

# *Biochemicals: Efficacy Assessment*

David Supkoff, Ph.D.

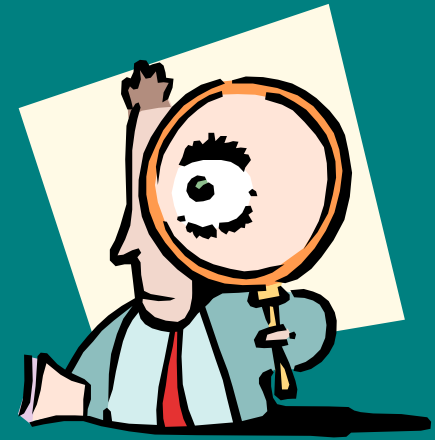
*California Department of Pesticide Regulation*

Biopesticide Registration Workshop  
November, 2000

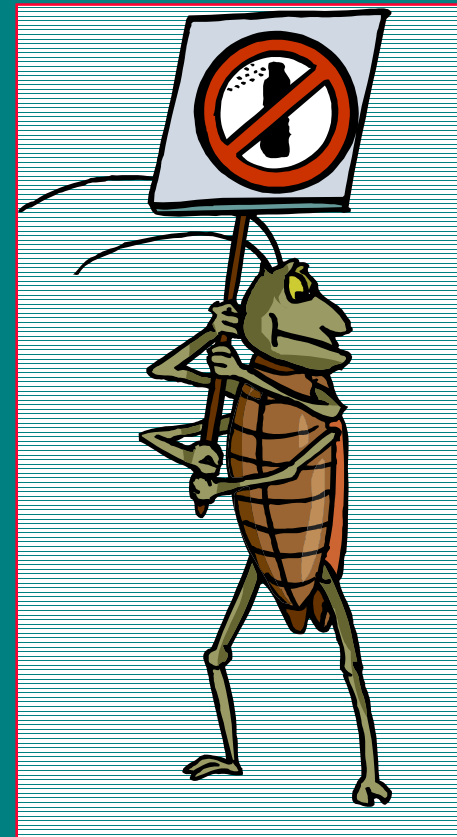


# What are Biochemicals?

- semiochemicals (e.g. insect pheromones)
- hormones (e.g. insect juvenile growth hormones)
- natural plant and insect regulators
- enzymes

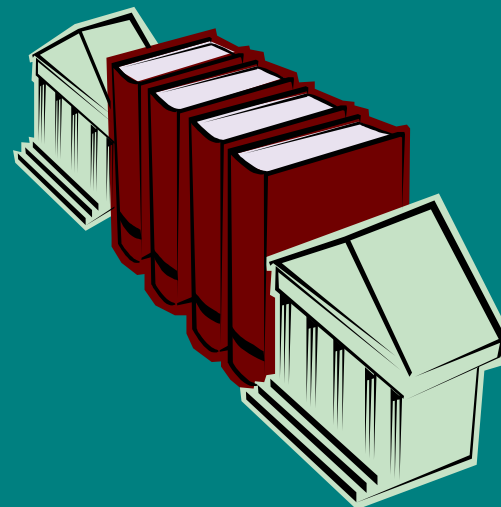


- distinguished from conventional chemical pesticides:
  - low use volume
  - unique modes of action
  - target species specificity
  - often occur naturally



# California Efficacy Requirements

- Generally Follow USEPA Guidelines  
Subdivision G -  
Product Performance
- Applies to Pesticides  
and Adjuvants



# Basic Concepts

- Data must address label claims and uses, and demonstrate efficacy when used according to the label directions
- Data must demonstrate that the user can expect a consistent, significant benefit from the use of the product

# Basic Concepts

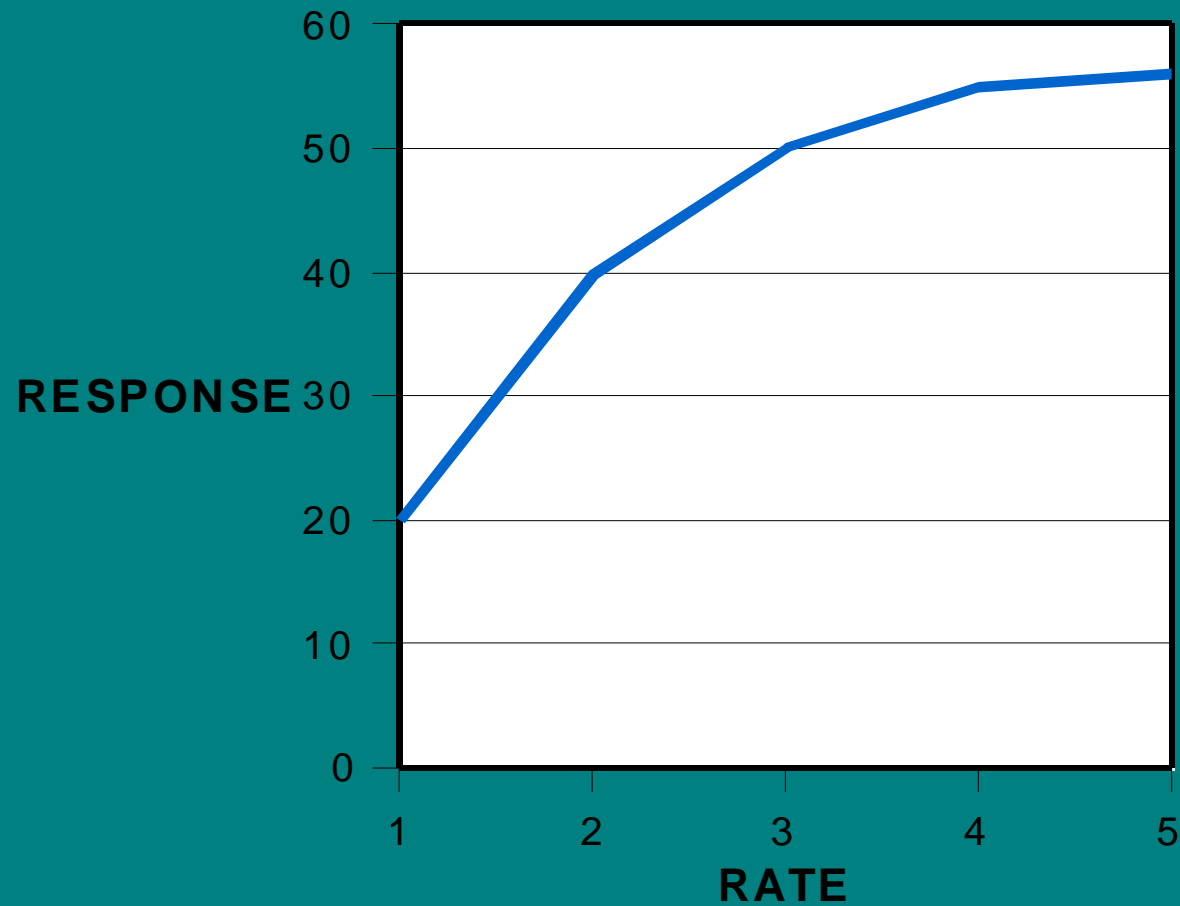
- Each Registrant Supports their Product
  - No “Cite-all” process
  - Develop your own data
  - Obtain a letter of authorization
  - Make use of public literature and university Studies and recommendations

# Scientific Credibility

- Rate-Response Relationship
- Mode of Action
- Scientific Rationale



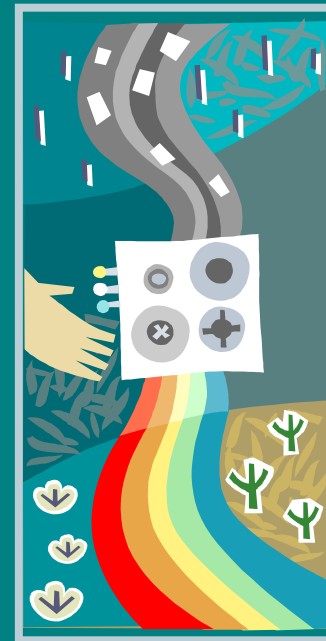
# Rate-Response Relationship



# Mode of Action

- Plant Growth Regulators and plant hormones effect specific developmental processes:

- Fruit enlargement
- Fruit ripening
- Breaking dormancy



# Mode of Action

- Semiochemicals such as insect pheromones act by modifying behaviour of pest species

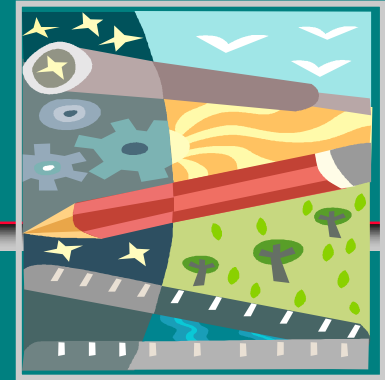


# Efficacy Field Trials



- Use proper experimental design
- Adequate replication in space and time
- Represent California conditions
- Use appropriate statistical analyses

# Field Trial Design



- Randomized complete block trial design
- Pretreatment and post-treatment counts for insecticides, nematicides, fungicides
- Have adequate controls
- Use several rates to demonstrate that the selected label rates are appropriate

# Location of Efficacy Trials



- Generally California studies are required for field trials
- Data from other states are supportive and should be submitted, especially for new active ingredients
- Run trials at several locations based on where crops are grown and labeled use

- For new formulations of registered products
  - Develop adequate bridging data to the registered product to show similar activity

# Analysis of Data



- Use appropriate statistical analyses
- Present the results of all trials
- Efficacy is determined by the consistency of treatment effects, not on the basis of an individual study result

# Phytotoxicity Data



- Must demonstrate safety of formulated product to crops/plants being treated
- Usually use injury ratings or other parameters (e.g. yield)
- At a minimum, document lack of phytotoxicity as part of efficacy trials
- Can run 2x rates or higher to demonstrate a margin of safety