Identifying and Managing Arthropod Pests in Hemp

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Identifying and Managing Arthropod Pests in Hemp

Getting to know the arthropods of Northeastern hemp fields

- Aphids, spider mites, etc.
- Beneficials

The basics of Integrated Pest Management in hemp

- Economics
- Various control strategies

Cannabis aphid (other aphids)

Found on leaves and stems

Winged and wingless forms

Cream color (outdoors, early in season)

Change color later in season (light green to pale pink to light brown)

Feed on fluid in phloem (often little to no leaf symptoms)

Populations slowly grow as the season progresses

High populations cause reduce plant vigor, slow growth, wilting and leaf yellowing

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Cannabis%20aphid%20October%202018%20revision%20(1).pdf

Two Spotted Spider Mites

Very small (often on leaf undersides)

Bodies are straw color to green

Pair of large, dark spots on each side of body

Cast skins and eggs (and egg shells) are distinctive

Leaf flecking symptoms on leaves

Extensive webbing may be visible when infestation is severe

Populations explode during hot and dry conditions

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Twospotted%20spider%20mite%20with%20photos.pdf

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Hemp Russet Mite

Not yet known in Vermont

Minute in size (require 15-20 X mag.) Mostly on leaf underside; may develop on stems

Leaves can become small and brittle; can cause bronze/gold color. slight upward rolling may occur

Most damage on developing buds

In severe infestations leaves become a duller color (appear slight gray or bronze) and growth suppressed

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Hemp%20Russet%20Mite%20Revision%20December%202018.pdf

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European Corn Borers

Hemp is not preferred host

Damage to stalks and stems causing them to break

peak 1st flight late June to early July in VT

If enough degree-day accumulation, 2nd flight in Aug.

Second flight can cause damage to buds

Photo credit: Smith, Auburn University, Bugwood.org.

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Japanese beetles

Hemp generally not favored

Grubs feed on roots

Adults early July through beginning of August

Leaves show chewing damage (skeletonized)

https://hempinsects.agsci.colostate.edu/faq/

https://ipcm.wisc.edu/blog/2020/02/videos-from-2020-wisconsin-agricultural-outlook-forum/

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Flea Beetles

Tiny beetles (different species may occur)

Larvae feed on plant roots (damage is not significant at this stage)

Adults cause small “shot holes” wounds on leaves

Large populations when plants are young may affect plant growth (damage growing points)

A couple of generations - June/early July, late August/September.

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Flea%20beetles%20with%20photos.pdf

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Leafhoppers (Potato Leafhopper)

Small with elongate body

Feed on leaves and stems

Adults are winged; readily jump and fly when disturbed

Main symptom “hopperburn” also small white flecks

PLH blown in on weather currents in early June. Can have several generation

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Potato%20leafhopper%20Hopperburn.pdf

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Thrips

Small, soft body, elongate (wingless immatures)

dark specks (insect feces) usually present

Feeding damage on young leaves cause leaf distortion

Aggregate on leaf undersides and youngest tissue

Symptoms are stippling (small white areas at feeding sites)

Multiple generations per season (temp. dependent)

https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Thrips%20with%20photos.pdf

Lygus Bug (Tarnished Plant Bug)

Oval shape body and flatted on the back

Several species (colors and sizes vary)

Minimal leaf damage; more important in seed production and quality (oilseed crop)

Destroy plant cells during feeding

Feeding concentrated on younger tissue (leaves, flowers, seeds)

Symptoms include new growth distortion, flower abortion and deformities of seeds.

Present in low numbers throughout the season




https://webdoc.agsci.colostate.edu/hempinsects/PDFs/Lygus%20Bugs%20with%20photos.pdf

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Other Insect Pests in Hemp

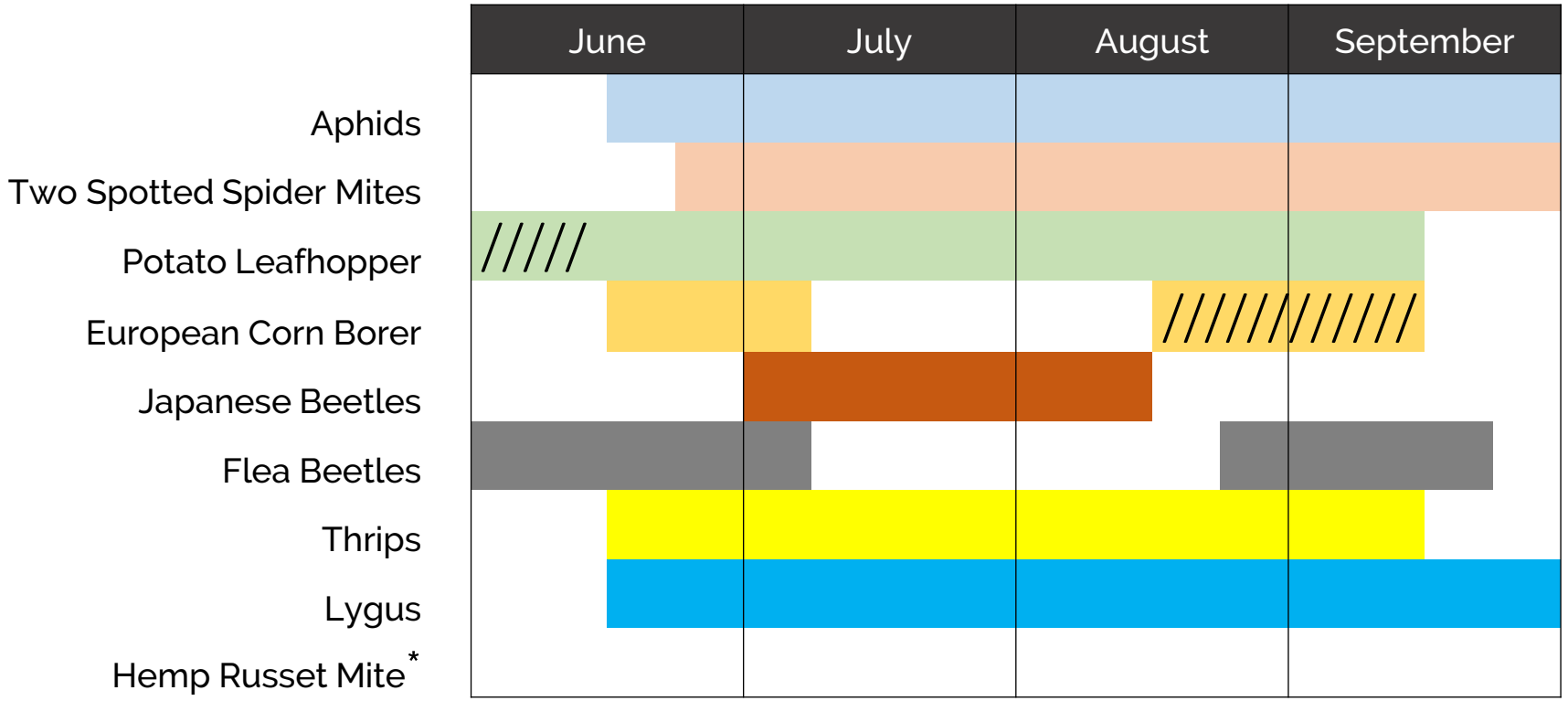
Cutworms

Stink bugs

Grasshoppers

Bertha armyworm

A Season of Pests



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Know The Good Guys Too!

Lacewing adult

Minute pirate bug

Parasitoid wasps

Lacewing egg and larva

Lady beetle larvae and adults

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Know The Good Guys Too!

Spider mite destroyer

Predatory mites

Hover fly

Spined soldier bug eggs, larvae, and adult

Spiders

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The Basics of Integrated Pest Management

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: Japanese Beetle

The Basics of Integrated Pest Management

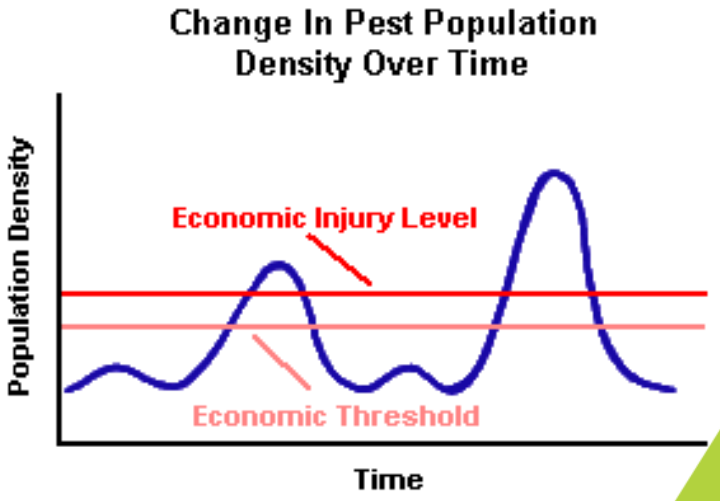
The Economics of Pest Management

Economic injury level:

when cost to control = amount of money lost

Economic threshold:

population density managed to prevent economic injury



The Basics of Integrated Pest Management

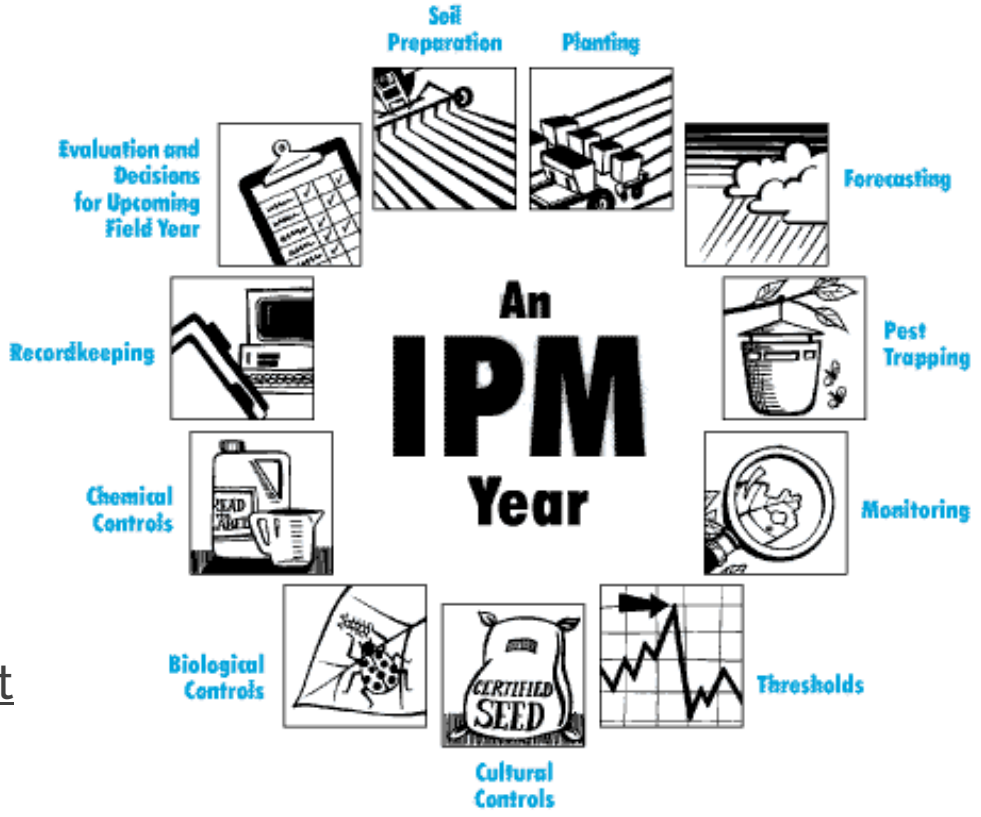
Management, not eradication

Strong emphasis on

- Monitoring
- Cultural controls
- Mechanical controls
- Biological control

Proactive, not reactive

Sensible chemical control as a last resort



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MONITORING

Weekly scouting

Industrial Hemp Arthropods - IPM Scouting Form

Farm/Field: _____

Crop use/Cultivar: _____

Scout: _____

Date: _____ **Time:** _____

Crop Stage (circle): germ/emerg vegetative (true leaf stage) flower/seed formation

Procedure: Walk in a W-shape pattern, being sure to cover all quadrants of the field. Make 20 stops and randomly inspect **5 leaves on 3 plants** - make sure to check both leaf surfaces and include different sections on each plant (top, mid and lower). At each stop, record **incidence** (number of individuals) and **severity** (% total leaf damage) for each arthropod listed. Note presence of other pests or disorders. Take same number of paces (25 steps for example) between stops to cover the entire field. Inspect stems, crown and roots if plant appears yellow, stunted or wilted. When necessary, samples will be collected and brought back to laboratory for further analysis and diagnosis.

	Arthropod (incidence and severity)												Notes
	Aphids		Spider Mites		Flea Beetles		Leaf-hoppers		Thrips		Other		
Stop	Inc	Sev	Inc	Sev	Inc	Sev	Inc	Sev	Inc	Sev	Inc	Sev	
1													
2													
3													

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Cultural/Mechanical controls

Burial or removal of crop residues after harvest

Autumn plowing and spring tillage to expose pests to natural enemies and the elements

Cultivation and cover cropping to keep weeds down

Planting an early adjacent trap crop

Transplanting hemp early to help seedlings harden before pests start to arrive

Biological control

Egg parasitoid *Trichogramma ostrinae* - European corn borer

Aphid midge *Aphidoletes aphidimyza* - Aphids

Predatory mite *Neoseiulus* (=*Amblyseius*) *fallacis* - spider mites

Predatory soil mite *Stratiolaelaps scimitus* - root aphids, root weevils, symphylans, pathogenic nematodes (eg. root lesion, root knot), thrips (soil pupating), and chronic spider mite problem (overwinter in soil)

Spider mite destroyer *Stethorus punctillum* - spider mite specialist (naturally occurring)

You can also promote naturally occurring predators (ladybugs, hoverflies, lacewings, spiders, etc.)

Chemical Control

Product Name
Ancora
Aza-Direct Biological Insecticide
AzaMax Botanical Insecticide Miticide And Nematicide
Azamax Botanical Insecticide/Miticide/Nematicide1
Carb-O-Nator
Crymax
EcoGarden
EcoWorks EC
Exponent Insecticide Synergist
Gemstar LC
LifeGard WG
PFR-97 20% WDG Microbial Insecticide
Preferal Microbial Insecticide
Prevasyn Insect Repellant/Insecticide
Prevasyn Insect Repellant/Insecticide2
Regalia Biofungicide
Regalia CG
Regalia Rx

http://www.kellysolutions.com/VT/showproductsbysite.asp?Site_ID=260100101

Chemical Control

In addition to the EPA-registered pesticide products that are labeled for use on hemp. In addition to these few products, Vermont will allow products to be used if they meet the following criteria:

- the active ingredient(s)has a tolerance exemption under Federal Food, Drug, and Cosmetic Act (FFDCA)
- shall only contain the active ingredients listed on State website
- must be labeled for use on unspecified food crops
- have an agricultural use label for hemp intended for commercial sale.

Chemical Control

Active Ingredient	Product Example (s)	Pesticide Type
Acetic acid	Vinagreen	Herbicide
Azadirachtin / Neem	Azamax, Azasol, Molt-X	Insecticide, Miticide, Nematicide
Ammonium soaps for higher fatty acids	Finalsan Herbicidal Soap	Herbicide
Bacillus spp.	Double Nickel, Serenade, Agree WG	Fungicide, Insecticide
Beauveria bassiana spp.	Botanigard ES	Insecticide
Isaria spp.	PFR-97 20% WDG, Preferal Microbial	Insecticide
Streptomyces spp	Mycostop, Actinovate	Fungicide
Trichoderma	Rootshield, Incept	Fungicide
Citric acid	Eliminator	Miticide, Insecticide,
Cytokinins	Agra-Rouse	PGR-General
Diatomaceous Earth	Celite 610, Diafil 610	Insecticide

https://agriculture.vermont.gov/sites/agriculture/files/documents/PHARM/hemp/VAAFM%20HEMP_Pesticides.pdf

Chemical Control

Outside of Vermont?

Check with your State

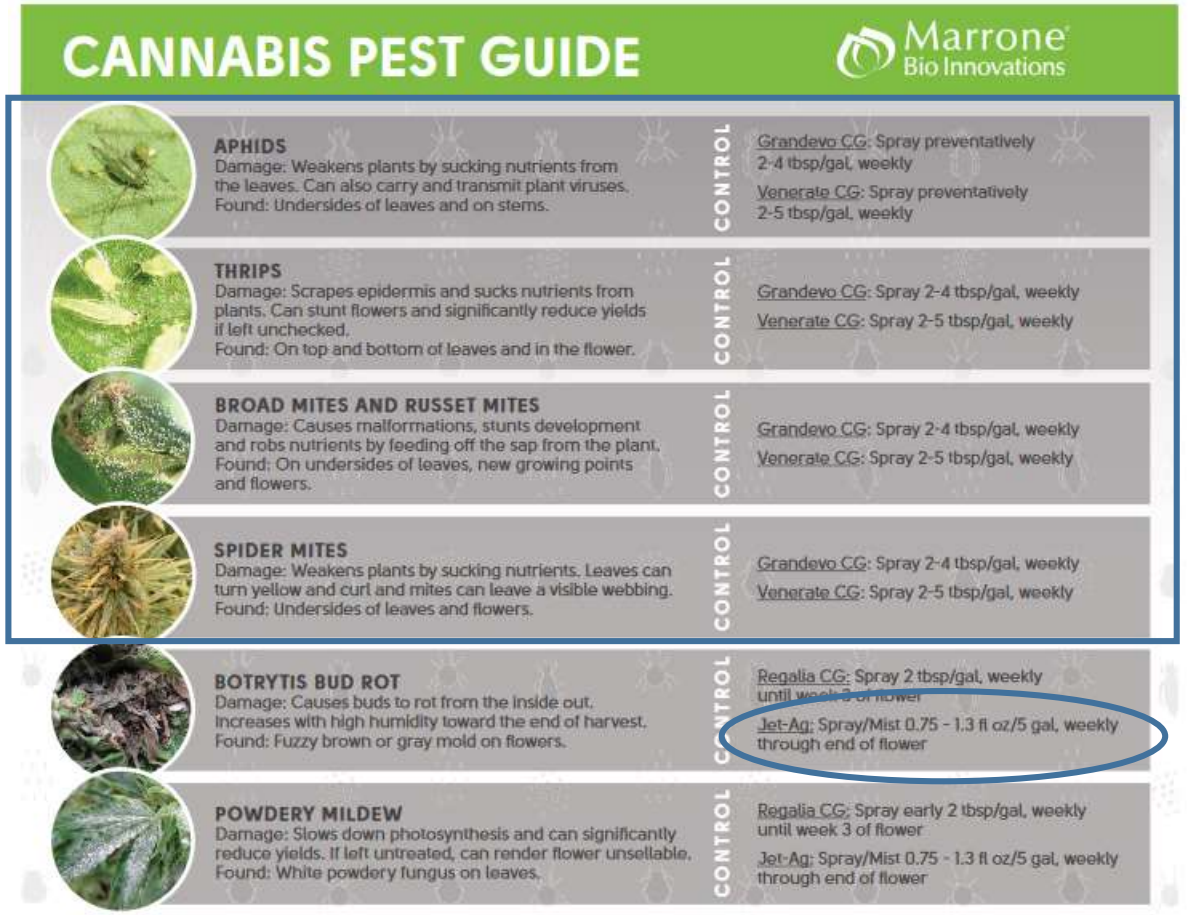
National Pesticide Information Retrieval System

http://npirspublic.ceris.purdue.edu/state/#

Remember, the label is the law…

CAVEAT EMPTOR
(LET THE BUYER BEWARE)

EPA registered, but not currently on hemp in VT



EPA registered, but not currently on anything in VT

Review

There are good things out there

- Spiders, hoverflies, lacewings, etc.

And bad things

- Aphids, spider mites, corn borers, etc

It is crucial to know both!

The basics of IPM

- Systems approach
- Economics
- Wide array of tactics

Be informed and proactive!

Thank You

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https://www.uvm.edu/extension/nwcrops/industrial-hemp

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