Integrated Pest Management in Hemp

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Getting to know you





Who are you?



Integrated Pest Management Systems approach Uses complimentary tactics

Minimizes impacts of activities



The Economics of Pest Management

- Injury physical harm or destruction caused by the presence or activities of a pest
- Damage monetary loss as a result of injury
 - How much loss is the pest causing?
 - How much will it cost to control the pest?

Example: Strawberries



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The Economics of Pest Management Economic injury level: cost to control = amount of damage caused



The Economics of Pest Management

- Economic injury level: cost to control = amount of damage caused
- Economic threshold:

population density managed to prevent economic injury





Management, not eradication

Proactive, not reactive Strong emphasis on Monitoring Cultural controls Mechanical controls Biological control



Sensible chemical control as a last resort VERMONT

Pest <u>and</u> natural enemy identification is crucial for success

The more you know about pest and natural enemy biology the better



Cultural Control Resistant varieties Crop rotation Intercropping Sanitation Phenological asynchrony





Mechanical Control Tilling & Cultivating Hand Picking Sticky traps/fly paper Physical barriers Vacuuming











Biological Control 3 approaches Classical Augmentative Conservation **Biocontrol agents:** predators parasitoids entomopathogenic fungi, nematodes, viruses, etc.



Chemical Control Contact insecticides Systemic insecticides Biopesticides Semiochemicals Chemosterilants Insect Growth Regulators

*The label is the law!







Aphids



Give birth to live young: populations increase quickly

Can develop wings when populations are dense and move to new areas

Feed on plant sap and secrete honeydew Honeydew can lead to black sooty mold

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Things to look for



Varnished appearance of leaves covered with honeydew White exoskeletons (molted skins)



Cannabis aphid (Phorodon cannabis)

ID Feature: stubby



The horns are visible with a hand lens



Two Spotted Spider Mite



Sexual reproduction: Eggs round and translucent Adults and nymphs are small and live in colonies usually on undersides of leaves Prefer hot dry environments

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Not in Vermont yet? Almost microscopic Large populations can develop undetected Symptoms Yellowing leaves Leaf rolling Loss of vigor

CAREFULLY SCOUT ALL PURCHASED PLANT MATERIAL!! OUT OF STATE



Other Arthropod Pests

Other arthropod pest reported in greenhouses Western Flower Thrips Whiteflies **Broad mites Fungus Gnats** MOSTLY AN ISSUE FOR GREENHOUSE PRODUCTION **DEVELOP AN IPM PROGRAM TO CONTROL**

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Other Arthropod Pests

Other arthropod pest reported in hemp fields





Hemp flea beetle

Hop aphids



Tarnished plant bugs



Grasshoppers



Bertha armyworm



Cutworms



Stink bugs



Japanese beetle



European corn Borer



Hemp borer



Powdery Mildew





Powdery Mildew Life Cycle



Obligate parasite: NEEDS LIVE HOST TO SURVIVE Found on upper surface of leaf Free moisture inhibits infection Select resistance varieties Good aeration important Infected hemp can be extracted



Powdery Mildew progression





Botrytis (Grey Mold)





More Botrytis





Botrytis Life Cycle



Botrytis can live on living or dead plant tissue Botrytis kills host cells Infected tissue should not be extracted

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Greenhouse

Avoid wetting leaves



As flower buds mature, check for botrytis



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Pythium Root Rot An issue for seedlings and transplants



ID feature: Outer root cortex slides off



Pythium can also cause Damping Off







Good Sanitation Prevents Most Root Rots

Take care with recirculated irrigation water

Avoid overwatering

Clean all surfaces that roots will touch

Sterilize all pots and tools after removing debris

Wash hands after handling diseased roots



Thank You

Questions?



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