

Integrated Pest Management

What It Is and How To Implement It

Presented By: Liz Jones of HappBee Acres



So What Is IPM?

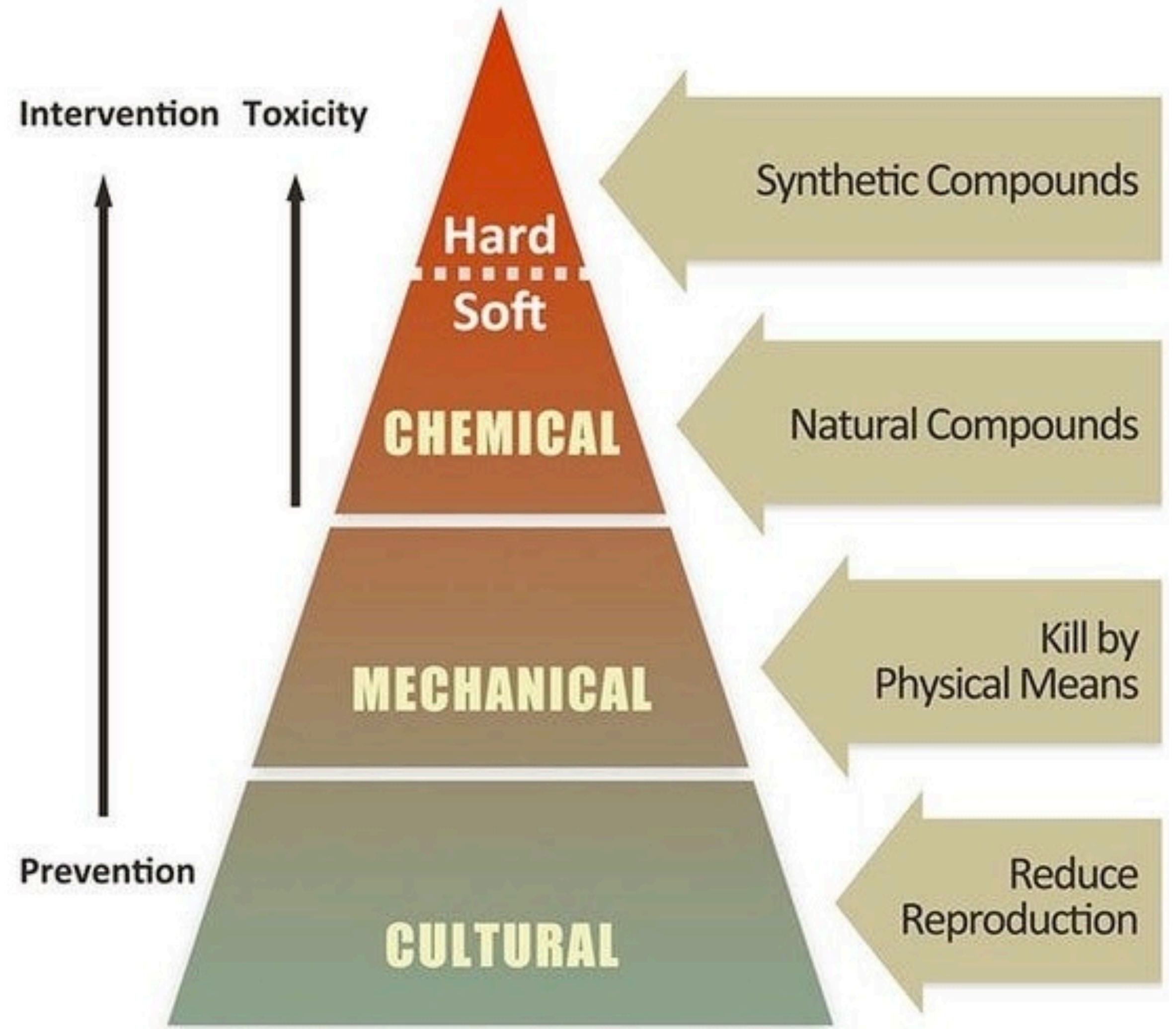
- **Proper identification of damage and responsible "pest"** - Treatment only works if it is the right treatment
- **Learn pest and host life cycle and biology** - This helps make sure you are using treatment at the right time
- **Monitor or sample environment for pest population** - Is the pest there? Numbers increasing or decreasing
- **Establish action threshold (economic, health or aesthetic)** - At what point MUST you treat
- **Choose appropriate combination of management tactics** - Use cultural or mechanical methods before using Chemicals
- **Evaluate results**- Was your plan effective or do you need to use the next steps in your treatment plan?

Your responsibilities before beginning

- Understand the pest life cycle
- Understand pest biology
- Understand bee life cycle and biology
- Determine your threshold of treatment
- Determining your plan of action

Plan of treatment

- IPM was designed to reduce reliance on Chemicals
- Originally for plants in the 1950's but developed for bees in the 1970's
- Apistan and Checkmite+ are no longer viable treatments due to overuse, a precipitating factor in developing the use of IPM



Hive Beetle

Life Cycle

- Eggs laid in clusters on pollen or bee pupae, incubate 3-6 days (relative humidity a factor)
- Larva for 13 days in hive, 3 days in soil
- Adults have a 4-6 month life span

Biology

- Fly after dusk
- Eat Pollen, Bee Bread, Bee Larva/Pupae
- Carriers of 3 known diseases including DFW
- 5 miles to find a hive
- Attracted to alarm pheromones
- Sexually mature at 1 week after emerging from ground

Identifying features

- Small beetle in hive
- Larva is white with 3 sets of front legs with NO prolegs, spikes on spine



Hive Beetle IPM

Cultural Methods

- Strong colonies that are Hygienic
- Hive placement: Full Sun in morning at least
- Soil type: Compacted soils are better, loose allows the larva to burrow

Mechanical Method

- Removing affected frames and freezing
- Actively killing beetles as you see them
- Beetle traps / jails
- Guardian Entrance

Chemical Method

- Soft:
 - Salting around hive
- Hard
 - Checkmite+ kills hive beetles
 - Permethrin 40% around hives

Wax Moth: Lesser and Greater

Life cycle

- Eggs are laid on or near brood frames- hatch in 5-8 days
- Larval stage 1-5 months temperature dependant, average being 6-7 weeks
- Pupae cocoon in white cocoon with frass and wax debris- average emergence is 37 days,
- Adults live 1 week

Biology

- Adults are active at night
- Mating occurs in hive
- Females lay eggs at night or in total darkness
- Larval stage is only stage that eats, consumes debris on bottom board or frames with brood and pollen

Identifying

- Pupae are similar in appearance, just size is different
- 3 sets of legs on front and 3 sets of prolegs in back, narrow bodies with brown head
- Leave behind silk trails and black frass
- Adults have a prominent yellow head but can range from silver gray to beige in color



Wax Moth IPM

Cultural Methods

- Strong colonies with high bees to comb ratio
- Strong queens
- Hygienic strains of bees

Mechanical Method

Cleaning bottom boards of debris

Removing infested frames and freezing

Storing comb appropriately well ventilated in well lit areas

Storing brood frames separate from honey frames

- Not storing frames for more than a year off hives
- Wax Moth Traps

Chemical Method

• Soft:

- B402 bacterial spray on frames that are stored (effective for 1 year before needing retreated)

• Hard:

- Fumigants such as Paramoth on stored frames (3oz to 7 stacked mediums, must be replenished when evaporated)

Varroa Mite (Varroa Destructor)

Life cycle

- Depending on cell size 3 or 4 eggs laid per cell
 - 1 male, the rest are female,
- Egg to adult mite takes 6-7 days,
- Females mate inside cell with male sibling, male dies, females exit and live for 27 days in brood right colony, several months in broodless colonies

Biology

- Live off hemolymph or fat bodies
- Phonetic stage; seen on backs of bees and move from bee to bee often
- Reproductive stages live under the abdominal segments of bees
- Flattened shape, allows them to fit between segments, claws allows them to firmly grasp the bees and prevent being cleaned off.
- Foundress Mite: Female mite actively reproducing, moves into cells, hides under larva in royal jelly until cells are capped
- Carries up to 30 different diseases to transfer to bees



Identifying

- Visual of mites on bees
- Punctures in brood cells
- Mites present on brood
- Deformed wing virus
- Alcohol wash, sticky board





Is this really bad?!?

Looks scary but is a benign bee louse (lice). Know your pests!

Varroa Mite IPM

Cultural Methods

- Using small cell comb
- Mite resistant or hygienic bees
- Brood breaks
- Colony spacing and distribution for drift management

Mechanical Methods

- Screened bottom board
- Drone brood frames
- Sticky board
- Varroa drop traps
- Bee Gym

Chemical Methods

- Soft
 - Natural or organic compounds- Oxalic Acid, Apiguard, Hopguard, Formic Pro
- Hard
 - Synthetic chemicals/ Pesticides- Apivar, Apistan, Checkmite+

Other pests:

- Bee Louse (lice)
 - No known Treatment
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- Yellow jackets, wasps, hornets
 - Traps in Spring for Queens
 - Strong Colonies
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- Robber bees
 - Robbing Screens
 - Strong Colonies
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- Ants
 - Treating Soil with Pesticides
 - Strong Colonies
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- Mice
 - Mouse Guards in Winter
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- Skunks
 - Raising Hives Off Ground

Thank You!

Questions?

