Interaction of chemigation timings with efficacy of reduced-risk insecticides and An update on West Coast cranberry variety trials and other pest management

Kim Patten
pattenk@wsu.edu

WASHINGTON STATE UNIVERSITY EXTENSION
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Interaction of Chemigation Timings with Efficacy of Reduced-Risk Insecticides

How does variation in chemigation timing effect efficacy?

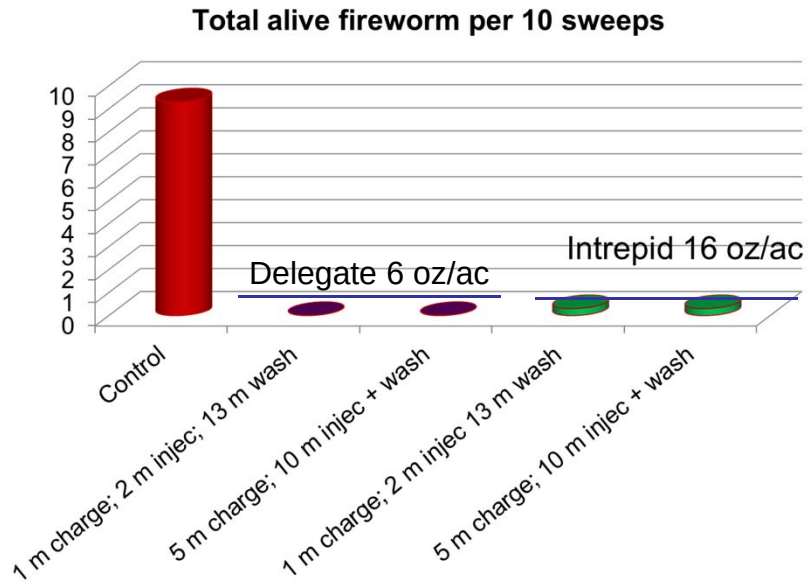
- Charge time – time of run prior to injection
- Injection time – duration of time chemical is injected
- Washoff time – duration of run after chemical is injected

How does efficacy vary within a non-uniform system?

- Variation in sprinkler locations/coverage and pressure effect chemigation efficacy

How does efficacy with chemigation vary with the insecticide?

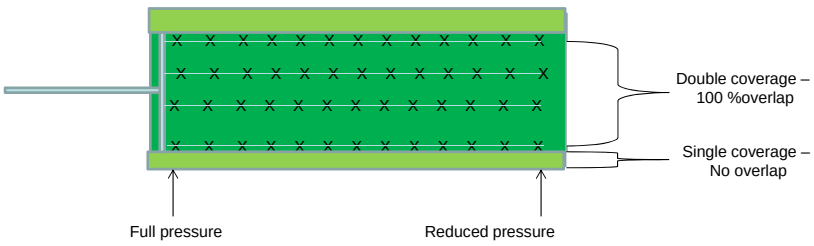
- Difference in type of chemistries
- Field data



Both Delegate and Intrepid respond well to chemigation with no variation in efficacy under different conditions.

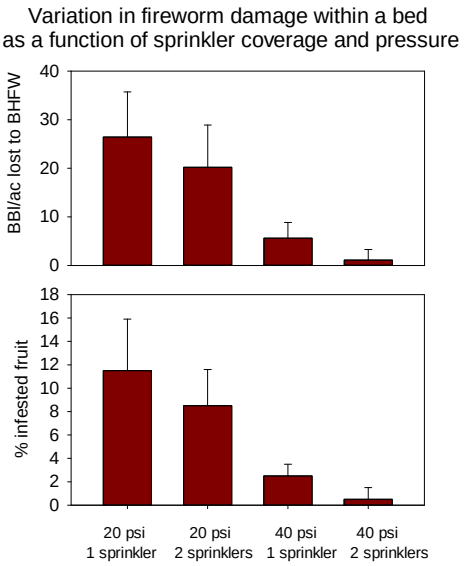
How does variation in sprinkler locations/coverage and pressure effect chemigation efficacy?

- Pressure/delivery rates of sprinklers can vary depending on their locations within beds or across farms
- Some beds are designed so that some sections of the beds are without 100% overlap with another sprinkler.



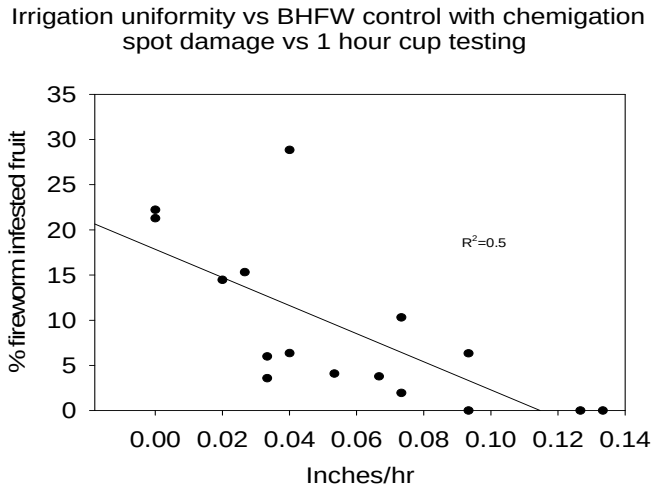
Fireworm infestation and crop lost to fireworm as function of sprinkler coverage and pressure within a bed - Intrepid 7/4/12

Survey of crop loss to fireworm on a cranberry bed with variation in sprinkler coverage and pressure.



A system with poor uniformity is maybe costing you more than you think!!

Fireworm infestation as function of sprinkler coverage within a bed Intrepid 7/4/12



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Modes of action of cranberry insecticides

- RESIDUAL OVICIDE kills eggs that are laid on top of residues left behind by an earlier insecticide application.
- TOPICAL OVICIDE kills eggs that are already in the orchard at the time of the application.
- CONTACT LARVICIDE kills larvae on contact
- INGESTED LARVICIDE must be consumed to kill larvae
- CONTACT ADULTICIDE kills adult moths on contact
- ADULT BEHAVIOR DISRUPTION affects successful mating

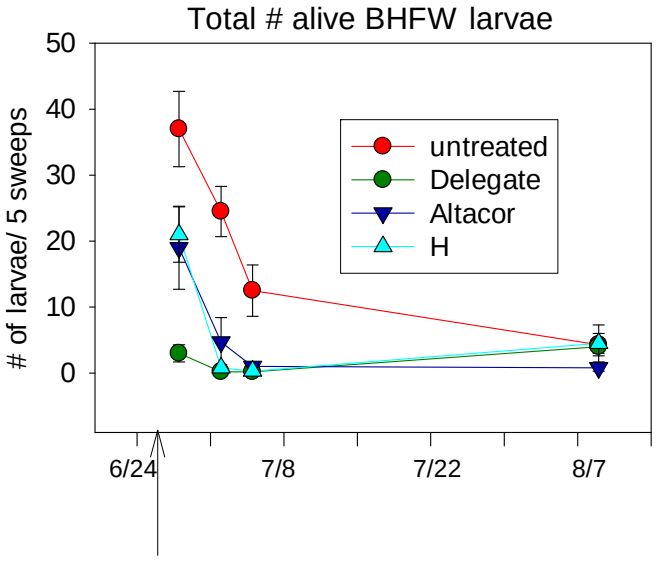
Insecticide	Residual Ovicide	Topical Ovicide	Contact Larvicide	Ingested Larvicide	Adulticide	Adult Behavior Disruption
Diazinon			x	x	x	
Intrepid	x	x		x		
Delegate				x		
Altacor	x	x	x	x		x / ?

Summary of new insecticides

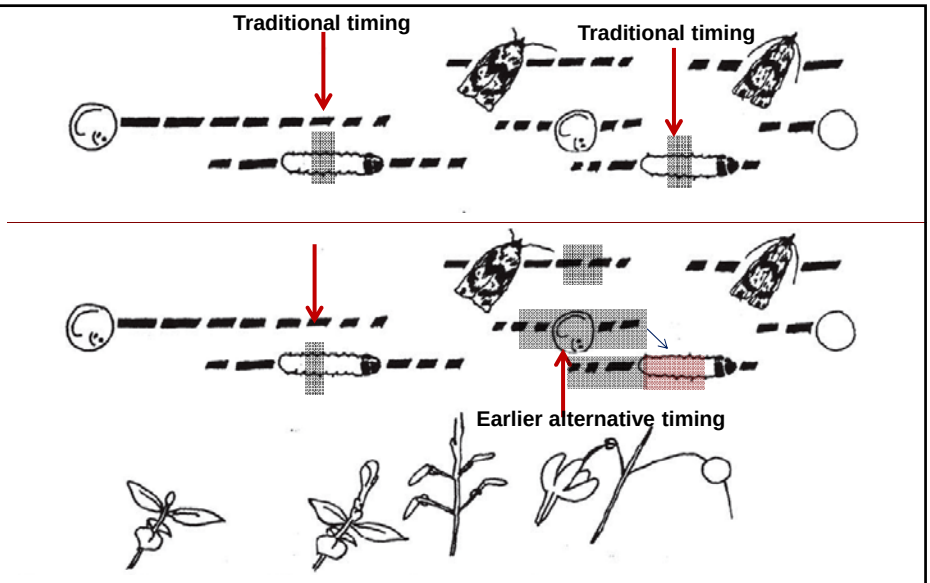
Chemical	Pros	Cons
Delegate	• Reasonable efficacy • Not too toxic to non-target species • Works on a range of FW larva instars	• Potential to harm beneficial insects • Reports of mixed success • Cost • Decent, but not great residual
Intrepid	• Good efficacy • Very safe to all “non-lep” insects • Not too expensive • Good grower experience with • Good ovicidal and larvicidal activity • Good residual activity	• Narrow target window (small to medium instars) • Must be ingested for larva activity • Resistance management needed
Altacor	• Good efficacy • Extremely safe to beneficial insects • Ovicidal and larvicidal activity • Affects adult behavior • Systemic activity (translaminar & root uptake) • Good residual activity • Potential activity on other pests	• Cost • Limited grower experience • Resistance management needed

How does efficacy with chemigation vary with the insecticide?

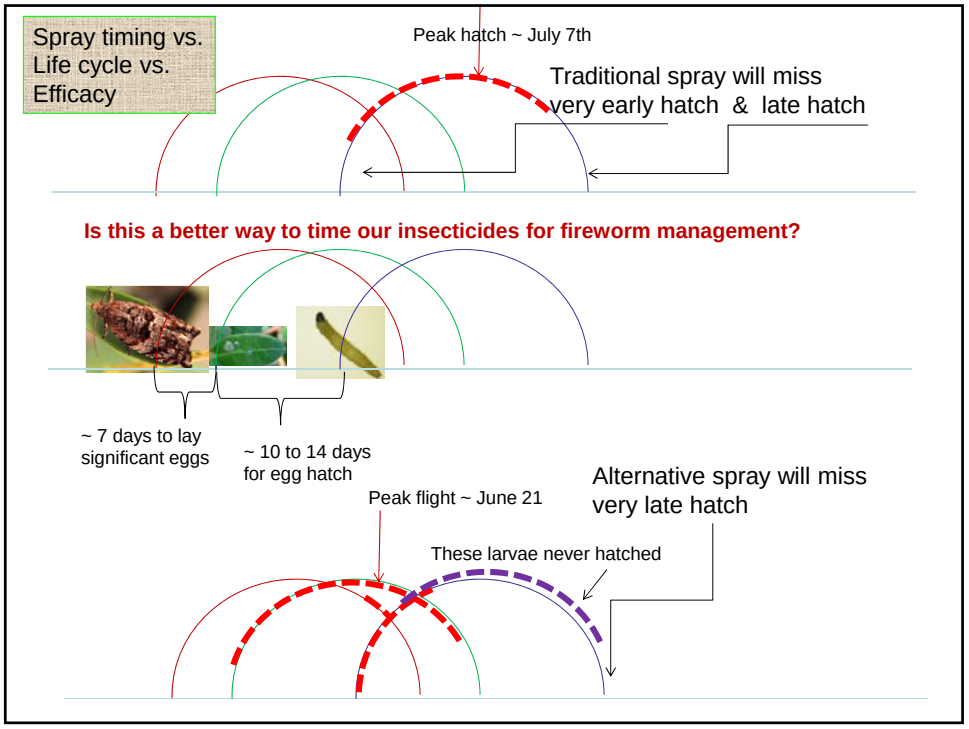
New chemistries work great with chemigation, but time frame for activity will vary.



Applied 280 gpa, washoff 730 gpa
6 reps 10' x 10'



Is this a better way to time our insecticides for fireworm management?



Is this a better way to time our insecticides for fireworm management?

Traditional timing as larvicide (OPs or reduced risk insecticides)

- First generation larvae
  - One spray @ peak of larvae hatch ~ May 15th

  or
  - Two sprays (1st one at first larvae hatch ~ May 7th, the 2nd in 10 to 14 days)
- Second generation larvae
  - One spray @ peak of second hatch (bees removed, ~14 days after peak flight)

  or
  - Two sprays (1st at mid to late bloom w/ RR, 2nd after bees removed w/ OP)

Alternative timing as ovicide (reduced risks insecticides)

- First generation larvae
  - Early to peak of larvae hatch (Delegate) ~ Mid- May
- Peak moth flight (Altacor, Intrepid) ~ Mid-June
- Peak 2nd generation larva and/or major adults populations in traps as needed (Altacor, Intrepid)

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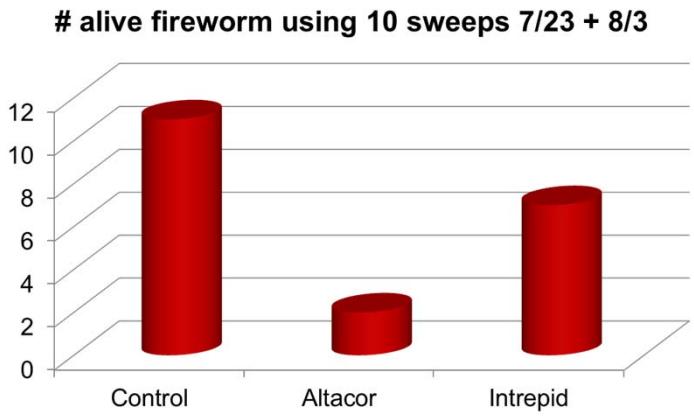
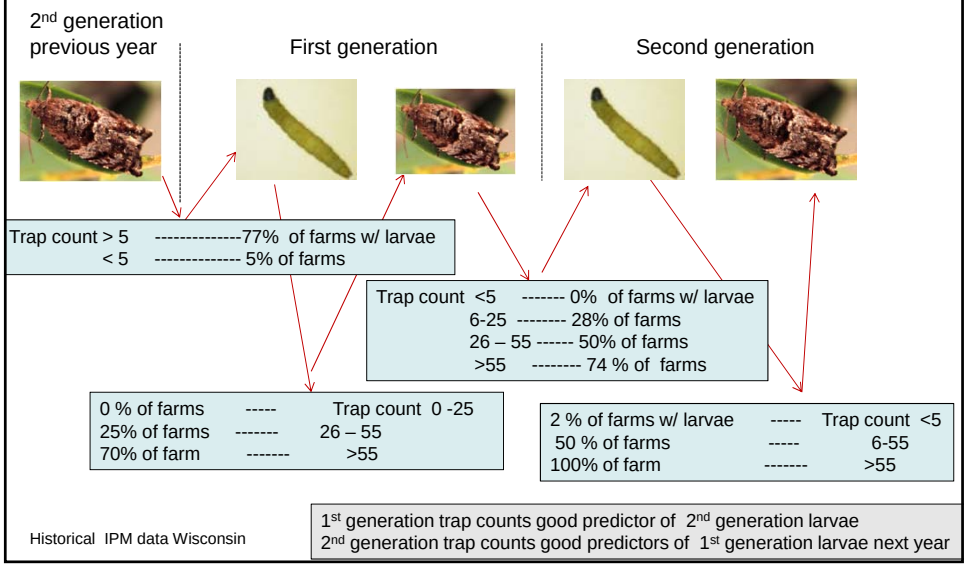
Altacor provided control of fireworm larvae 6 to 7 weeks after application via ovicidal activity. That is, application during first egg laying prevented viable larvae hatch.



Treatments applied 6/11/12 at first significant moth flight recorded in pheromone trap

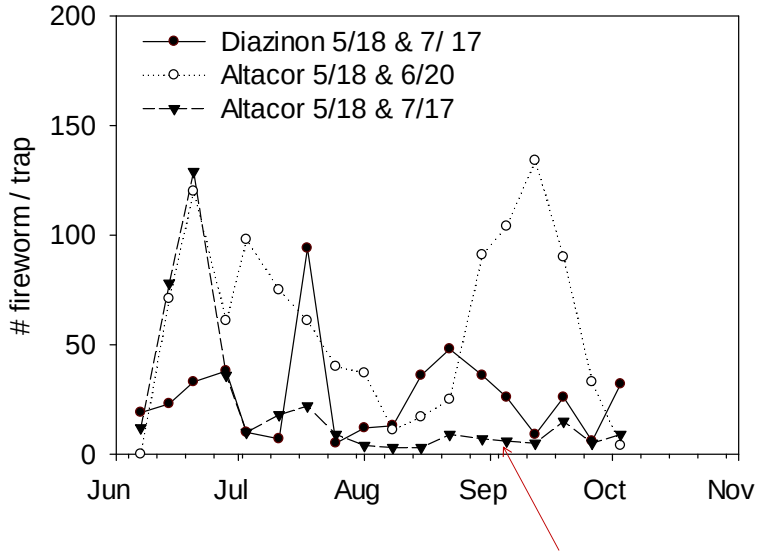
What is the relationship between populations?



Historical IPM data Wisconsin

1st generation trap counts good predictor of 2nd generation larvae
2nd generation trap counts good predictors of 1st generation larvae next year

Season long fireworm trap counts on 3 beds within a farm with differrent reduced risk insecticides



Goal is to keep late summer adult population as low as possible.

Pros and Cons of different insecticide timing for fireworm management

Advantage of traditional timing

1. Tradition
2. Cost ($30 to 60/ac)
3. Effective

Problems with traditional timing

1. Difficult to find small larvae
2. No peak larvae hatch
3. Bees removed too late or earlier
4. Asynchronous hatch
5. Works better with OPs than with biorational insecticides
6. Tough on beneficial insects (affects other pest outbreaks)
7. OPs won't be around too much longer

Advantage of alternative timing

1. Monitoring very easy (trap counts)
2. No effect on bees or beneficial insects
3. Better season-long management of whole farm populations

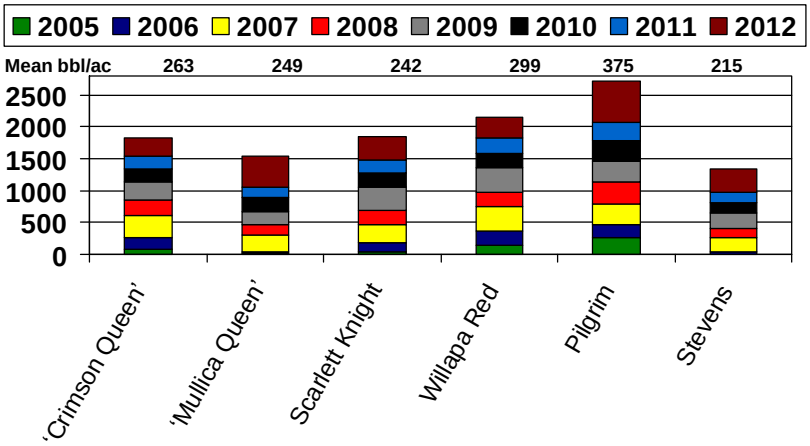
Problems with alternative timing

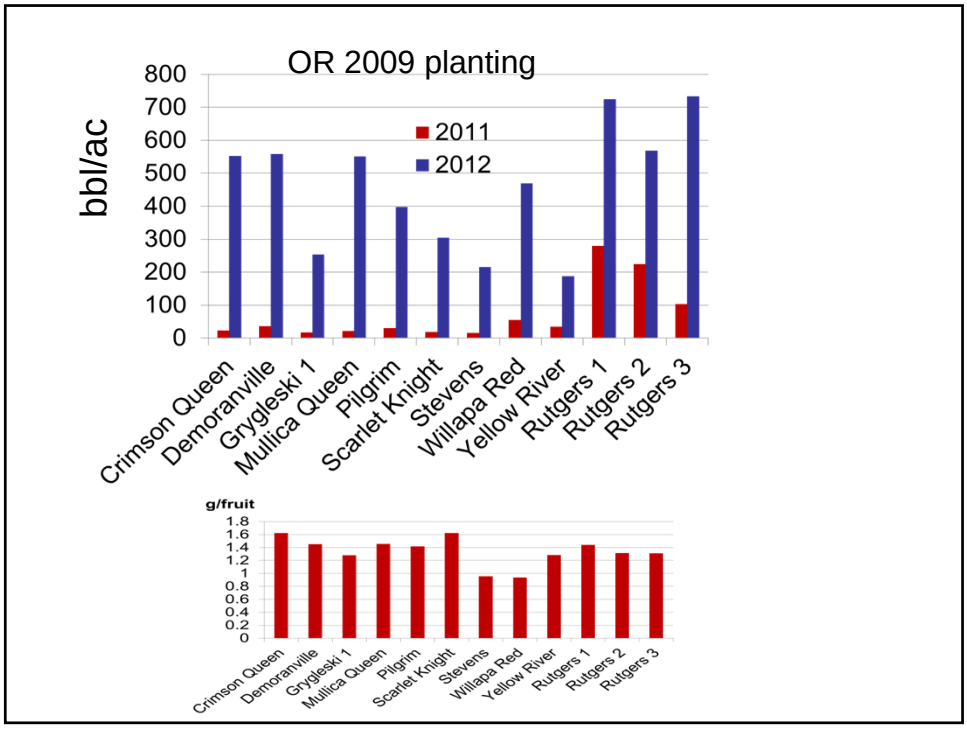
1. Too new and untried
2. Cost ($75 to $120/ac)
3. Overall effectiveness has yet to be determined outside of research plots

West Coast cranberry variety trials

WSU 2003 planting

Cumulative yield – 8 years (bbl/ac)




OR 2009 planting
bbl/ac
800
700
600
500
400
300
200
100
0
2011
2012
Crimson Queen
Demoranville
Grygleski 1
Mullica Queen
Pilgrim
Scarlet Knight
Stevens
Willapa Red
Yellow River
Rutgers 1
Rutgers 2
Rutgers 3
g/fruit
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Crimson Queen
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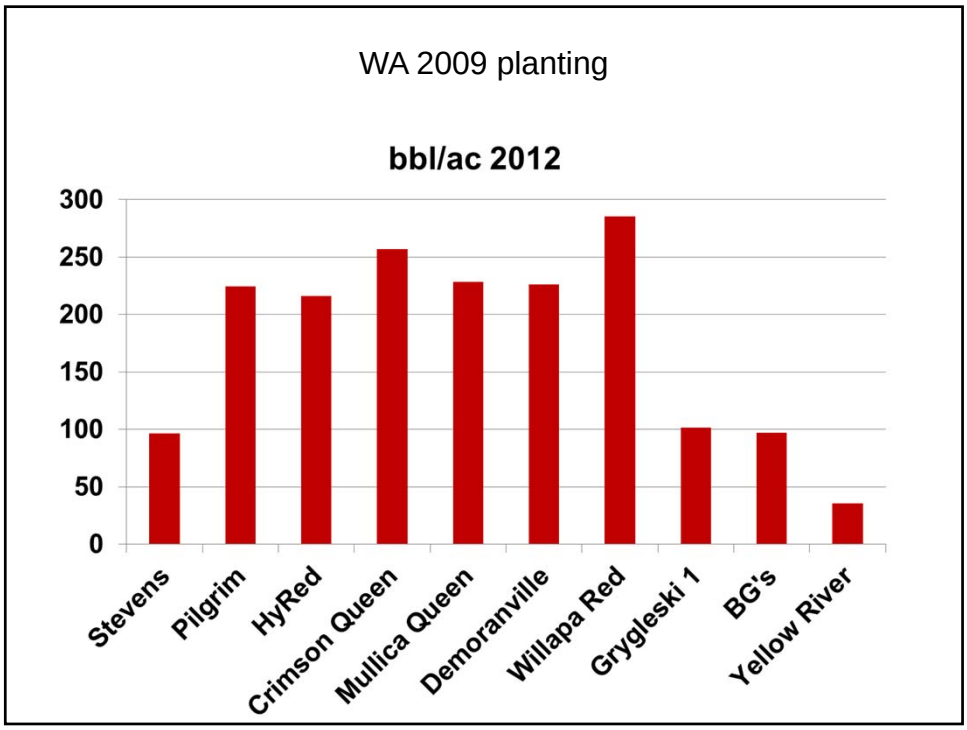
WA 2009 planting
bbl/ac 2012
300
250
200
150
100
50
0
Stevens
Pilgrim
HyRed
Crimson Queen
Mullica Queen
Demoranville
Willapa Red
Grygleski 1
BG's
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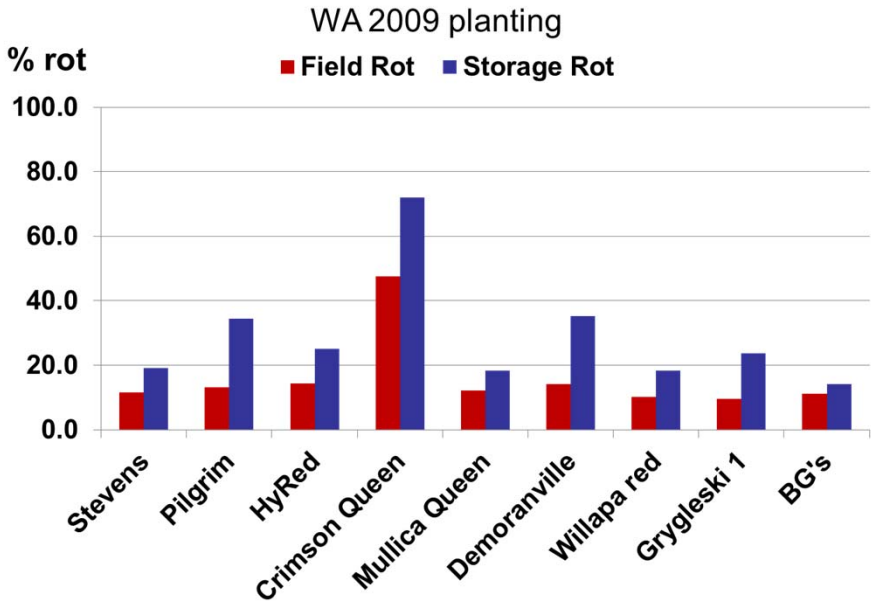

Recommendations

- Genetically tested Pilgrim and Stevens
- Any of the currently released Rutgers selections
- Wait until 2014 for new Rutgers releases
- HyRed
- Willapa Red