

(The Status of) Organic Management of Rice Arthropods and Diseases in California

Luis Espino, UCCE Butte County

Ian Grettenberger, UC Davis

Contents

- Arthropods

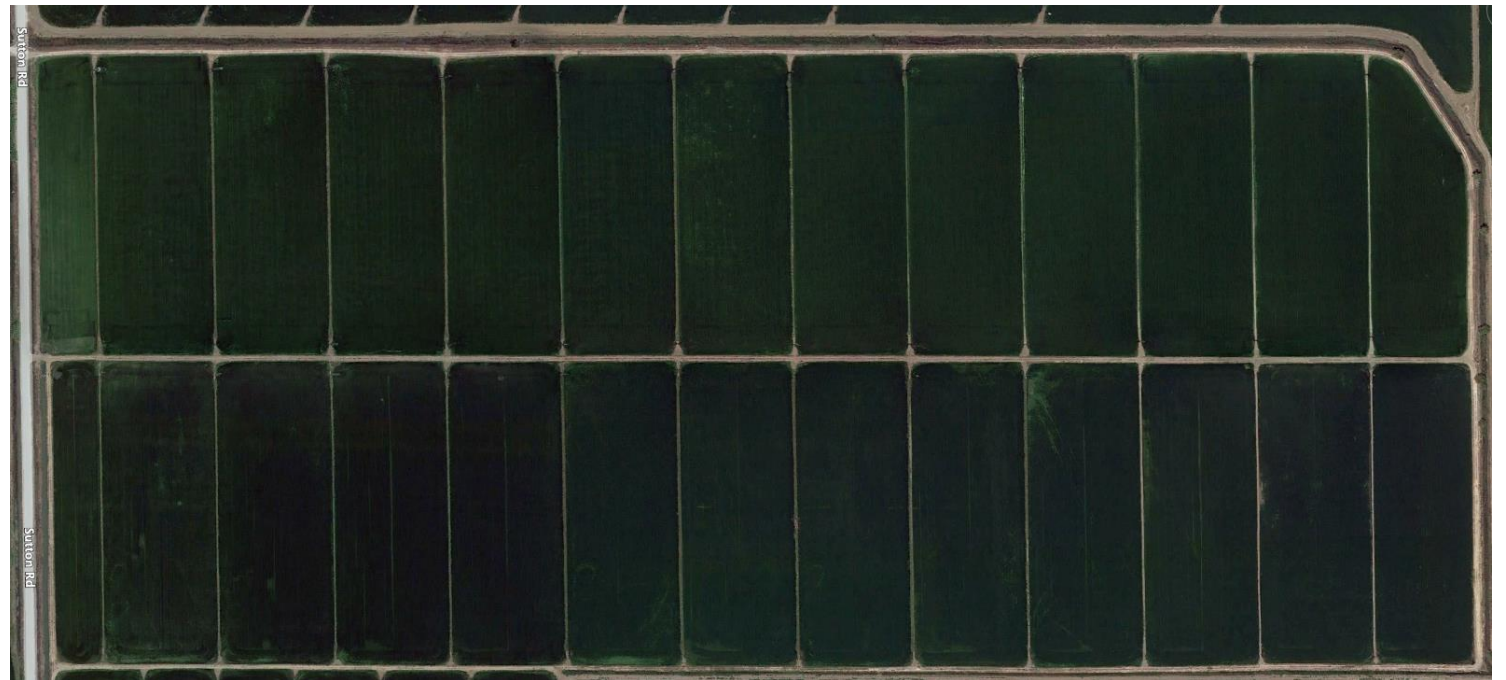
- Tadpole shrimp
- Rice seed midge
- Rice water weevil
- Armyworms

- Diseases

- Bakanae
- Seedling diseases
- Stem rot
- Aggregate sheath spot
- Blast
- Kernel smut

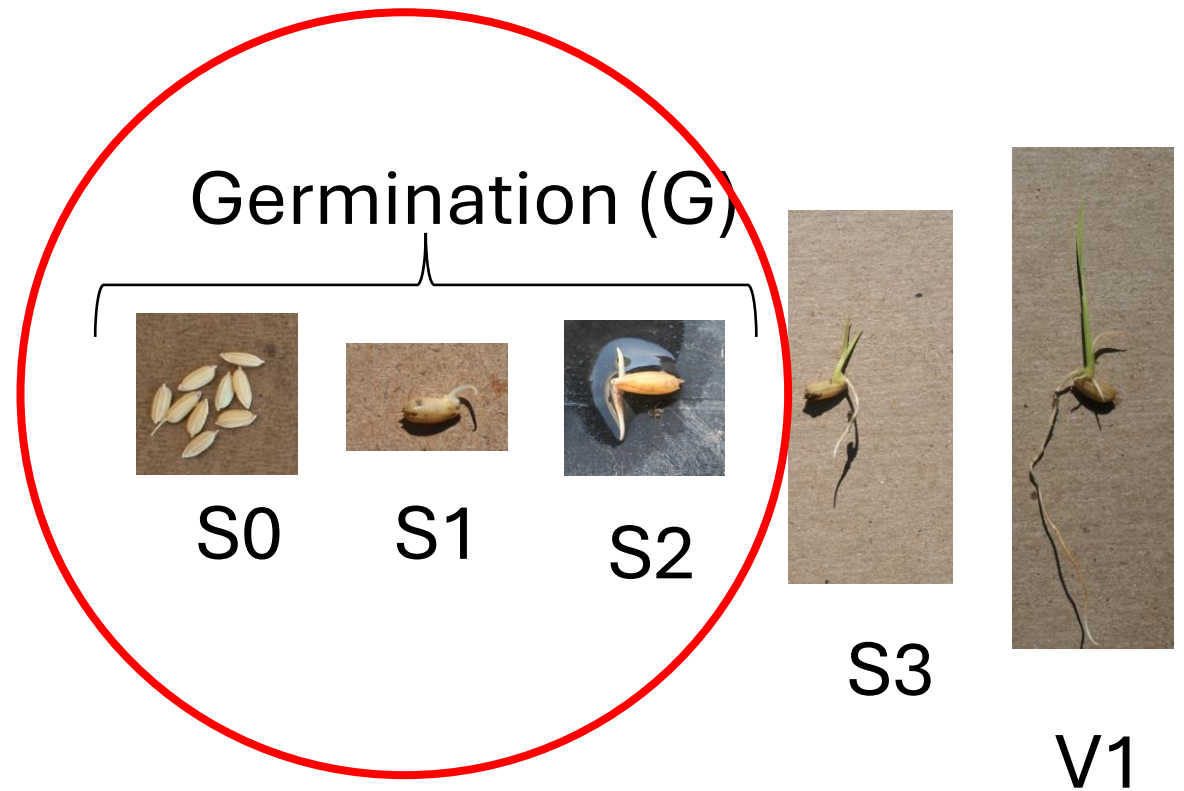
Tadpole shrimp

- **Avoidance of of injury**
 - **Seed soon after flooding**



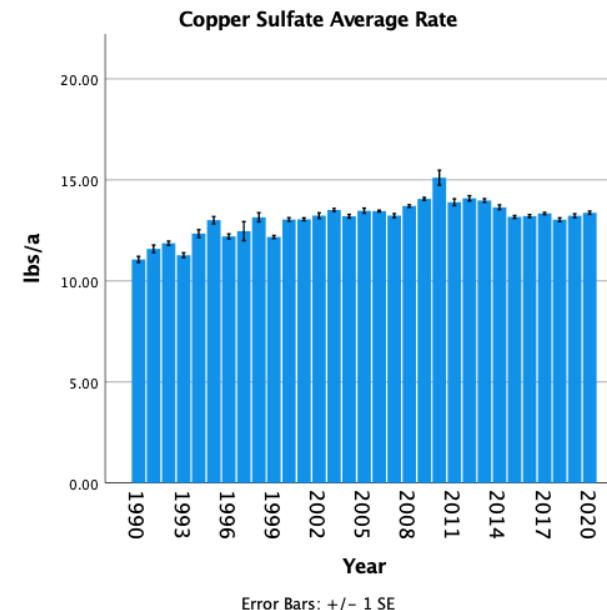
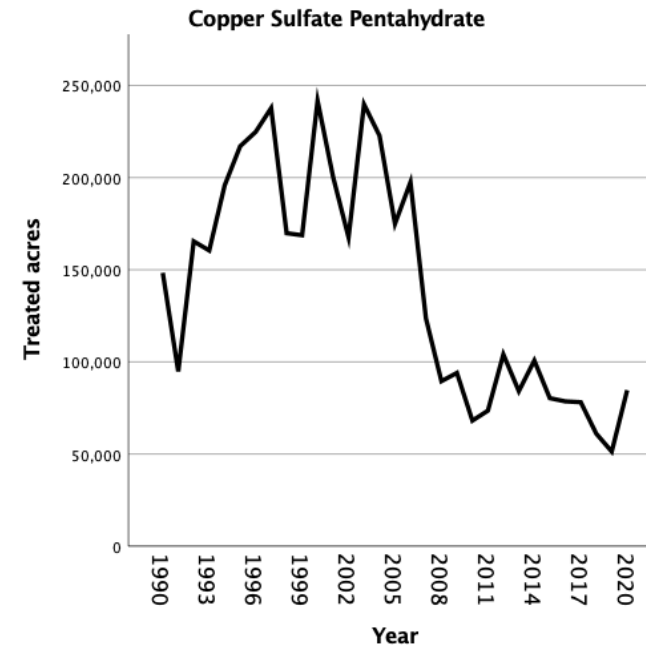
Tadpole shrimp

- Avoidance of injury
 - Seed soon after flooding
 - **Monitoring for seedling development and TPS presence**



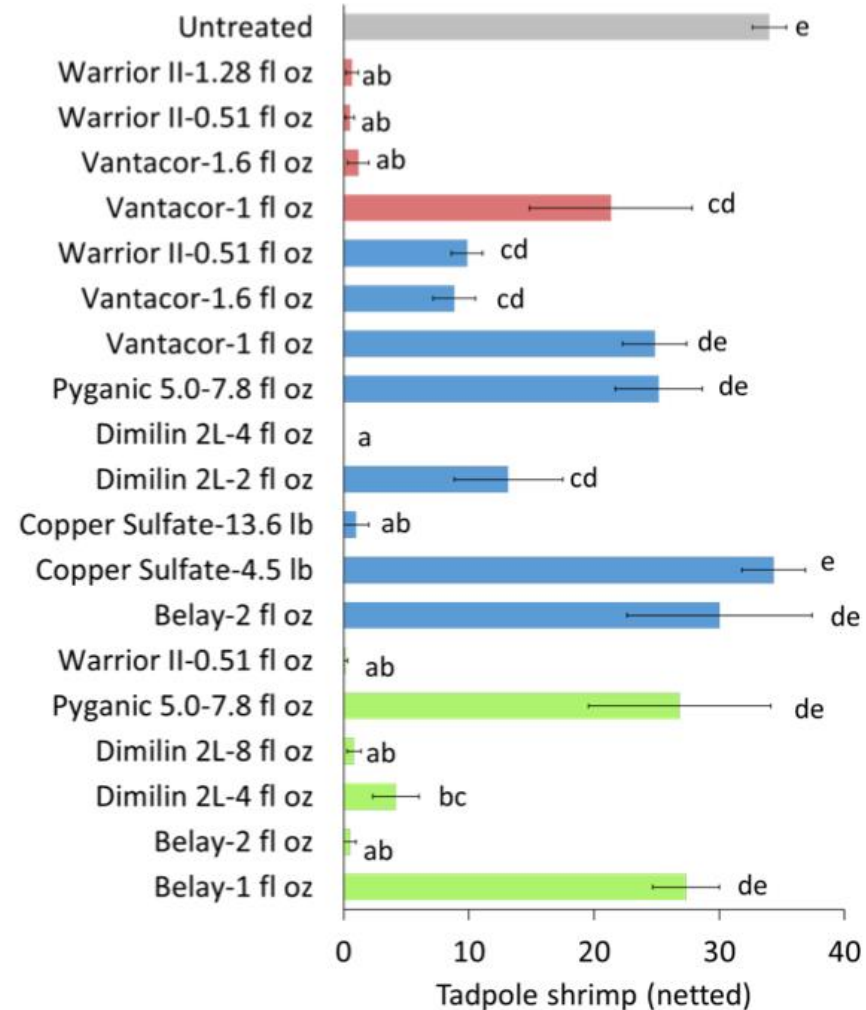
Tadpole shrimp

- Avoidance of of injury
 - Seed soon after flooding
 - Monitoring for seedling development and TPS presence
- **Copper sulfate pentahydrate**
 - 5-10 lbs/a
 - Efficacy
 - Formulations



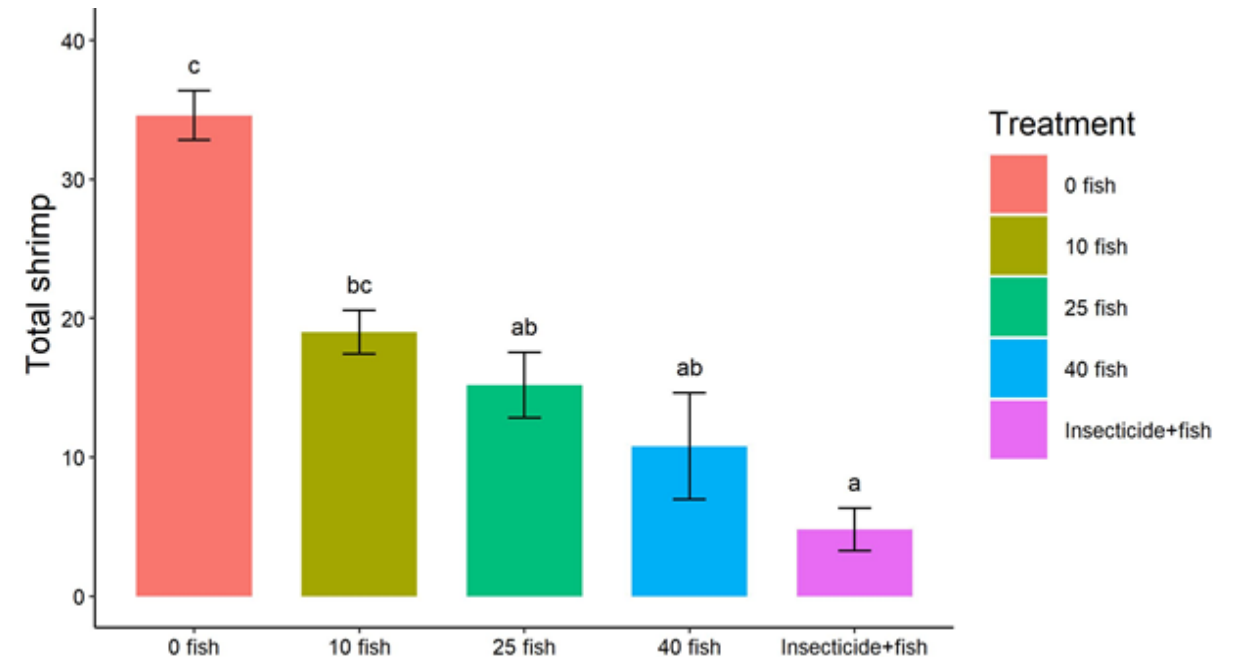
Tadpole shrimp

- Avoidance of of injury
 - Seed soon after flooding
 - Monitoring for seedling development and TPS presence
- **Copper sulfate pentahydrate**
 - 5-10 lbs/a
 - Efficacy
 - Formulations
- **Organic pyrethroids**



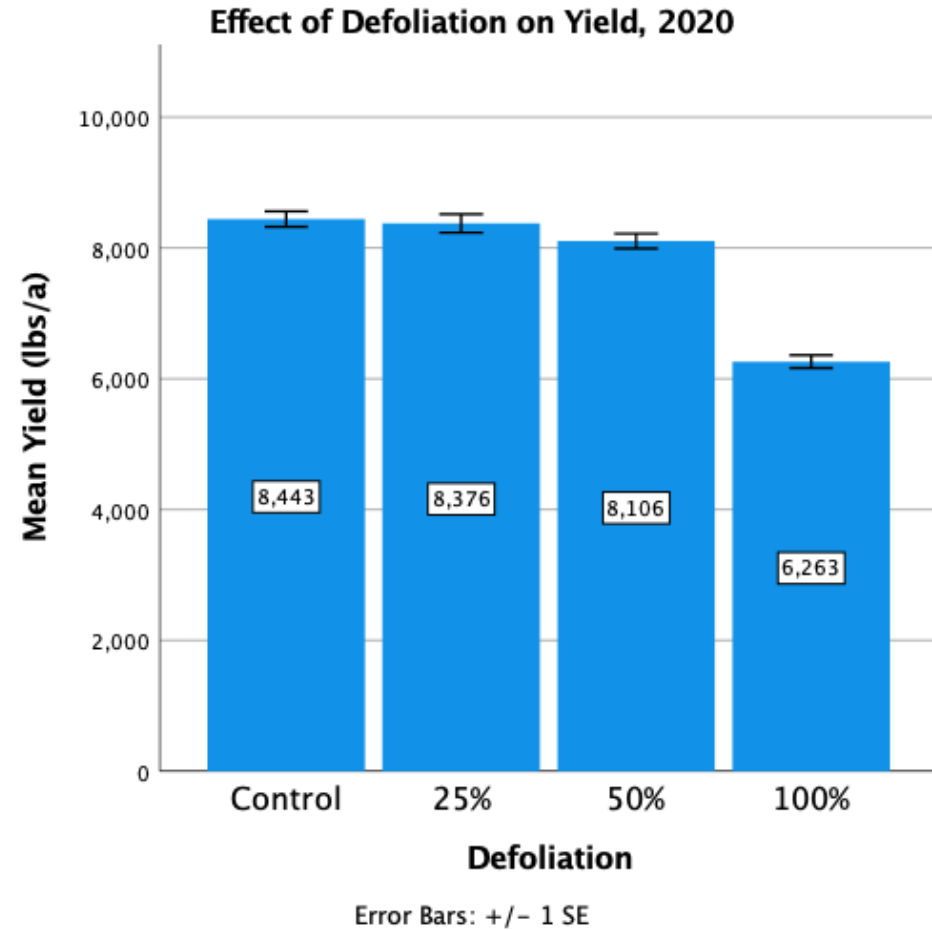
Tadpole shrimp

- Avoidance of of injury
 - Seed soon after flooding
 - Monitoring for seedling development and TPS presence
- Copper sulfate pentahydrate
 - 5-10 lbs/a
 - Efficacy
 - Formulations
- Organic pyrethroid
- **Mosquito fish**



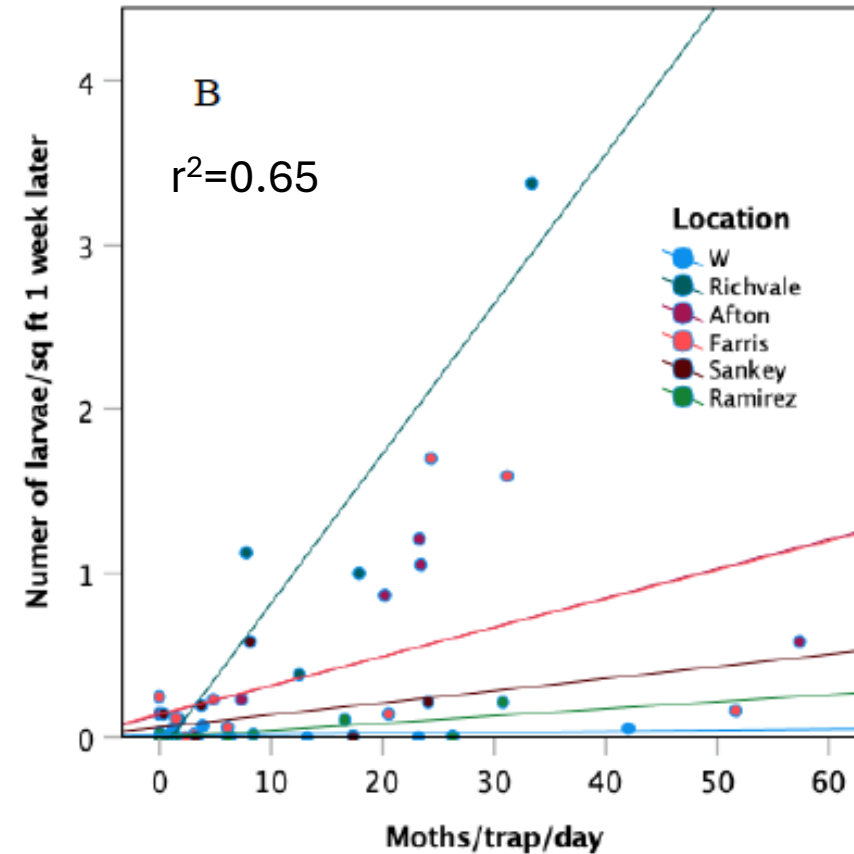
Armyworms

- Effect of defoliation on yield



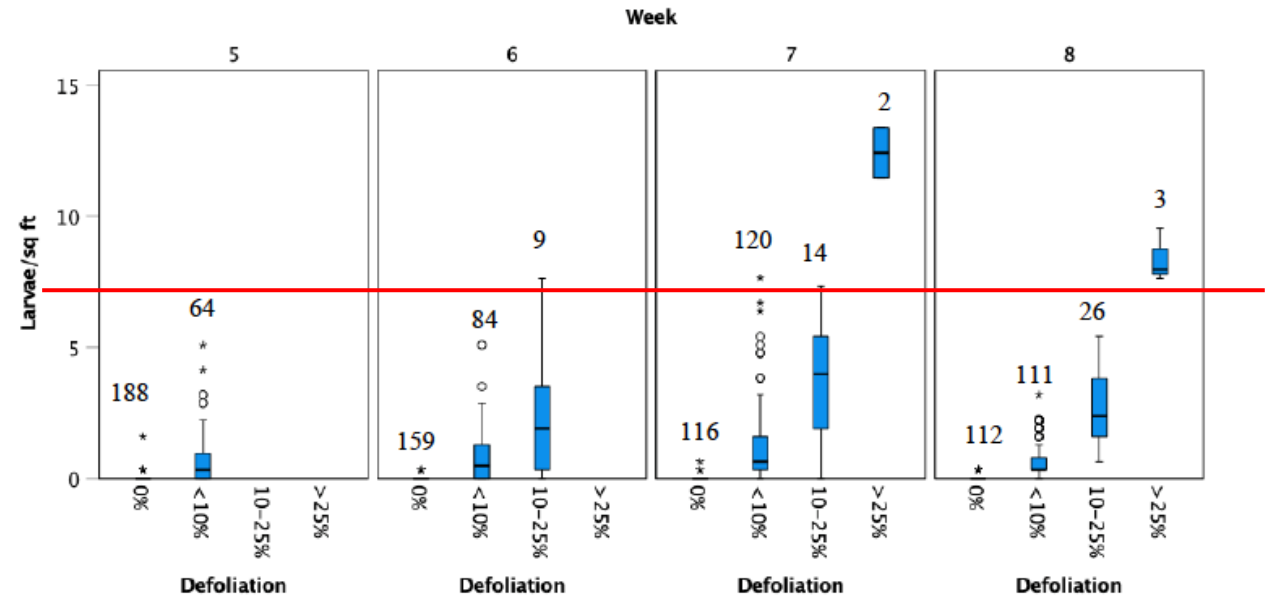
Armyworms

- Effect of defoliation on yield
- **Monitoring**
 - **Pheromone traps**
 - Larvae



Armyworms

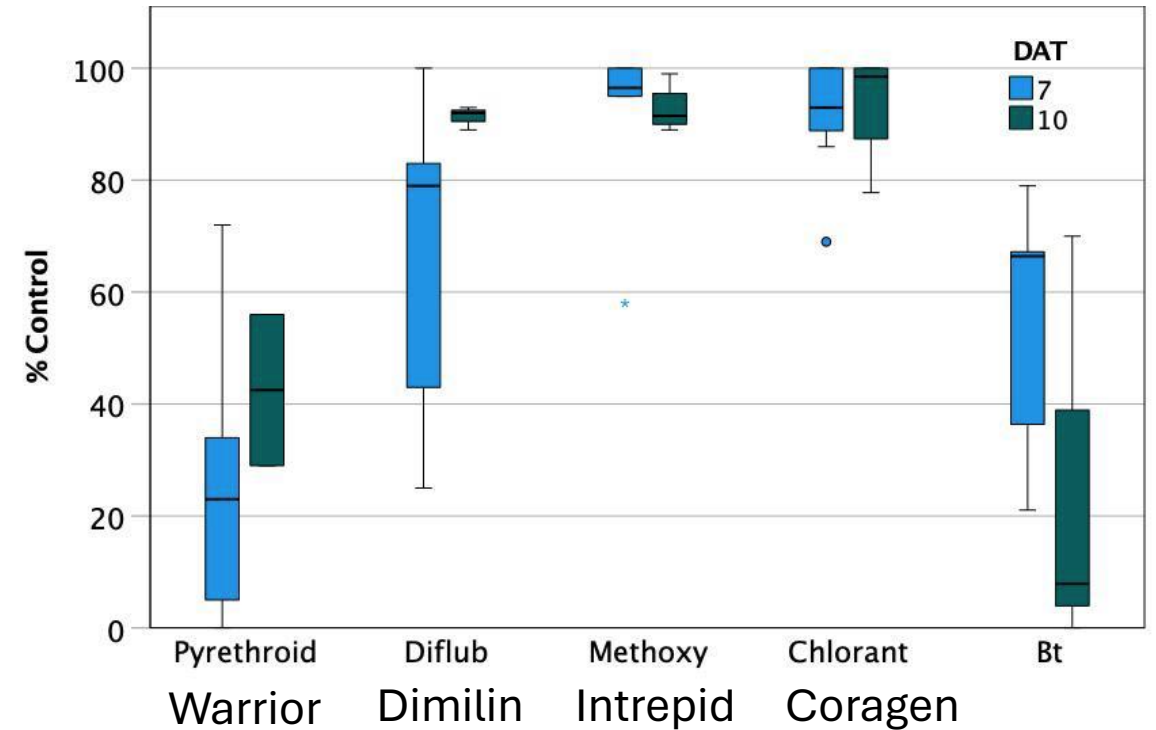
- Effect of defoliation on yield
- Monitoring
 - Pheromone traps
 - **Larvae**



Armyworms

- Effect of defoliation on yield
- Monitoring
 - Pheromone traps
 - Larvae
- ***Bacillus thuringiensis***
 - Timing of application

Summary of Insecticide Trials 2018-2021



Armyworms

- Effect of defoliation on yield
- Monitoring
 - Pheromone traps
 - Larvae
- *Bacillus thuringiensis*
 - Timing of application
- **Natural enemies**

Table 1: Proportion of Likely (pending positive identification) Beneficial and Potential Pest Species Collected in Rice Fields, 1994

Beneficial Species (Predatory and Entomoparasitic at some stage):

Aranae:	21 spp. (Including <i>Pardosa ramulosa</i> , the aquatic wolf spider)
Ephemeroptera:	1 sp.
Odonata:	2 spp.
Hemiptera:	10 spp.
Coleoptera:	25 spp.
Diptera:	8 spp.
Hymenoptera:	29 spp.

TOTAL: 96 spp.

Potential Pest Species (Occasional or common rice herbivores):

Aranae:	2 spp.
Orthoptera:	10 spp.
Hemiptera:	15 spp.
Homoptera:	12 spp. (Aphids and Leafhoppers)
Coleoptera:	25 spp. (Including <i>Lissorhoptrus oryzophilus</i> , the rice water weevil)
Diptera:	~20 spp. (Including seed midges)
Lepidoptera:	6 spp. (including armyworms)

TOTAL: ~90 spp.

Armyworms

- Effect of defoliation on yield
- Monitoring
 - Pheromone traps
 - Larvae
- *Bacillus thuringiensis*
 - Timing of application
- **Natural enemies**
 - Augmentation/conservation



Apanteles



Hyposoter

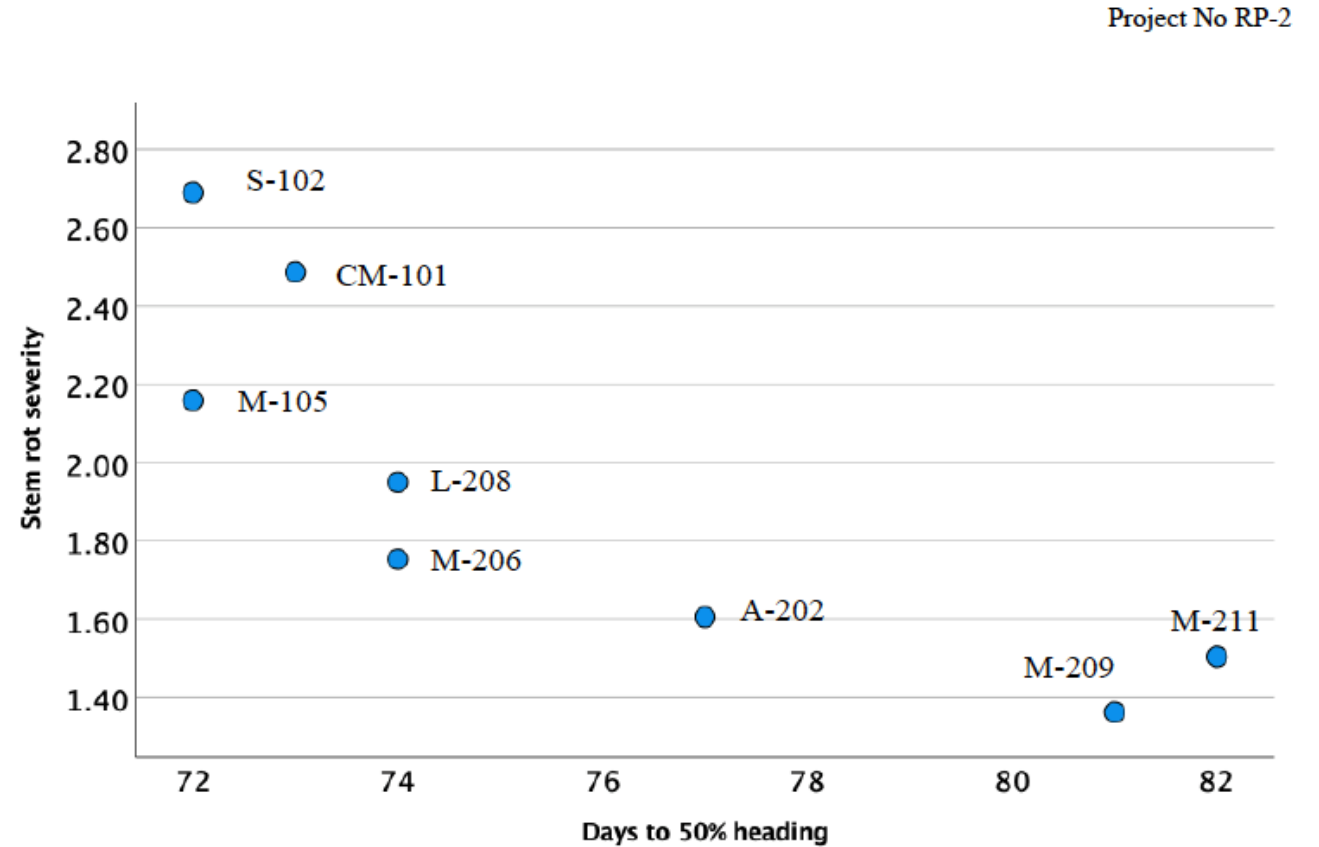
Bakanae

- Seed borne disease
- No seed treatment for organic rice available
- Use certified seed



Stem rot

- Nitrogen and potassium management
- Varietal susceptibility



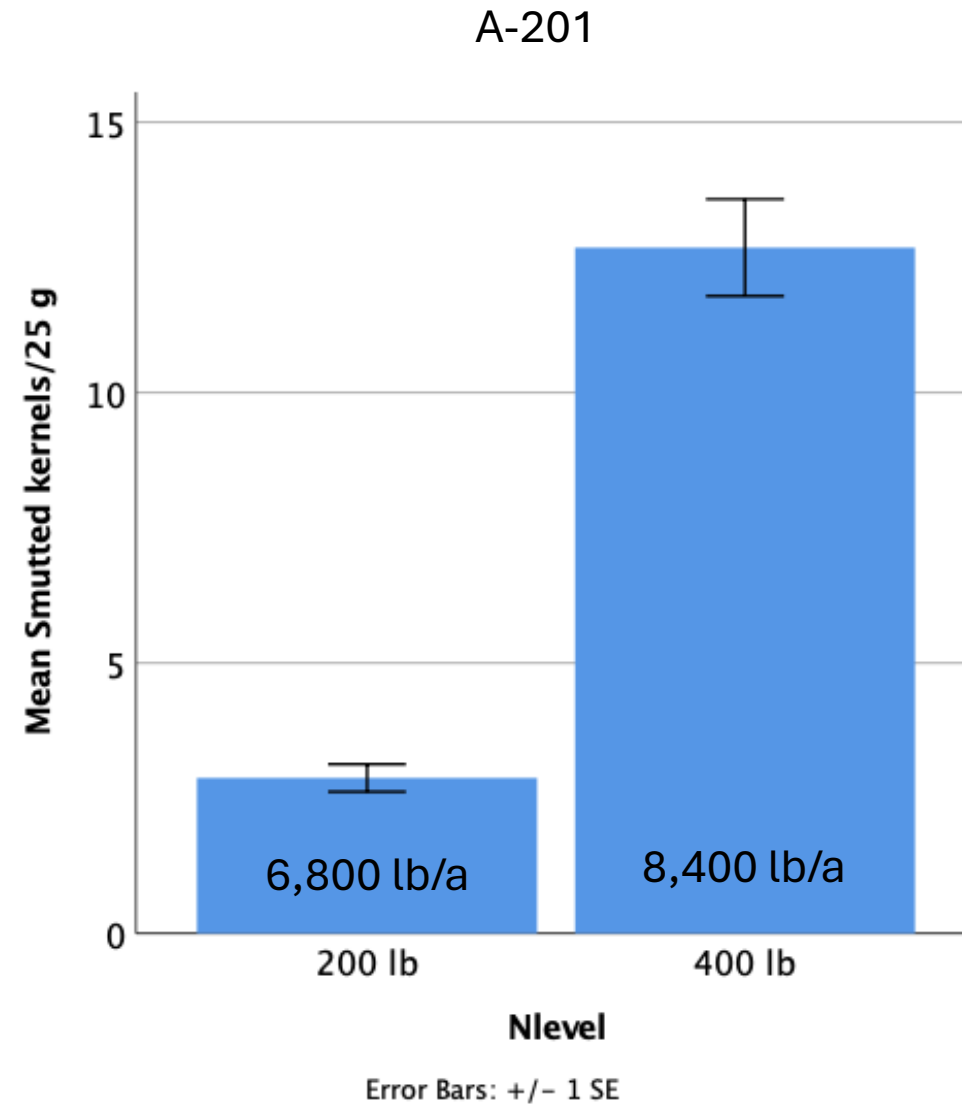
Blast

- Nitrogen management
- Water management
 - Effect of drydown
- Varietal susceptibility
 - M-210
 - M-521
 - Valent
 - Long grains?
- Race monitoring



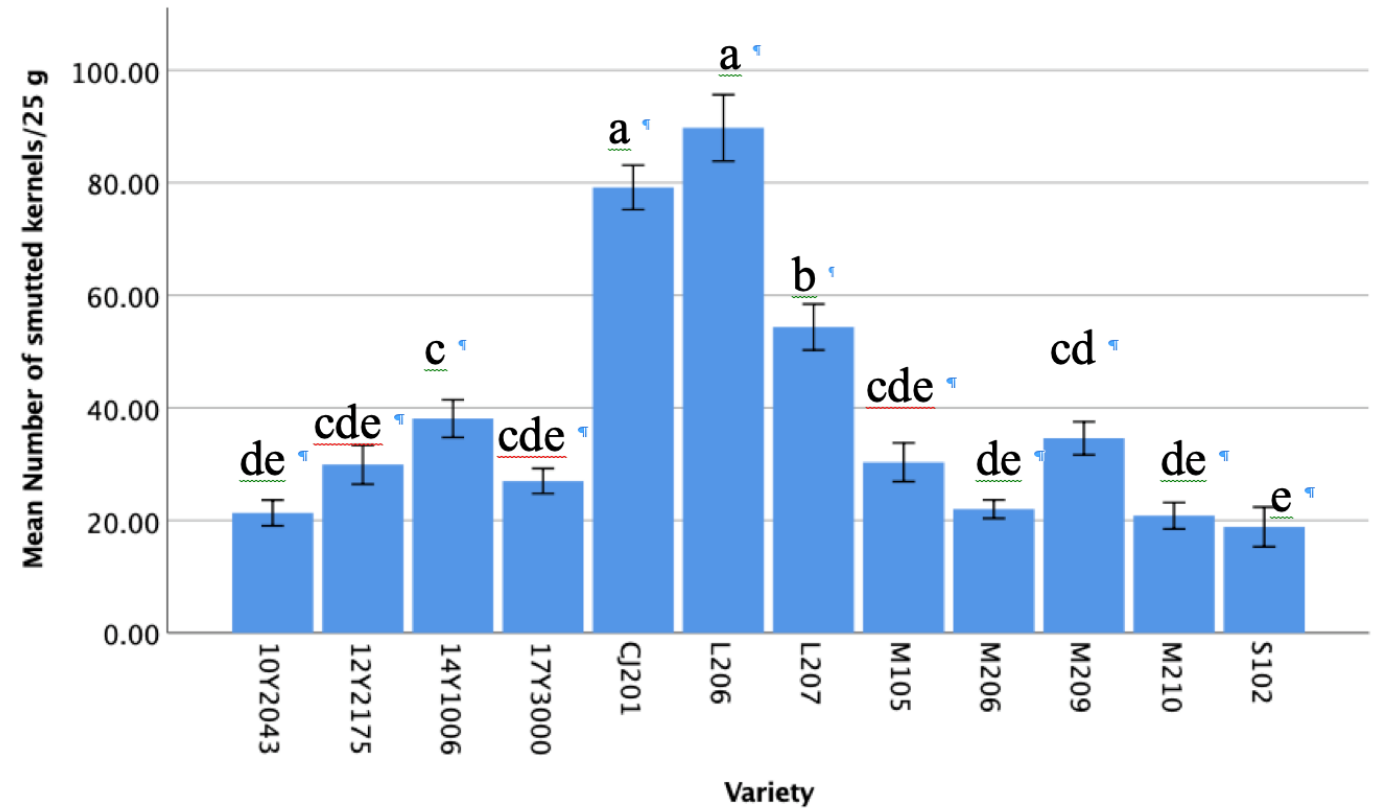
Kernel Smut

- Nitrogen management



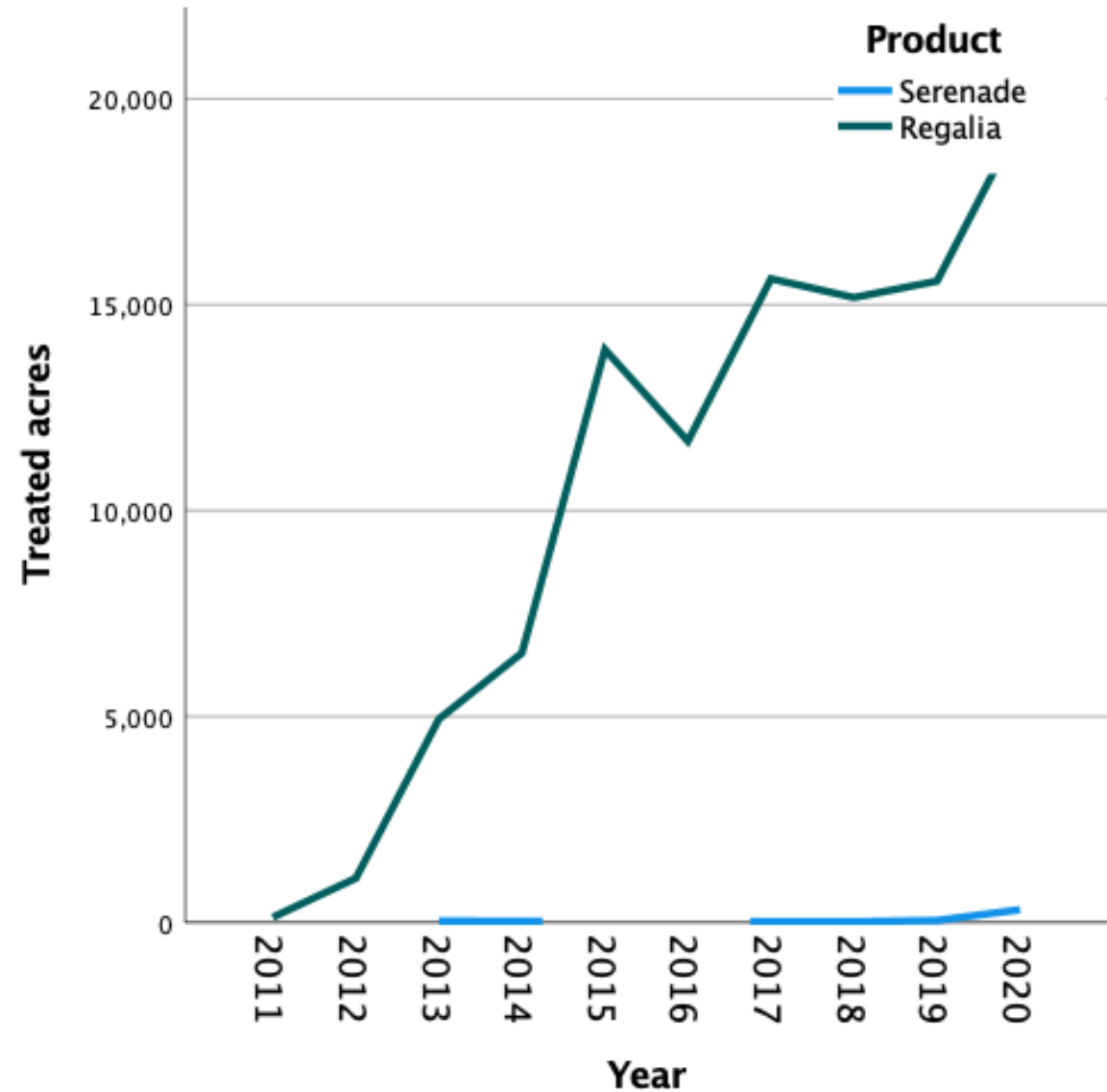
Kernel Smut

- Nitrogen management
- **Varietal susceptibility**



Organic Fungicides

- Induced resistance
 - Regalia
- Microbials
 - Serenade



Factors that will affect pest management in organic systems

- Alternative systems
 - Drill seeding
 - Reduced tillage
 - Fallowing
- DPR Sustainable Pest Management