



NAFTA Technical Working Group on Pesticides
Grupo de Trabajo Técnico del TLCAN sobre plaguicidas
Groupe de travail technique de l'ALENA sur les pesticides

PHEROMONES: RISK ASSESSMENT AND DECISION MAKING

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Pheromones are Biochemical Pesticides

- ◆ Pheromones are classified as biochemical pesticides by USEPA
 - ❖ Naturally occurring
 - ❖ Non-toxic mode of action on targeted pest species



ASSESSING RISKS TO HUMANS, ENVIRONMENT

- ◆ **No adverse effects reported in more than 10 years of use of lepidopteran pheromones as pesticides**
- ◆ **No risk to human health or environment expected based on low toxicity in animal testing, high target specificity, and low exposure to humans and the environment**



Exemptions for Pheromones

◆ FIFRA

- ❖ Registration: Arthropod pheromones exempt as sole active ingredient(s) in traps (otherwise registration required)
- ❖ EUPs: not req'd < 250 acres

◆ FFDCA/Food Tolerance

- ❖ Arthropod pheromones in retrievable polymeric matrix dispensers, 150 g/acre/yr
- ❖ Certain lepidopteran pheromones when applied up to 150 g/acre/yr)



DATA REQUIREMENTS FOR PHEROMONES

- ◆ **Product Chemistry - not waived**
- ◆ **Tier I toxicity studies - usually waived**
- ◆ **Non-targets - usually waived**



Risk Assessment: Dependent on Type of Pheromone

If a new pheromone is not a straight-chain lepidopteran pheromone, and/or it is not in a trap, or has potential for higher exposures, the data requirements and risk assessment is similar to other biochemical pesticides



Risk Assessment: Dependent on Exposure & Use Pattern

- ◆ Retrievable dispensers - attached to trees or to stakes in the field slowly release the pheromone over a period of weeks
- ◆ Sprayable formulations



Example: Retrievable Dispensers

- ◆ Attached to trees or to stakes in the field
 - ❖ Slow release of pheromone over a period of weeks
 - ❖ Dermal exposure: negligible
 - ❖ Inhalation exposure: negligible

- ◆ Decision to register based on:
 - ❖ **very low exposure, risk to workers & non-targets**
 - ◆ 0 hour reentry interval appropriate



Example: Sprayable Bead Formulations

- ◆ **Dermal exposure: negligible**
- ◆ **Inhalation: exposure on the order of ppm**
- ◆ **Decision:**
 - ❖ **very low exposures, risk to workers & environment is low**
 - ◆ 0 hour reentry interval appropriate



DECISION MAKING:

EPA has registered over 20 lepidopteran pheromones, and more than 60 individual pesticide products containing these active ingredients to control approx. 21 different pests

Newest: Z-11 hexadecenyl acetate



Non-Lep Pheromones

(Z)-9-Tricosene

Produced by female house flies to attract males. Used in traps and "fly paper" strips to attract male flies to prevent mating.

(R,Z)-5-(1-decenyl)dihydro-2(3H)-Furanone (Nuranone)

Produced by female Japanese beetles to attract males. Used to lure male Japanese beetles into traps to prevent mating.



Boll Weevil Aggregation Pheromone (4 Active Ingredients)

Attracts cotton boll weevils to a malathion trap (Attract/Kill)

Pheromone mixture has no known toxicity

Malathion inside the trap prevents exposure to non-target organisms



Trimedlure: A New Non-Lep

4-(or 5-)Chloro-2-methylcyclohexane-carboxylic acid, 1,1-dimethyl ester

- ◆ Female Mediterranean fruit flies produce to attract males for mating
- ◆ Approved for use in the manufacturing of products intended to attract males to traps, which may contain toxic materials (Attract/Kill)



Pheromone-Like

3-Methyl-2-cyclohexene-1-one (MCH)

Used in forests to repel/protect trees from spruce beetles and Douglas fir beetles.

Small amounts of MCH are attached to dead trees, beetles are prevented from aggregating on the dead trees and from large scale reproduction.

Produced by infested/dying trees=semiochemical



4-Allyl Anisol: Newest AI

- ◆ Intended to protect conifers in forests, parks & recreation areas from bark beetles, including the southern pine beetle (*Dendroctonus frontalis*), that feed, mate, & reproduce on the trees
- ◆ Beetles are prevented from aggregating, feeding on trees & from large scale reproduction.
- ◆ Naturally produced by infested/dying trees

