

# ***New tools for insect, weed and disease control in cranberries in 2010 and other misc. stuff***

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*World Class. Face to Face.*

# 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
  - Multiple spot treatments of winter/early spring 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**

# Barnyard 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. Needs to be watered in ASAP. Ditto for Casoron, but maybe less control.
- Post-emergence control
  - Use Select (30 day PHI)
  - Callisto (control best on small plants, efficacy is compromised on large plants)



**Prevent from seeding, control with grass herbicide if possible**



# Perennial grass management

- 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**

# Buttercup management

- Deep rooted, spreads fast (one plant can cover 40ft<sup>2</sup> /year, long-lived (20 to 80 years) seeds
  - Difficult to hand pull
  - Abundant seed populations in sand piles, in beds, along dikes.
  - Treat roads, dikes (non-bed areas) with selective herbicides to prevent spread.
  - Important to use herbicides (Callisto, Casoron and Devrinol) to prevent new seedlings from becoming difficult to control adults
- Callisto and Devrinol at label rates only suppress mature plants
- Curio (new herbicide) very effective
  - 3<sup>rd</sup> party 24C label in 2010 (WA only)
  - PCCRF will hold label
  - Waiver of liability signature required
  - 1 oz/ac rate

**Prevent new infestations, suppress with Callisto, use Curio when available**

# Sheep Sorrel management

- Extensive deep horizontal roots, creeping rhizomes and long-lived (10 to 20 years) seeds make management difficult
  - Prevent from seeding
  - Consider fumigation of new plantings if there is rich seed bank
  - Difficult to hand pull and not rip up cranberries
- Casoron effective as pre-emergent and partial post-emergent herbicide
  - Requires high rates
  - Effect might wear off by mid-season.
  - Use on established beds as last resort
- Not very susceptible to label rates of Callisto, unless new seedlings
  - Carefully monitor new plantings and treat when first observed.
- Partial control/suppression with Stinger possible
  - Multiple treatments starting early post-harvest and again in early spring
  - Results have been mixed, high rates work better.

**Prevent from seeding and establishment in new beds,  
Try Casoron, early post-emergent Callisto & winter Stinger**

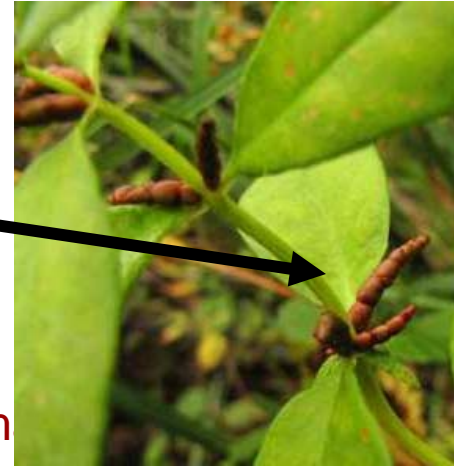
# Purple Aster Management

- 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 bulblets
  - Good bed sanitation following harvest to prevent spread
- Late spring Casoron will suppress
  - Doesn't provide permanent control, long-term use will damage soil, suggest alternative year usage
- Early Callisto will reduce height and prevent bulblets
  - 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 (1<sup>st</sup> or 2<sup>nd</sup> instars): Confirm, Intrepid, Success, Delegate
  - medium (3<sup>rd</sup> and 4<sup>th</sup> instars) : high rate of Delegate
  - Large (5<sup>th</sup> 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 2<sup>nd</sup> 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.

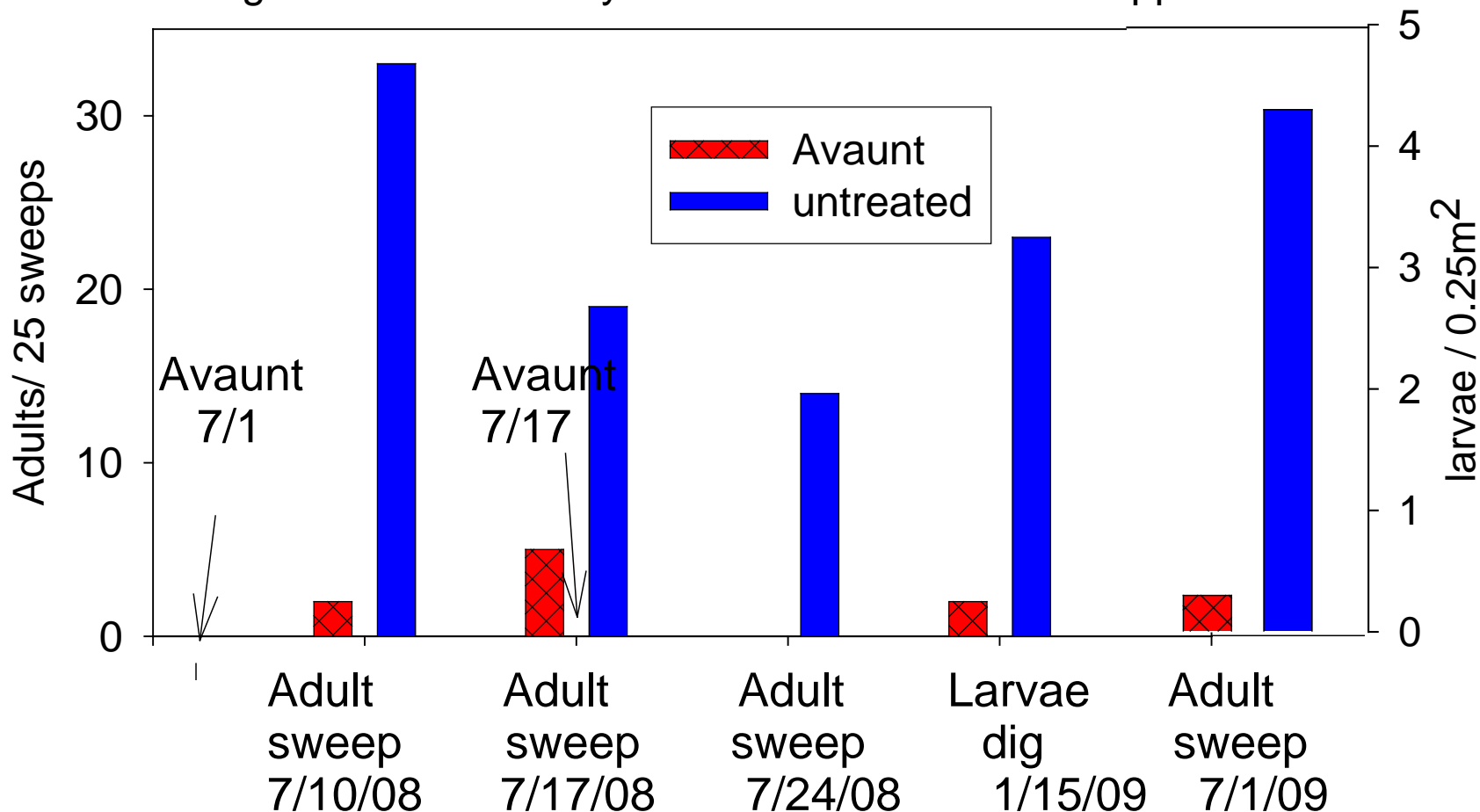
# Tipworm management (big problem in BC, not in WA)

- Ovicides
  - One new chemistry, with label pending, but we don't know how to use it for this purpose or if it works.
- Larvicides
  - Assail: poor
  - Avaunt: poor
  - Delegate: poor
  - Diazinon: good
  - Movento: good – label maybe in 2011
- Timing
  - 3 to 5 asynchronous generations
  - frequent applications aimed at 1<sup>st</sup> instar larvae
  - Some applications timings correspond to fireworm timing, others not
  - Need to scout

# 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

Change in Weevil density with two 6 oz/ac Avaunt applications



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 ( $\mu\text{g}/\text{bee}$ )	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

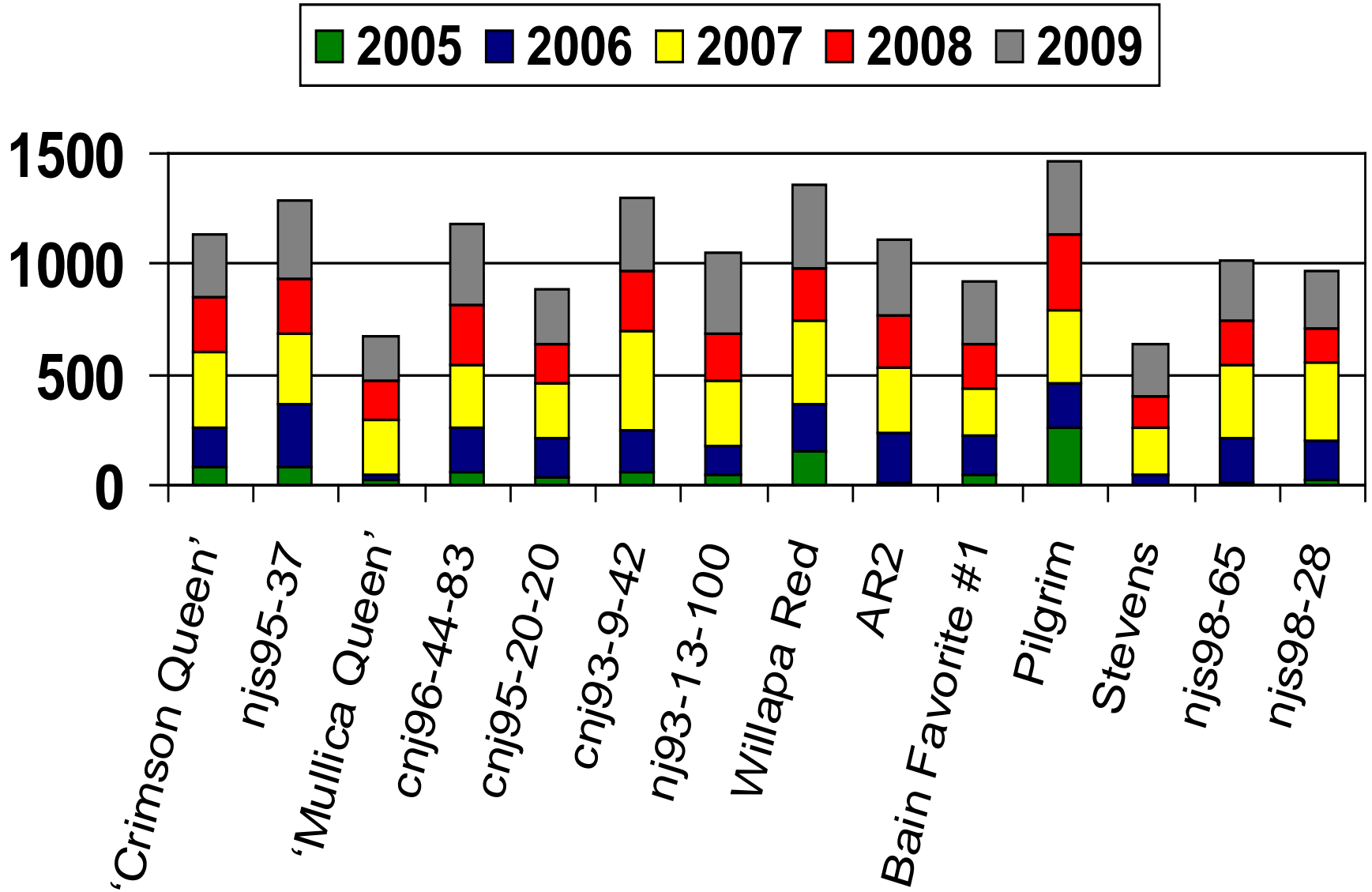
	Active ingredient	Toxic to mammals	Method of application
Rozol Pellet	Chlorophacinone	low	Drop down holes
Weather Blok XT	Brodifacoum	high	Bait stations only

# 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

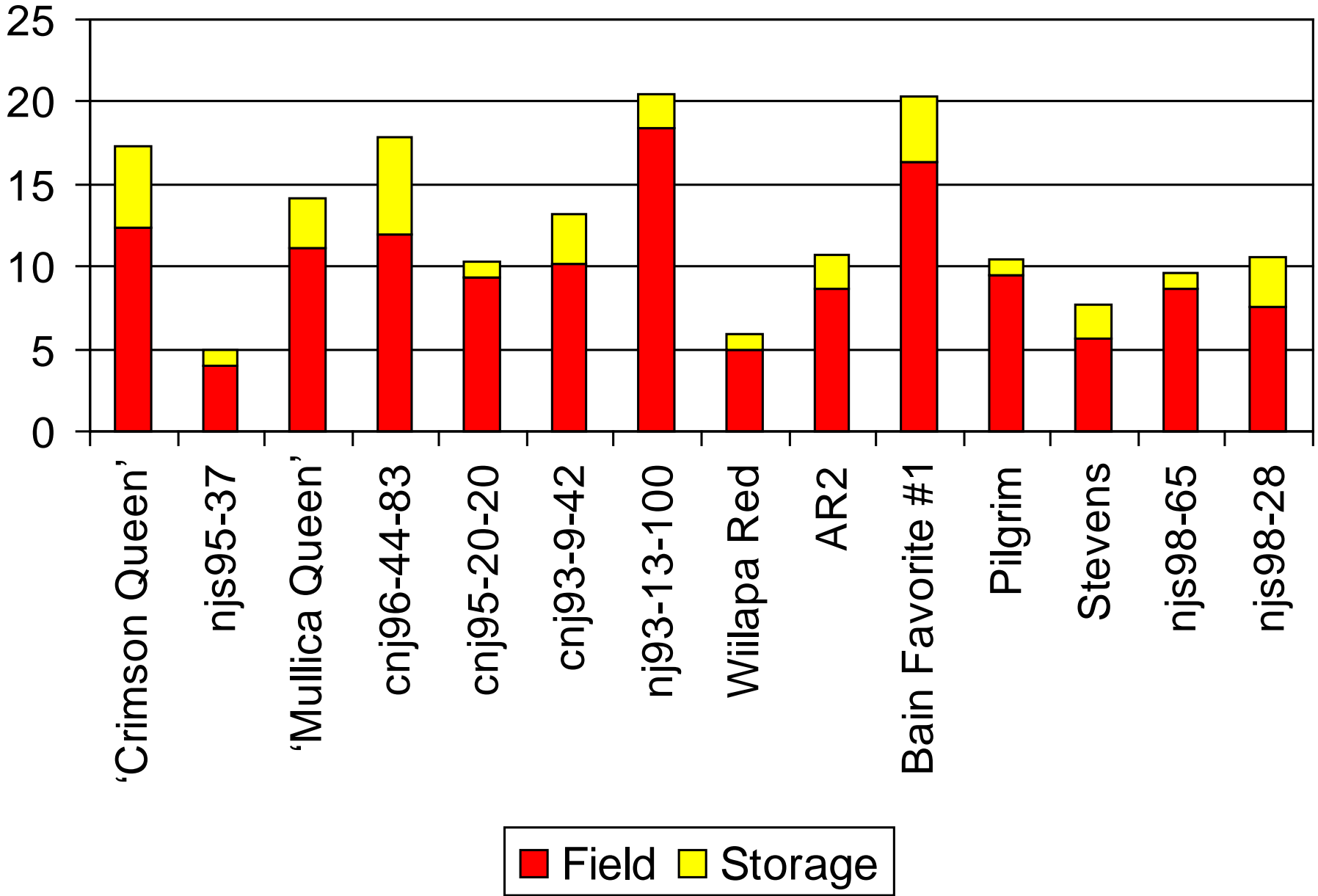
## Yield bbl/ac



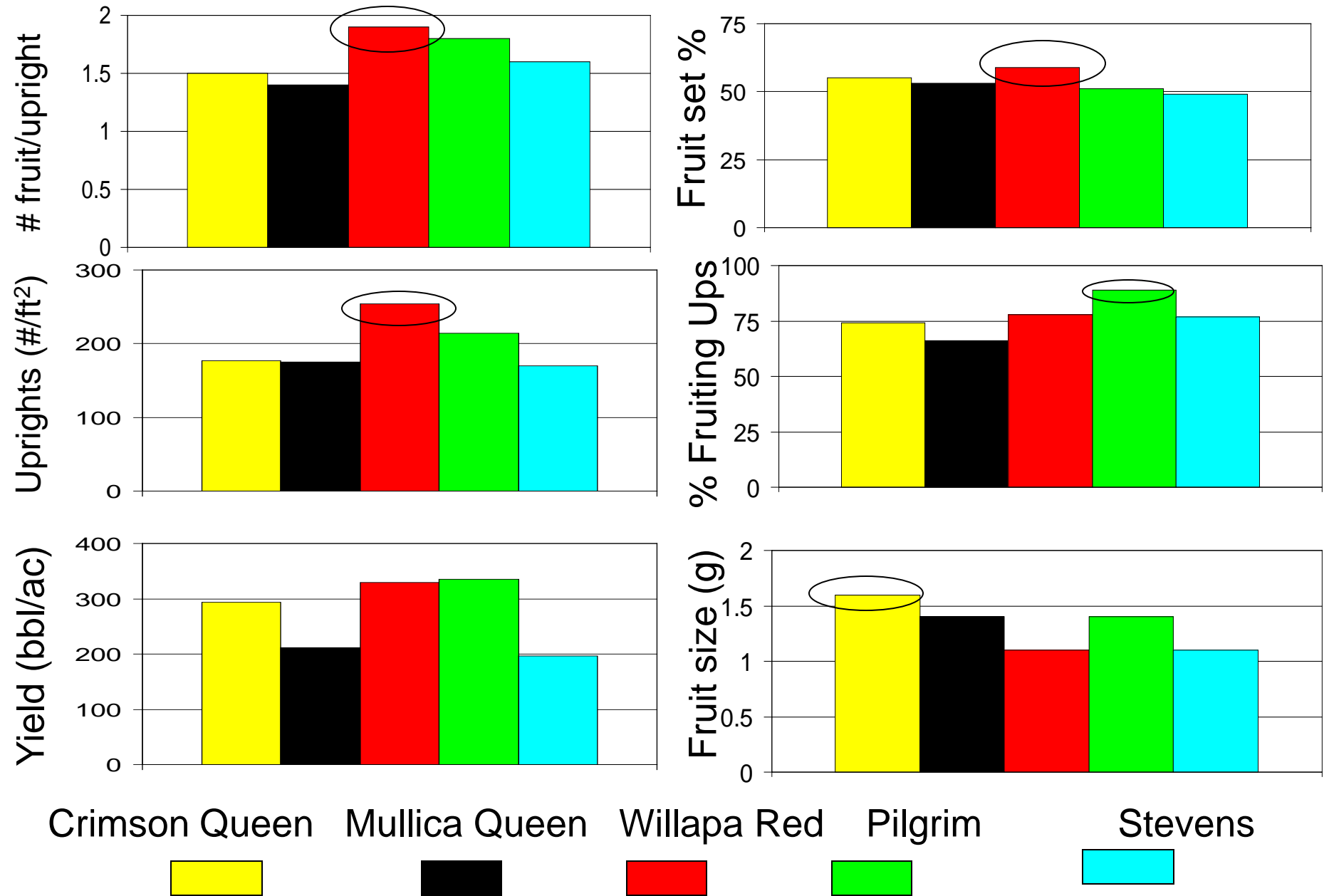
# Fruit Size G/fruit

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

# 3 year average % Rot



# Yield components



## Early color, disease resistance, & canopy characteristics

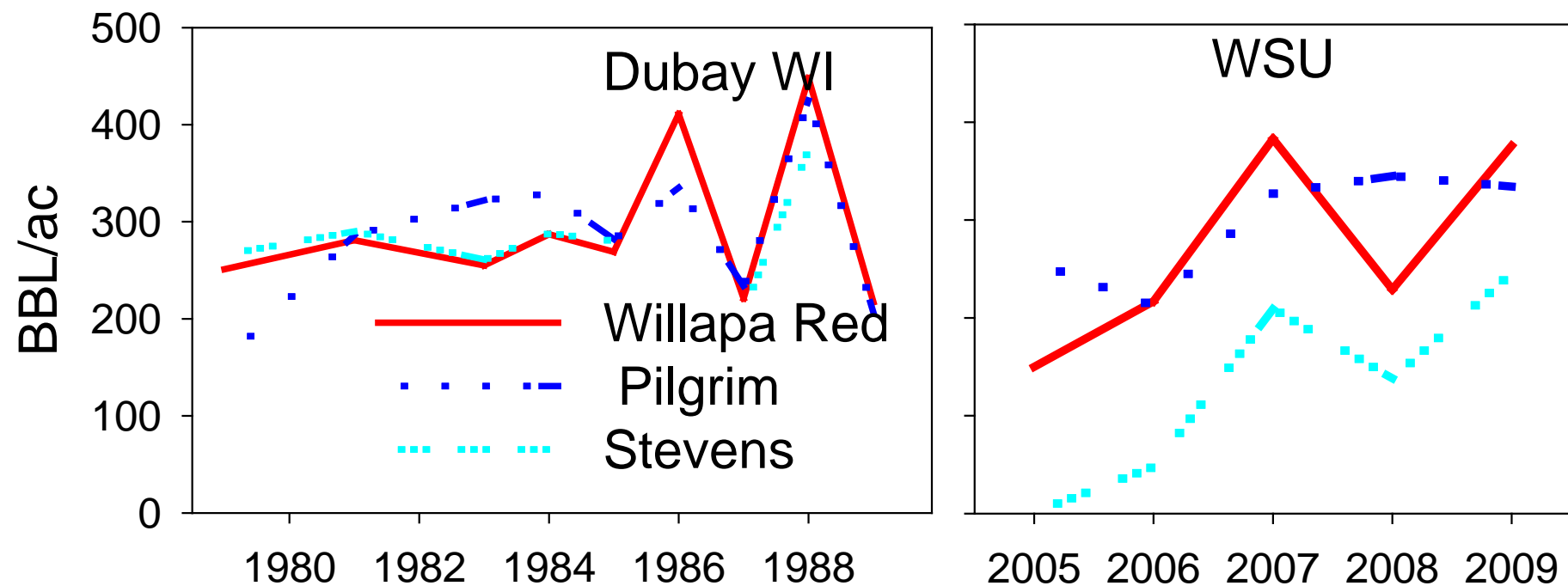
<b>Variety</b>	<b>Early red color</b>	<b>Incidences of foliage diseases</b>	<b>Inclination to be over-vegetative (runner/m<sup>2</sup>)</b>	<b>Ease of dry harvesting*</b>
'Crimson Queen'	excellent	Moderate to high	31	good
njs95-37	good	Moderate to high	5	excellent
'Mullica Queen'	good	Moderate	13	good
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



# Comparative Yields

## Willapa Red vs. Pilgrim & Stevens



DNA Purity of original pilgrim  
plantings in WA 1980's to early 1990's

Location	type of sample	source of vines	date planted	% Pilgrim
Long Beach	uprights	WI or BC	1980's	50%
Long Beach	runners	WI or BC	1980's	0%
Grayland	uprights	BC	1980	0%
Grayland	uprights	BC	1982	0%
Long Beach	uprights	Dillion, BC	1991	66%
Long Beach	uprights	Dillion, BC	1991	85%
Long Beach	uprights	Dillion, BC	1991	85%
Chinook	uprights	Scott, WI	2000	88%

# Trace change in purity over time when prunings are used for new plantings

McPhail q3, 1991 Uprights 85% Pilgrim	McPhail j/k, 1997 0% Pilgrim	McPhail s1, 1998 Uprights 25% Pilgrim, Runners 0% Pilgrim	McPhail a8, 2000 Uprights 20% Pilgrim
Sacks, 1998, Upright 40% Pilgrim			
Wood, 1998, Upright 100% Pilgrim			

Whannell a10, 1991 Uprights 85% Pilgrim	Whannell a11, 1994 Uprights 100% Pilgrim, Runners 0% Pilgrim	Whannell a4, 2002 Uprights and Runners 0% Pilgrim	Whannell a5, 2007 Uprights 33% Pilgrim Runners 50 % Pilgrim
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Jubilee c40, 1980's Uprights 50% Pilgrim Runners 0% Pilgrim	Jubilee c36, 2008 0% upright
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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%