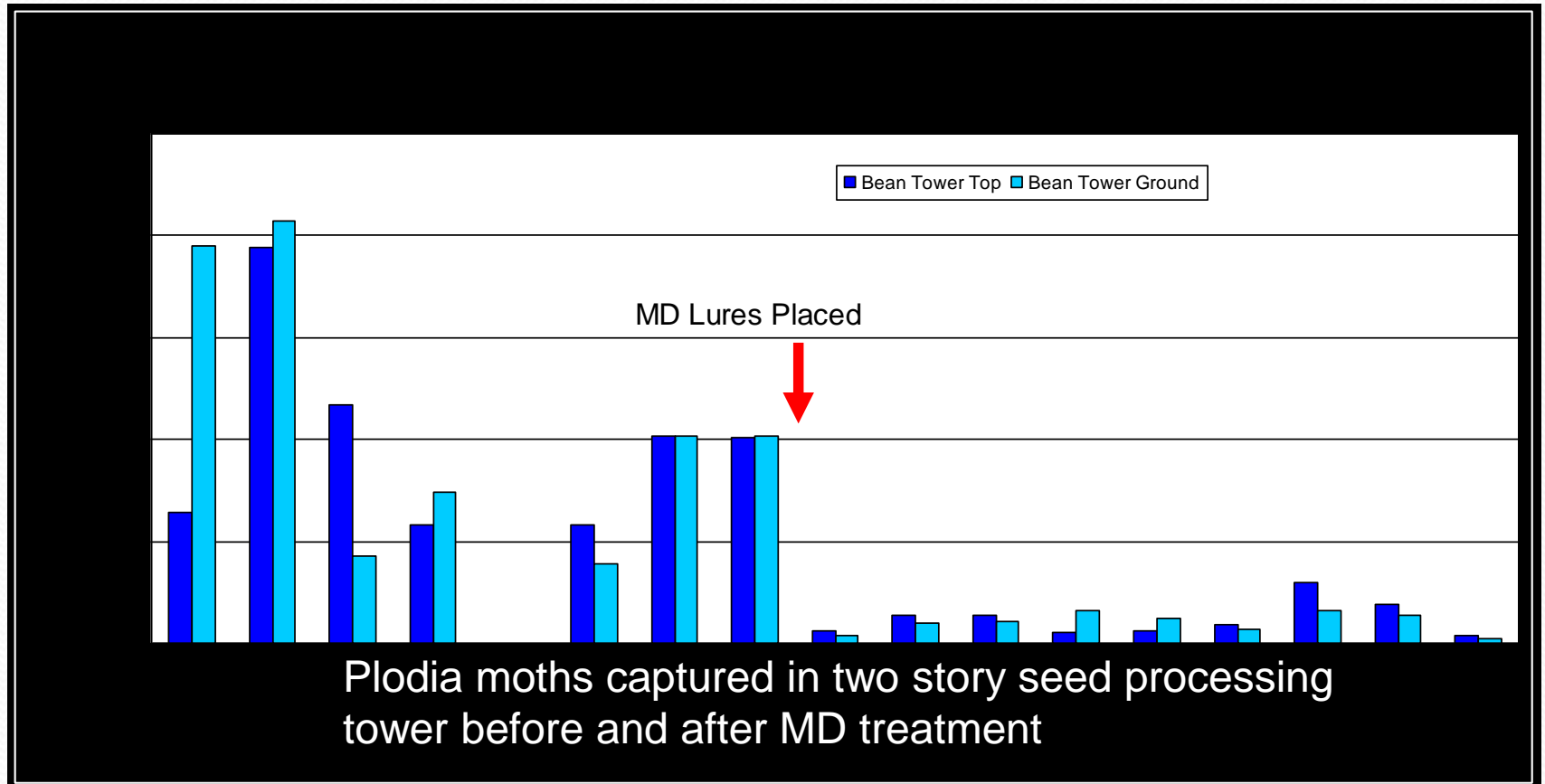
Caudill Seed IMM Catches

| | 2007 | 2008 | 2009 |
|-------|------|------|------|
| TOTAL | 1939 | 122 | 331 |

IMM COUNTS



Seed Warehouse



Delayed Mating

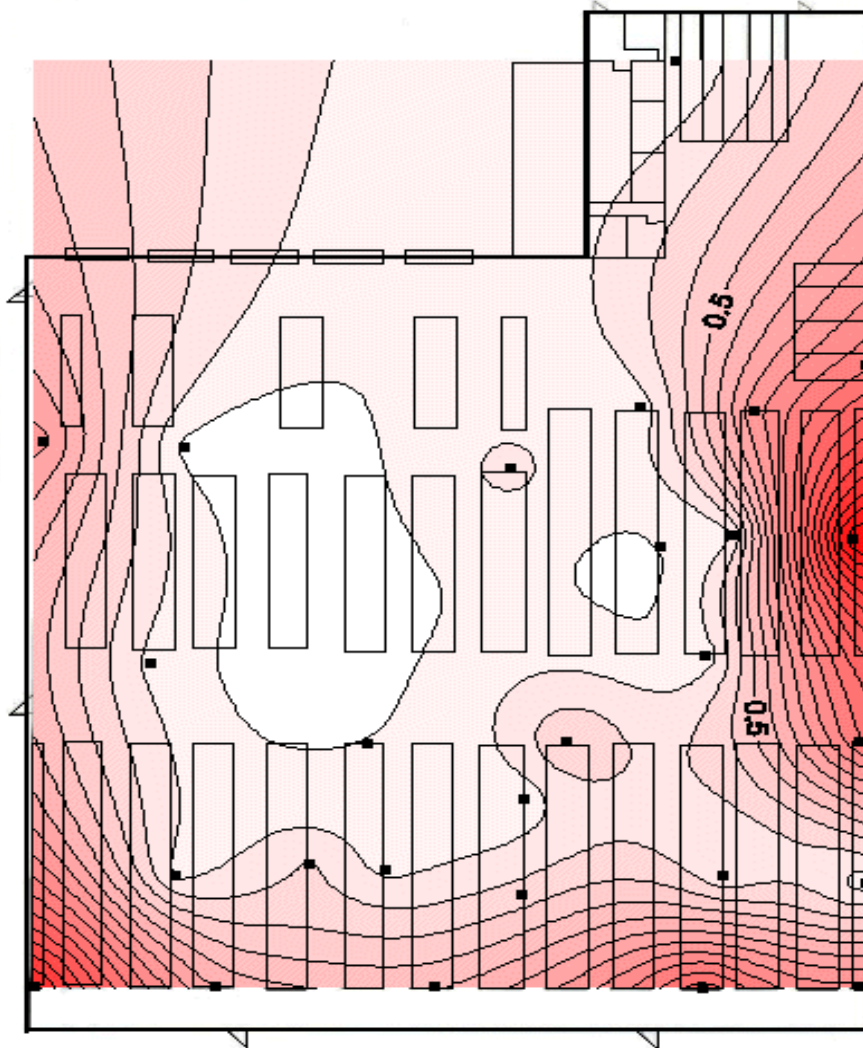


Laboratory and field studies suggest

- Male Indianmeal moths sat on the wall and showed little to no activity
- A delay in mating reduces the numbers of fertile eggs produced by females.
- Egg viability is reduced 22% per day when mating is delayed in IMM
- After 5 days no eggs are laid and male moths are unsuccessful in mating.¹

¹ Huang and Subramanyam, 2003, J of Stored Prod. Research 39:53-63

Pin Pinpointing New Infestations



Potential for Other Insect Pests

- Tineola and Tinea



Large populations of clothes moths in Scandinavia

- Lasioderma serricorne



Being tested in tobacco warehouses in USA

Summary

- Possible control measure for organic stored products
- Mating disruption reduces trap catch within days
- Mating disruption reduces the number of eggings
- Observed a residual effect in treated and untreated areas



Summary

- Did we achieve delayed mating?
- Did we reduce customer complaints?
- 90% reduction of male population needed to effect control
- Females need to be captured and examined for egg fertility
- New infestations can continue to cause customer complaints



Acknowledgements:

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