

Newer approaches to soil fumigation and alternatives for caneberries



Central Coast Caneberry Meeting
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TOM WALTERS

WALTERS AG RESEARCH
Horticultural Contract Research & Consultation

Current Washington Standard Practice:

- Kill old crop with Roundup/Crossbow after harvest (optional)
- Ground prep
- Deep shank inject Telone:chloropicrin combination (Telone C-35, C-17, or PC 60).
- Non-tarped, roller packer used to seal
- Small grain cover crop



- + Decent protection from nematodes and disease for a couple of years
- Cost is high, and rising
- Buffers can be a problem

Grower Trials of Bed Fumigation

Five trials established in raspberry fields:

- Lynden 1, non-replicated, substantial *P. rubi* and *P. penetrans*
- Lynden 2, replicated, low *P. penetrans* and *P. rubi*; Also trialing non-tarped bed
- Lynden 3, replicated, substantial *P. penetrans*
- Burlington, replicated, high *P. penetrans* and *P. rubi*; Also trialing middle row management
- Mount Vernon, replicated, high *P. penetrans*

Treatments applied Sept 2010, raspberries planted April 2011

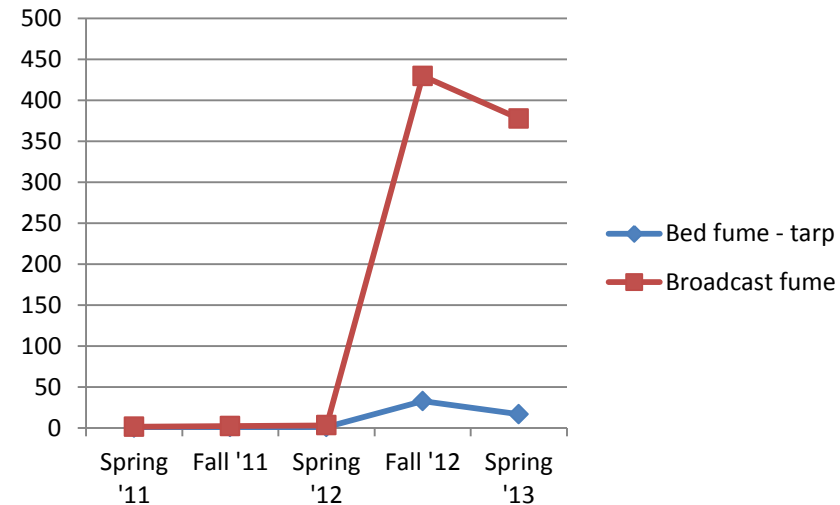
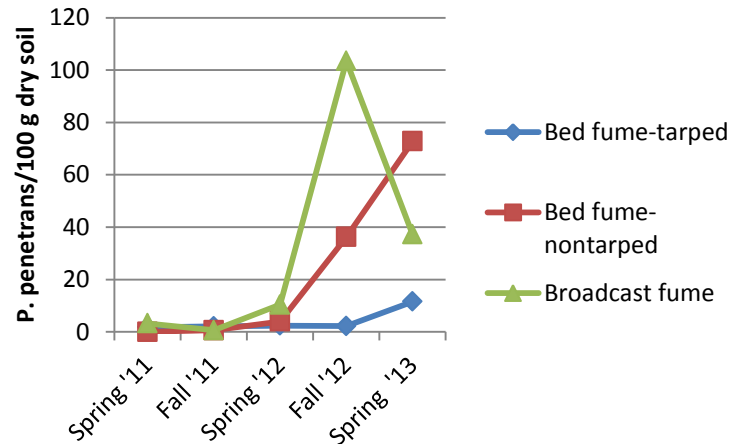


Nematode recolonization in bed- and broadcast-fumigated plots

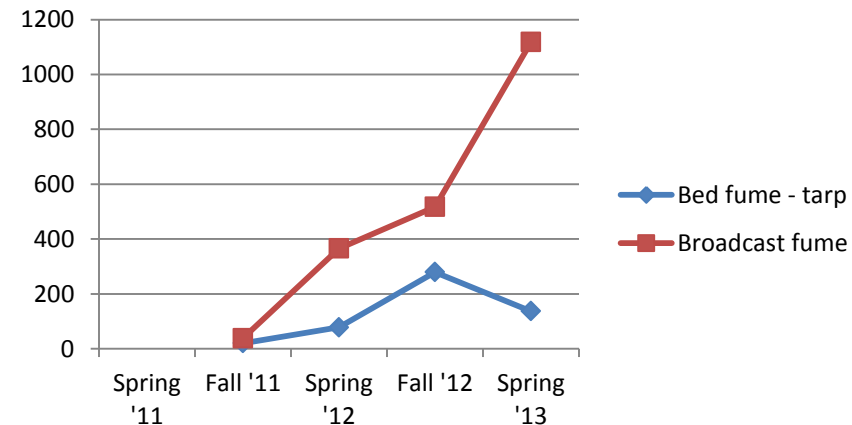
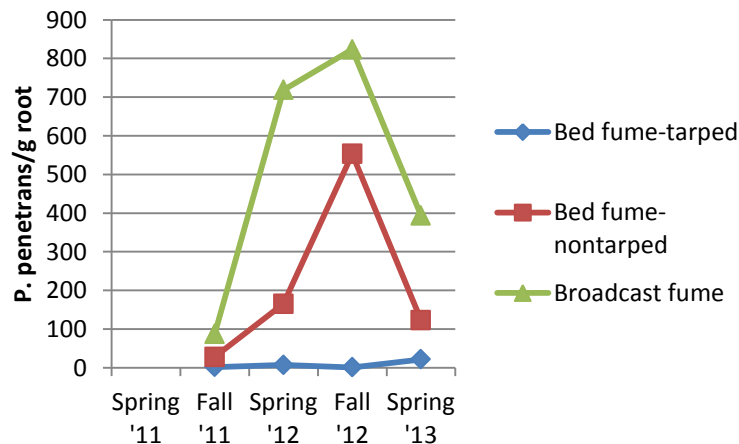
Lynden 2

Lynden 3

From Soil



From Roots



Challenges:

- The shaper we used (an adjustable unit for vegetables) can only make beds up to about 8" high. You'd need a different shaper to make **larger beds**.
- You'll need GPS or some other way to assure that beds are made in the correct **location**.
- It takes **more time** to fumigate a field this way; we usually travel at about 3 mph when fumigating and laying tarp. (Broadcast rig travels about 5-6 mph.)



Samson Farms:

**One-year fallow, with
Brassica summer
cover crop.**



Sep 2013: old crop removed (nematode pressure low), winter cover crop seeded.

Feb 2014: Root lesion nematodes present on winter cover crop.

April 2014: Brassica cover crop seeded.

July 2014: Cover crop chopped and incorporated.

August 2014: Low numbers of Root lesion nematodes present on weeds in field.

Samson Farms:

One-year fallow, with
Brassica summer
cover crop.



	P. penetrans/g dry root	P. penetrans/100 g dry soil
Mustard field weeds	15	24
Adj Raspberry	105	60

Tremaine Farms, Trident Ag Products

Bed fumigation, Trident's rig.

October 2014: Prefumigation samples
taken



Maberry Packing fumigation rig

- Metam, Dominus applied with this.
- Field fumigation by Trident.



Dominus application notes:



BIOPESTICIDE FOR AGRICULTURAL SOIL TREATMENT USE

A Broad Spectrum Pre-Plant Soil Biofumigant For The Control Of
Certain Soil Borne Fungi, Nematodes, Weeds And Insects

ACTIVE INGREDIENT:

Allyl isothiocyanate 96.3%

OTHER INGREDIENTS: 3.7%

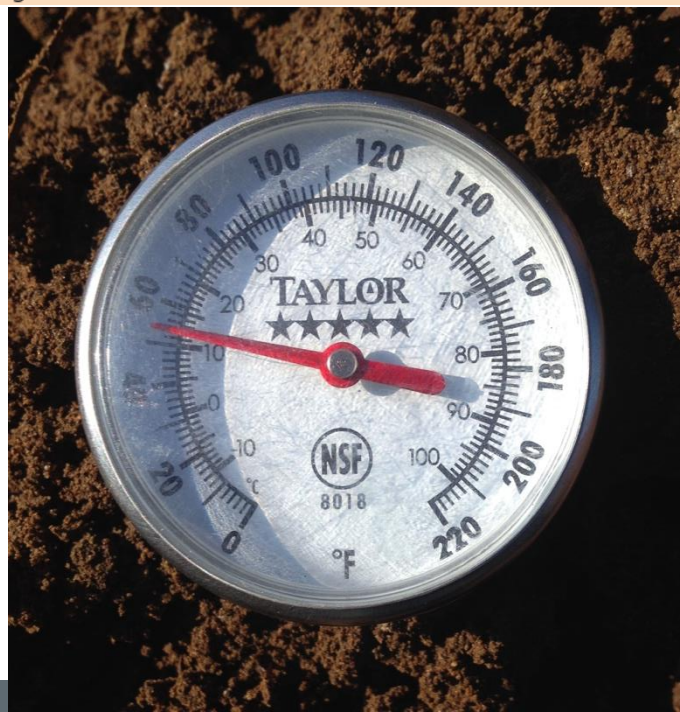
TOTAL: 100.0%

Contains 8.19 lbs. active ingredient (allyl isothiocyanate)
per gallon. This product weighs 8.5 lbs. per gallon.



Manufactured for:
Isagro USA, Inc.

430 Davis Drive, Suite 240
Morrisville, NC 27560



- Buffers are only 25 ft.
- Product has a **strong** horseradish smell. Not a problem as long as no product is leaking out above ground.
- Odor dissipated quickly.
- Applied at 40 gal/A, 340 lb/a.
- Cost?

Root Removal to Enhance Fumigation Efficacy

- **Inga Zasada and Jerry Weiland**
USDA-ARS HCRL
- **Lisa Wasco-DeVetter**
WSU-Mount Vernon NWREC
- **Tom Walters**
Walters Ag Research



See these diggers in action at:
<http://youtu.be/vnN0h8JrOA4>

Maberry Packing: *P. penetrans*/g dry root

	Prefumigation (raspberry roots)	Postfumigation (cover crop roots)
Northern plot (Dominus)	1474	710
Middle plot (Vapam)	1196	626
Southern plot (Vapam)	559	----
Adjacent row (C-35)	1441	5141

- Dominus applied at 40 gal/A, 0.4 A
- Vapam applied at 75 gal/A, 0.8 A
- C-35 applied at 35 gal/A, field

Cover crops on fumigated Washington fields often harbor root lesion nematodes

Location	<i>P. penetrans</i> /g dry root	
D	0	
B	145	
A	161	Roller packed and water sealed
F	250	Not fumigated; Fallow year and Brassica cover crop
E	391	
C	652	
G	3467	
H	5141	Field with Dominus and Vapam trials

How does this affect growers here in California?



- Injection depth matters.
- Good seals (tarps) matter.
- Field prep and after-care matter.
- Less volatile products can be effective when properly applied.