

Pest Control Weed control & New varieties

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Lotus management

- Long-lived (40 years) seeds with prolonged germination during summer
 - Prevent from seeding – or you'll be fighting its control for next 40 years
- Slow canopy development in spring makes it hard to find and successfully treat with Stinger.
 - Post-harvest mapping /flagging
 - Spot treatments of winter Stinger
 - High spray volumes (200 gpa) to get under canopy
 - Treat areas bigger than infested zone
- Lotus very susceptible to Callisto, but only if treated early
 - Post-harvest mapping /flagging
 - High spray volumes (200 gpa or chemigation) to get under canopy
 - Treat twice
 - Don't let the canopy gets too big before treatment.
 - Treat areas bigger than infested zone

Prevent from seeding, early season treatment with Stinger followed by Callisto

Perennial grass management

- Single plants can produce up to 10,000 seeds, seeds remain viable from 2 to 7 years, and germinate late when soil temperature warms up
 - Consider removing seed heads prior to their maturity
 - Spray out all off-bed infested sites
 - Don't let new plants get infested
- Pre-emergence control
 - Devrinol provides good grass control, but unlikely to provide season long efficacy.
- Post-emergence control
 - Select (30 day PHI)
 - Treat early to late spring while vigorous
 - May require two or more treatments
 - May require two years
 - Callisto (45 day PHI)
 - Only works on some grass species
 - Not very well on perennials
 - Ok if new seedlings



Prevent seeding establishment, control with Select

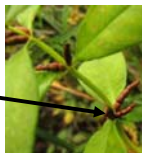
Purple Aster Management

- Late emergence makes management difficult
 - Prevent from seeding
 - Consider fumigation of new planting if there is rich seed bank
 - Difficult to hand pull and not rip up cranberries
- Casoron effective for suppression only
 - Requires high rates & effect might wear off by mid-season.
 - Use on established beds as last resort
- Callisto for suppression &/or control
 - Requires >1 application, early timing, lower spray volumes.
 - Mixed report of success from growers.
 - Carefully monitor new plantings and treat when first observed.
- Partial control/suppression with Stinger possible
 - Wiping after bud set
 - Broadcast early post-harvest

Prevent from seeding and establishment in new beds, Callisto effective, but requires persistence

Yellow loosestrife management

- Spreads rapidly from seeds, rhizomes and bulbets
 - Good bed sanitation following harvest to prevent spread
- Late spring Casoron will suppress
 - Doesn't provide permanent control, long-term use will damage bed, suggest alternative year usage
- Early Callisto will reduce height and prevent bulbets
 - Not really a viable option
- Wiping with Roundup
 - Difficult to do when height suppressed with Casoron or Callisto
 - Only a few growers have been successful with this treatment
- New herbicides look very promising



Prevent from spreading with good sanitation, Casoron to suppress, Improve drainage

Blackberries/brambles management

- Some susceptibility to Callisto
 - Each species a little different in their susceptibility
 - Growers report varying degrees of success based on rate and frequencies (within year and across years)
- Wiping
 - Upright species reasonable easy
 - Consider using Roundup in lanolin as dormant season hand application
 - Trailing species not wipeable without special precautions such as staking.

Wiping and maybe Callisto

Silverleaf management

- Deep-rooted, swollen rhizomes with large food reserves, seeds medium-lived 3 years, with ~100 seeds per flower
 - Difficult to control on long-established beds
- Pre-emergence control
 - Casoron for suppression, high rate on peat, low split applications on sand
- Post-emergence control
 - Callisto efficacy ranges for suppression (one application) to complete control (two applications/yr for several years)
 - Timing is important: one early when weed canopy first full developed, second when weed canopy regrowth has occurred.

Callisto usually adequate, if not suppress with Casoron

Blackhead fireworm management without diazinon

- Most new alternative chemistries are showing good efficacy with broadcast applications - chemigation is the problem.
- Ovicides
 - One new chemistry, with label pending, but we don't know how to use it for this purpose or if it works.
- Larvicides – getting closer
 - Efficacy with broadcast
 - Success/Entrust: OK to good @ right timing
 - Confirm: OK @ right timing
 - Delegate: good @ right timing
 - Intrepid: OK to good @ right timing
 - Efficacy with chemigation
 - Success/Entrust: poor to OK @ right timing
 - Delegate: good at high rate & right timing
 - Intrepid: OK with right timing @ right timing

Blackhead fireworm management without diazinon

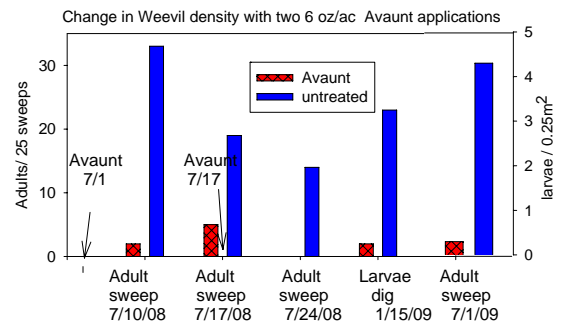
- Order of activity (rule of thumb)
 - Delegate > Success/Entrust = Intrepid > Confirm
- Activity on different larvae size
 - small (1st or 2nd instars): Confirm, Intrepid, Success, Delegate
 - medium (3rd and 4th instars) : high rate of Delegate
 - Large (5th instar): all are marginal
- Chemigation (rule of thumb)
 - Rinse off under 6 minutes: Confirm, Intrepid, Success, low-rate Delegate
 - Rinse off under 8 minutes: high rate of Delegate
- Retreatment
 - 6 hours drying time following application is required, retreat if rain or frost protection interfered.
 - New growth is not protected.
 - Residual effect 7- 10 days, retreatment recommended
 - Asynchronous hatch, retreatment recommended
 - Previous history of infestation, retreatment required

Blackhead fireworm management without diazinon

- First generation (good control critical to reduce population base and avoid damage from 2nd generation)
 - Sweep net in May, especially along warm edges
 - When small larvae are found on rim of net spray – Treat ASAP with Confirm, Intrepid, Success
 - Sweep again in a week to assess efficacy, and retreat
 - If large larvae found use Delegate
- Second generation
 - Pheromone trap for timing, but also consider using a sweep net
 - Timing for Intrepid or Confirm is 2 weeks after onset of moth flight and again 10 days later (Not 10 days after peak moth flight).
 - Intrepid or Confirm are bee safe; Spinosyn products are moderately toxic to bees.
 - If larvae reached large size (sweep net sample), Delegate is a preferred choice.

Blackvine Weevil management

- All individuals are females and very fecund: an overwintering adult lays 600-700 eggs, new adults lay 200 to 300 eggs
 - High fecundity requires >95% control for success
- Adulticides
 - Orthene – knockdown only
 - Avaunt – good tool, apply two – three times, 10 to 14 days apart, based on sweep counts. Start at first adult emergence
 - Assail – OK, but not great
 - Sodium silicofluoride-based baits: poor to fair
 - Actara – poor
 - Rimon – poor to fair
- Larvicides
 - Entomopathogenic Nematodes – several species, efficacy variable from fair to good, not always predictable, \$, requires exacting application
 - Entomopathogenic Fungus – label pending, initial data from USDA/OSU looks promising
 - Several insecticides in US, variable efficacy with nothing too great
 - Admire: good on sand, poor on peat



Appears we get 7-10 days of good activity from Avaunt
Control of adults translates to good control of larvae

Avaunt is a great tool for BVW control, but don't assume it will be 100% effective. Scout for damage, larvae, adults and notching yearly.

The lower the risk quotient the safer the insecticide for bees

Insecticide	Bee Toxicity LD50 (µg/ bee)	Rate used (lbs/ac)	Relative risk quotient (use rate/toxicity)
Admire	0.0037	0.5	135
Success	0.003	0.15	50
Lorsban	0.06	1.5	25
Diazinon	0.09	2	22
Actara	0.024	0.4	16
Delegate	0.11	.13	1
Assail	8.09	0.1	0.01
Avaunt	17.32	0.1	0.01
Intrepid	100	0.25	0.002

Vole control with anti-coagulant baits

- None registered on beds, use on dike (non producing ground) only
- PNW raspberry industry uses
 - Weatherblok XT
 - Rozol Pellets
- Works best when very cold and dry
- Bait must be available until the vole population is controlled. Therefore use for several weeks until feeding is no longer observed.
- Winter is best time to control

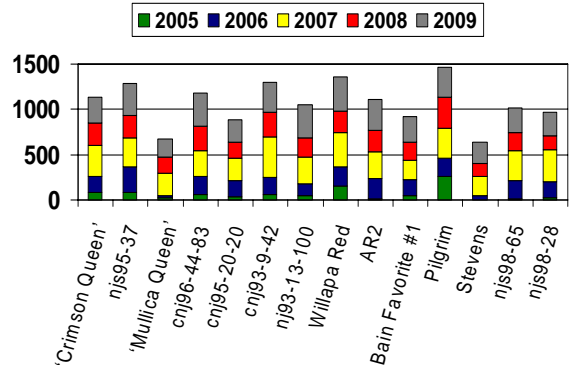
	Active ingredient	Toxic to mammals	Method of application
Rozol Pellet	Chlorophacinone	low	Drop down holes
Weather Blok XT	Brodifacoum	high	Bait stations only

Deer management - How

- Chemical – no repellents have approval for food use
- Frightening tactics for small acreage
 - Need two senses (sight and sound) to be effective
 - 24-hour talk radio, flash tape, and motion type devices, propane exploder.
- Fences.
 - poly or steel wire
 - A straight ten-foot fence provides poor barrier to a deer determined
 - A 7-foot fence inclined at a 25° angle out from the vertical – better.
 - Electric fences (inclined better than straight up and down)
- Gun

New Variety trials – planted 2003

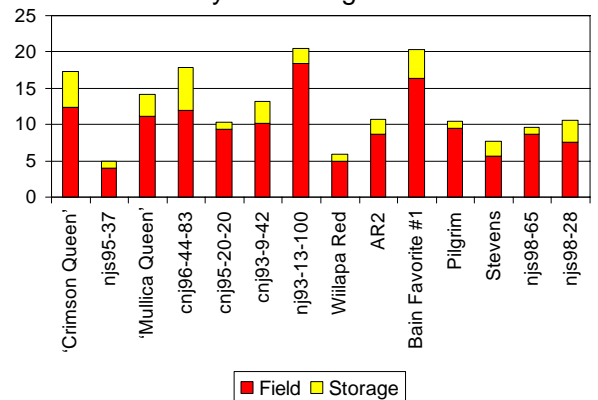
Yield bbl/ac

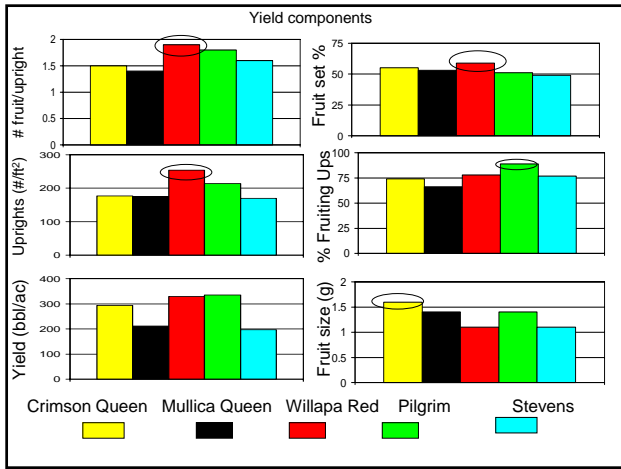


Fruit Size G/fruit

Variety	2007	2008	2009	Average
'Crimson Queen'	1.56	1.56	1.58	1.57
'Mullica Queen'	1.52	1.42	1.38	1.44
Willapa Red	1.11	1.00	1.13	1.08
Pilgrim	1.48	1.31	1.38	1.39
Stevens	1.09	1.10	1.16	1.12

3 year average % Rot

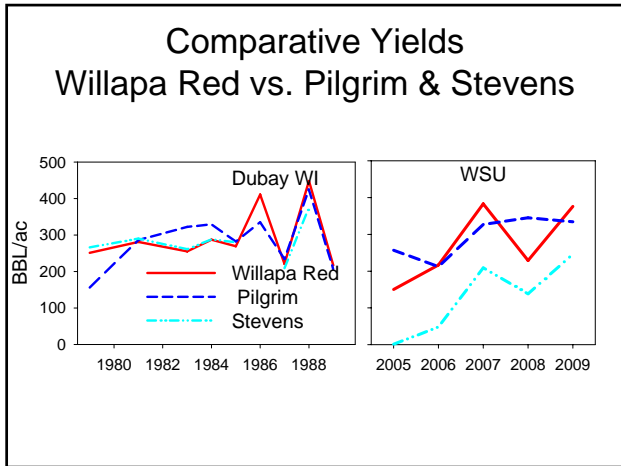




Early color, disease resistance, & canopy characteristics

Variety	Early red color	Incidences of foliage diseases	Inclination to be over-vegetative (runner/m2)	Ease of dry harvesting*
'Crimson Queen'	excellent	Moderate to high	31	good
njs95-37	good	Moderate to high	5	excellent
'Mullica Queen'	good	Moderate	13	good
cnj96-44-83	good	Moderate to high	4	excellent
cnj95-20-20	good	Moderate to high	17	fair
cnj93-9-42	good	Moderate to high	3	excellent
nj93-13-100	good	Moderate to high	12	excellent
Willapa Red	good	Moderate to high	3	excellent
AR2	poor	low	15	poor
Bain Favorite #1	poor	Moderate to high	25	poor
Pilgrim	poor	Moderate to high	2	poor
Stevens	good	low	15	good
njs98-65	good	Moderate to high	18	fair
njs98-28	good	Moderate to high	7	fair

* Based on grower ratings, fruit size, location of fruit within canopy



DNA purity of Pilgrims: Runner vs uprights

Comparative purity of Pilgrim uprights and runners off the same bed					
Owner	Bed	Type and number of samples		Pilgrim Purity (%)	
				uprights	runners
Whannell	a11	grouped uprights 4 samples;	grouped runners 1 sample	100%	0%
Whannell	a4	grouped uprights 4 samples;	grouped runners 1 sample	0%	0%
Whannell	a5	grouped uprights 3 samples;	grouped runners 2 samples	33%	50%
McPhail	s1	grouped uprights 4 samples;	grouped runners 1 sample	25%	0%
Gray	g1	grouped uprights 1 sample;	grouped runners 1 sample	100%	0%
Jubilee	c40	grouped uprights 4 samples;	grouped runners 4 samples	50%	0%

