

Grain Protectants, Aerosols and Residual Insecticides

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Introduction

- Grain protectants, aerosols (fogging, ULVs), contact insecticides (fumigants not covered)
- Examine factors affecting pesticide efficacy, but will not present complete lists of available products
- Will also illustrate topics and ideas covered in the training session

Grain Protectants

- Contact insecticides applied as grain is loaded into storage-several options
- Storicide II-chlorpyrifos-methyl and deltamethrin
- Methoprene (Diacon II) IGR
- Diatomaceous earth (DE) products

Protectant Application

- Usually applied as grain falls out of the truck into the boot of a grain auger
- A spraying system is mounted on the truck so that the spray hits the grain and is mixed
- Better sprayers have their own pump and pressure gauge

LittleGus Sprayer



Why Use a Protectant?

- Test with biological insecticide spinosad, already registered for many field crops
- Reduced-risk product, little toxicity to mammals
- Field test with 1 ppm applied to wheat loaded into bins at Manhattan laboratory

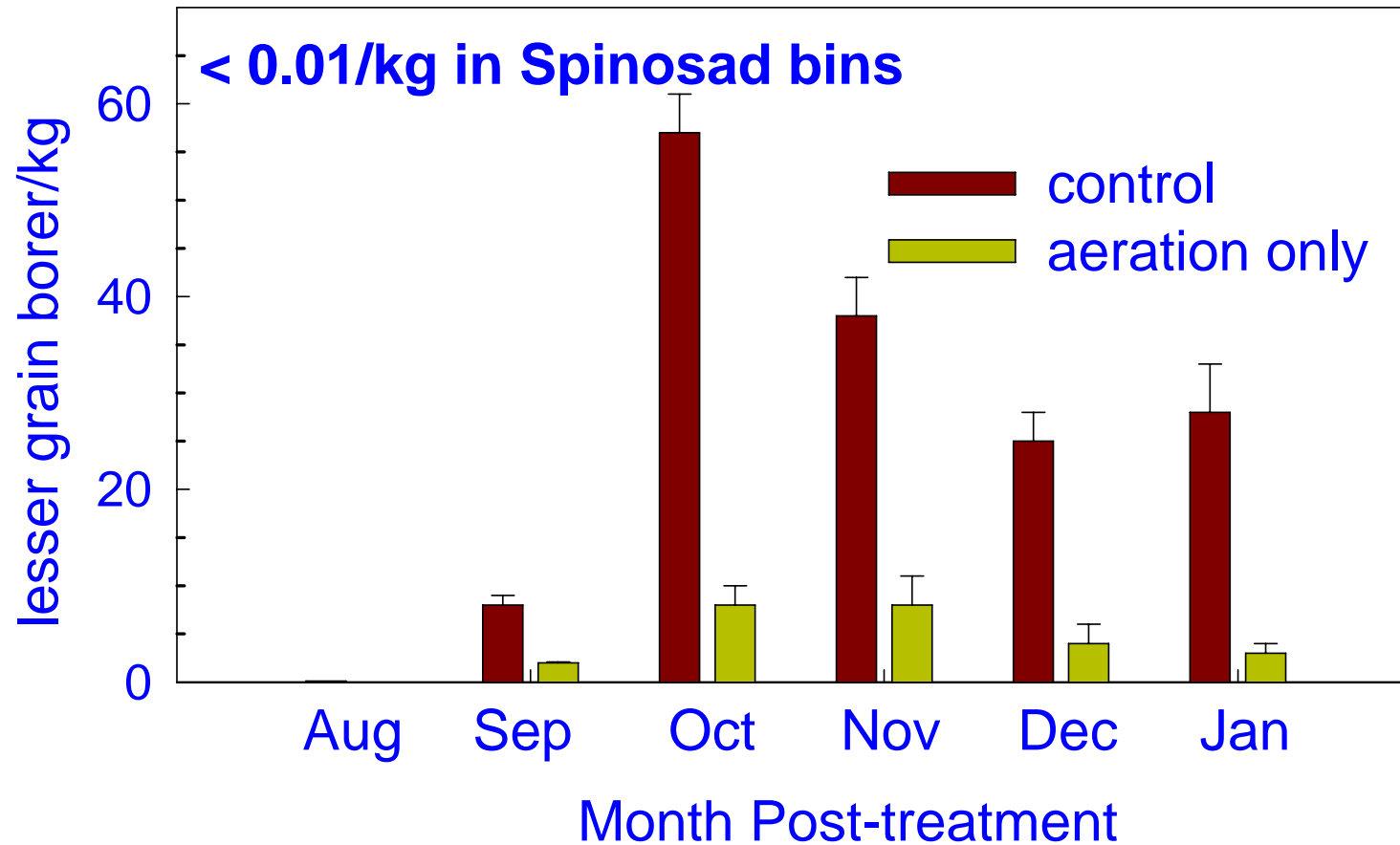
Loading Test Bins



Lesser grain borer
Rhyzopertha dominica



Adult lesser grain borer in bins



Need for Grain Protectant

- Aeration alone didn't completely control lesser grain borer, protectant was needed
- Spinosad label granted by US-EPA, Dow AgroSciences has Codex tolerances
- Problems with importing countries (Japan), marketing delayed until 2008?

Aerosols/Fogs

- Aerosols (Fogs) are liquid formulations, atomized and applied through a nozzle
- They kill exposed flying or crawling insects, do not penetrate packaging
- Thought to give little or no residual control, but no recent research in this area

Field Trial

- Tests conducted in 600,000 ft³ room inside a large food bank
- Pyrethrin formulation, red and confused flour beetles (RFB and CFB) were exposed with and without flour food-15 sites on the floor
- Estimated 10% of the space volume was occupied by stacked goods

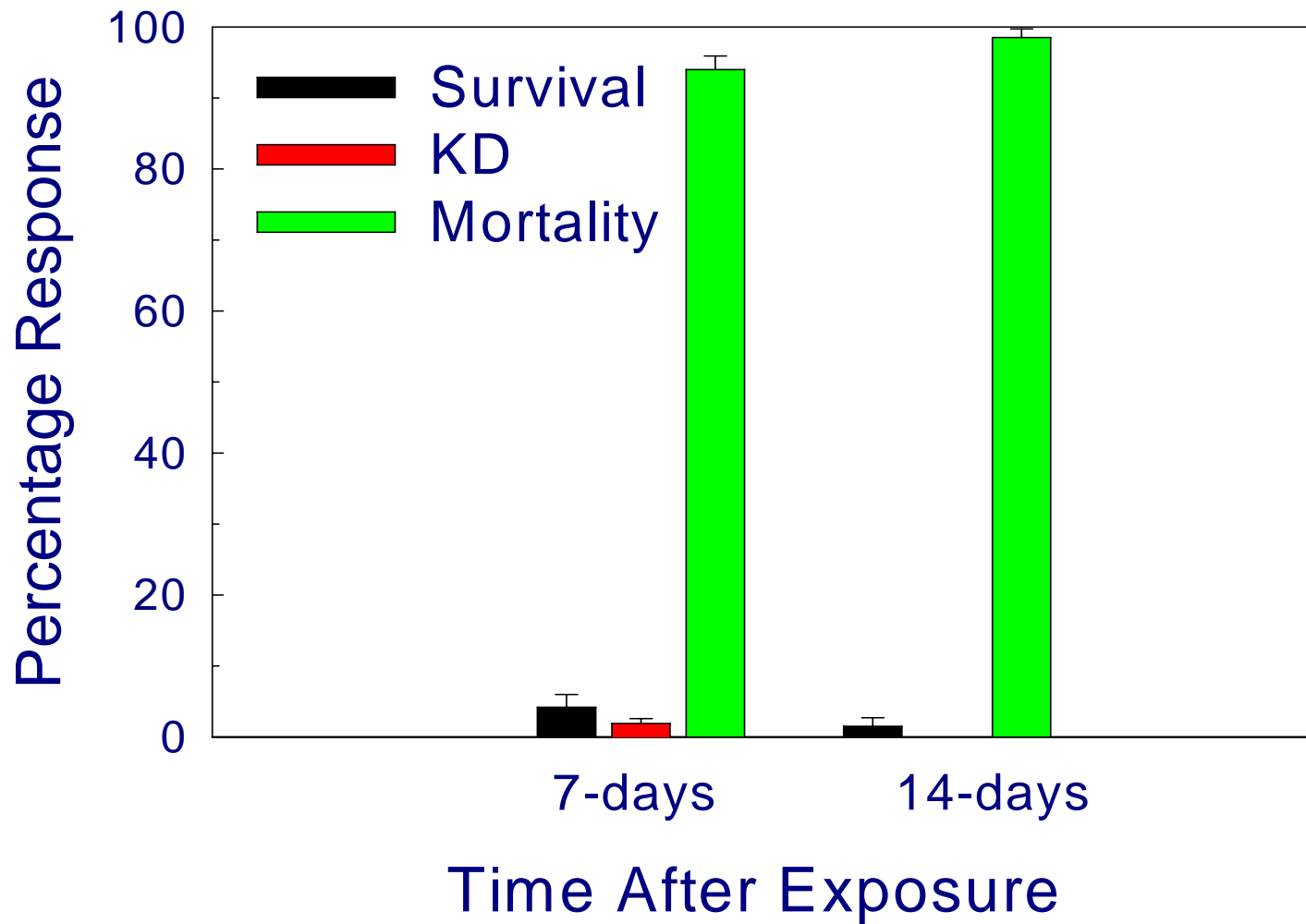
Partial View of the Test Room



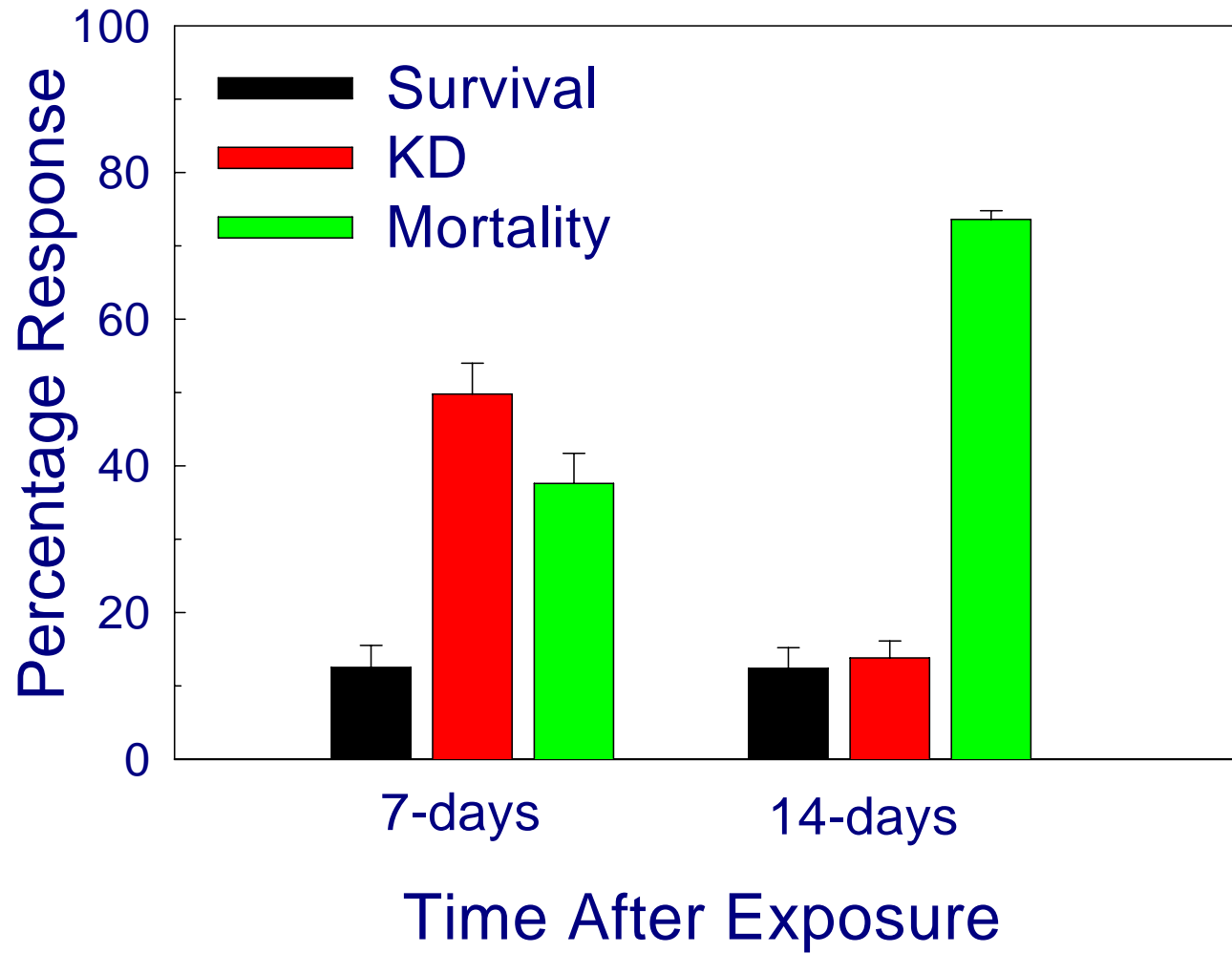
Fog distribution from 2 nozzles suspended from the ceiling



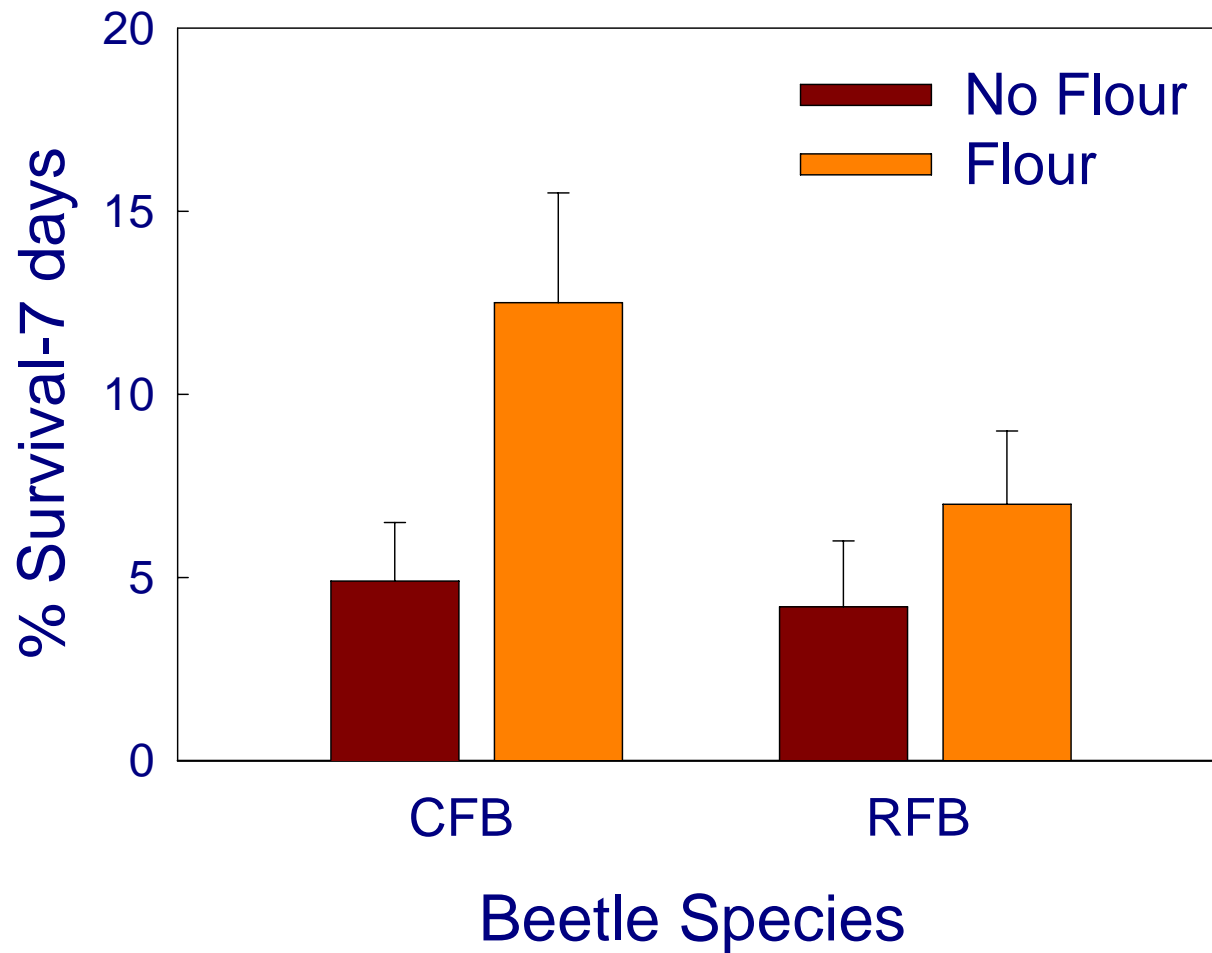
RFB Adults-No Flour



CFB Adults-No Flour



Adult Survival: Flour vs No Flour



Other Aerosols

- Different pyrethrin formulations, some pyrethroids (esfenvalerate-Conquer)
- Methoprene (Diacon II), is also registered for aerosol application
- Still some use of dichlorvos (Vapona, DDVP)

Aerosol Fogging with Methoprene



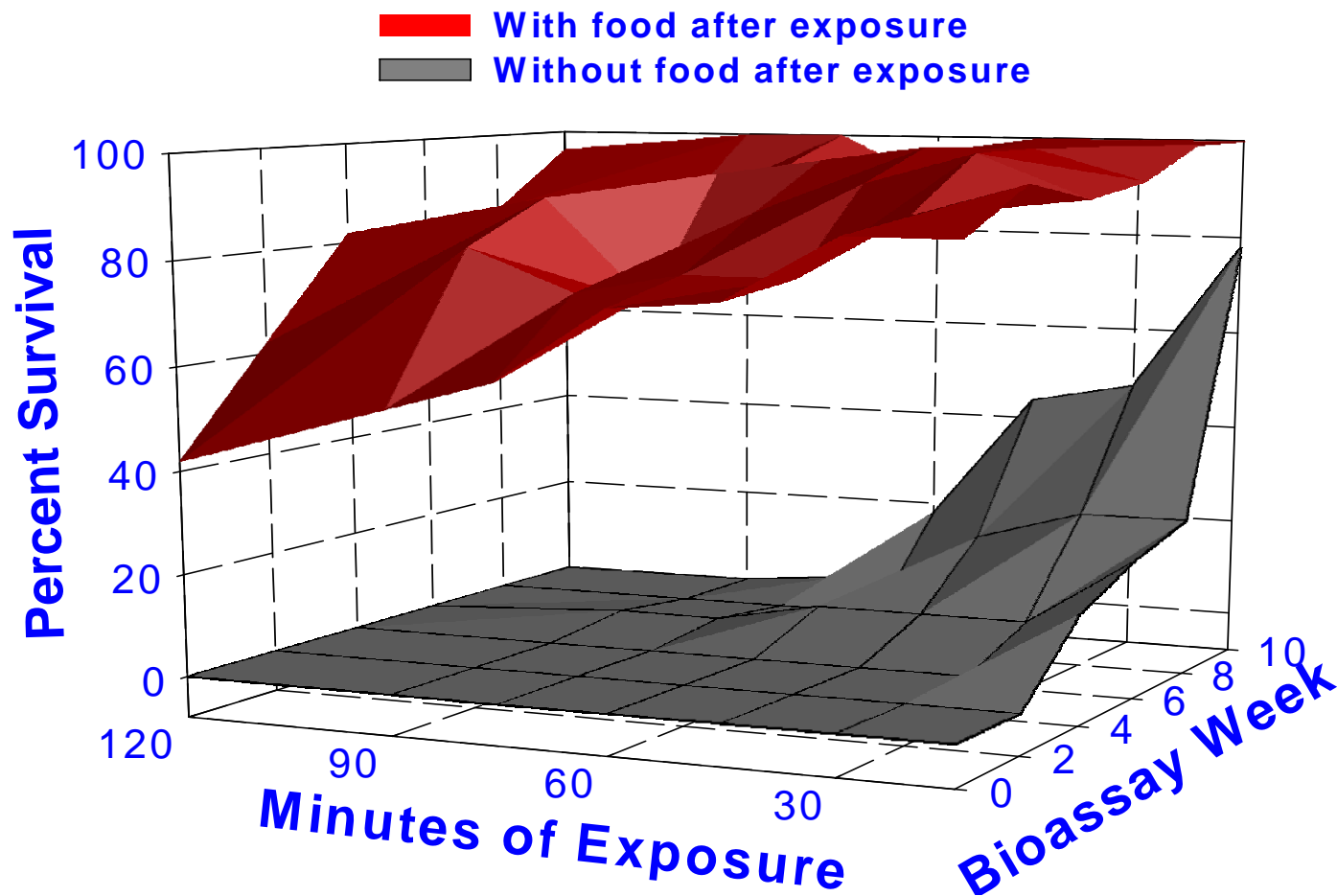
Arrested Larvae



Contact Insecticides

- Surface substrate, specific insecticide and application rate, target species, time insects are exposed– all affect pesticide efficacy
- Presence of food material either during or after application increases survival
- Example with RFB and Tempo WP

Red flour beetle on concrete treated with cyfluthrin WP, 3.8 mg [AI]/ft²



Tempo SC Ultra

- Newest formulation, also has a high and low rate of 8 and 16 ml, similar to the old EC
- However, it's 1 lb/gallon [AI], lower than the older Tempo EC (2 lbs/gallon [AI])
- We will look at this label in more detail

Other Contact Insecticides

- Insect growth regulators pyriproxyfen (Nylar) hydroprene (Gentrol), and methoprene (Diacon II); various DE formulations are general surface treatments
- There are others that are limited to spot and or crack and crevice treatments

Summary

- Generalized presentation of research with grain protectants, aerosols, and contact insecticides
- Parallels ideas to be discussed in the general workshop training session

Objectives for Workshop Session

- Will discuss practical problems and considerations when applying insecticides
- Examine selected insecticide labels (Storicide II, Conquer, and Tempo) and calculate some application rates for different scenarios
- Illustrate some of the concepts described in the classroom presentation

More on Workshop Session

- Emphasis will be on discussion with trainers and fellow peers and participants
- Some of you will have experiences with these insecticides that we all need to hear
- Opportunity to learn from each other, and from the trainers

Trainers

- Frank Arthur, USDA-ARS, Manhattan KS
- Patricia Hottel, McCloud Services, Chicago IL
- Jim Sargent, Copesan Services, Menomonee Falls WI
- Jeff Weier, Sprague Pest Solutions, Tacoma WA