

*Insect Bioassays & Insect
Numbers After Heat Treatment
June 25-27, 1999
Flour Mill Heat Treatment*

Bh. Subramanyam, Dale Eustace, S. Retta, and Kim Korte

Department of Grain Science and Industry

Alan Dowdy, Frank Arthur, and Mike Mullen

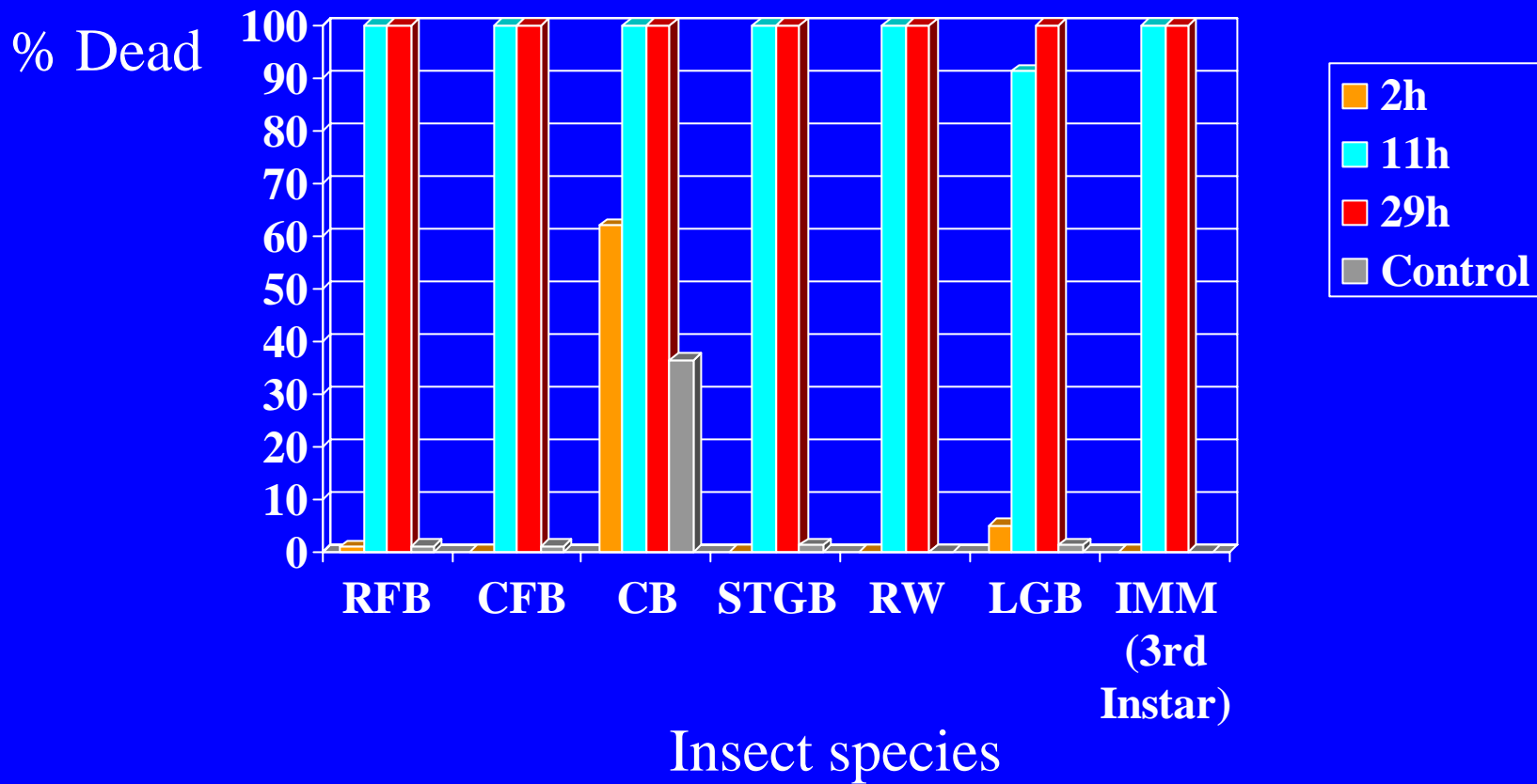
Grain Marketing and Production Research Center

Flour Mill Experiments with Insects



- These square dishes with and without food contained 8 different species of insects.
- Different dishes were used for different species.
- Dishes were removed at 3 different times during heat-up.
- For each species, we had dishes with food and without food.

Insect Bioassays: Dishes with Food

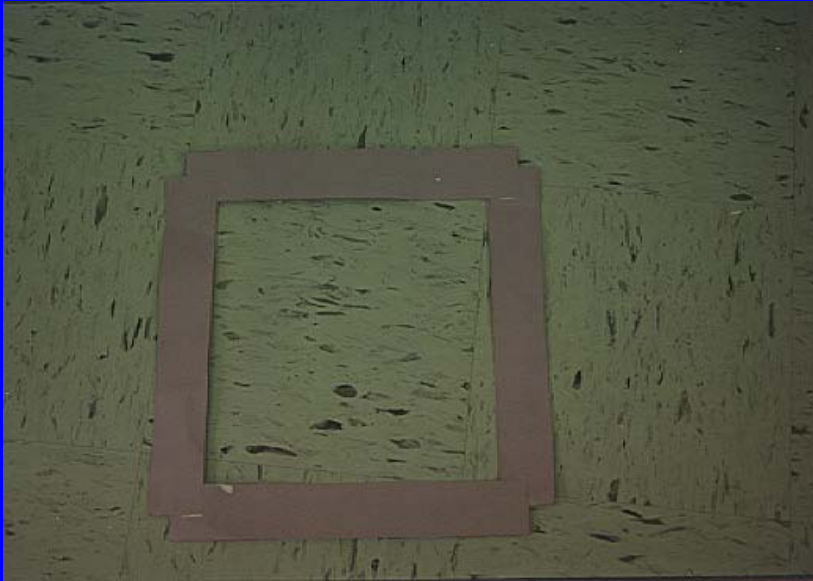


3rd Floor Cleaning House



- Buhler aspirator.
- Note wheat on floor.
- Dead insects on floor were counted by placing the grid.

Square Grid



- Insects in the grid were vacuumed into a plastic bag.
- Insects were examined under a microscope to separate species and counted.
- Insect counts were expressed as number of adults/square foot.

Blo-Vac Gun



- This gun works on the venturi/vortex principle.
- It can work as a vacuum or as a duster.
- We used it to vacuum bugs from floor after a heat treatment.

Number of Dead Insects in a Square Grid

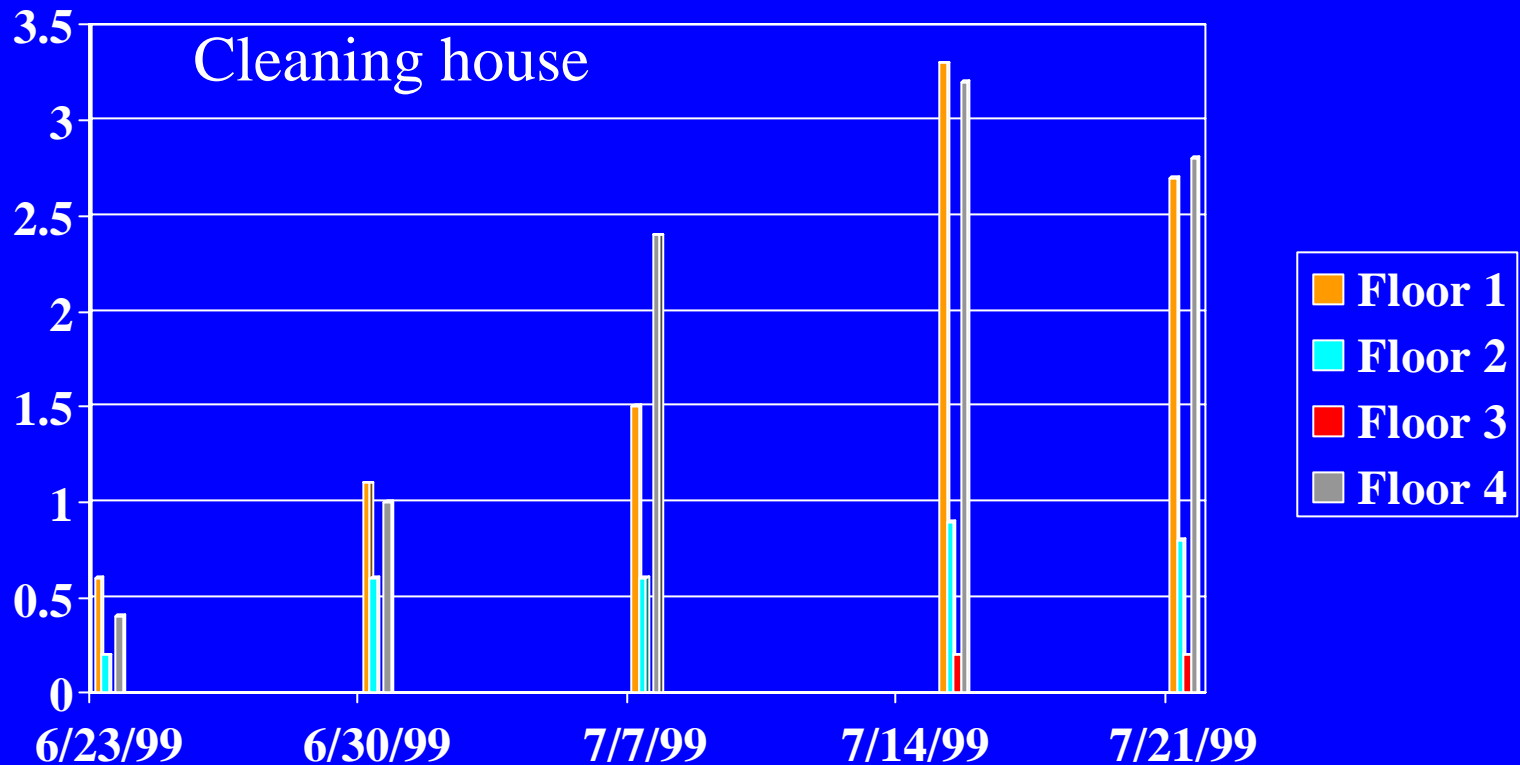
Room	Floor	No. Adults/Sq ft (No. samples)
Cleaning house	1	72.4 (9)
Cleaning house	2	92.7 (3)
Cleaning house	3	23.3 (3)
Cleaning house	4	16.3 (5)
Mill	2	12.0 (2)
Mill	3	6.6 (5)
Mill	4	0.6 (5)
Mill	5	0.5 (4)

Flite Trak Trap



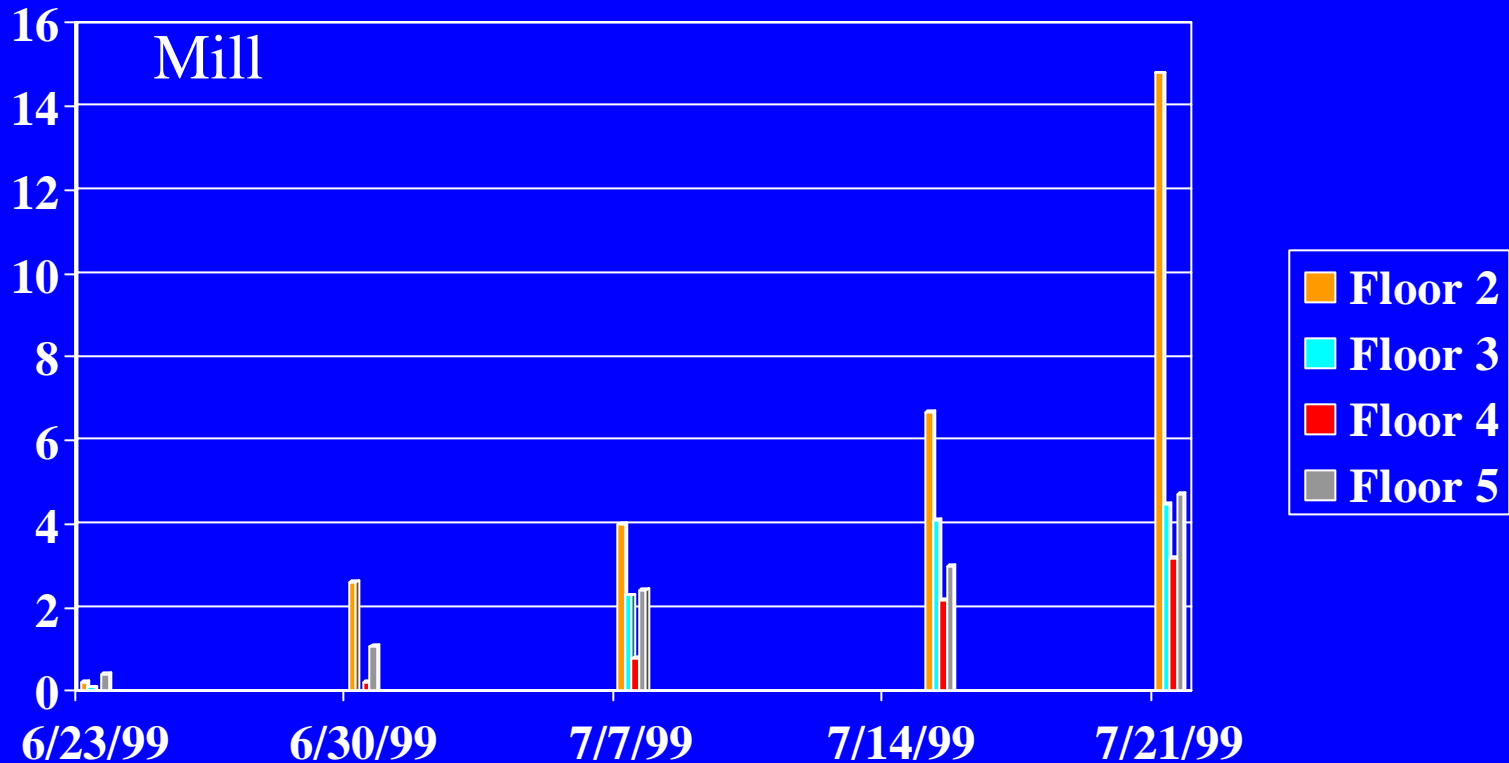
- Traps contain a shallow receptacle for oil.
- The cover has 3 holes to hold three different lures.

Insect Counts in Flite-Trak Traps: Total no. insects/trap/week



Traps were baited with oil and 3 pheromone lures.

Insect Counts in Flite-Trak Traps: Total no. insects/trap/week



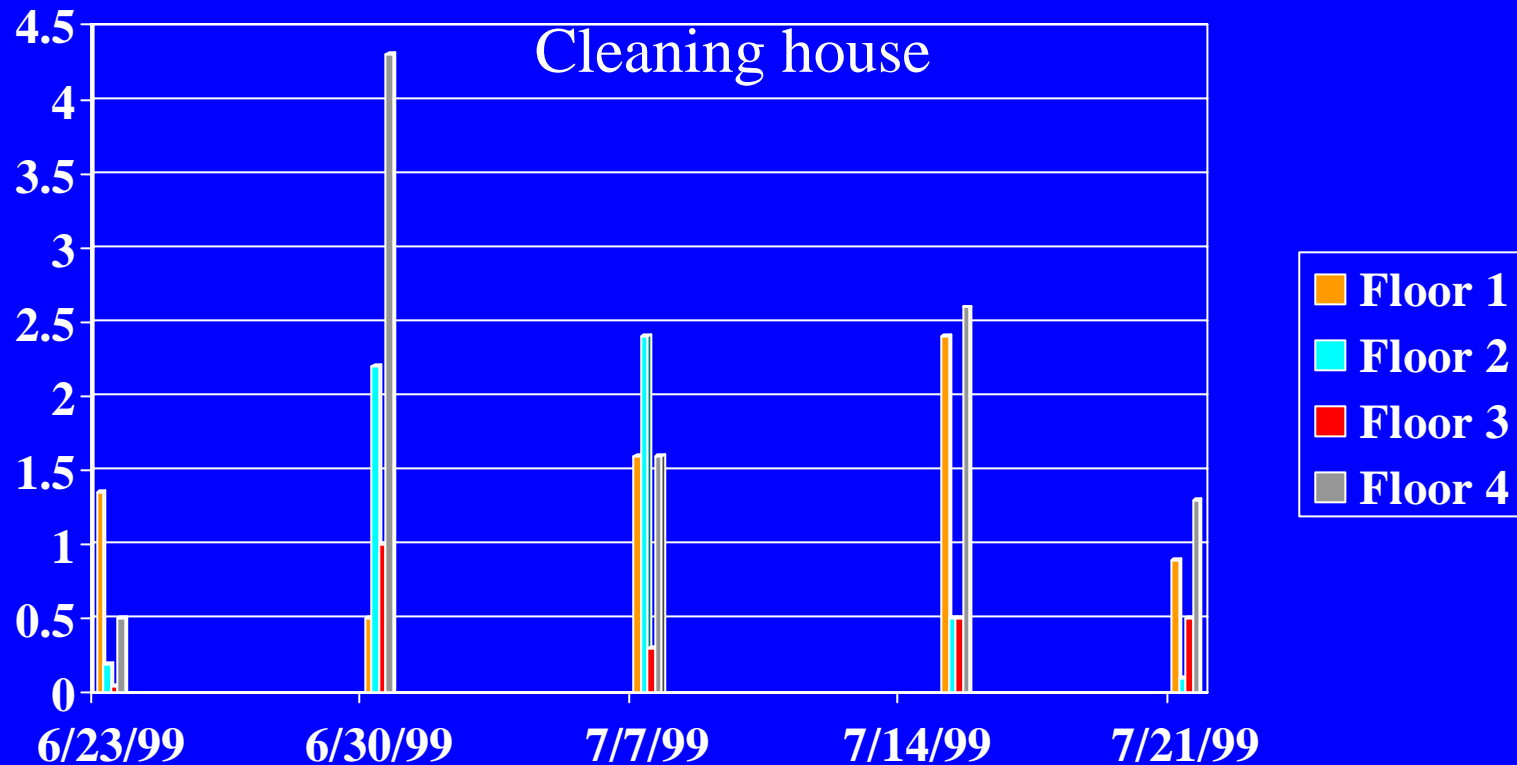
Traps were baited with oil and 3 pheromone lures.

Phercon II Moth Trap



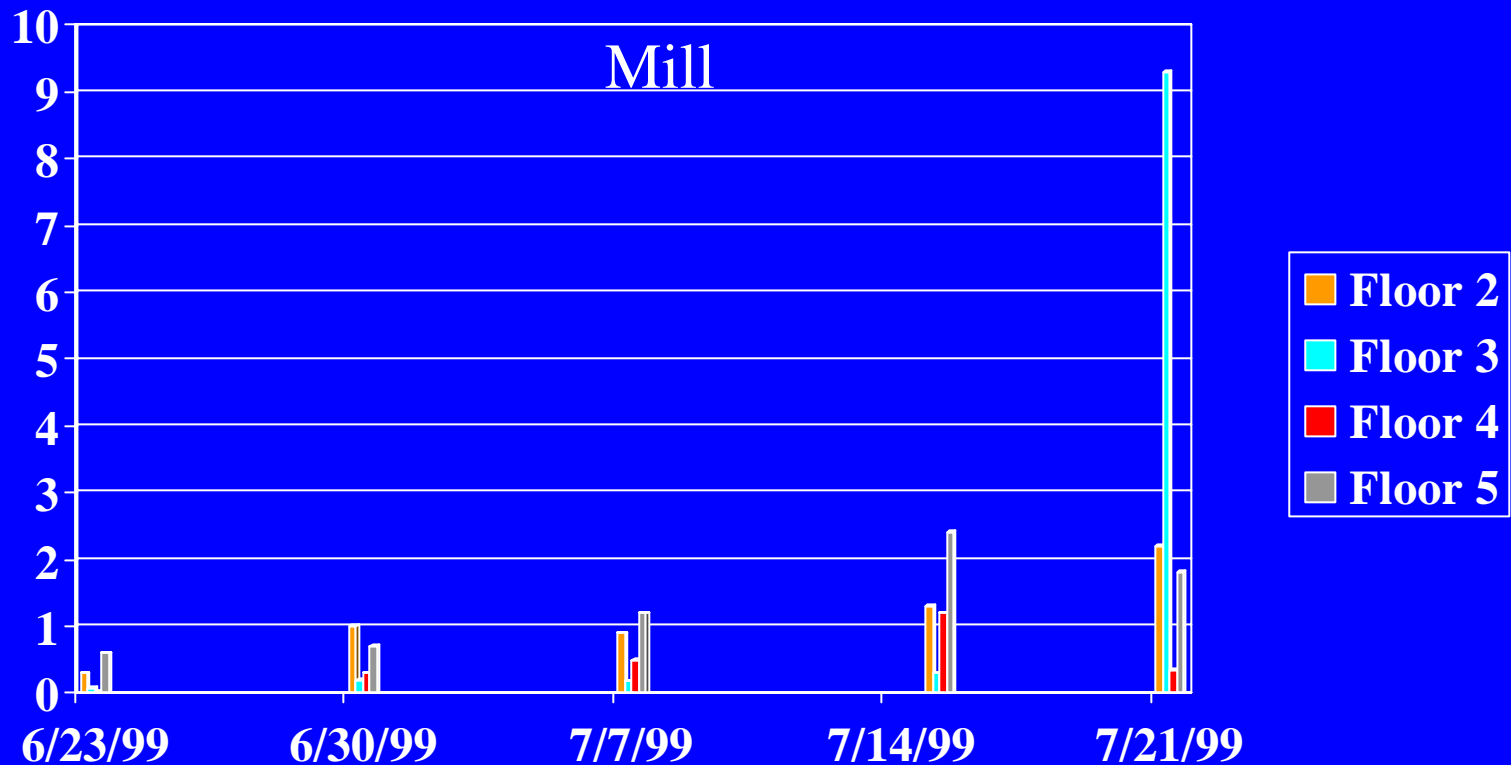
- Almond moth or Indianmeal moth lures were placed inside the trap..
- For each species, there were 10 traps per floor (there were 8 floors in the flour mill & cleaning house combined).

Total moths/trap/week: ALM and IMM Combined



Total moths/trap/week

ALM and IMM



Mill Experiments: Pheromone Lures



- Trays with plastic dishes containing insects, and pheromone lures of 5 insect species.
- RFB/CFB, CB, IMM, ALM, WB/KB lures.
- These were sampled over time during heat treatment.

Fate of Lures Exposed to High Temperatures

- Lures sampled at 2, 11, and 29 h from the time of heat treatment.
- Samples (3 replicates/lure) were sent to Trece for analysis.
- CB lure difficult to analyze (no data).
- No change in amount of pheromone content, except in CFB/RFB lure where a 40% drop was observed.

Fate of Sticky Material in Trap

- Heat had no effect on the sticky material.

Manlift Area



- Door leads into 1st floor of cleaning house.
- This area was not heat treated.
- Insects escaping heat treatment were present at the bottom of this door.
- Apply Tempo.

Conclusions

- 100% mortality of insects exposed to heat with 11 hours.
- More insects were found on the floor after heat treatment (insects coming out of machinery, mostly CFB).
- Insects were still being captured in traps after heat treatment.