



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

# Biopesticides Registration Workshop - Pheromones

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# Pheromones and Semiochemicals

- ◆ Data requirements for pheromones and semiochemicals are harmonized between the Environmental Protection Agency (EPA) and the Pest Management Regulatory Agency (PMRA).
- ◆ California has concurrent review with US EPA for semiochemical products.



# Value and Efficacy Data

- ◆ Applicant must provide objective information regarding:
  - ❖ Pest biology, type and extent of the damage and economics of the pest problem,
  - ❖ Crops/sites which are affected by the pest,
  - ❖ Geographic distribution of the pest problem,
  - ❖ Performance data to support proposed label claims of EP (e.g., proposed rate, use conditions and control claims).
  - ❖ Contribution of the EP to risk reduction and sustainable pest management in the specific crop.
  - ❖ Summary of currently available pest management tools for proposed use.



# Semiochemical Value Data Requirements

Value (required for each pest/site combination)

Value Summaries

Efficacy Studies

Mode of Action - TGAI

Description of Pest Problem

Efficacy Trials (EP)

Small Scale Trials Lab, Greenhouse

Field Trials/Operational Use Trials



# Semiochemical Value Data Requirements

Adverse Effects on Use Site (EP)  
Adverse Effects to Crop (phytotoxicity),  
Host Animals, Rate of Application  
Economics  
Sustainability  
Survey of Alternatives (chemical and non-  
chemical)  
Compatibility with Current Management  
Practices Including IPM  
Resistance Management  
Contribution to Risk Reduction



# Mode of Action

- ◆ Semiochemicals act by modifying behaviour of the pest species rather than killing it,
  - ❖ more target specific than conventional insecticides,
  - ❖ used at concentrations close to those occurring in nature, and
  - ❖ dissipate rapidly.
- ◆ Applicants must describe the mode of action of semiochemical in modifying the behaviour of the target pest (e.g., controls the pest population through mating disruption, acts as an attractant in a pesticide bait).



# Product Performance Review

- ◆ Validate use claims and use recommendations on the proposed EP label.
- ◆ Data regarding EP pest/host range needed to establish the lowest effective dose and optimum application timing.
- ◆ Nature and extent of control or management of the pest or disease problem.
- ◆ Assess beneficial or adverse effects on the host crop and the crop production system.



# Product Performance Review

- ◆ Important to assess safety to non-target organisms,
- ◆ Relative effectiveness of proposed EP in comparison to currently available control options (chemical and non-chemical) and compatibility with IPM programs.



# Efficacy Directives and Guidelines

## PMRA

- ◆ DIR93-07a Guidelines for Efficacy Assessment of Chemical Pesticides
- ◆ DIR93-07b Guidelines for Efficacy Assessment of Herbicides and Plant Growth Regulators
- ◆ DIR96-01 Guidelines for Efficacy Assessment of Fungicides, Bactericides and Nematicides
- ◆ T-1-215 Efficacy Data for Antimicrobial Products
- ◆ Documents 93-07a, 93-07b, 96-01 are being updated as PRO-XX
- ◆ All documents cited available on the PMRA website: <http://www.hc-sc.gc.ca/pmra-arla/>



# Efficacy Directives and Guidelines

## EPA

- ◆ **Pesticide Assessment Guidelines, Subsection G: Product Performance.**
- ◆ **California generally follows above guidelines for reduced risk products.**



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

- ◆ Technical pheromone active ingredient, Z-11-tetradecenyl acetate and EP, 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm (BHF Pheromone) reviewed under the PMRA User Requested Minor Use Registration (URMUR),
- ◆ First consideration by PMRA of a pheromone EP applied directly to a food crop,
- ◆ BHF Pheromone had already been registered in the U.S., so the PMRA was able to use the reviews completed by the EPA their assessment.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Proposed use

- ◆ BHF Pheromone is a microencapsulated formulation containing 20% of the active ingredient.
- ◆ Proposed for control of blackheaded fireworm in cranberry fields through mating disruption.
- ◆ Pheromone acts on the adult moth by causing mating disruption; must be present in the field throughout the adult moth flight periods at sufficient levels to mask the natural pheromone produced by female moths.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Proposed Use (cont'd)

- ◆ Applied at a rate of 222 mL of product (44 g a.i.) per hectare just prior to the start of the spring (first) and summer (second) generations moth flight periods,
- ◆ Repeat applications made at 2-3 week intervals during each adult flight period.
- ◆ Optimum timing of applications by monitoring moths with pheromone traps and routine inspection of foliage/fruit for larvae and damage,
- ◆ Application by ground boom sprayer, aerial equipment, or through irrigation equipment.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

- ◆ Results submitted from field trials conducted in 1996 and 1997 in British Columbia, Washington and Wisconsin
- ◆ Efficacy assessed by recording trap catches of male moths on a weekly basis in pheromone-baited traps in the treated and untreated plots,
- ◆ Treatment considered effective if low numbers of male moths are caught in the traps in the treated plots while high numbers of male moths are caught in the untreated plots,
- ◆ Reduction in trap catches in the treated plots interpreted as disruption of pheromone communication by male and female moths.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## 1996 Trials:

- ◆ Trials conducted in 1996 at sites located in Washington (three sites) and Wisconsin (three sites)
- ◆ Two to three applications of BHF Pheromone were made at a rate of 89 g a.i./ha/application
- ◆ Treatments were applied either by helicopter, mist blower or through the irrigation system



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## 1996 Trials (cont'd):

- ◆ In Washington sites, trap catches of male moths in the treated plots were reduced by 90–100% compared with the untreated plots
- ◆ In Wisconsin sites, reductions in trap catches ranged from near zero at one site to 85–95% at another site (due to treatments applied prior to beginning of moth flight period),



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## 1997 Trials:

- ◆ Trials conducted in 1997 in British Columbia (2 sites), Washington (3 sites) and Wisconsin (3 sites)
- ◆ Application rates of 44 and/or 89 g a.i./ha were evaluated
- ◆ One to four applications applied to coincide with the first and second generation moth flight periods.
- ◆ Trap catches of male moths were reduced by 75–100% following treatment with BHF Pheromone in 7 of 8 sites compared with untreated plots.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## 1997 Trials (cont'd):

- ◆ Trap catches of male moths were significantly reduced following application at the sites in British Columbia, Washington and Wisconsin.
- ◆ In trials that directly compared the performance of both rates, treatments at a rate of 44 g a.i./ha were similar in duration and effectiveness to 89 g a.i./ha.
- ◆ Larval populations following the pheromone treatment were also assessed in treated and untreated plots.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## 1997 Trials (cont'd):

- ◆ No significant correlation between reductions in trap catches of male moths and subsequent reductions in larval populations in the treated fields.
- ◆ Possibly due to limitations in sampling techniques rather than an indication that the pheromone treatments were ineffective in disrupting mating.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Value conclusions and recommendations

- ◆ Efficacy data suggest that the product is effective in disrupting pheromone communication in male moths when applied during the moth flight periods
- ◆ There was no significant correlation between reductions in trap catches of male moths and reductions in subsequent larval populations in the submitted studies.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Value conclusions and recommendations (cont'd)

- ◆ BHF Pheromone is a potentially useful tool in the management of blackheaded fireworm in commercial cranberry fields.
- ◆ BHF Pheromone will likely be most useful in a pest management program to complement the use of insecticide treatment rather than replace chemical insecticides completely.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Regulatory Decision

- ◆ PMRA granted temporary registration of the technical grade active ingredient and EP formulation BHF Pheromone and requested comments from the public on their future regulatory status.



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Comments received from the public regarding the efficacy of this pheromone product

- ◆ Trials do not demonstrate mating disruption,
- ◆ Reduction in trap catches were not correlated with reductions in larval populations,
- ◆ Reductions in trap catches not proven to be associated with reductions in mating and subsequent damage by larvae,
- ◆ Trap catch data showed only a disruption in communication



# 3M Sprayable Pheromone for Mating Disruption of Blackheaded Fireworm

## Data from other studies assessed the effect of BHF Pheromone on the mating success

- ◆ Mating success of caged virgin female moths in treated plots was compared to that in untreated plot.
- ◆ Mating success of female moths in treated plots was reduced by 73–100%, compared to that in untreated plots, for a period of 3–4 weeks following application
- ◆ Demonstration of mating disruption of blackheaded fireworm by BHF Pheromone.

