# Use of semiochemical mass traps to reduce mirid damage in strawberry crops

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- Background
  - The pest
  - Sex pheromone
  - Plant volatiles
- CORE Organic II EU
  - Objectives
  - Trap Type
  - Mass trapping
  - Conclusion
  - Future research

- ***Lygus rugulipennis***
  **European tarnished plant bug**
- Large yield losses (10->80%) in conventional and organic strawberry
- Interrupts IPM

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# ATTRACTION OF MALE EUROPEAN TARNISHED PLANT BUG, *Lygus rugulipennis* TO COMPONENTS OF THE FEMALE SEX PHEROMONE IN THE FIELD

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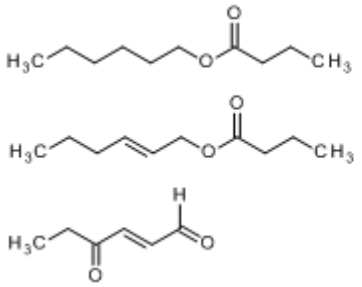
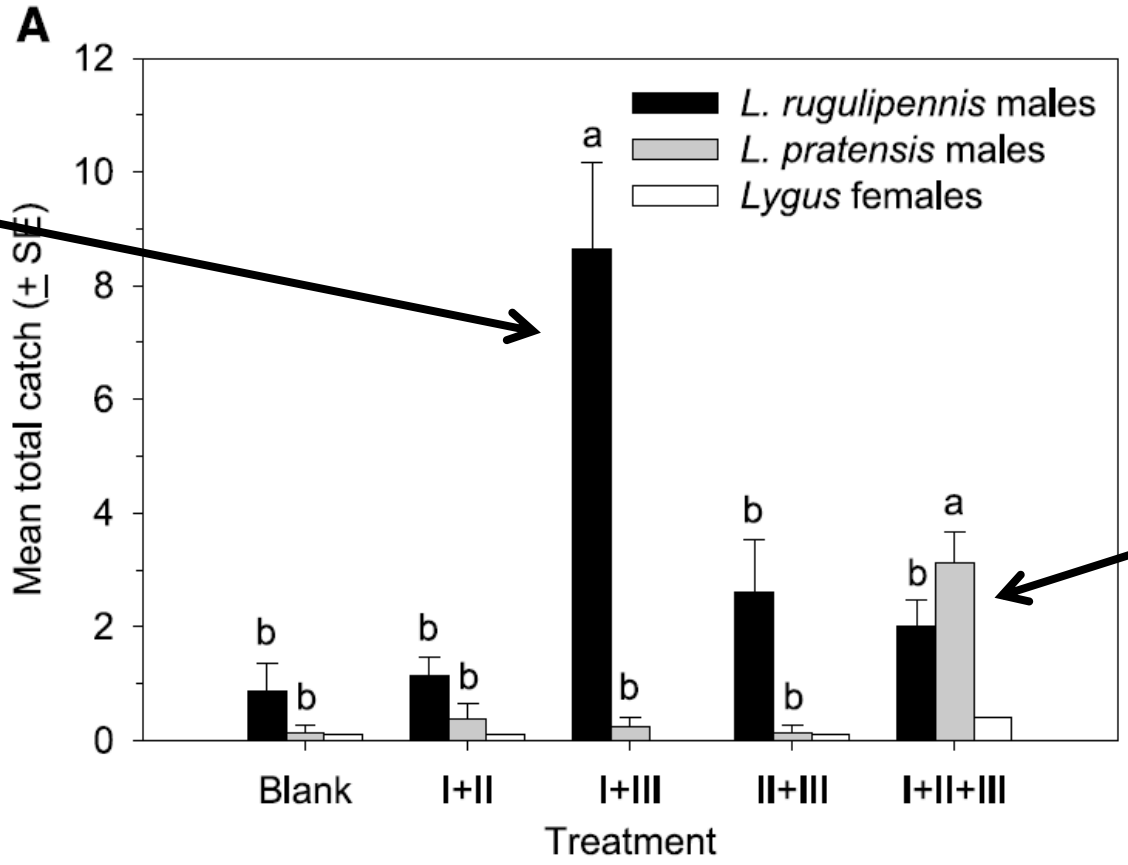


hexyl butyrate (HB)

(*E*)-2-hexenyl butyrate (E2HB)

(*E*)-4-oxo-2-hexenal (KA)




# Further Studies on Sex Pheromones of Female *Lygus* and Related Bugs: Development of Effective Lures and Investigation of Species-Specificity

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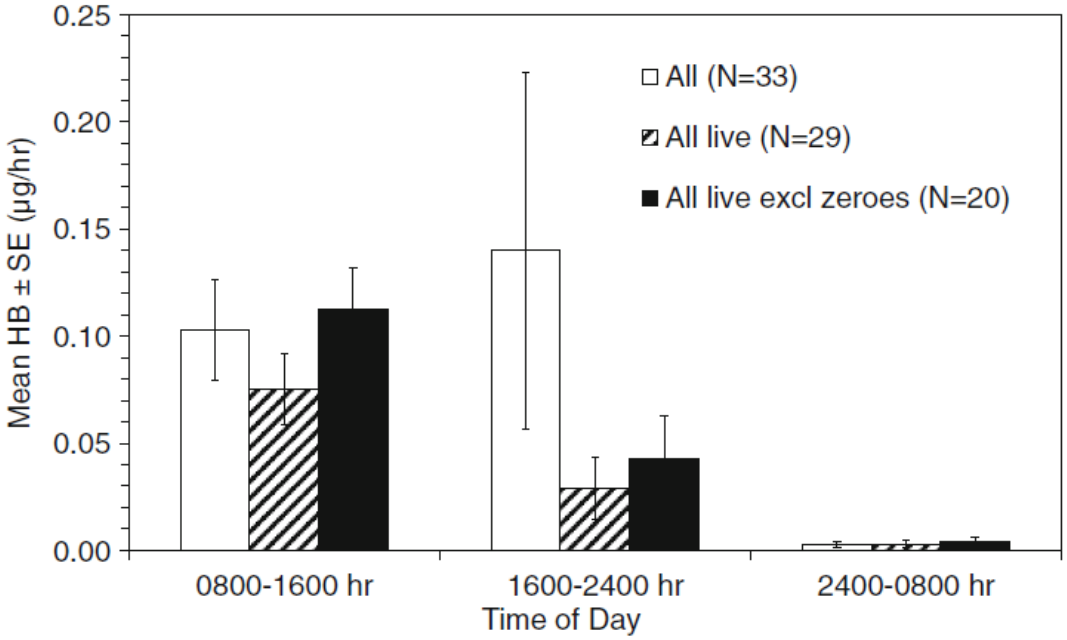


| | Ratio ± SE (HB=100) | |
|---|---|---|
| | E2HB/HB | KA/HB |
| *Lygus rugulipennis* (*N*=10) | 3.1±0.8 | 15.8±6.1 |
| *Lygocoris pabulinus* (*N*=30) | 3.8±0.2 | 8.2±0.3 |
| *Liocoris tripustulatus* (*N*=13) | 7.2±0.5 | 13.9±1.2 |
| *Lygus pratensis* (*N*=12) | 25.1±1.4 | 23.9±3.0 |

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# Attraction of *Lygus rugulipennis* and *Adelphocoris lineolatus* to synthetic floral odour compounds in field experiments in Hungary

Authors Authors and affiliations

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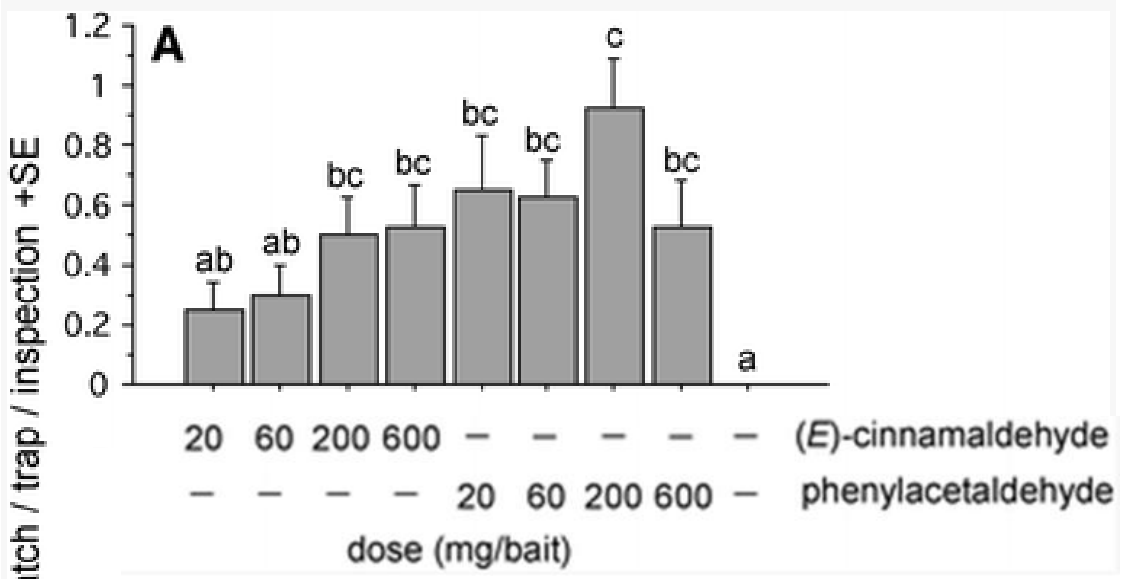



*L. rugulipennis*
(total 172 individ.)

- Advances in identification of mirids semiochemicals
- Opportunity to exploit synthetically produced
  - Sex pheromones long range attraction of males to females
  - Plant volatiles egg laying female mirids

- Sub objective: Investigate the ability of mass trapping to reduce damage in strawberry crops

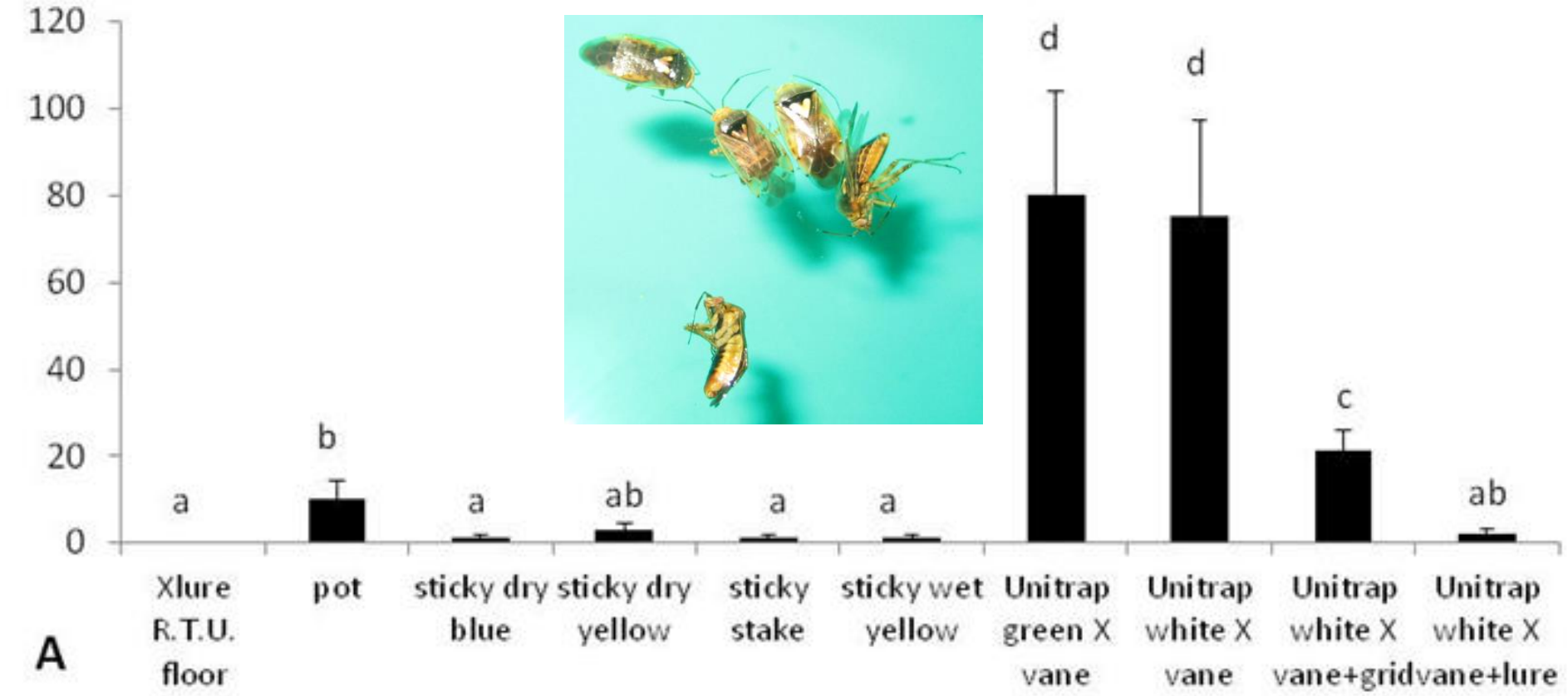
CORE organic II
Softpest Multitrap

# Mass traps

- Competitive with surrounding crop,
- Ensure pest is captured
- Does not kill or disrupt significant numbers of natural enemies and other beneficial insects, e.g. pollinators
- Should not become saturated with bycatch
- Easy to use and maintain
- Cost effective

# Trap Type – total number ETB captured (sex pheromone lure only)







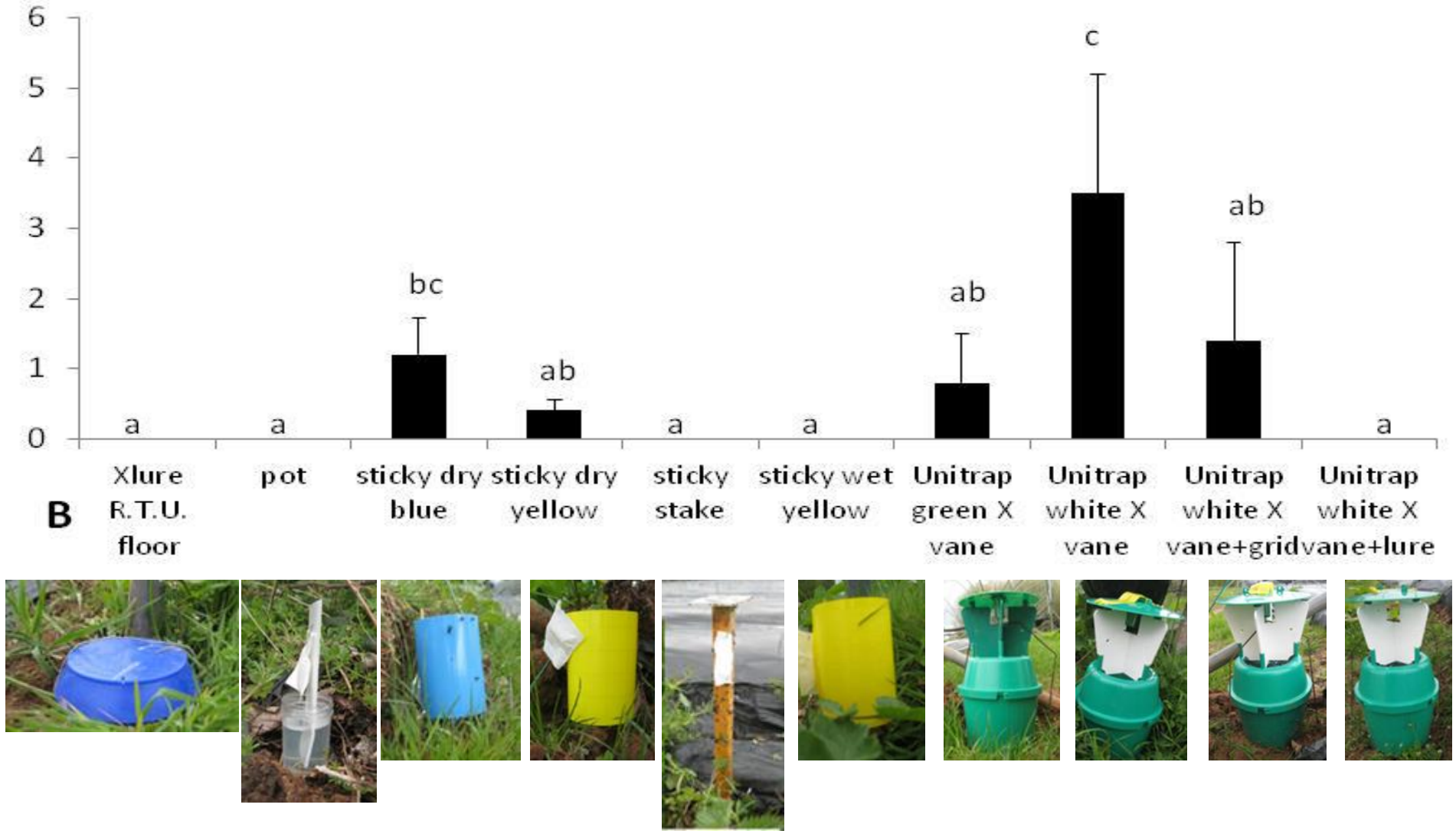




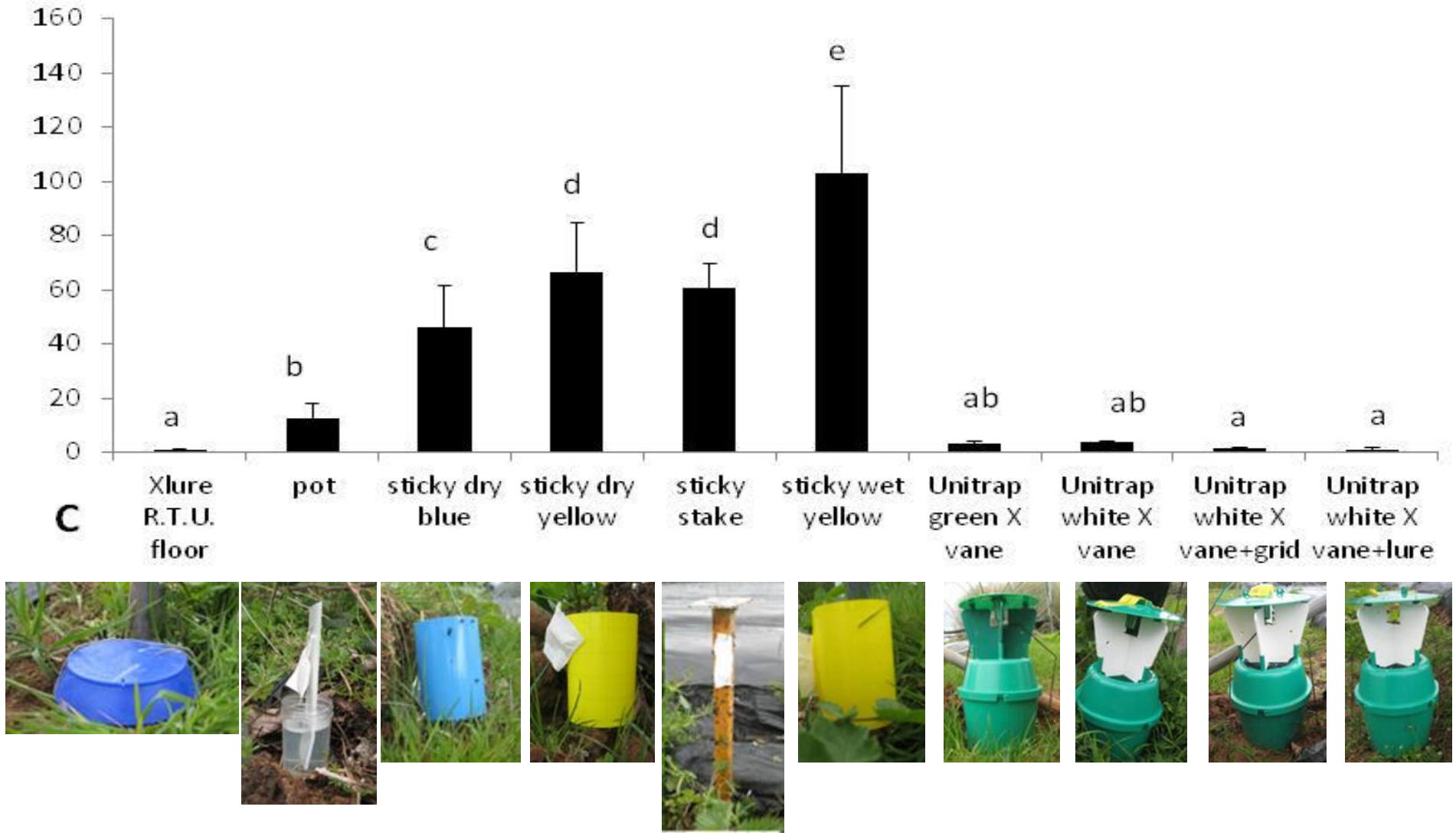




# Trap Type – total number honeybees captured (bycatch)



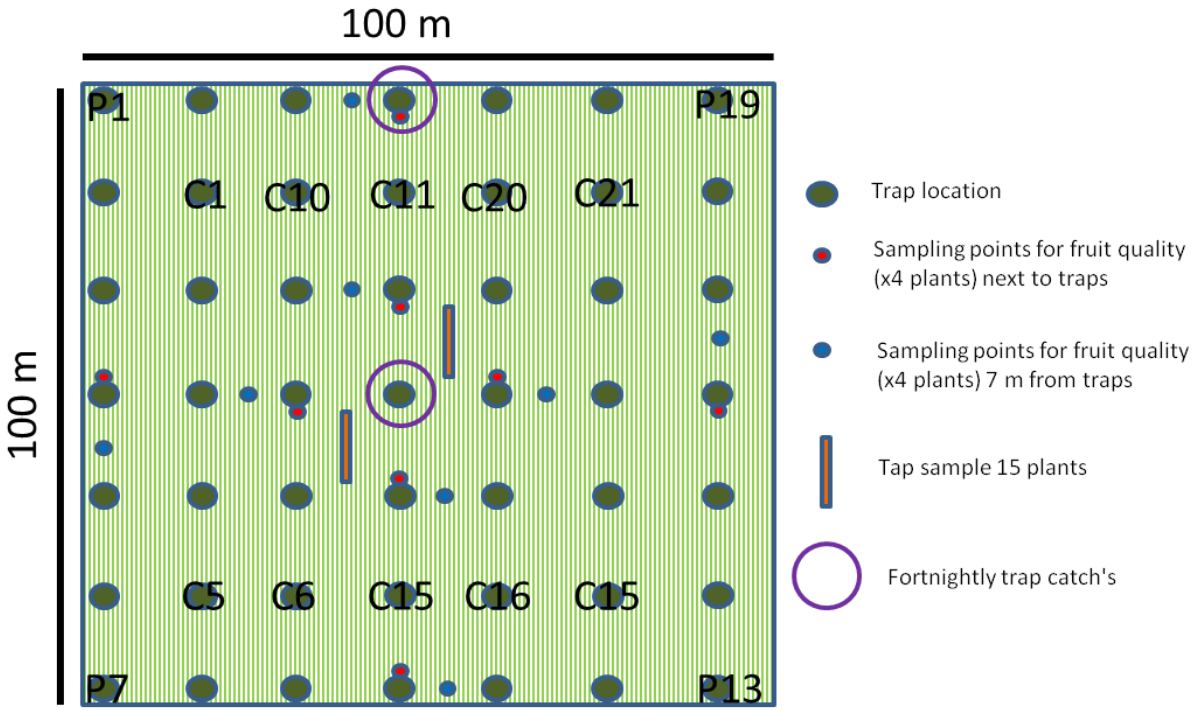
# Trap Type – total number Diptera captured (bycatch)



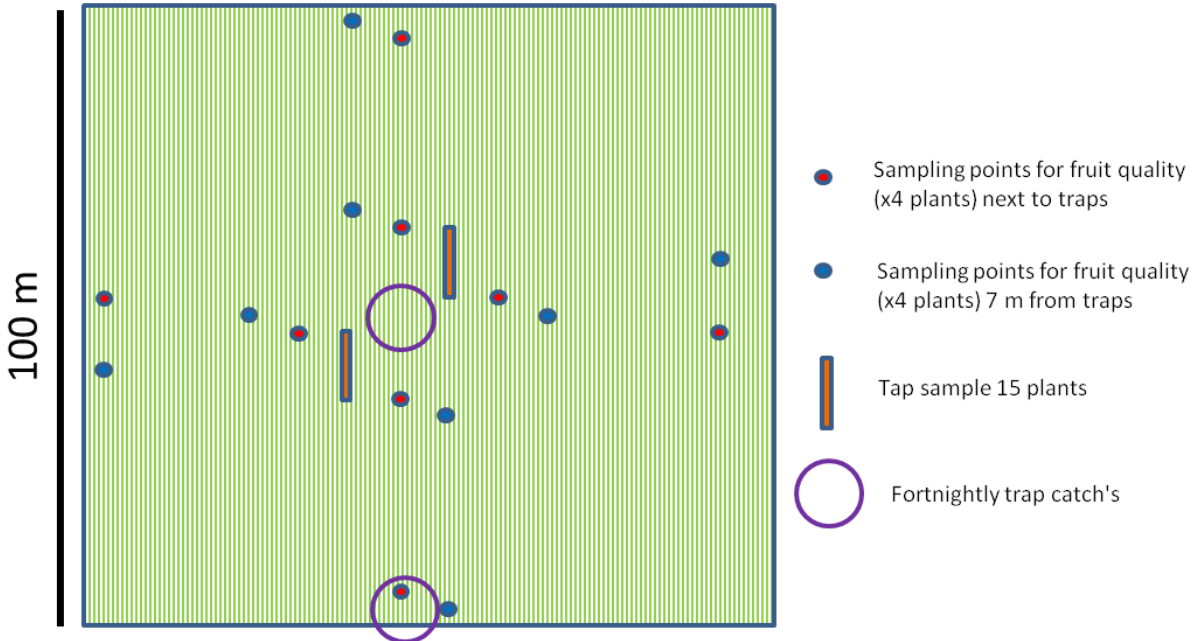
# Methods

- Organic crop – no conventional sprays
- Green cross vane bucket traps without excluder grids
- Trap on ground
- 50/ha
- ETB pheromone (NRI)
- PAA sachet (NRI)


# Assessments




Buffer Zone



# Assessments

**Trap catches:** every 4 weeks - record number ETB

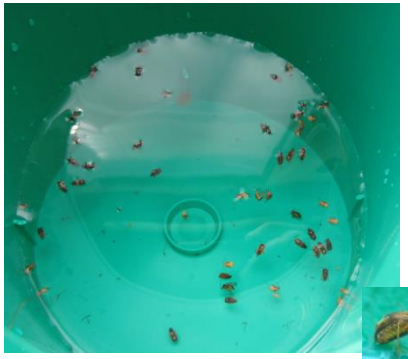
**Damage:** Score of ‘cat-faced’ fruits, two occasions (July and August)

- Green fruit – before harvested
- 20 fruits from 16 sampling points
- Included perimeter and centre

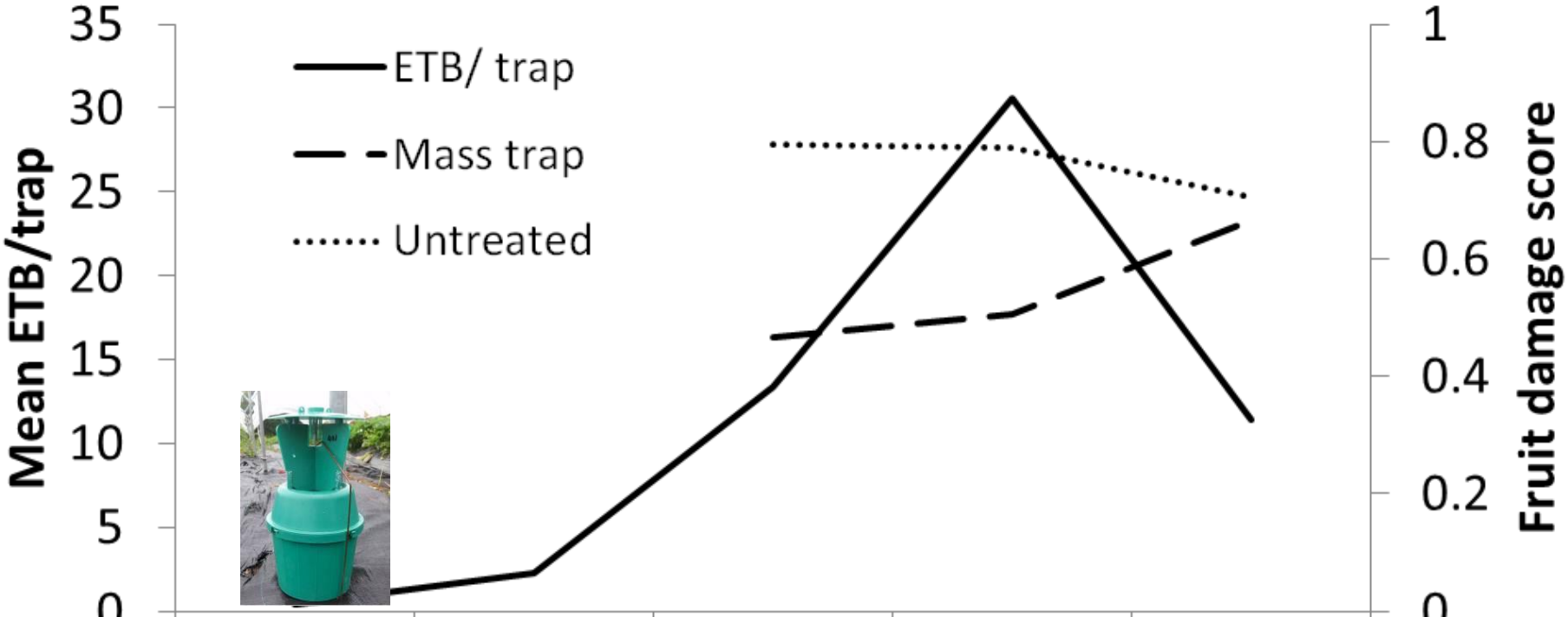
- Damage score:
  - 0 = no damage (left)
  - 1 = slight damage (top)
  - 2 = moderate damage (right)
  - 3 = severe damage (bottom)

  - 15-Jul, 12-Aug, 09-Sep

# Results - trap catch vs. damage score

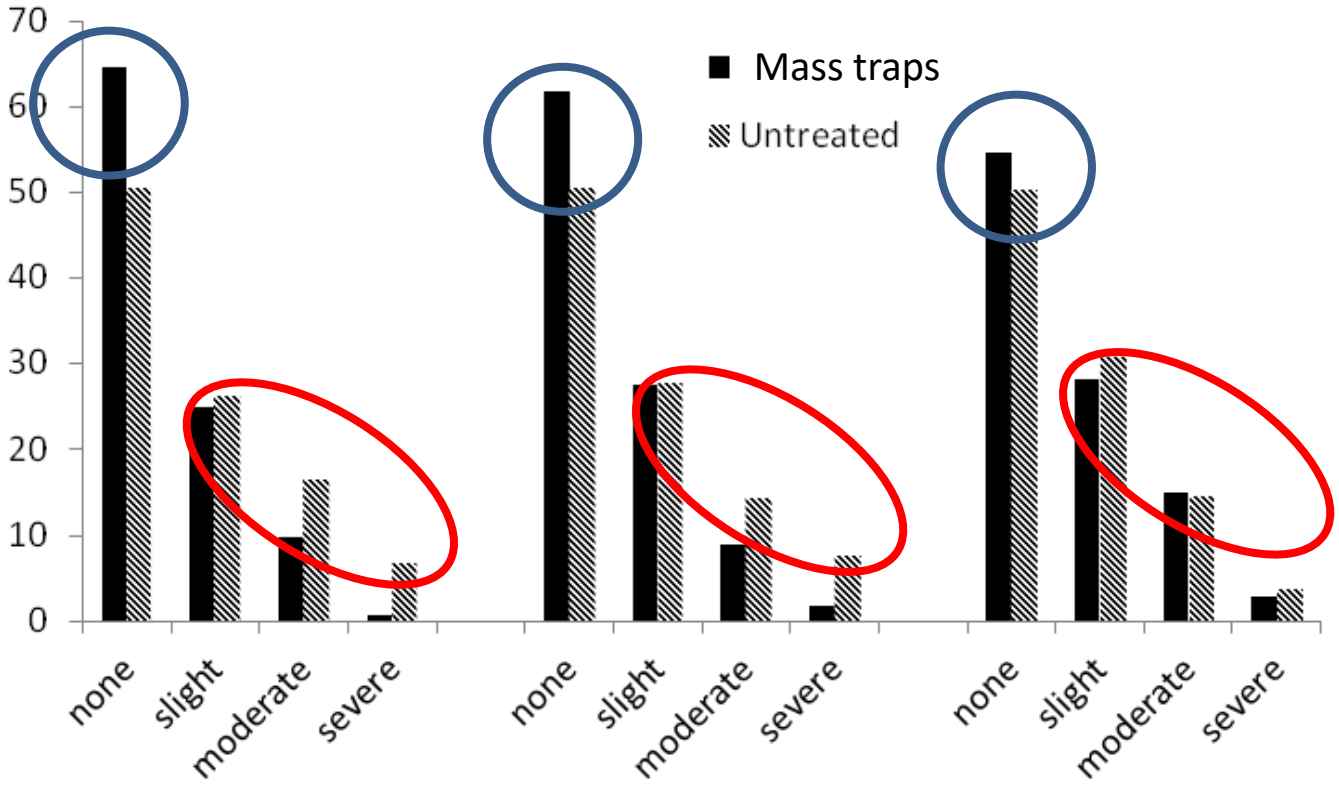




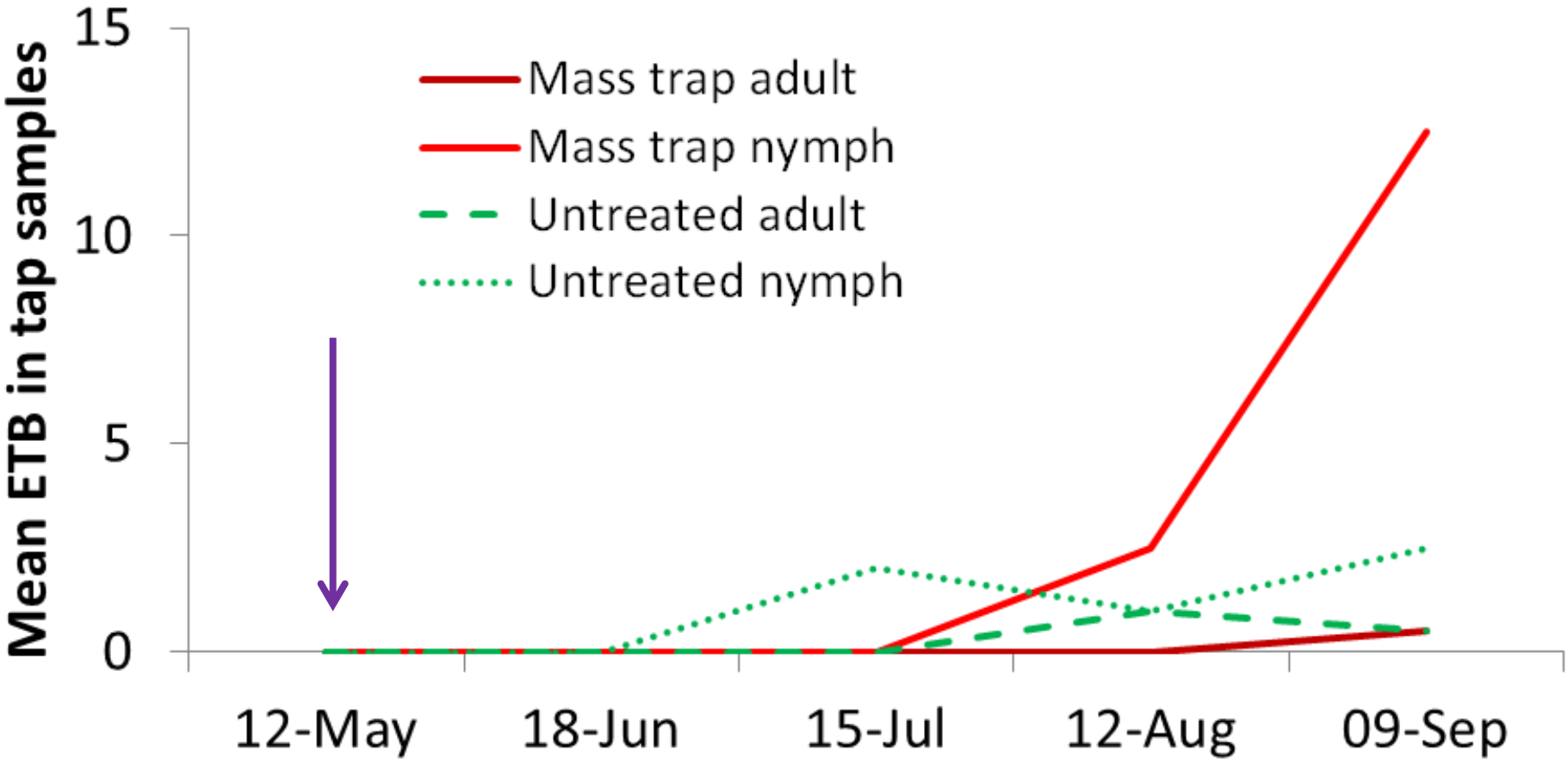


# Results - % strawberry fruits with no or slight-severe damage

| **Assessment date** | 15-Jul | 12-Aug | 09-Sep |
|---|---|---|---|
| Mass traps | 65 | 62 | 55 |
| Untreated | 50 | 50 | 50 |
| % difference in fruit with NO damage | **14** | **11** | **4** |



# Tap samples – 30 plants



# Conclusions

- Mass trapping *Lygus rugulipennis* in strawberry crops
  - Potentially a 4-14% increase in undamaged fruits
  - Reduction in waste fruit
  - Economically not currently viable

  Caveats
  - Organic crops
  - Few other alternatives – no conventional sprays applied
  - Only 2 plots in one area of UK tested
  - ? Pull effect from untreated to mass trap treated area
  - Pre - *Drosophila suzukii*

# Potential future research

- Increase attraction to females
  - 32% of mirids in traps were females
  - Enhance with additional plant volatiles
  - (PAA + (*E*)-cinnamaldehyde)
- Reduce labour and cost
  - Longevity of semiochemical lure ~ 4 weeks
  - Drowning solution – replace with dry insecticide technology
  - Traps made of cheaper materials
- Attract and Kill in a Push Pull Strategy
  - Perimeter of pull (attractant traps)
  - Sprays of repellent compounds
- Different growing systems

# Thanks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