

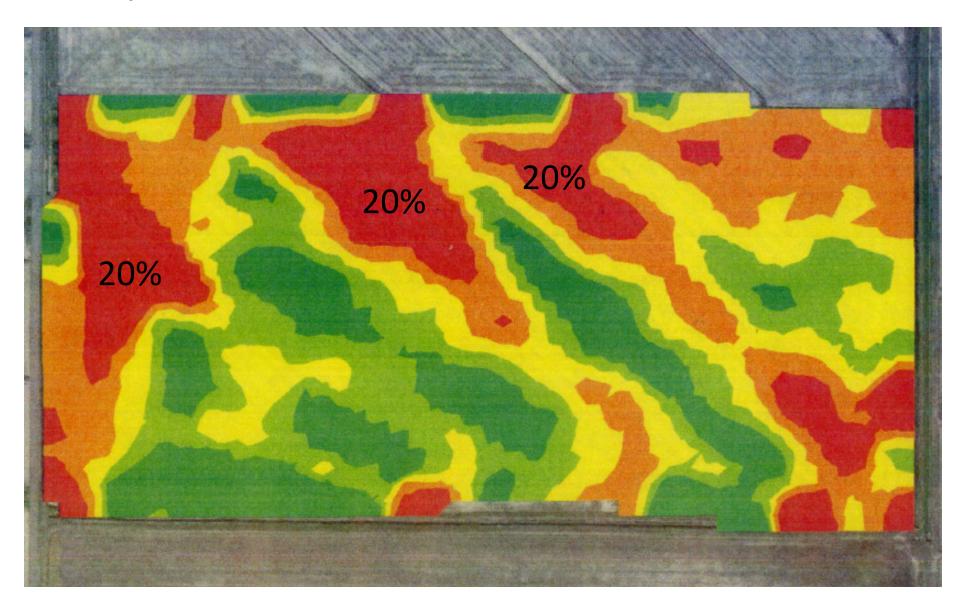








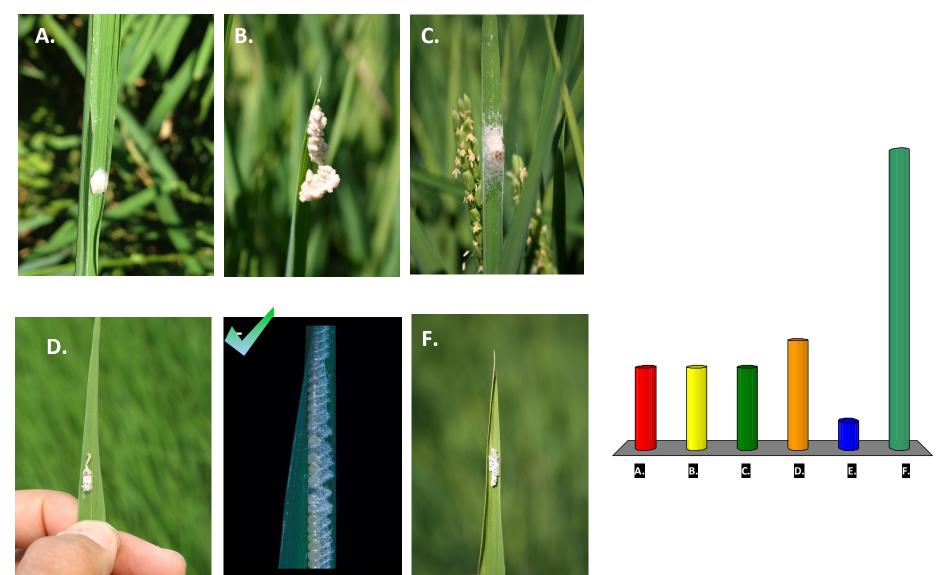
### 20% yield reduction



### Armyworm Outbreak

- Mild winter, drought
- Infestations are difficult to detect
  - Biology
  - Monitoring

# Which are armyworm eggs?



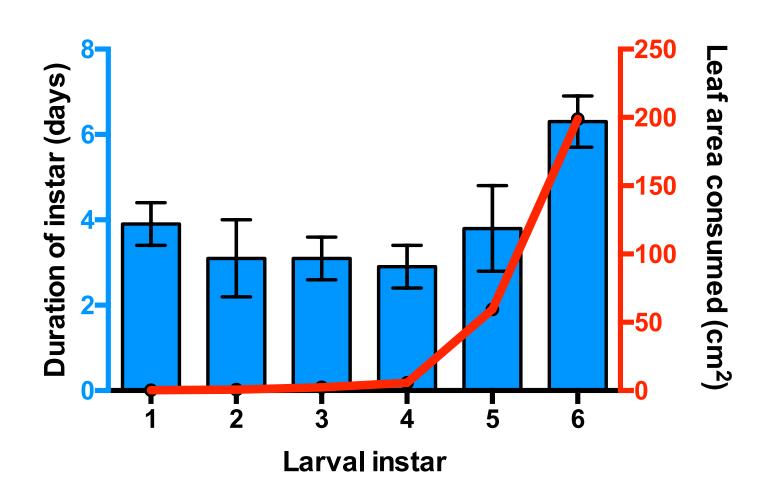


sand dollars to anyone finding the eggs of the species in the field; the fact that there were no takers testifies to the difficulty of such a discovery. This is due to the moth's habit of con-

### **Armyworm Biology**

- Eggs and early instars undetected
  - Hidden
  - Small
- Early instars (1<sup>st</sup>-4<sup>th</sup>) consume very little leaf tissue (4%), 5<sup>th</sup> and 6<sup>th</sup> instars consume a lot (96%)

## **Armyworm Biology**



**Armyworm Monitoring** 

- Thresholds
  - 25% defoliation
  - 10% panicle injury



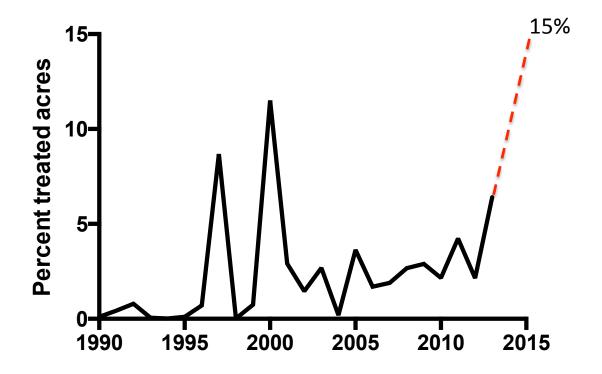


### Insecticides

- Available insecticides not very effective
  - Pyrethroids
  - Carbaryl
  - Bacillus thuringensis (Bt)
  - Harder to kill older, larger armyworms
  - Harder to reduce high densities

### **Future Outbreaks**

Will outbreaks occur again?



### Needs for the Future

- Improving detection
  - Threshold
    - 25% defoliation
    - 10% panicle injury
  - Traps, degree days models
- More effective insecticides

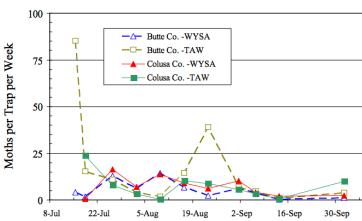


Figure 11. Armyworm moth flight timing (WYSA=western yellow-striped armyworm and TAW-true armyworm) from pheromone traps located near rice fields in Colusa Co. and Butte Co., 2005.

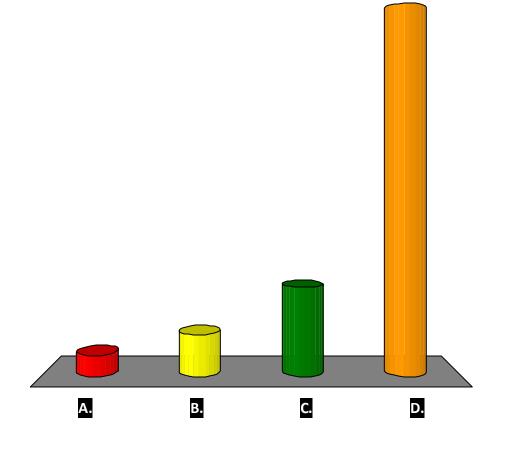
#### Degree-day accumulations required for each stage of development

Host: Oat foliage	DD (°F)	DD (°C)
Eggs:	113.4	63.0
Larvae:	498.6	277.0
Pupae:	297.0	165.0
Generation time (egg to adult):	909.0	505.0
Pre-egglaying adults:	126.0	70.0
Generation time (egg to egg):	1035.0	575.0

# Intrepid Section 18 Emergency Exemption for 2016

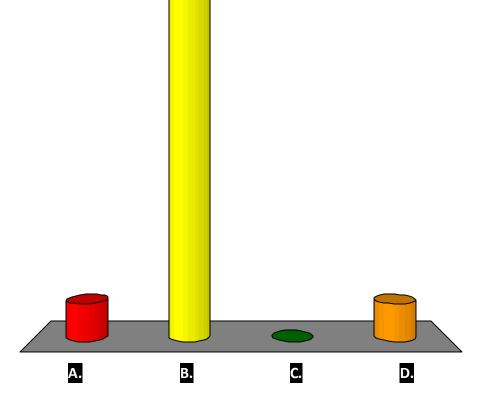
# Did you have any area affected by armyworm in 2015?

- A. No
- B. < 10 acres
- C. 10-20 acres
- D. >20 acres



## Did you treat for armyworm?

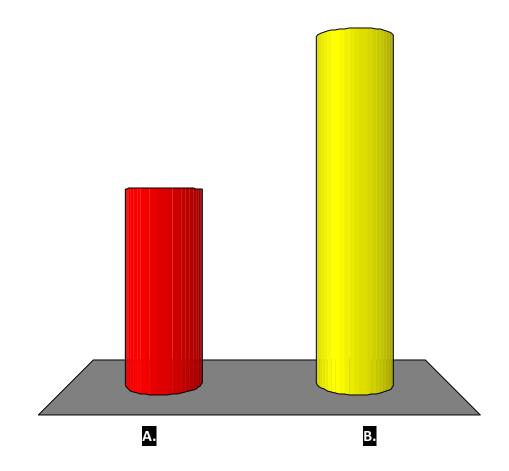
- A. No
- B. Yes registered insecticide (Warrior, Mustang, Sevin, others)
- C. Yes Intrepid
- D. Yes registered insecticides and Intrepid



# Were any of the treatments effective (killed armyworms)?

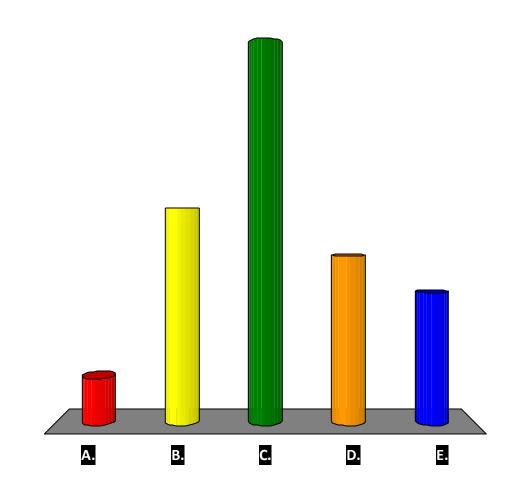
A. Yes

B. No



### Estimated yield loss in affected area

- A. 0 cwt/a
- B. < 5 cwt/a
- C. 5-10 cwt/a
- D. 10-20 cwt/a
- E. >20 cwt/a



## County where outbreak occurred:

- A. Butte
- B. Colusa
- C. Glenn
- D. Sutter
- E. Yolo
- F. Yuba
- G. Other

