**Things to consider when choosing a pre-plant management strategy for soilborne pathogen and nematode management in raspberry**

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## Pros and cons of pre-plant fumigant management options in raspberry.

**Disclaimer:** Always consult the label before applying a product. Mention of trade names or commercial products in this document is solely for the purpose of providing specific information and does not imply recommendation or endorsement by USDA and WSU.

| **Telone C-35 (34.7% chloropicrin:63.4% 1,3-dichloropropene)** | | |
|---|---|---|
| | **Pro** | **Con** |
| Broadcast application without a tarp | • What raspberry growers are familiar with<br>• Mixture favors nematode control over root rot (*Phytophthora rubi*) control | • Not available<br>• In some soils with high sand content, limited efficacy at shallow soil depths<br>• Mixture favors nematode (*Pratylenchus penetrans* and *Xiphinema* spp.) control over root rot control<br>• Larger buffer zones |
| Broadcast application with a tarp | • Tarping improves efficacy at shallow soil depths<br>• Mixture favors nematode control over root rot control<br>• Smaller buffer zones | • Not available<br>• Mixture favors nematode control over root rot control<br>• Tarp is an added up-front cost |
| Bed application without a tarp | • Available<br>• Mixture favors nematode control over root rot control<br>• Leaving alleyways untreated has not been demonstrated to be an issue for nematode control<br>• Smaller buffer zones | • Mixture favors nematode control over root rot control<br>• Leaving alleyways untreated may be an issue for root rot control |
| Bed application with a tarp | • Tarping improves fumigant efficacy<br>• Smaller buffer zones | • Not available<br>• Tarp is an added up-front cost |

| Pic-Clor 60 (59.6% chloropicrin:39% 1,3-dichloropropene) | | |
|---|---|---|
| | **Pro** | **Con** |
| Broadcast application without a tarp | • Available<br>• Mixture favors root rot control over nematode control | • Mixture favors root rot control over nematode control<br>• In some soils, limited efficacy at shallow soil depths<br>• Larger buffer zones |
| Broadcast application with a tarp | • Available<br>• Mixture favors root rot control over nematode control<br>• Tarping improves fumigant efficacy<br>• Smaller buffer zones | • Mixture favors root rot control over nematode control<br>• Not available<br>• Tarp is an added up-front cost |
| Bed application without a tarp | • Available<br>• Mixture favors root rot control over nematode control<br>• Leaving alleyways untreated has not been demonstrated to be an issue for nematode control<br>• Smaller buffer zones | • Mixture favors root rot control over nematode control<br>• Leaving alleyways untreated may be an issue for root rot control |
| Bed application with a tarp | • Tarping improves fumigant efficacy<br>• Smaller buffer zones | • Not available<br>• Tarp is an added up-front cost |

| Vapam (sodium methyldithiocarbamate) and K-Pam (potassium N-methyldithiocarbamate) | | |
|---|---|---|
| | **Pro** | **Con** |
| Broadcast application without a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant (nematodes and root rot) | • May not target organisms deep in soil profile<br>• No commercial application equipment available |
| Broadcast application with a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant<br>• Improved efficacy over nontarped application | • May not target organisms deep in soil profile<br>• No commercial application available<br>• Tarp is an added up-front cost |
| Bed application without a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant | • May not target organisms deep in soil profile<br>• No commercial application available |
| Bed application with a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant<br>• Improved efficacy over nontarped application | • May not target organisms deep in soil profile<br>• No commercial application available<br>• Tarp is an added up-front cost |
| Drip applied for crop termination | • Used effectively in other cropping systems | • Has not been tested in raspberry |

| Basamid (tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione) | | |
|---|---|---|
| | **Pro** | **Con** |
| Broadcast application without a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant<br>• Experience with this product by Canadian raspberry growers | • No commercial application available<br>• May not target organisms deep in soil profile<br>• Irrigation required |
| Broadcast application with a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant<br>• Improved efficacy over nontarped application | • No commercial application available<br>• May not target organisms deep in soil profile<br>• Irrigation required<br>• Tarp is an added up-front cost |
| Bed application without a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant | • No commercial application available<br>• May not target organisms deep in soil profile<br>• Irrigation required<br>• Tarp is an added up-front cost |
| Bed application with a tarp | • Available<br>• Affordable<br>• Broad-spectrum fumigant<br>• Improved efficacy over nontarped application | • No commercial application available<br>• May not target organisms deep in soil profile<br>• Irrigation required<br>• Tarp is an added up-front cost |

| Dominus (allyl isothiocyante) | | |
|---|---|---|
| | **Pro** | **Con** |
| Broadcast application without a tarp | • Available<br>• Broad-spectrum fumigant<br>• Smaller buffer zones | • Expensive<br>• May not target organisms deep in soil profile |
| Broadcast application with a tarp | • Available<br>• Broad-spectrum fumigant<br>• Smaller buffer zones<br>• Tarping improves fumigant efficacy | • Expensive<br>• May not target organisms deep in soil profile<br>• Tarp is an added up-front cost |
| Bed application without a tarp | • Available<br>• Broad-spectrum fumigant<br>• Smaller buffer zones | • Expensive<br>• Questions regarding mobility in soil |
| Bed application with a tarp | • Available<br>• Broad-spectrum fumigant<br>• Smaller buffer zones<br>• Tarping improves fumigant efficacy<br>• | • Not available<br>• Expensive<br>• Tarp is an added up-front cost |
| Drip applied for crop termination | | • Has not been tested in raspberry<br>• Expensive |

| **Inline (**33.8% chloropicrin:60.8% 1,3-dichloropropene) | | |
|---|---|---|
| | **Pro** | **Con** |
| Drip applied for crop termination | • Used effectively in other cropping systems | • Has not been tested in raspberry |

## Pros and cons of pre-plant nonfumigant management options in raspberry.

| | Pro | Con |
|---|---|---|
| Soil solarization | • Effective in some systems and climates<br>• No buffer zones | • Climate in northern WA marginal for this practice<br>• Inconsistent nematode and root rot control across years |
| Rotation | • Allows the land to rest | • If weeds are allowed to grow, many are hosts for root lesion nematode; perennial weeds can also be difficult to control<br>• Most available cover crops are a host to root lesion nematode<br>• Unknown how long land needs to be out of raspberry production for root rot control<br>• Increased herbicide usage<br>• Increased tillage<br>• Land out of raspberry production for an extended period |
| Brassica seed meal | • Provides additional nitrogen to the system<br>• Potential for improved soil health<br>• No buffer zones | • Expensive<br>• Not widely available<br>• Nematode control results are inconsistent |
| Brassica cover crops | • Addition of organic matter into the soil<br>• Potential for improved soil health<br>• No buffer zones | • Many brassica cover crops are hosts for root lesion nematode<br>• Land out of raspberry production for an extended period<br>• Nematode control results are inconsistent<br>• Unknown root rot control<br>• Need to exercise care when purchasing seeds – they need to be treated so that they are not hosts to black leg [*Phoma lingam* (sexual stage: *Leptosphaeria maculans*)]<br>• In some areas, need to make sure they don't encroach on isolation distances for brassica seed production |
| Anaerobic soil disinfestation | • Some promising results for soil fungal and pathogen management<br>• No buffer zones | • Climate in northern WA likely too cool and marginal for this practice<br>• Practice requires use of labile carbon source<br>• Inconsistent results |
| Post-plant fungicides | • Mefenoxam and fosetyl-Al products registered for use on raspberry | • Resistance can be a concern if mefenoxam is overused |
| Post-plant nematicides | • Label for nonbearing oxamyl available<br>• Several other nematicides registered for use in raspberry | • Efficacy of many of registered nematicides in the raspberry system is unknown |

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