Ontario Ministry of Agriculture, Food & Rural Affairs

# Oriental Fruit Moth & Codling Moth

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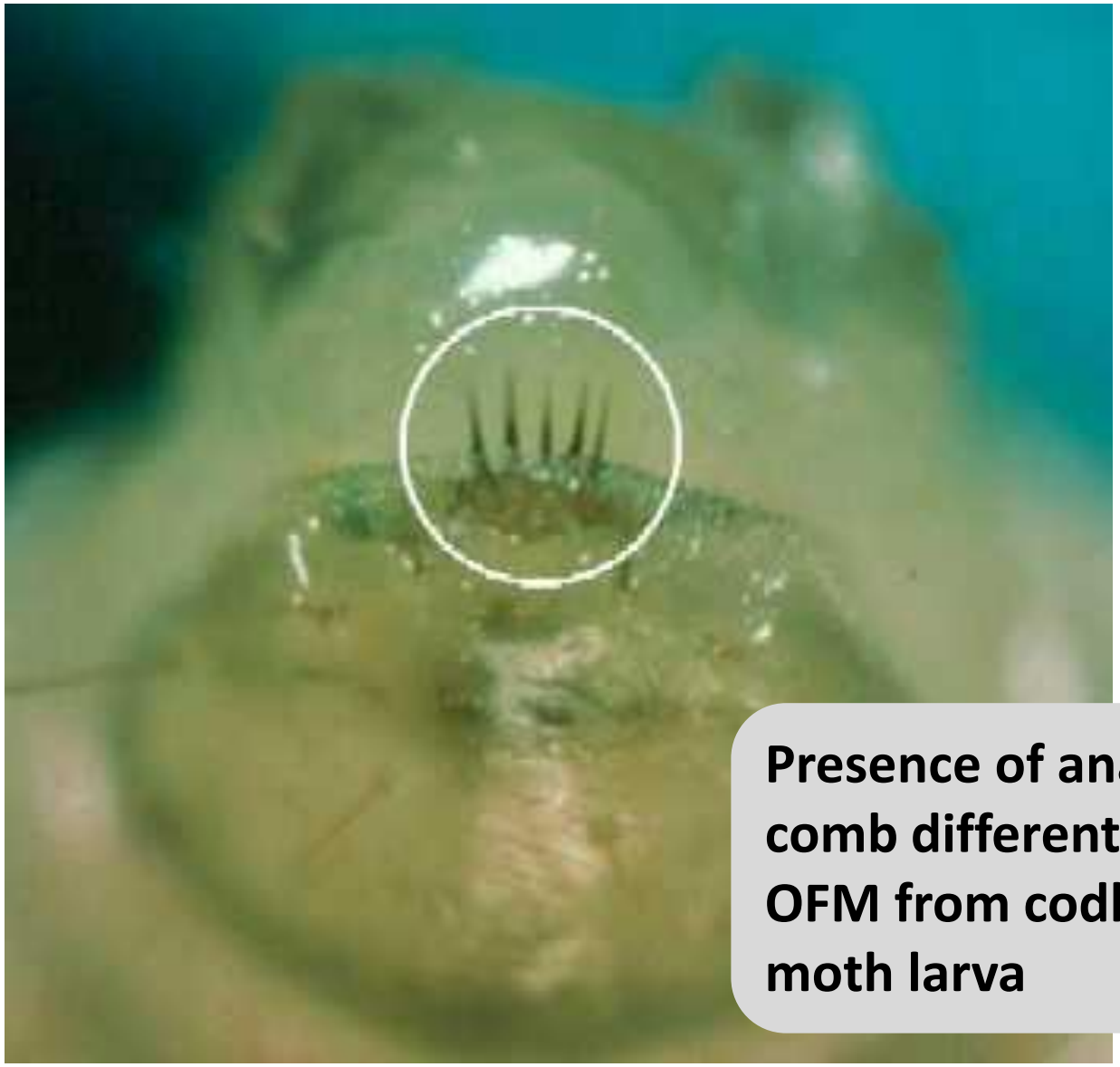
# Oriental Fruit Moth, *Grapholita molesta* (Busck)

## Larva

- cream to pink body
- brown head capsule
- frass often present

## Adult

- small moth
- mottled wing pattern
- grey / brown colour



**Presence of anal comb differentiates OFM from codling moth larva**

**First generation** attack shoots and developing fruitlets, “flagging”

Oriental fruit moth

Oriental fruit moth


**Later generations** tunnel into fruit, but avoid seed cavity
Oriental fruit moth

- OW as late instar larva under bark or leaf litter
- Adults emerge **pre-bloom**, peak flight at **petal fall**
- 3-4 generations per year

Monitoring:

- **Pheromone traps**
- Used to establish biofix (sustained catch), timing on peak and / or as “sentinel traps” for mating disruption

Oriental fruit moth

# Guidelines to using monitoring traps

**When?**

- Install traps by late April

**How Many?**

- Ideally 1 trap per 4 hectares (10 acres)
- Typically 3-5 traps per site
- >40 m apart

**Where?**

- At eye level
- At least 2 rows in from edge
- Arrange in transect through orchard

# Verify your identifications!

**Lesser apple worm – a common early bycatch in OFM traps**

Pacific Northwest Handbook

Oriental Fruit Moth

Lesser Apple Worm

P. Jentsch, Cornell

Oriental fruit moth

Thresholds

- Approx. 1 week after **upswing in trap counts**

OR

- **Degree days** (base 7.2$^{o}$C)

  1$^{st}$: 139-208 DDC

  2$^{nd}$: 750-833 DDC

  3$^{rd}$: 1305-1389 DDC and 1556-1667 DDC

Oriental fruit moth

# Codling Moth, *Cydia pomonella*

## Larva

- Newly emerged: 2-3 mm, cream with black head capsule
- Mature: 12-20 mm, cream-pink with brown head capsule

## Adult

- 9-12 mm length
- Brown, bands of grey and white
- Tips of forewings bronzed
- Active at dusk

Oriental Fruit Moth


Codling Moth

Photo: Andermott Biocontrol

**Codling moth**


Codling moth


Codling moth

## Codling Moth Damage

**Internal feeding in <u>seed cavity</u>**

## Oriental Fruit Moth Damage

**Internal feeding of <u>flesh</u> surrounding seed cavity**

Codling moth

- OW as late instar under bark, leaf litter, brush piles
- Adults emerge beginning **bloom**, summer generation emerge **Aug into Sept**
- 2 generations per year

Monitoring

- **Pheromone traps**
- Used to establish biofix (sustained catch) and / or as “sentinel traps” for mating disruption

Threshold

- **Degree days** for 1$^{st}$ gen: 83-138 DDC (base 10$^{o}$C)
- **Degree days** for 2$^{nd}$ gen: 611-694 DDC (base 10$^{o}$C)

# Guidelines to using monitoring traps

**When?**

- Bloom

**How Many?**

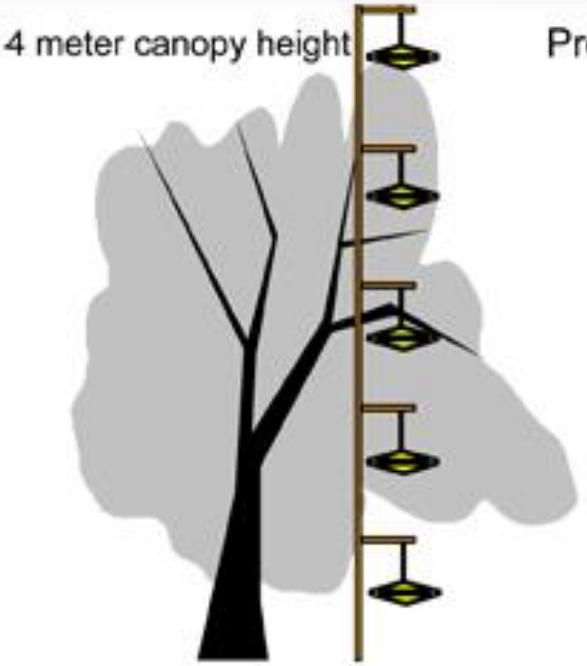
- Install at least 4 traps per orchard

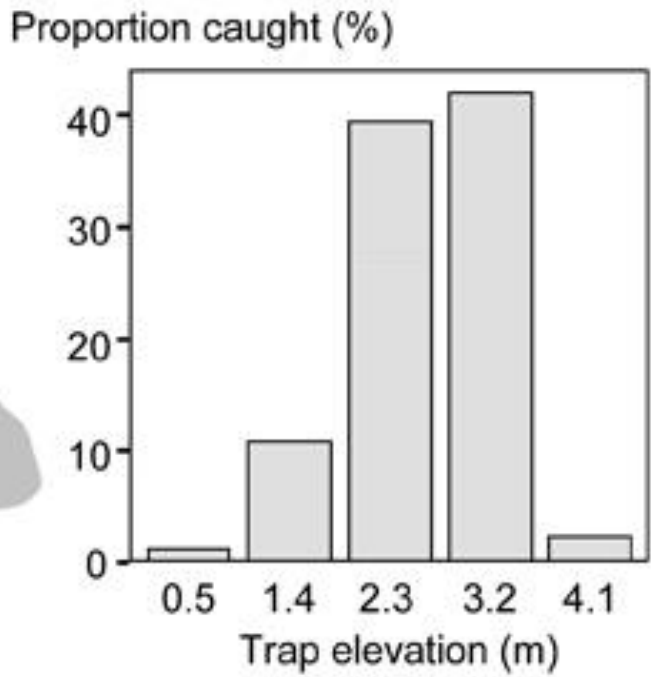
**Where?**

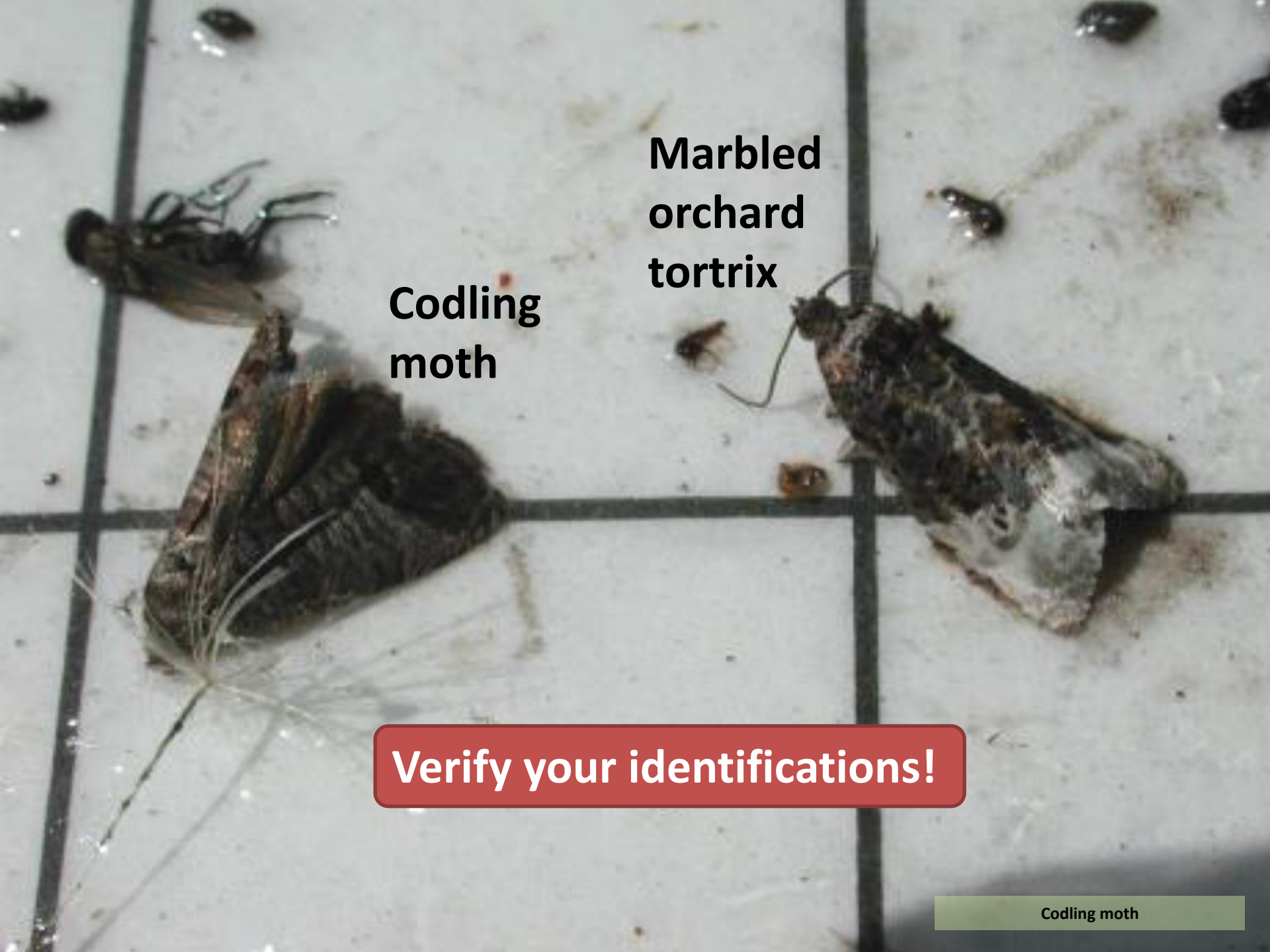
- Upwind from potential sources of infestation
- At least two rows from orchard edge
- Place traps in canopy as high as possible
- Make sure the trap entrance is not obstructed

Codling moth

# Place traps as high as possible in canopy




Marbled orchard tortrix
Codling moth
Verify your identifications!
Codling moth

# Management strategies for oriental fruit moth & codling moth

## Cultural control

- Remove wood piles, fruit bins, stumps and loose bark that could provide overwintering sites

## Physical control

- Exclusion netting, bagging
- Kaolin clay creates unappealing surface

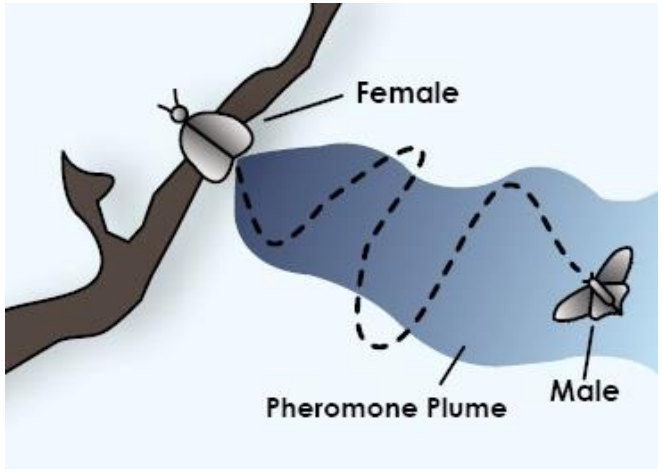
## Biological control

- Predators, such as ground beetles, ants and crickets, and parasitic wasps attack larvae
- Do not provide effective economic control alone
- *Cydia pomonella* granulovirus

# Management strategies for oriental fruit moth & codling moth

## Behavioural control

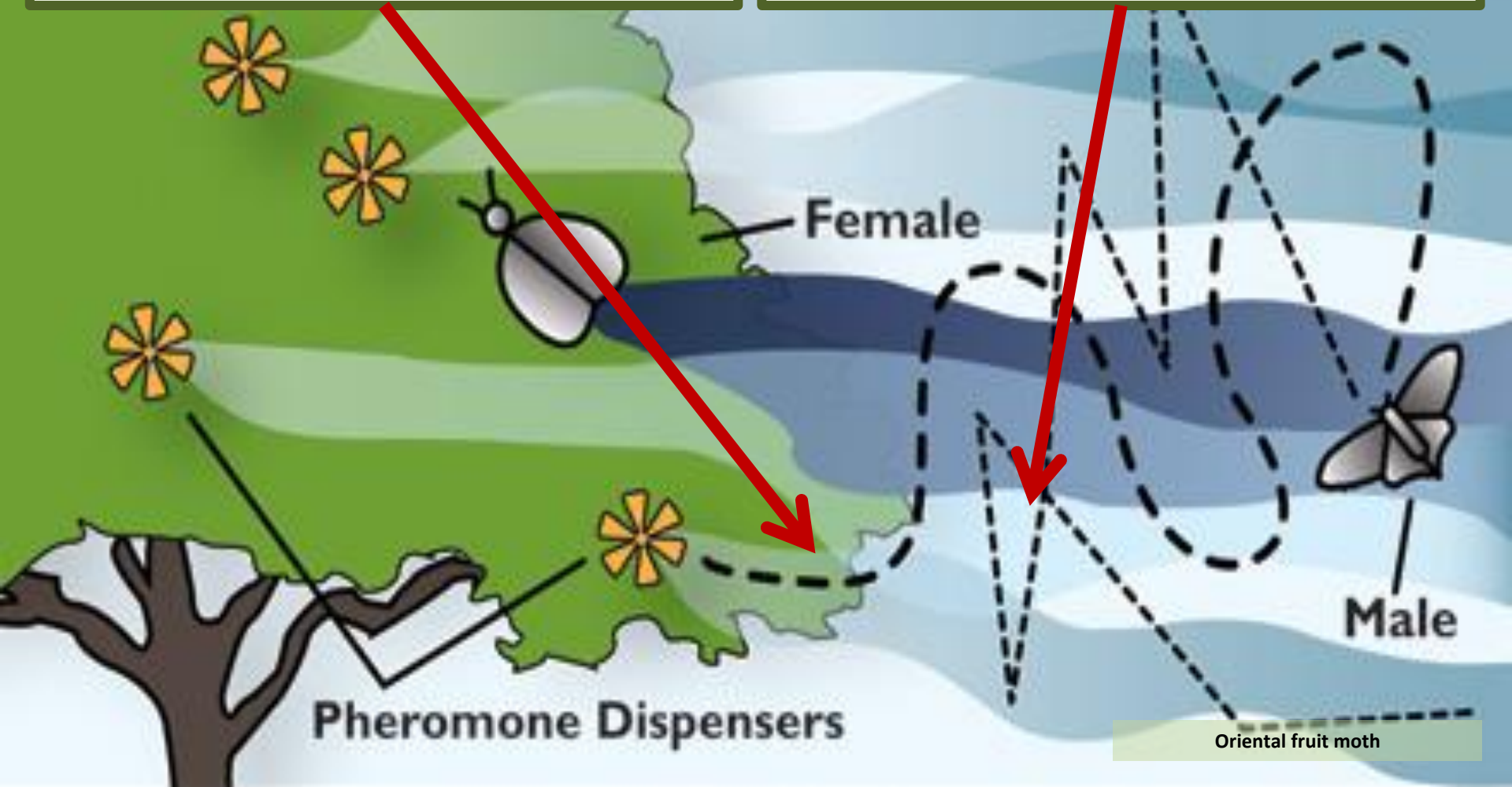
- **Mating disruption**: releases high concentrations of pheromone to confuse male, reduce mating
  - ➢Control populations
    - E.g., oriental fruit moth, codling moth, borers
    - Highly effective for OFM, moderately effective for CM




Codling moth

**Competitive attraction:**
Attracts males to false sources or masks the female plume, male is unable to pinpoint the location

**Sensory fatigue/habituation:**
Males become desensitized as a result of continuously high concentrations of pheromone.



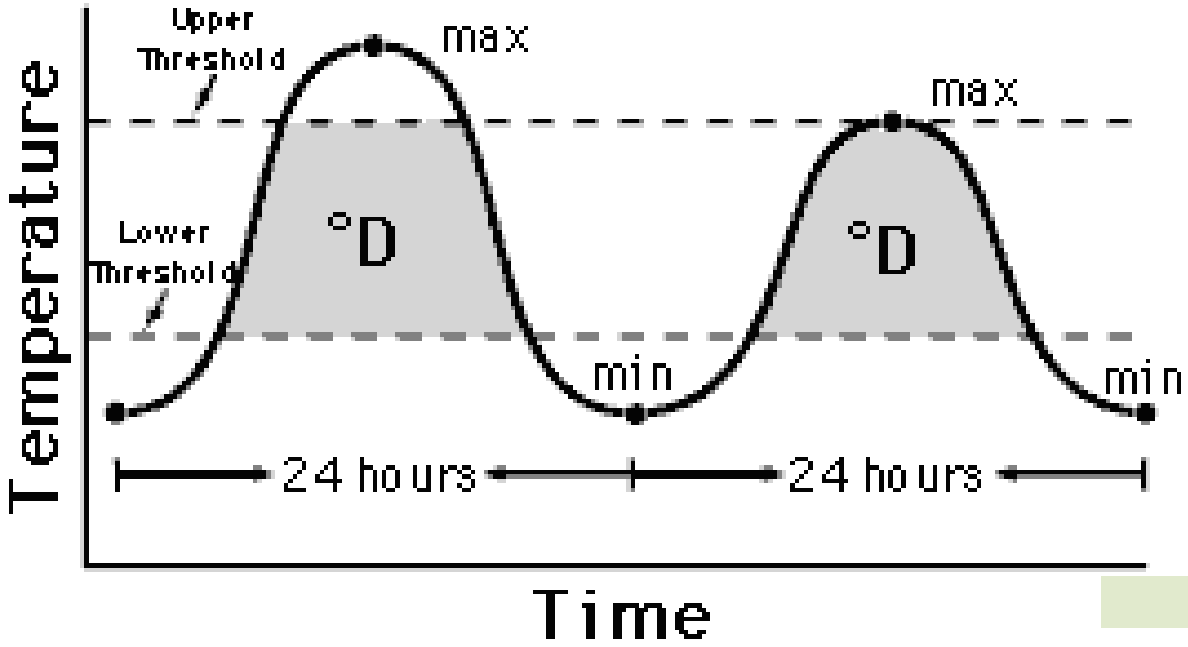
# Management strategies for oriental fruit moth & codling moth

## Chemical control

- Application can vary depending on lifestage targeted
  - Degree day modelling important
- Resistance has been documented in ON populations
- Subsequent border sprays following initial cover spray effective for some products

# Degree Days Celcius (DDC)

- Estimate growth and development of pest (egg laying or hatch, movement of crawlers, disease infection)
- Used to schedule inspection and spray program
- Biofix: event that initiates beginning of DDC calculations (eg., first adult trap catch)
- Accumulated daily




Oriental fruit moth

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$$GDD = \left[\frac{(\text{Max Temp} + \text{Min Temp})}{2}\right] - \text{Base Temp}$$

Oriental fruit moth

# Thank You!

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