Flooding Options for Pest Management

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Flooding Options for Pest Management

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Why are we interested

- Organic production
- Cost savings?
  - Much depends on cost to manage the flood
  - Elimination of some pesticide applications
  - Biggest potential is with Late Water
  - Concern about carbohydrate ‘cost’ to the cranberry
What are they?

**Late Water**
- CFW
- Mites
- Fruit rot
- Weeds?

**Short spring floods**
- Worm pests
- Dodder

**Summer flood**
- Grubs
- Perennial weeds

**Fall flood**
- Girdler
- CFW and perennial weeds
Late Water Method

- 30 day re-flood starting about April 15
  - Weather and plant stage determines this

- Buds must still be dormant (ok if leaves are a bit green)

- Flood must cover the vines

- Ideal is warm water but less than 65F

- Plants lose carbohydrate but recover most of it within 2 weeks after flood
Late Water - Pros

- Suppresses fruit rot
  - No fungicide needed that year
  - Reduced rates or no fungicide in following year
- Suppresses cranberry fruitworm (CFW)
  - Many sites needed no sprays
- Suppresses cutworms
  - But watch for re-invasion after
Late Water - Pros

- Suppresses Southern Red Mite
  - Controlled in LW year and most of next
- Suppresses dewberry
  - Prevents spread
- Need less fertilizer
  - 30% less N
- New plantings
- Maybe less frost protection for the season
Late Water - Cons

- Loss of frost tolerance
  - After 2 weeks some; after 3 weeks all

- Temperature of the flood
  - Warm kills pests but can affect cranberry – the carbohydrate hit
  - Algae growth

- Early release less effective
  - 4 weeks killed 98% CFW
  - 2.5-3 weeks killed 40-50% CFW

- COST?
Short May Floods

- 24 hours
  - Un-webbed worms (false army, blossom, gypsy moth)

- 48 (up to 72 hours)
  - Webbed worms – BHF, YHF (they must have hatched)
  - Dodder
  - NOT Spag

- Must be able to move water fast and cover the vines completely
Spring Flash Flood - When?

- Early to mid May – BEFORE roughneck

- Cloudy, cool – not above 75-80F air temp (less carbohydrate impact)
  - But warm water kills pests better (less oxygen)

- Timing for pest development
  - BHF – eggs must be hatched but worms small
  - Dodder – must be germinated but not attached to cranberry
Spring flood

Black-headed Fireworm (BHF)

- Timing critical – must be hatched
- Kills most larvae but if not all hatched may still have a problem after
- If water too cool – not effective
Spring flood

- Dodder
  - May match up with BHF timing
  - 24-48 hrs
  - Variable impacts
  - Suppresses dodder growth NOT seed germination
  - Timing critical: 3-4 weeks after first emergence
Attachment to initial host, produce haustoria

Elongation and searching

Hook

Flooding

Germination and emergence

Late April – Mid-May

Overwintering seed

* May occur in some species

Proliferation of stems, additional host attachments

May

May-June

Flowering

July-August

Seeds form

Seed set and stem senescence

September

Overwintering haustoria *

* May occur in some species
Summer Flood

- Mid May to mid July
- Eliminates crop
- Grubs, briars controlled
- Preparation for renovation?
Fall floods

- Cranberry Girdler
  - September 25th for 1 week
  - May coincide with harvest for early cultivars

- Holding the harvest flood
  - Up to 4 weeks, best if start by late September
Fall floods - harvest

- Holding the harvest flood
  - Up to 4 weeks, best if start by late September
  - Suppresses dewberry and CFW
  - No apparent impact on yield but carbohydrates take a big hit
  - Water quality?

![Graph showing Phosphorus (mg/L) over days after flood applied]

Days after flood applied:

1, 5, 10, 12, 16, 17, 19, 20, 22

Phosphorus (mg/L):

0.00, 0.10, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90

PO4
Fall Flood

- Only affects running bramble (not upright)
  - 1/3 fewer crowns after a 4-week flood
  - 3-week flood results mixed

Running Bramble (*R. hispidus*)  Upright Bramble (*R. allegheniensis*)
Fall Flood

- Killed CFW in hibernacula (did not emerge in spring)
  - 100% mortality after 3 or 4 weeks
The bottom line

- Potential exists to reduce pesticide and fertilizer requirements

- Cost/benefit and cost comparison
  - Manage to limit crop impact and provide effective pest management
  - How much does the flood cost?
This is not a pest management flood – it has to cover the vines or pests just move out of the water