

US EPA ARCHIVE DOCUMENT



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

Biopesticides Registration Improvement Course

Risk Assessments of Pheromones & Semiochemicals 5.5



Russell S. Jones, Ph.D., Sr. Biologist

U.S. Environmental Protection Agency

Office of Pesticide Programs

Biopesticides and Pollution Prevention Division



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The views in this presentation are not intended to be used to formulate or support any EPA decision or position. Discussion of pesticide products in this presentation does not constitute EPA endorsement of these products.





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Overview

- Pheromones
 - Arthropod Pheromones
 - Straight-Chain Lepidopteran Pheromones (SCLPs)
 - All Other Pheromones
- All Other Semiochemicals



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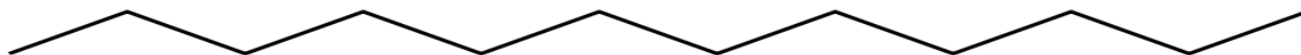
Arthropod Pheromones

- Phylum Arthropoda
 - insects, arachnids, crustaceans
 - non-toxic/non-lethal mode of action
 - target pest specificity
 - effective at low rates; at or below background levels

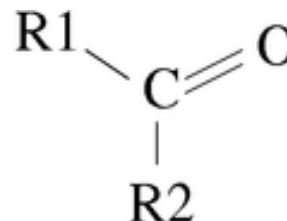
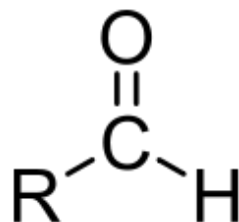
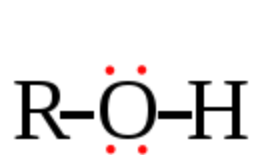


Straight-Chain Lepidopteran Pheromones (SCLPs)

- unbranched aliphatic chain (between 9 and 18 carbons)



- ends in an alcohol, aldehyde or acetate functional group



- contains up to 3 double bonds



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Straight-Chain Lepidopteran Pheromones (SCLPs)

- Majority of known pheromones produced by insects in the order Lepidoptera
- butterflies and moths





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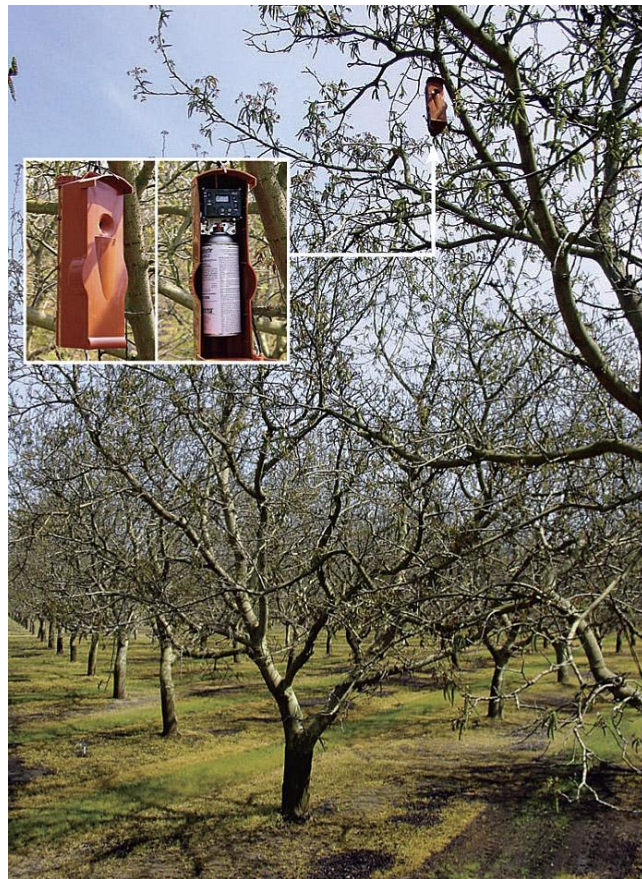
Arthropod Pheromone Products

- Most pheromone products = Arthropods
- Most arthropod products = SCLPs
- Passive/Active dispensers/Traps
- Sprayable encapsulated



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Arthropod Pheromone Products





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Pheromone Hazard/Risk Assessment

Product Chemistry

Toxicity

Exposure



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Pheromone Hazard/Risk Assessment

- generally volatile
- dissipate rapidly in the environment
 - photo-oxidation
 - enzymes
 - e.g. Gossyplure $\frac{1}{2}$ life approx. 29-50 hrs



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Pheromone Hazard/Risk Assessment

- Dispensers - no residues detected on food
- App rates at or below background
 - Individual codling moth = 240 ng/hr
 - infestation = 17,000 – 380,000 females/A
 - up to 91 mg pheromone/A/hr (OECD, 2001)
 - up to 1.1 g/A/day (12-hr day)
 - up to 8.7 g/week
 - up to 452 g/year



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Pheromone Hazard/Risk Assessment

- Codling Moth Dispenser Products
 - typical recommended rates for CM
 - = 20 g/A/application
 - no more than 150 g/A/year
- Human health/non-target impacts not expected from exposure



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Pheromone Hazard/Risk Assessment

- SCLPs = Minimal toxicity (OECD, 2001)
 - No acute toxicity or mutagenicity
 - No subchronic tox
 - No developmental tox
 - Rapidly metabolized by enzyme systems



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SCLPs & Other Arthropod Pheromones

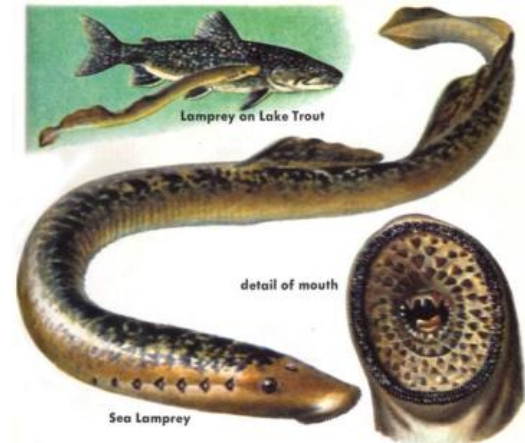


- Arthropod Pheromones: Non-Target Organism Data Are Not Required
- SCLPs: Human Health & Non-Target Organism Data Are Not Required



Other Pheromones/Semiochemicals

- Lamprey Mating & Migration Pheromones
- Other animal pheromones & semiochemicals
- Evaluated as any other Biochemicals



Pheromones in Animals





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Resources for Pheromones

Touhey, J.G. (1990) “A review of the current bases for the United States Environmental Protection Agency’s policies for the regulation of pheromones and other semiochemicals, together with a review of the available relevant data which may impact the assessment of risk for these classes of chemicals. Part No. 1, Straight Chain Alcohols, Acetate Esters and Aldehydes”.

(Unpublished report, 474 pp.)



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Resources for Pheromones

- Touhey, J.G. (1990) “Pheromone White Paper”
- Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control. OECD SERIES ON PESTICIDES Number 12 (2001)

<http://www.oecd.org/dataoecd/44/31/33650707.PDF>



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Resources for Pheromones

- Lepidopteran Pheromones Fact Sheet

http://www.epa.gov/oppbppd1/biopesticides/ingredients/factsheets/factsheet_lep_pheromones.htm

Exemptions from the requirement of a tolerance

- 40 CFR § 180.1124 Arthropod Pheromones
- 40 CFR § 180.1122 Inert ingredients of semiochemical dispensers
- 40 CFR § 180.1153 Lepidopteran pheromones

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=acb8dfd1077a24ab37686342bd006f19&tpl=/ecfrbrowse/Title40/40cfr180_main_02.tpl



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Commonly Seen Problems / Issues

- Product chemistry
 - inerts in food-use EPs not cleared for food use (sprayables)
- *“Its just like an SCLP, so it must be exempt!!!”*
- Impurities/isomers are “actives”?



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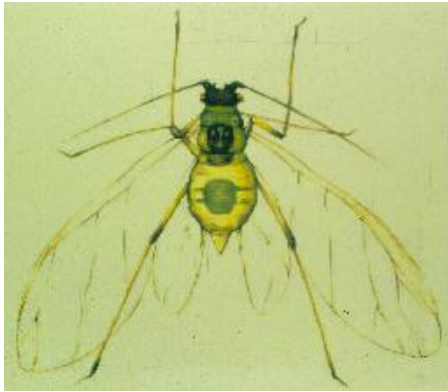


photo: Littler & Littler, 2000, Caribbean Reef Plants

