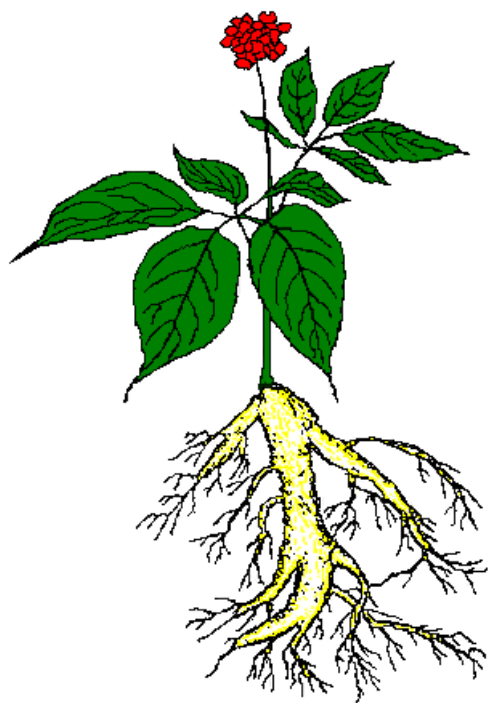


# CONTROL OF DISEASES, PESTS AND WEEDS IN CULTIVATED GINSENG, 2019

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Remember that the pesticide label is the legal document on pesticide use. Read the label, as they change often and follow all instructions closely. Some chemicals listed in this bulletin may be dropped by the manufacturer or distributor after the publication of this bulletin. The use of a pesticide in a manner not consistent with the label can lead to the injury of crops, humans, animals, and the environment. The use of a pesticide inconsistent with the label directions can also lead to civil or criminal fines and/or condemnation of the crop. Pesticides are good management tools for the control of pests on crops, but only when they are used in a safe, effective and prudent manner according to the label.

These recommendations are not intended to replace the specific product labels. Always read and follow label instructions carefully.

- This information does not take the place of the product label; changes to product label information can occur without notice. Always read and follow ALL label directions.
- Follow ALL requirements of the worker protection standard (WPS) to protect agriculture workers from exposure to these materials.
- Use only approved materials.
- Some products are registered for use only in Michigan (**MI only**) or in Wisconsin (**WI only**), but not in both states.

## Disease: **ALTERNARIA LEAF AND STEM BLIGHT** (*Alternaria panax*)

### CULTURAL CONTROL:

This disease is favored by long periods of rain, dew, fog, and high humidity. Choose garden sites that have good soil drainage with rows oriented in the direction of the prevailing winds. Avoid sites that are bordered by woods. Smaller gardens allow better air movement than larger gardens. Side and end curtains will decrease air movement and should be used only as needed. Dense plants stands are especially at risk for this disease because it takes longer for them to dry following dew periods or rain.

Pesticide	Rate of product/acre	Comments
<b>★ AZOXYSTROBIN/DIFENOCONAZOLE★ [11/3]</b>		
Quadris Top .....	10-14 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar applications before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT apply more than 56 fl oz/acre per year.</li> <li>▪ Use a minimum of 15 gal water for ground applications and a minimum of 10 gal water for aerial applications.</li> </ul>
<b>★ AZOXYSTROBIN/MANCOZEB★ [11/M3]</b>		
Dexter Max .....	2.1 lbs at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications (11.76 lb a.i. mancozeb/0.84 lb a.i. azoxystrobin)/acre per year.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ In Wisconsin, apply with a minimum of 80 gallons of water per acre.</li> </ul>
<b>★ CHOROTHALONIL★ [M5]</b>		
Bravo Weather Stik SC -or- Chloronil 720 -or- Chlorothalonil 720 -or- Echo 720 -or- Equus 720 SST -or- Initiate 720 -or- Orondis Opti B.....	2.0 pt at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications (12 lb a.i.)/acre per year.</li> <li>▪ DO NOT apply within 14 days of harvest.</li> </ul>
<b>★ CHLOROTHALONIL/OXATHIPIPROLIN★ [M5/U15]</b>		
Orondis Opti (Premix).....	1.75-2.5 pt at 14-day intervals at minimum volume of 50 gallons per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 10 pt per acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ DO NOT apply more than 2 sequential applications of Orondis Opti.</li> <li>▪ DO NOT apply more than 0.125 lb ai per acre per year of oathiapiprolin products.</li> <li>▪ DO NOT apply more than 12.0 lb ai per acre per year of chlorothalonil products.</li> </ul>
<b>★ CYPRODINIL/FLUDIOXONIL★ [9/12]</b>		
Switch 62.5WDG.....	11-14 oz at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar applications before alternating with a fungicide with a different mode of action for at least 2 applications.</li> <li>▪ DO NOT exceed 56 oz/acre per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## ALTERNARIA LEAF AND STEM BLIGHT *continued*

Pesticide	Rate of product/acre	Comments
<b>★FLUAZINAM★[29]</b>		
Omega 500F .....	1.0-1.5 pt at 7- to 14-day intervals in a minimum of 100 gal water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 6 pt per season.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ Use 1 pt/acre when the disease first appears or when conditions are favorable. Under conditions that favor severe disease development, use higher rate.</li> </ul>
<b>★FLUOPYRAM/TRIFLOXYSTROBIN★ [7/11]</b>		
Luna Sensation .....	7.6 fl oz at a 14-day interval.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 15.3 fl oz per acre per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
<b>★IPRODIONE★[2]</b>		
<ul style="list-style-type: none"> <li>▪ Tankmix programs: Apply at 7- to 10-day intervals.</li> </ul>		
Iprodione 4L AG <i>-or-</i> Meteor <i>-or-</i> Nevado 4F <i>-or-</i> Rovral Brand 4 Flowable .....	1.0-1.5 pt.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 10 pt/acre per season.</li> <li>▪ DO NOT exceed 5 applications per season.</li> <li>▪ DO NOT apply within 36 days of harvest.</li> <li>▪ Apply in a minimum of 10 gal/acre.</li> <li>▪ Always use in a fungicide resistance management program by tankmixing or alternating with another fungicide registered for Alternaria blight control in ginseng.</li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> <li>▪ <i>Alternaria</i> may develop resistance to iprodione products if this fungicide is overused.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Alternating programs: Apply at 14-day intervals and alternate with another registered fungicide.</li> </ul>		
Iprodione 4L AG <i>-or-</i> Meteor <i>-or-</i> Nevado 4F <i>-or-</i> Rovral Brand 4 Flowable .....	1.5-2 pt.	
<b>★MANCOZEB★[M3]</b>		
Fortuna 75 WDG <i>-or-</i> ManKocide <i>-or-</i> Koverall <i>-or-</i> Manzate Pro-Stick <i>-or-</i> Penncozeb 75DF <i>-or-</i> Penncozeb 80WP <i>-or-</i> Roper DF Rainshield.....	2.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 24 lb (18 lb a.i.)/acre Dithane/Fortuna/ManKocide/Koverall/Manzate Pro-Stick/Penncozeb 75DF/Penncozeb 80WP/Roper or 18 qt (18 lb a.i.)/acre Manzate Flowable/Penncozeb 4FL/Dithane F-45 Rainshield or 22.5 lb Dithane M-45 per season.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ DO NOT exceed 12 applications per year.</li> <li>▪ Apply in a minimum of 80 gal water/acre with ground equipment.</li> </ul>
Manzate Flowable or Manzate Max Fungicide <i>-or-</i> Dithane F-45 Rainshield (supplemental label).....	1.5 qt at 7- to 10-day intervals.	
Dithane M-45 .....	1.8 lb at 7- to 10-day intervals.	
<b>★PYRACLOSTROBIN/FLUXAPYROXAD★[11/7]</b>		
Merivon Xemium Brand Fungicide .....	4.0-5.5 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT make more than 2 sequential applications of Merivon before alternating to a labeled non-Group 7 or non-Group 11 fungicide.</li> <li>▪ DO NOT apply more than 16.5 fl oz/A of Merivon per year.</li> <li>▪ DO NOT apply more than 3 applications of Merivon per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>

## ALTERNARIA LEAF AND STEM BLIGHT *continued*

Pesticide	Rate of product/acre	Comments
<b>AZOXYSTROBIN [11]</b>		
Aframe <i>-or-</i> Equation SC <i>-or-</i> Quadris F <i>-or-</i> Willowood Azoxystar <i>-or-</i> Azoxyzone- <i>-or-</i> Gold Rush <i>-or-</i> Satori <i>-or-</i> Tetraban <i>-or-</i> Trevo	6.0-15.5 fl oz at 7- to 14-day intervals.  6.0-20.0 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 foliar application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT alternate with QoI fungicides such as Cabrio, Flint or Gem.</li> <li>▪ Please note that resistance of <i>A. panax</i> to group 11 fungicides is a concern in WI.</li> <li>▪ DO NOT exceed 123 fl oz (2 lb a.i.)/acre per season.</li> <li>▪ Apply in a volume of water for adequate coverage of foliage and stems.</li> </ul>
<b>ALUMINUM TRIS [33]</b>		
Aliette WDG <i>-or-</i> Linebacker WDG	5.0 lb at 7-day intervals in a minimum of 100 gal/acre water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 9 applications per year.</li> <li>▪ DO NOT apply within 31 days of harvest.</li> <li>▪ DO NOT tankmix with copper compounds.</li> <li>▪ DO NOT apply with a spreader/sticker.</li> <li>▪ For suppression only.</li> </ul>
<b>BACILLUS SUBTILIS [44]</b>		
Cease Serenade ASO Serenade Max WP	3.0-6.0 qt at 7- to 10-day intervals. 2.0-4.0 fl oz/1 gal at 7-day intervals. 1.0-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Apply at stated interval or as needed.</li> </ul>
<b>BOSCALID [7]</b>		
Endura 70WG	4.5 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar applications before alternating with a fungicide with a different mode of action for at least 1 application.</li> <li>▪ DO NOT exceed 5 applications (22.5 oz)/acre per year.</li> <li>▪ Please note that resistance of <i>A. panax</i> to boscalid is a concern in WI.</li> </ul>
<b>COPPER AMMONIUM COMPLEX [M1]</b>		
Copper-Count-N	3.5 qt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ <b>Tankmix with Iprodione/Meteor/Nevado/Rovral in 100 gal minimum.</b></li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> </ul>
<b>COPPER HYDROXIDE [M1]</b>		
Agri Star Nu-Cop HB ( <i>MI only</i> ) Champ WG <i>-or-</i> Agri Star Nu-Cop 50DF ( <i>MI only</i> ) <i>-or-</i> Nu-Cop 50WP ChamplON++ <i>-or-</i> DuPont Kocide 3000 46DF Champ DP Dry Prill Champ Formula 2F Agri Star Nu-Cop 3L ( <i>MI only</i> ) <i>-or-</i> Kentan DF Kocide 2000 Fungicide Previsto	1.5-2.1 lb at 7-day intervals. 2.1 lb at 7-day intervals. 1-1.75 lb at 7-day intervals. 1.75 lb at 7-day intervals. 1.75 pt at 7-day intervals. 2.0-2.6 lb at 7-day intervals. 2.0-3.0 lb at 7-day intervals. 1.0-3.0 qt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ <b>Tankmix with Iprodione/Meteor/Nevado/Rovral in 100 gal minimum.</b></li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> <li>▪ DO NOT apply more than 14.5 pt of Champ Formula 2F per acre per year.</li> <li>▪ DO NOT make more than 5 applications of Champ WG per year.</li> <li>▪ DO NOT apply more than 69 qt of Previsto per acre per year</li> </ul>

## ALTERNARIA LEAF AND STEM BLIGHT *continued*

Pesticide	Rate of product/acre	Comments
<b>COPPER OXYCHLORIDE/COPPER HYDROXIDE [M1]</b>		
Badge SC .....	1.0-3.5 pt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Tankmix with Iprodione/Meteor/Nevado/Rovral in 100 gal minimum.</li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> </ul>
Badge X <sub>2</sub> .....	1.0-3.5 lb at 7-day intervals.	
<b>COPPER OCTANOATE [M1]</b>		
Camelot O <i>-or-</i> Cueva .....	0.5-2.0 gal/100 gal at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Begin 2 weeks before disease appears.</li> <li>▪ Apply at the higher rate at 7-day intervals when disease is increasing rapidly.</li> <li>▪ Reapply after rain.</li> <li>▪ DO NOT apply more than 33 gal of Cueva per acre per year</li> </ul>
Bonide Liquid Copper <i>-or-</i> Soap-Shield Flowable Liquid Copper Fungicide.....	0.5-2.0 fl oz/gal water at 7- to 10-day intervals.	
<b>COPPER SULFATE [M1]</b>		
Cuprofix Ultra 40 Disperss.....	1.75-2.5 lb at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Tankmix with Iprodione/Meteor/Nevado/Rovral in 100 gal minimum.</li> <li>▪ Cover stems thoroughly.</li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> </ul>
Cuproxat .....	3.25-4.0 pt at 7-day intervals.	
<b>CUPROUS OXIDE [M1]</b>		
Nordox 75 WG .....	2.25 lb at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Tankmix with 2 lb Rovral 50W in 100 gal minimum.</li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> </ul>
<b>COPPER SULFATE PENTAHYDRATE [M1]</b>		
Instill .....	15.0-30.0 fl oz at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Tankmix with 2 lbs Rovral 50W in 100 gal minimum.</li> <li>▪ Cover stems thoroughly.</li> <li>▪ Use spreader/sticker products to improve control; be sure stems and leaves are covered.</li> <li>▪ DO NOT exceed 1.05 lbs metallic copper per acre per single application.</li> <li>▪ DO NOT exceed 5.25 lbs metallic copper per acre per year.</li> </ul>
Mastercop .....	0.5-1.5 pt at 7-day intervals.	
<b>FLUOPYRAM/PYRIMETHANIL [7/9]</b>		
Luna Tranquility.....	16-27 fl oz at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 54.7 fl oz per acre per year.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
<b>HYDROGEN PEROXIDE/PEROXYACETIC ACID</b>		
Rendition.....	Curative treatment: 3.0 pt in a minimum of 100 gal water repeat daily for up to 3 consecutive days.	<ul style="list-style-type: none"> <li>▪ Preventative treatment: 3 pt in a minimum of 100 gal water at 5-day intervals for 3 total applications. Reduce to 1 pt in a minimum of 100 gal water at 5- to 14-day intervals. Then follow with curative treatment.</li> </ul>
<b>LAMINARIN [P4]</b>		
Vacciplant .....	14.0-22.0 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ At water volumes less than 70 gal per acre apply at 14.0 fl oz per acre. At water volumes above 70 gal per acre apply at 0.15% v/v.</li> </ul>

## ALTERNARIA LEAF AND STEM BLIGHT *continued*

Pesticide	Rate of product/acre	Comments
<b>NEEM OIL</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 gal/acre per application.</li> </ul>
Trilogy.....	0.5-1.0% at 7- to 14-day intervals in 25-100 gal water. 2.0 pt at 7- to 14-day intervals in 5 gal water.	
<b>PENTHIOPYRAD [7]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 61 fl oz/acre per application.</li> <li>▪ May be applied day of harvest (PHI=0).</li> <li>▪ DO NOT exceed 2 sequential applications before switching to a fungicide with a different mode of action.</li> </ul>
DuPont Fontelis.....	16-30 fl oz at 7- to 14-day intervals.	
<b>POLYOXIN D ZINC SALT [19]</b>		<ul style="list-style-type: none"> <li>▪ Use in alternation with fungicides that have a different mode of action.</li> <li>▪ DO NOT exceed 3 applications (2.1 oz a.i./acre) per season.</li> </ul>
Affirm <i>-or-</i> Ph-D WDG .....	6.2 oz at 7- to 10-day intervals.	
<b>PYRACLOSTROBIN [11]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 sequential application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT rotate with QoI fungicides such as Quadris, Satori, Flint, Gem.</li> <li>▪ DO NOT exceed 3 applications or 48 oz/acre per season.</li> <li>▪ Please note that resistance of <i>A. panax</i> to group 11 fungicides is a concern in WI.</li> </ul>
Cabrio 20EG .....	8.0-12 oz at 7- to 14-day intervals.	
<b>PYRIMETHANIL [9]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 54 fl oz/A of Scala SC per crop.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> </ul>
Scala SC.....	18 fl oz at minimum 7-day intervals.	
<b>STREPTOMYCES LYDICUS</b>		<ul style="list-style-type: none"> <li>▪ For best results use spreader-sticker.</li> </ul>
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	
<b>TRIFLOXYSTROBIN [11]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 3 sequential applications of Flint and 1 application of Gem before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT rotate with QoI fungicides such as Quadris, Satori, Cabrio.</li> <li>▪ DO NOT exceed 4 applications (11.5 oz Gem or 12 oz Flint/acre) per season (see labels).</li> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ Please note that resistance of <i>A. panax</i> to group 11 fungicides is a concern in WI.</li> </ul>
Flint 50WG.....	2.0-3.0 oz at 14-day intervals.	
Gem 500SC .....	1.9-2.9 fl oz at 14-day intervals. <ul style="list-style-type: none"> <li>▪ Use higher rates and shorter intervals when disease pressure is severe.</li> </ul>	

## Disease: **BOTRYTIS BLIGHT** (*Botrytis cinerea*)

### CULTURAL CONTROL:

*Botrytis* can grow and survive on any dead plant material found in a ginseng garden. Keep humidity in the gardens as low as possible by promoting good air movement (also see cultural notes listed under *Alternaria* for additional tips). *Botrytis* readily invades damaged tissue. Minimize plant wounding via equipment. Avoid foliar fertilizers or products that cause plant burn.

Pesticide	Rate of product/acre	Comments
<b>★ CAPTAN★ [M4]</b>		
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a foliar spray in a minimum of 100 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 lb/acre Drexel Captan 50W.</li> <li>▪ DO NOT exceed 30 lb/acre Captan 80WDG per year.</li> <li>▪ DO NOT apply Drexel 50W within 365 days of harvest.</li> <li>▪ DO NOT apply Captan Gold/Captan 80WDG within 14 days of harvest.</li> </ul>
Captan Gold 80WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 100 gal of water per acre.	
Captan 80WDG (Product Bulletin) .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 100 gal of water per acre.	
<b>★ CHOROTHALONIL★ [M5]</b>		
Bravo Weather Stik SC -or- Chloronil 720 -or- Chlorothalonil 720 -or- Echo 720 -or- Equus 720 SST -or- Orondis Opti B.....	2.0 pt at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications (12 lb a.i.)/acre per year.</li> <li>▪ DO NOT apply within 14 days of harvest.</li> </ul>
<b>★ CHLOROTHALONIL/OXATHIPIPROLIN★ [M5/U15]</b>		
Orondis Opti (Premix).....	1.75-2.5 pt at 14-day intervals. For ground application apply in at least 50 gal per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 10 pt per acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ DO NOT apply more than 2 sequential applications of Orondis.</li> <li>▪ DO NOT apply more than 0.125 lb ai per acre per year of oathiapiprolin products.</li> <li>▪ DO NOT apply more than 12.0 lb ai per acre per year of chlorothalonil products.</li> </ul>
<b>★ FENHEXAMID★ [17]</b>		
Elevate 50WDG .....	1.5 lb at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 consecutive applications before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT exceed 4 applications (6 lb)/acre per season.</li> </ul>
<b>★ FLUAZINAM★ [29]</b>		
Omega 500F .....	1.0-1.5 pt at 7- to 14-day intervals in a minimum of 100 gal water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 6 pt per season.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ Use 1 pt/acre when the disease first appears or when conditions are favorable. Under conditions that favor severe disease development, use higher rate.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## BOTRYTIS BLIGHT continued

Pesticide	Rate of product/acre	Comments
<b>★ AZOXYSTROBIN/DIFENOCONAZOLE★ [11/3]</b>		
Quadris Top .....	10-14 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT apply more than 56 fl oz/acre per year.</li> <li>▪ Use a minimum of 15 gal water for ground applications and a minimum of 10 gal water for aerial applications.</li> </ul>
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC .....	0.5-6.0 qt at 7- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Serenade ASO .....	2-4.0 fl/1 gal water oz at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Apply at stated interval or as needed.</li> </ul>
Serenade Max WP .....	1.0-3.0 lb at 7- to 10-day intervals.	
Serenade Opti.....	14-20 oz at 7- to 10-day intervals.	
<b>COPPER OCTANOATE [M1]</b>		
Camelot O <i>-or-</i> Cueva .....	0.5-2.0 gal/100 gal at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Begin 2 weeks before disease appears.</li> <li>▪ Apply at the higher rate at 7-day intervals when disease is increasing rapidly.</li> <li>▪ Reapply after rain.</li> <li>▪ DO NOT apply more than 33 gal of Cueva per acre per year</li> </ul>
Bonide Liquid Copper <i>-or-</i> Soap-Shield Flowable Liquid Copper Fungicide.....	0.5-2.0 fl oz/gal water at 7- to 10-day intervals.	
<b>FLUOPYRAM/PYRIMETHANIL[7/9]</b>		
Luna Tranquility.....	16-27 fl oz at 7-day interval.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 54.7 fl oz per acre per year.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
<b>FLUOPYRAM/TRIFLOXYSTROBIN [7/11]</b>		
Luna Sensation .....	7.6 fl oz at a 14-day interval.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 15.3 fl oz per acre per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
<b>NEEM OIL</b>		
Trilogy.....	0.5-1% in 25-100 gal water at 7- to 14-day intervals. 2.0 pt in 5 gal water at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 gal/acre per application.</li> </ul>
<b>PENTHIOPYRAD [7]</b>		
DuPont Fontelis.....	16-30 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 61 fl oz/acre per season.</li> <li>▪ May be applied day of harvest (PHI=0).</li> <li>▪ DO NOT exceed 2 sequential applications before switching to a fungicide with a different mode of action.</li> </ul>



## BOTRYTIS BLIGHT continued

Pesticide	Rate of product/acre	Comments
<b>POLYOXIN D ZINC SALT [19]</b>		<ul style="list-style-type: none"> <li>▪ Use in alternation with fungicides that have a different mode of action.</li> <li>▪ DO NOT exceed 3 applications (2.1 oz a.i./acre) per season.</li> </ul>
Affirm <i>-or-</i> Ph-D WDG .....	6.2 oz at 7- to 10-day intervals.	
<b>PYRIMETHANIL [9]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 54 fl oz/A of Scala SC per crop.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> </ul>
Scala SC.....	18 fl oz at minimum 7-day intervals.	
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		<ul style="list-style-type: none"> <li>▪ May be applied on day of harvest.</li> </ul>
Regalia Biofungicide.....	1.0-4.0 qt foliar application in 25-100 gal water at 7- to 10-day intervals.	
<b>STREPTOMYCES LYDICUS</b>		<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	
<ul style="list-style-type: none"> <li>▪ Use of <b>Iprodione/Meteor/Nevado/Rovral</b> combined with fixed copper fungicides for Alternaria leaf and stem blight may provide some control of Botrytis blight.</li> </ul>		

## Disease: CYLINDROCARPON ROOT ROT/RUSTY ROOT

**(*Cylindrocarpon destructans*, *Rhexocercosporidium panacis*; other fungi are involved)**

### CULTURAL CONTROL:

Use treated seed from healthy gardens. Work in diseased gardens at the end of the day. After equipment has been used in a garden with *Cylindrocarpon*, use a power washer to remove soil and plant debris from it, then clean with a detergent.

Pesticide	Rate of product/acre	Comments
<b>★ CAPTAN ★ [M4]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 lb/acre Captan 50W per year.</li> <li>▪ DO NOT exceed 30 lb/acre Captan 80WDG/Captan Gold per year.</li> <li>▪ DO NOT apply Captan 50W within 365 days of harvest.</li> <li>▪ DO NOT apply Captan Gold/Captan 80WDG within 14 days of harvest.</li> </ul>
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a drench in a minimum of 200 gal of water per acre.	
Captan Gold 80 WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 200 gal of water per acre.	
Captan 80WDG (Product Bulletin).....	3.75 lb at 6- to 8-day intervals as a drench in a minimum of 200 gal of water per acre.	
<b>★ FLUDIOXONIL ★ [12]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply within 14 days of harvest.</li> <li>▪ DO NOT exceed 2 lb/acre per season.</li> <li>▪ DO NOT apply more than 32 oz (1.0 lb a.i./A) per crop.</li> </ul>
Cannonball WG <i>-or-</i> Cannonball WP .....	4.0-8.0 oz/acre at 14-21 day intervals.	
<b>POLYOXIN D ZINC SALT [19]</b>		<ul style="list-style-type: none"> <li>▪ Use in alternation with fungicides that have a different mode of action.</li> <li>▪ DO NOT exceed 3 applications (2.1 oz a.i./acre) per season.</li> </ul>
Affirm <i>-or-</i> Ph-D WDG .....	6.2 oz drench at 14-day intervals.	
<ul style="list-style-type: none"> <li>▪ Use of <b>Quadris</b> for damping-off may provide control of Cylindrocarpon root rot/rusty root.</li> <li>▪ Use of <b>Fontelis</b> for white mold and Alternaria blight may provide control of Cylindrocarpon root rot/rusty root.</li> </ul>		

★Products with starred active ingredients are particularly recommended for problem infestations.

**Disease: DAMPING-OFF (*Cylindrocarpon destructans*, *Fusarium* spp.,  
*Phytophthora cactorum*, *Pythium* spp., *Rhizoctonia solani*)**

**CULTURAL CONTROL:**

Use treated seed produced in healthy gardens. Choose sites and soil types with good drainage. Minimize soil compaction. Avoid standing water by digging trenches as needed to drain water away from the garden.

Pesticide	Rate of product/acre	Comments
<b>★ AZOXYSTROBIN★[11]</b>		
<ul style="list-style-type: none"> <li>Banded applications: band width 7" or less. Banded applications contact the foliage and are counted as a foliar application.</li> </ul>		
Aframe <i>-or-</i> Azoxystar <i>-or-</i> Azoxyzone <i>-or-</i> Equation SC <i>-or-</i> Gold Rush <i>-or-</i> Satori <i>-or-</i> Tetraban <i>-or-</i> Quadris F <i>-or-</i> Willowood Azoxy 2SC .....	0.4-0.8 fl oz/1000 row feet. 0.7 fl oz/1000 row feet maximum for 22" rows.	<ul style="list-style-type: none"> <li>Active against <i>Rhizoctonia</i>, <i>Pythium</i>.</li> <li>DO NOT exceed 1 foliar application before alternating with a fungicide with a different mode of action.</li> <li>DO NOT alternate with QoI fungicides such as Cabrio, Flint, Gem.</li> <li>DO NOT exceed 4 applications per year.</li> <li>DO NOT exceed 123 fl oz (2 lb a.i.)/acre per season.</li> </ul>
<b>★ CAPTAN★[M4]</b>		
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a drench in a minimum of 200 gal of water per acre.	<ul style="list-style-type: none"> <li>Active against <i>Cylindrocarpon</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>DO NOT exceed 32 lb/acre Captan 50W per year.</li> <li>DO NOT exceed 30 lb/acre Captan 80WDG/Captan Gold per year.</li> <li>DO NOT apply Captan 50W within 365 days of harvest.</li> <li>DO NOT apply Captan Gold/Captan 80WDG within 14 days of harvest.</li> </ul>
Captan Gold 80WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 200 gal of water per acre.	
Captan 80WDG (Product Bulletin).....	3.75 lb at 6- to 8-day intervals as a drench in a minimum of 200 gal of water per acre.	
<b>★ MEFENOXAM★[4]</b>		
Ridomil Gold GR .....	pre-emergence: 15 lb post-emergence: 10 lb (up to 4 applications) at monthly intervals.	<ul style="list-style-type: none"> <li>Active against <i>Pythium</i>, <i>Phytophthora</i>.</li> <li>DO NOT exceed 60 lb/acre per growing season.</li> <li>DO NOT exceed 45 lb/acre per growing season if Ridomil Gold EC or Ridomil Gold SL is applied in spring before plants have begun to grown.</li> <li>DO NOT apply within 9 days of harvest.</li> <li>NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
Ridomil Gold SL .....	0.75 pt as a drench in 100-400 gal water. 1.0-2.0 pt/A preplant incorporated or soil spray at planting.	
Ultra Flourish.....	1.5 pt in 100-400 gal water applied once as a drench.	<ul style="list-style-type: none"> <li>Active against <i>Phytophthora</i>.</li> <li>DO NOT make supplemental applications.</li> <li>DO NOT make more than one application.</li> <li>NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## DAMPING-OFF continued

Pesticide	Rate of product/acre	Comments
<b>★METALAXYL★[4]</b>		
MetaStar 2E.....	1.5 qt as a drench in 100-400 gal/acre water.	<ul style="list-style-type: none"> <li>▪ Active against <i>Pythium</i>, <i>Phytophthora</i>.</li> <li>▪ DO NOT exceed 1 application per year.</li> <li>▪ Apply before early growth, follow with applications of a metalaxyl or mefenoxam granular product.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55.....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Pythium</i>, <i>Phytophthora</i>, <i>Rhizoctonia</i>, <i>Verticillium</i>.</li> <li>▪ First application as a soil or seedline drench, banded in-furrow at planting.</li> <li>▪ Follow-up applications via drip/sprinkler, spray onto soil surface and/or lower plant parts followed immediately with overhead irrigation, or inject directly into the rooting zone using shanks, etc.</li> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC.....	0.5-6 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Rhapsody.....	2.0-8.0 qt at 5- to 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Begin applications at planting, during or after seeding, during or after transplanting and at any stage of growth.</li> </ul>
Serenade Soil.....	2.0-4.0 fl oz/1 gal water at 7-day intervals. 2.2-13.2 fl oz/1000 row feet as in-furrow spray.	
<b>FENAMIDONE [11]</b>		
Reason 500SC.....	5.5-8.2 fl oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ Active against <i>Pythium</i>, <i>Phytophthora</i></li> <li>▪ Apply only in a 1:1 alternation with a mefenoxam-containing fungicide.</li> <li>▪ DO NOT exceed 24.6 fl oz/acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> </ul>
<b>POLYOXIN D ZINC SALT [19]</b>		
Ph-D WDG.....	6.2 oz drench at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ Active against <i>Rhizoctonia</i>.</li> <li>▪ Use in alternation with fungicides that have a different mode of action.</li> <li>▪ DO NOT exceed 3 applications (2.1 oz a.i./acre) per season.</li> </ul>
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		
Regalia Biofungicide.....	1.0-3.0 qt soil drench in 100 gal water at 10- to 14-day intervals. 1.0-4.0 qt/acre or 2.2-8.8 fl oz per 1000 ft-row in-furrow applications in 5-15 gal water.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>, <i>Verticillium</i>.</li> <li>▪ May be applied on day of harvest.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## DAMPING-OFF continued

Pesticide	Rate of product/acre	Comments
<b>TRICHODERMA ASPERELLUM/T. GAMSII</b>		
Bio-Tam 2.0 -or- Tenet WP...	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Use of <b>Iprodione/Meteor/Nevado/Rovral</b> in alternation or as a tankmix with fixed copper fungicides for Alternaria leaf and stem blight control may provide some control of damping-off caused by <i>Rhizoctonia solani</i>. Adequate coverage of stems is critical for obtaining damping-off and crown/root rot control.</li> <li>▪ Use of <b>Cannonball</b> for Cylindrocarpum root rot/rusty root or white mold may provide control of damping-off.</li> <li>▪ See also Seedborne Pests/Fumigation section for preplant chemical control of damping-off.</li> <li>▪ See also Seed Treatment section for chemical control of damping-off through treatment of seeds.</li> </ul>		

## Disease: FUSARIUM ROOT ROT (*Fusarium* spp.)

### CULTURAL CONTROL:

Use treated seed from healthy gardens. Work in diseased gardens at the end of the day. After equipment has been used in a garden with *Fusarium*, use a power washer to remove soil and plant debris from it, then clean with a detergent. Use disposable, plastic boots over footwear before entering a garden with *Fusarium*. Clean hand tools with a disinfectant such as bleach (10% solution) and rinse.

Pesticide	Rate of product/acre	Comments
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Serenade Soil .....	2.0-6.0 qt at 7 to 10 day intervals.	<ul style="list-style-type: none"> <li>▪ Begin applications at planting, during or after seeding, during or after transplanting and at any stage of growth.</li> </ul>
<b>PHOSPHOROUS ACID SALTS [33]</b>		
Fosphite -or- Resist 57 -or- Rampart.....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> <li>▪ DO NOT apply when conditions favor wet tissue for &gt;4 hours.</li> </ul>
Confine Extra .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
K-Phite 7LP AG.....	1.0-3.0 qt in a minimum of 20 gal water.	
<b>STREPTOMYCES LYDICUS</b>		
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## FUSARIUM ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>TRICHODERMA ASPERELLUM/T. GAMSII</b>		
Bio-Tam <i>-or-</i> Tenet WP .....	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Use of <b>Cannonball</b> and <b>Fontelis</b> for <i>Cylindrocarpum</i> root rot/rusty root or white mold may provide control of <i>Fusarium</i> root rot.</li> </ul>		

## Disease: PHYTOPHTHORA ROOT ROT (*Phytophthora cactorum*)

### CULTURAL CONTROL:

Plant only treated seed produced in a healthy garden. Select a site with a soil type that provides good drainage. Avoid working in the garden when the soil is wet to avoid compaction. Form plant beds with a flat top to allow water to runoff and prevent pooling. Avoid standing water by digging trenches to drain water away from the garden. Do not allow water from older ginseng gardens to drain into younger gardens. Work in diseased gardens at the end of the day. After equipment has been used in a garden with *Phytophthora*, use a power washer to remove soil and plant debris from it, then clean with a detergent. Use disposable, plastic boots over footwear before entering a garden with *Phytophthora*. Clean hand tools with a disinfectant such as bleach (10% solution) and rinse.

Fungicide Resistance Management: Alternate applications of different fungicides to prevent the development of strains of *Phytophthora cactorum* that are resistant to these fungicides. Strains of *Phytophthora cactorum* that are resistant to Ridomil Gold (mefenoxam) are prevalent in Wisconsin and some Michigan ginseng gardens.

Pesticide	Rate of product/acre	Comments
<b>★ALUMINUM TRIS★[33]</b>		
Aliette WDG <i>-or-</i> Linebacker WDG.....	5.0 lb at 7-day intervals in a minimum of 100 gal/acre water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 9 applications per year.</li> <li>▪ DO NOT apply within 31 days of harvest.</li> <li>▪ DO NOT tankmix with copper compounds.</li> <li>▪ DO NOT apply with a spreader/sticker.</li> </ul>
<b>★CAPTAN★[M4]</b>		
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a drench in a minimum of 200 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 lb/acre Drexel Captan 50W per year.</li> <li>▪ DO NOT exceed 30 lb/acre Captan Gold/Captan 80WDG per year.</li> <li>▪ DO NOT apply within 365 days of harvest.</li> <li>▪ DO NOT apply Captan Gold/Captan 80WDG within 14 days of harvest.</li> </ul>
Captan Gold 80WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 200 gal of water per acre.	
Captan 80WDG (Product Bulletin).....	3.75 lb at 6- to 8-day intervals as a drench in a minimum of 200 gal of water per acre.	
<b>★DIMETHOMORPH★[40]</b>		
Forum .....	6.0 fl oz at 7-day intervals in a minimum of 20 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 30 fl oz/acre or 5 applications per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ Begin applications before infection occurs.</li> <li>▪ DO NOT exceed 1 application of Forum before rotating to a labeled non-Group 40 fungicide for at least 1 application.</li> </ul>

## PHYTOPHTHORA ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>★ETHABOXAM [22]★</b>		
Elumin.....	8.0 fl oz at 7- to 11-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 14 days of harvest.</li> <li>▪ DO NOT make more than 2 applications per year.</li> <li>▪ DO NOT apply more than 16 fl oz per acre per year.</li> </ul>
<b>★FENAMIDONE★[11]</b>		
Reason 500SC.....	5.5-8.2 fl oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 24.6 fl oz/acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> </ul>
<b>★FLUOPICOLIDE [43]★</b>		
Presidio.....	3.0-4.0 fl oz at 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Must be tankmixed with another fungicide that has a different mode of action.</li> <li>▪ DO NOT exceed 4 applications per year.</li> </ul>
<b>★MANDIPROPAMID★[40]</b>		
Revus SC <i>-or-</i> Orondis Ultra B .....	8.0 fl oz at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 fl oz/acre per year.</li> <li>▪ DO NOT harvest within 2 days of treatment.</li> <li>▪ Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide.</li> </ul>
<b>★OXATHIPIPROLIN★ [U15]</b>		
Orondis Opti A <i>-or-</i> Orondis Ultra A .....	4.8-38.6 fl oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 4 applications per year.</li> <li>▪ DO NOT exceed 77.2 fl oz per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ DO NOT apply more than 2 sequential applications of Orondis.</li> <li>▪ DO NOT exceed 19.2 fl oz of Orondis Gold 200 per year.</li> </ul>
Orondis Gold 200.....	4.8-9.6 fl oz at 14-day intervals.	
<b>★OXATHIPIPROLIN/CHLOROTHALONIL★ [U15/M5]</b>		
Orondis Opti (Premix).....	1.75-2.5 pt at 14-day intervals. For ground application apply in at least 50 gal per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 10 pt per acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ DO NOT apply more than 2 sequential applications of Orondis.</li> <li>▪ DO NOT apply more than 0.125 lb ai per acre per year of oathiapiprolin products.</li> <li>▪ DO NOT apply more than 12.0 lb ai per acre per year of chlorothalonil products.</li> </ul>
<b>★OXATHIPIPROLIN/MANDIPROPAMID★ [U15/40]</b>		
Orondis Ultra (Premix).....	5.5-8.0 fl oz at 14-day intervals. For ground application apply at least 15 gal per acre. For aerial application apply at least 5 gal per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 4 applications per year.</li> <li>▪ DO NOT exceed 32.0 fl oz per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ DO NOT apply more than 2 sequential applications of Orondis.</li> <li>▪ DO NOT apply more than 0.125 lb ai per acre per year of oathiapiprolin products.</li> <li>▪ DO NOT apply more than 0.522 lb ai per acre per year of mandipropamid products.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## PHYTOPHTHORA ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>★ PHOSPHOROUS ACID SALTS ★ [33]</b>		
Fosphite <i>-or-</i> Resist 57 <i>-or-</i> Rampart.....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> <li>▪ DO NOT apply when conditions favor wet tissue for &gt;4 hours.</li> </ul>
Confine Extra .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
K-Phite 7LP AG.....	1.0-3.0 qt in a minimum of 20 gal water.	
Alude .....	2.25 qt/100 gal at 7-day intervals.	
Fungi-Phite .....	1.0-1.5 qt foliar application in a minimum of 10 gal water. 3.0 pt to newly planted seedlings by side dressing/shank application.	<ul style="list-style-type: none"> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 7-14 day intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 7-10 day intervals until control is reached.</li> <li>▪ DO NOT exceed 6 applications/season.</li> </ul>
Fungi-Phite .....	2.0 qt/100 gal (0.5% v/v solution) preplant root dip for 2 minutes	
Reliant Systemic Fungicide ...	2.5 qt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications per season.</li> <li>▪ Apply in 100 gal water.</li> </ul>
Drexel Phiticide <i>-or-</i> Phostrol ..	4.5 pt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 9 applications per season.</li> <li>▪ Apply in 100 gal water.</li> </ul>
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Serenade Soil .....	2.0-6.0 qt drench at 21- to 28-day intervals. 2.2-13.2 fl oz/1000 row feet as in-furrow spray.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Begin applications at planting, during or after seeding, during or after transplanting and at any stage of growth.</li> </ul>
Cease .....	3-6 qt at 7- to 10-day intervals.	
<b>HYDROGEN DIOXIDE/PEROXYACETIC ACID</b>		
OxiDate 2.0.....	32.0 fl oz at 5-day intervals in 100 gal water.	<ul style="list-style-type: none"> <li>▪ Preventative treatment: Apply the first three treatments at a curative rate at 5-day intervals. Reduce rate to 32.0 fl oz per 100 gal water after the completion of the third treatment and maintain 5-day interval until harvest.</li> </ul>

## PHYTOPHTHORA ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>MEFENOXAM [4]</b>		
Ridomil Gold GR .....	15 lb pre-emergence. 10 lb post-emergence (up to 4 applications) at monthly intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 60 lb/acre per growing season.</li> <li>▪ DO NOT exceed 45 lb/acre per growing season if Ridomil Gold EC or Ridomil Gold SL is applied in spring before plants have begun to grown.</li> <li>▪ DO NOT apply within 9 days of harvest.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
Orondis Gold B <i>-or-</i> Ridomil Gold SL.....	0.75 pt as a drench in 100-400 gal water.	<ul style="list-style-type: none"> <li>▪ DO NOT apply to ginseng foliage.</li> <li>▪ Apply ONCE only as a replacement for the pre-emergence application of Ridomil Gold GR.</li> <li>▪ NOTE: 80% of isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl..</li> </ul>
Ultra Flourish.....	1.5 pt in 100-400 gal water applied once as a drench.	<ul style="list-style-type: none"> <li>▪ DO NOT make supplemental applications.</li> <li>▪ DO NOT make more than one application.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
<b>METALAXYL [4]</b>		
MetaStar 2E <i>-or-</i> Metalaxyl 2E AG .....	1.5 qt as a drench in 100-400 gal/acre water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 application per year.</li> <li>▪ Apply before early growth and follow with applications of a metalaxyl or mefenoxam granular product.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		
Regalia Biofungicide.....	1.0-3.0 qt soil drench in 100 gal water at 10- to 14-day intervals. 1.0-4.0 qt/acre or 2.2-8.8 fl oz per 1000 ft-row in-furrow applications in 5-15 gal water.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>, <i>Verticillium</i>.</li> <li>▪ May be applied on day of harvest.</li> </ul>
<b>STREPTOMYCES LYDICUS</b>		
Actinovate AG .....	3-12 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>
<b>TRICHODERMA ASPERELLUM/T. GAMSII</b>		
Bio-Tam <i>-or-</i> Tenet WP .....	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>



## Disease: FOLIAR PHYTOPHTHORA (*Phytophthora cactorum*)

### CULTURAL CONTROL:

Straw mulch prevents the splash of *Phytophthora* spores from soil onto ginseng stems and foliage. See additional suggestions for *Phytophthora* root rot (above).

Pesticide	Rate of product/acre	Comments
<b>★ALUMINUM TRIS★[33]</b>		
Aliette WDG <i>-or-</i> Linebacker WDG.....	5.0 lb at 7-day intervals in a minimum of 100 gal/acre water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 9 applications per year.</li> <li>▪ DO NOT apply within 31 days of harvest.</li> <li>▪ DO NOT tankmix with copper compounds.</li> <li>▪ DO NOT apply with a spreader/sticker.</li> </ul>
<b>★CHLOROTHALONIL/ZOXAMIDE★ [M5/22]</b>		
Zing! .....	22.0-30.0 fl oz at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT harvest within 28 days of treatment.</li> <li>▪ DO NOT make more than 6 applications or apply more than 1.02 lb zoxamide and 5.88 lb chlorothalonil per acre per year.</li> <li>▪ DO NOT apply through any type of irrigation system.</li> <li>▪ Use in a minimum spray volume of 80 gal of water per acre.</li> </ul>
<b>★DIMETHOMORPH★[40]</b>		
Forum .....	6.0 fl oz at 7-day intervals in a minimum of 20 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 30 fl oz/acre or 5 applications per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> <li>▪ Begin applications before infection occurs.</li> <li>▪ DO NOT exceed 1 application of Forum before rotating to a labeled non-Group 40 fungicide for at least 1 application.</li> </ul>
<b>★FENAMIDONE★[11]</b>		
Reason 500SC.....	5.5-8.2 fl oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 24.6 fl oz/acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> </ul>
<b>★PHOSPHOROUS ACID SALTS★[33]</b>		
Fosphite <i>-or-</i> Resist 57 <i>-or-</i> Rampart.....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> <li>▪ DO NOT apply when conditions favor wet tissue for &gt;4 hours.</li> </ul>
Confine Extra .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
K-Phite 7LP AG.....	1.0-3.0 qt in a minimum of 20 gal water.	
Fungi-Phite .....	1.0-1.5 qt foliar application in a minimum of 10 gal water. 3.0 pt to newly planted seedlings by side dressing/shank application.	<ul style="list-style-type: none"> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 7-14 day intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 7-10 day intervals until control is reached.</li> <li>▪ DO NOT exceed 6 applications/season.</li> </ul>
Alude .....	2.5 qt/100 gal.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications per season.</li> </ul>
Reliant Systemic Fungicide ...	2.5 qt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 8 applications per season.</li> <li>▪ Apply in 100 gal water.</li> </ul>
Drexel Phiticide <i>-or-</i> Phostrol .....	4.5 pt at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 9 applications per season.</li> <li>▪ Apply in 100 gal water.</li> </ul>

★Products with starred active ingredients are particularly recommended for problem infestations.

## FOLIAR PHYTOPHTHORA continued

Pesticide	Rate of product/acre	Comments
<b>COPPER OCTANOATE [M1]</b>		<ul style="list-style-type: none"> <li>▪ Begin 2 weeks before disease appears. Apply at the higher rate at 7-day intervals when disease is increasing rapidly.</li> <li>▪ Reapply after rain.</li> <li>▪ DO NOT apply more than 33 gal of Cueva per acre per year</li> </ul>
Camelot O <i>-or-</i> Cueva .....	0.5-2.0 gal/100 gal at 7- to 10-day intervals.	
Bonide Liquid Copper <i>-or-</i> Soap-Shield Flowable Liquid Copper Fungicide .....	0.5-2.0 fl oz/gal water at 7- to 10-day intervals.	

## Disease: POWDERY MILDEW (*Erysiphe* sp.)

### CULTURAL CONTROL:

Cool, humid conditions favor this disease. Choose garden sites that have good soil drainage with rows oriented in the direction of the prevailing winds. Avoid sites that are bordered by woods. Smaller gardens allow better air movement than larger gardens. Side and end curtains will decrease air movement and should be used only as needed.

Pesticide	Rate of product/acre	Comments
<b>★ AZOXYSTROBIN★ [11]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 foliar application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT alternate with QoI fungicides such as Cabrio, Flint, Gem.</li> <li>▪ DO NOT exceed 4 applications per year.</li> <li>▪ DO NOT exceed 123 fl oz (2 lb a.i.)/acre per season.</li> </ul>
Aframe <i>-or-</i> Azoxystar <i>-or-</i> Azoxyzone <i>-or-</i> Equation SC <i>-or-</i> Gold Rush <i>-or-</i> Satori <i>-or-</i> Tetraban <i>-or-</i> Trevo <i>-or-</i> Quadris F <i>-or-</i> Willowood Azoxy 2SC .....	9.0-15.4 fl oz at 5- to 7-day intervals.	
<b>★ BOSCALID★ [7]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar applications before alternating with a fungicide with a different mode of action for at least 1 application.</li> <li>▪ DO NOT exceed 5 applications (22.5 oz)/acre per year.</li> </ul>
Endura 70WG .....	4.5 oz at 7- to 14-day intervals.	
<b>★ FLUOPYRAM/TRIFLOXYSTROBIN★ [7/11]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 15.3 fl oz per acre per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
Luna Sensation .....	7.6 fl oz at a 14-day interval.	
<b>★ FLUOPYRAM/PYRIMETHANIL★ [7/9]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 54.7 fl oz per acre per year.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ DO NOT exceed 2 applications before alternating with a different mode of action.</li> </ul>
Luna Tranquility .....	16-27 fl oz at a 7-day interval.	
<b>★ PYRACLOSTROBIN★ [11]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 sequential application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT rotate with QoI fungicides such as Quadris, Flint, Gem.</li> <li>▪ DO NOT exceed 3 applications or 48 oz/acre per season.</li> </ul>
Cabrio 20EG .....	8.0-12 oz at 7- to 14-day intervals.	

★Products with starred active ingredients are particularly recommended for problem infestations.

## POWDERY MILDEW *continued*

Pesticide	Rate of product/acre	Comments
<b>★PYRACLOSTROBIN/FLUXAPYROXAD★[11/7]</b>		
Merivon Xemium Brand Fungicide .....	4.0-5.5 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT make more than 2 sequential applications of Merivon before alternating to a labeled non-Group 7 or non-Group 11 fungicide.</li> <li>▪ DO NOT apply more than 16.5 fl oz/A of Merivon per year.</li> <li>▪ DO NOT apply more than 3 applications of Merivon per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>
<b>★TRIFLOXYSTROBIN★[11]</b>		
Flint 50WG .....	2.0-3.0 oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 3 sequential applications of Flint and 1 application of Gem before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT rotate with QoI fungicides such as Quadris, Cabrio.</li> <li>▪ DO NOT exceed 4 applications (11.5 oz Gem or 12 oz Flint/acre) per season (see labels).</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>
Gem 500SC .....	1.9-2.9 fl oz at 14-day intervals.	
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS PUMILUS [44]</b>		
Sonata .....	2.0-4.0 qt at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ Use higher rates and shorter application intervals under heavy disease pressure.</li> </ul>
<b>BACILLUS SUBTILIS [44]</b>		
Serenade ASO .....	2.0-4.0 fl oz/1 gal water at 7-day intervals.	<ul style="list-style-type: none"> <li>▪ Apply at stated interval or as needed.</li> </ul>
Serenade Max WP .....	1.0-3.0 lb at 7- to 10-day intervals.	
<b>COPPER OCTANOATE [M1]</b>		
Camelot O <i>-or-</i> Cueva .....	0.5-2.0 gal/100 gal at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Begin 2 weeks before disease appears.</li> <li>▪ Apply at higher rate at 7-day intervals when disease is increasing rapidly.</li> <li>▪ Reapply after rain.</li> <li>▪ DO NOT apply more than 33 gal of Cueva per acre per year</li> </ul>
Bonide Liquid Copper <i>-or-</i> Soap-Shield Flowable Liquid Copper Fungicide.....	0.5-2.0 fl oz/gal water at 7- to 10-day intervals.	
<b>CYPRODINIL/FLUDIOXONIL [9/12]</b>		
Switch 62.5WDG.....	11-14 oz at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 foliar applications before alternating with a fungicide with a different mode of action for at least 2 applications.</li> <li>▪ DO NOT exceed 56 oz/acre per year.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>
<b>HYDROGEN DIOXIDE/PEROXYACETIC ACID</b>		
OxiDate 2.0.....	32.0 fl oz at 5-day intervals in 100 gal water.	<ul style="list-style-type: none"> <li>▪ Preventative treatment: Apply the first three treatments at a curative rate at 5-day intervals. Reduce rate to 32.0 fl oz per 100 gal water after the completion of the third treatment and maintain 5-day interval until harvest.</li> </ul>

## POWDERY MILDEW *continued*

Pesticide	Rate of product/acre	Comments
<b>LAMINARIN [P4]</b>		
Vacciplant .....	14.0-22.0 fl oz at 7- to- 14-day intervals.	<ul style="list-style-type: none"> <li>▪ At water volumes less than 70 gal per acre apply at 14.0 fl oz per acre. At water volumes above 70 gal per acre apply at 0.15% v/v.</li> </ul>
<b>NEEM OIL</b>		
Trilogy .....	0.5-1% at 7- to 14-day intervals in 25-100 gal water. 2.0 pt at 7- to 14-day intervals in 5 gal water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 gal/acre per application.</li> </ul>
<b>PENTHIOPYRAD [7]</b>		
DuPont Fontelis.....	16-30 fl oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 61 fl oz/acre per season.</li> <li>▪ May be applied day of harvest (PHI=0).</li> <li>▪ DO NOT exceed 2 sequential applications before switching to a fungicide with a different mode of action.</li> </ul>
<b>PHOSPHOROUS ACID SALTS [33]</b>		
Fosphite <i>-or-</i> Rampart .....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> <li>▪ DO NOT apply when conditions favor wet tissue for &gt;4 hours.</li> </ul>
Confine Extra <i>-or-</i> K-Phite 7LP AG .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
<b>POTASSIUM BICARBONATE</b>		
Kaligreen.....	2.5-3.0 lbs at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 5 lb per application</li> <li>▪ DO NOT use when disease pressure is severe.</li> </ul>
Milstop .....	2-5 lb at 7- to 14-day intervals.	
<b>POTASSIUM SILICATE</b>		
Sil-Matrix.....	1.0-4.0 qt in 50-250 gal water at 7-day intervals for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 10 qts per acre per application.</li> <li>▪ DO NOT apply more than 20 gal per acre per season.</li> <li>▪ Only apply this product through drip, sprinkler, furrow, flood, or border irrigation systems.</li> </ul>
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		
Regalia Biofungicide.....	1.0-4.0 qt foliar application in 25-100 gal water at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ May be applied on day of harvest.</li> </ul>
<b>STREPTOMYCES LYDICUS</b>		
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ For best results use spreader-sticker.</li> </ul>

## Disease: **PYTHIUM ROOT ROT** (*Pythium* spp.)

### CULTURAL CONTROL:

Select a site with a soil type that provides good drainage. Avoid working in the garden when the soil is wet to avoid compaction. Form plant beds with a flat top to allow water to run off and prevent pooling. Avoid standing water by digging trenches to drain water away from the garden. Do not allow water from older ginseng gardens to drain into younger gardens.

Pesticide	Rate of product/acre	Comments
<b>★ CAPTAN★[M4]</b>		
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a drench in a minimum of 200 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 lb/acre Drexel Captan 50W per year.</li> <li>▪ DO NOT exceed 30 lb/acre Captan 80WDG per year.</li> <li>▪ DO NOT apply Drexel Captan 50W within 365 days of harvest.</li> <li>▪ DO NOT apply Captan 80WDG/Captan Gold within 14 days of harvest.</li> </ul>
Captan Gold 80WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 200 gal of water per acre.	
Captan 80WDG (Product Bulletin) .....	3.75 lb at 6- to 8-day intervals as a drench in a minimum of 200 gal of water per acre.	
<b>★ FENAMIDONE★[11]</b>		
Reason 500SC.....	5.5-8.2 fl oz at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 24.6 fl oz/acre per year.</li> <li>▪ DO NOT harvest within 14 days of treatment.</li> </ul>
<b>★ MEFENOXAM★[4]</b>		
Ridomil Gold GR .....	15 lb pre-emergence. 10 lb (up to 4 applications) at monthly intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 60 lb/acre per growing season.</li> <li>▪ DO NOT exceed 45 lb/acre per growing season if Ridomil Gold EC or Ridomil Gold SL is applied in spring before plants have begun to grow.</li> <li>▪ DO NOT apply within 9 days of harvest.</li> </ul>
Ridomil Gold SL .....	0.75 pt in 100-400 gal water drench.	<ul style="list-style-type: none"> <li>▪ DO NOT apply to ginseng foliage.</li> <li>▪ Apply ONCE only as a replacement for the pre-emergence application of Ridomil Gold GR.</li> </ul>
<b>★ METALAXYL★[4]</b>		
MetaStar 2E.....	1.5 qt as a drench in 100 to 400 gal/acre water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 application per year.</li> <li>▪ Apply before early growth and follow with applications of a metalyxyl or mefenoxam granular product.</li> </ul>
<b>AZOXYSTROBIN [11]</b>		
<ul style="list-style-type: none"> <li>▪ Banded applications: band width 7" or less. Banded applications contact the foliage and are counted as a foliar application.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Active against <i>Rhizoctonia</i>, <i>Pythium</i>.</li> <li>▪ DO NOT exceed 1 foliar application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT alternate with QoI fungicides such as Cabrio, Flint, Gem.</li> <li>▪ DO NOT exceed 4 applications per year.</li> <li>▪ DO NOT exceed 123 fl oz (2 lb a.i.)/acre per season.</li> </ul>
Aframe -or- Azoxystar -or- Azoxyzone -or- Equation SC -or- Gold Rush -or- Satori -or- Tetraban -or- Trevo -or- Quadris F .....	0.4-0.8 fl oz/1000 row feet. 0.7 fl oz/1000 row feet maximum for 22" rows.	
<ul style="list-style-type: none"> <li>▪ In furrow applications: apply in 3-15 gal water at planting.</li> </ul>		
Quadris F .....	See label for fl oz/acre depending on row sizes.	

## PYTHIUM ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC ( <i>WI only</i> )....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Serenade Soil .....	2-6 qt drench at 21- to 28-day intervals. 2.2-13.2 fl oz/1000 row feet as in-furrow spray.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Begin applications at planting, during or after seeding, during or after transplanting and at any stage of growth.</li> </ul>
Cease .....	3.0-6.0 qt at 7 to 10 day intervals.	
<b>FLUOPICOLIDE [43]</b>		
Presidio.....	3.0-4.0 fl oz at 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Must be tankmixed with another fungicide that has a different mode of action.</li> <li>▪ DO NOT exceed 4 applications per year.</li> </ul>
<b>GLIOCLADIUM VIRENS</b>		
Soilgard .....	2.0-10 lbs in a 50 gal water minimum.	<ul style="list-style-type: none"> <li>▪ Apply in 50-100 gallons of water per acre as banded drench in-furrow at or immediately before planting.</li> </ul>
<b>PHOSPHOROUS ACID SALTS [33]</b>		
Fosphite <i>-or-</i> Rampart .....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> </ul>
Confine Extra .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
K-Phite 7LP AG.....	1.0-3.0 qt in a minimum of 20 gal water.	
Fungi-Phite .....	1.0-1.5 qt foliar in a minimum of 10 gal water. 3.0 pt to newly planted seedlings by side dressing/shank application.	
Fungi-Phite .....	2.0 qt/100 gal (0.5% v/v solution) preplant root dip for 2 minutes.	<ul style="list-style-type: none"> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 7-14 day intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 7-10 day intervals until control is reached.</li> <li>▪ DO NOT exceed 6 applications/season.</li> </ul>
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		
Regalia Biofungicide.....	1.0-3.0 qt soil drench in 100 gal water at 10- to 14-day intervals. 1.0-4.0 qt/acre or 2.2-8.8 fl oz per 1000 ft-row in-furrow applications in 5-15 gal water.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>, <i>Verticillium</i>.</li> <li>▪ May be applied on day of harvest.</li> </ul>
<b>STREPTOMYCES LYDICUS</b>		
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>

## PYTHIUM ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>TRICHODERMA ASPERELLUM/T. GAMSII</b>		
Bio-Tam <i>-or-</i> Tenet WP .....	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>
<ul style="list-style-type: none"> <li>▪ The use of <b>Elumin</b> for <i>Phytophthora</i> root rot control may offer <i>Pythium</i> control.</li> </ul>		

## Disease: RHIZOCTONIA CROWN AND ROOT ROT (*Rhizoctonia solani*)

### CULTURAL CONTROL:

Maintain even moisture conditions to avoid plant stress. Avoid soil situations that range from too dry to soil saturation.

Pesticide	Rate of product/acre	Comments
<b>★ AZOXYSTROBIN★ [11]</b>		
<ul style="list-style-type: none"> <li>▪ Banded applications: band width 7" or less. Banded applications contact the foliage and are counted as a foliar application.</li> </ul>		
Aframe <i>-or-</i> Azoxystar <i>-or-</i> Azoxyzone <i>-or-</i> Equation SC <i>-or-</i> Gold Rush <i>-or-</i> Willowood Azoxy 2SC <i>-or-</i> Satori <i>-or-</i> Tetraban <i>-or-</i> Trevo <i>-or-</i> Quadris F .....	0.4-0.8 fl oz/1000 row feet. 0.7 fl oz/1000 row feet maximum for 22" rows.	<ul style="list-style-type: none"> <li>▪ Active against <i>Rhizoctonia</i>, <i>Pythium</i>.</li> <li>▪ DO NOT exceed 1 foliar application before alternating with a fungicide with a different mode of action.</li> <li>▪ DO NOT alternate with QoI fungicides such as Cabrio, Flint, Gem.</li> <li>▪ DO NOT exceed 4 applications per year.</li> <li>▪ DO NOT exceed 123 fl oz (2 lb a.i.)/acre per season.</li> </ul>
<ul style="list-style-type: none"> <li>▪ In furrow applications: apply in 3-15 gal water at planting.</li> </ul>		
Quadris F .....	See label for fl oz/acre depending on row sizes.	
<b>★ FLUAZINAM★ [29]</b>		
Omega 500F .....	1.0-1.5 pt at 14-day intervals in a minimum of 100 gal water.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 6 pt per season.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> </ul>
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		
Double Nickel 55 .....	0.25-3.0 lb at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		
Serenade Soil .....	2.0-6.0 qt drench at 21- to 28-day intervals. 2.2-13.2 fl oz/1000 row feet as in-furrow spray.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Begin applications at planting, during or after seeding, during or after transplanting and at any stage of growth.</li> </ul>
Cease .....	3.0-6.0 qt at 7 to 10 day intervals.	

★Products with starred active ingredients are particularly recommended for problem infestations.

## RHIZOCTONIA CROWN AND ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>CAPTAN [M4]</b>		
Drexel Captan 50W .....	4.0 lb at 7- to 10-day intervals as a drench in a minimum of 200 gal of water per acre.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 32 lb/acre Drexel Captan 50W per year.</li> <li>▪ DO NOT exceed 30 lb/acre Captan 80WDG/Captan Gold per year.</li> <li>▪ DO NOT apply Drexel Captan 50W within 365 days of harvest.</li> <li>▪ DO NOT apply Captan 80WDG/Captan Gold within 14 days of harvest.</li> </ul>
Captan Gold 80WDG .....	3.75 lb at 6- to 8-day intervals as a foliar spray in a minimum of 200 gal of water per acre.	
Captan 80WDG (Product Bulletin) .....	3.75 lb at 6- to 8-day intervals as a drench in a minimum of 200 gal of water per acre.	
<b>GLIOCLADIUM VIRENS</b>		
Soilgard .....	2.0-10 lbs in a 50 gal water minimum.	<ul style="list-style-type: none"> <li>▪ Apply in 50-100 gallons of water per acre as banded drench in-furrow at or immediately before planting.</li> </ul>
<b>HYDROGEN DIOXIDE/PEROXYACETIC ACID</b>		
OxiDate 2.0.....	32.0 fl oz at 5-day intervals in 100 gal water.	<ul style="list-style-type: none"> <li>▪ Preventative treatment: Apply the first three treatments at a curative rate at 5-day intervals. Reduce rate to 32.0 fl oz per 100 gal water after the completion of the third treatment and maintain 5-day interval until harvest.</li> </ul>
<b>PHOSPHOROUS ACID SALTS [33]</b>		
Fosphite <i>-or-</i> Resist 57 <i>-or-</i> Rampart.....	1.0-3.0 qt foliar application in a minimum of 100 gal water. 2.0 qt/100 gal (2/3 fl oz/gal) as a root dip.	<ul style="list-style-type: none"> <li>▪ DO NOT apply at intervals less than 3 days.</li> <li>▪ Disease Prevention Program: Apply lower rate of foliar application at 2-4 week intervals after plants become established.</li> <li>▪ Disease Control Program: Apply high rate of foliar application at 2-3 week intervals until control is reached.</li> <li>▪ DO NOT apply to dormant or heat- or moisture-stressed plants.</li> <li>▪ DO NOT apply when conditions favor wet tissue for &gt;4 hours.</li> </ul>
Confine Extra .....	1.0-4.0 qt foliar application in a minimum of 20 gal water.	
K-Phite 7LP AG.....	1.0-3.0 qt in a minimum of 20 gal water.	
<b>POLYOXIN D ZINC SALT [19]</b>		
Affirm <i>-or-</i> Ph-D WDG .....	6.2 oz drench at 14- to 28-day intervals.	<ul style="list-style-type: none"> <li>▪ Use in alternation with fungicides that have a different mode of action.</li> <li>▪ DO NOT exceed 3 applications (2.1 oz a.i./acre) per season.</li> </ul>
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		
Regalia Biofungicide.....	1.0-3.0 qt soil drench in 100 gal water at 10- to 14-day intervals. 1.0-4.0 qt/acre or 2.2-8.8 fl oz per 1000 ft-row in-furrow applications in 5-15 gal water. 1.0-4.0 qt/acre chemigation at 14-day intervals.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>, <i>Verticillium</i>.</li> <li>▪ May be applied on day of harvest.</li> </ul>
<b>STREPTOMYCES LYDICUS</b>		
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>



## RHIZOCTONIA CROWN AND ROOT ROT *continued*

Pesticide	Rate of product/acre	Comments
<b><i>TRICHODERMA ASPERELLUM/T. GAMSII</i></b>		
Bio-Tam <i>-or-</i> Tenet WP .....	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Use of <b>Iprodione/Meteor/Nevado/Rovral</b> tankmixed or alternated with fixed copper fungicides for control of Alternaria leaf and stem blight may provide some control of Rhizoctonia crown and root rot. Adequate coverage of lower stems is critical for obtaining any crown/root rot control.</li> <li>▪ Use of <b>Cabrio 20EG</b> for control of Alternaria leaf and stem blight may provide some control of Rhizoctonia crown and root rot.</li> <li>▪ Use of <b>Cannonball</b> for Cylindrocarpon root rot/rusty root or white mold may provide control of Rhizoctonia crown and root rot.</li> <li>▪ See also fumigation section for preplant chemical control of Rhizoctonia crown and root rot.</li> </ul>		

**Disease: WHITE MOLD LEAF AND STEM BLIGHT AND ROOT ROT**  
**(*Sclerotinia sclerotiorum*)**

CULTURAL CONTROL:

Remove and destroy infected plants.

Pesticide	Rate of product/acre	Comments
<b>★FLUAZINAM★[29]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 6 pt per season.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ Use 1 pt/acre when the disease first appears or when conditions are favorable. Under conditions that favor severe disease development, use higher rate.</li> </ul>
Omega 500F .....	1.0-1.5 pt at 7- to 14-day intervals in a minimum of 100 gal water.	
<b>★FLUDIOXONIL★[12]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT apply within 14 days of harvest.</li> <li>▪ DO NOT exceed 2 lb/acre per season.</li> <li>▪ DO NOT apply more than 32 oz (1.0 lb a.i./A) per crop.</li> </ul>
Cannonball WG <i>-or-</i> Cannonball WP .....	4.0-8.0 oz/acre at 14-21 day intervals.	
<b>BACILLUS AMYLOLIQUEFACIENS [44]</b>		<ul style="list-style-type: none"> <li>▪ Under light disease pressure, when applied to smaller plants or when used in a tank mix, use lower rates.</li> <li>▪ Under moderate-severe disease pressure, use higher rates, apply more frequently, and mix or rotate with other fungicides.</li> </ul>
▪ Foliar application.		
Double Nickel 55 .....	0.25-3.0 lb at 2- to 4-week intervals.	
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
▪ Soil application.		
Double Nickel 55 .....	0.125-1.0 lb at 7- to 10-day intervals.	
Double Nickel LC .....	0.5-6.0 qt at 3- to 10-day intervals.	
<b>BACILLUS SUBTILIS [44]</b>		<ul style="list-style-type: none"> <li>▪ Apply at stated interval or as needed.</li> </ul>
Serenade ASO .....	2.0-4.0 fl oz/1 gal water at 7-day intervals.	
Serenade Max WP..... Serenade Opti.....	1.0-3.0 lb at 7- to 10-day intervals. 14-20 oz at 7- to 10-day intervals.	
<b>CONIOTHYRIUM MINITANS [M-91]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT tank mix with other fungicides.</li> </ul>
Contans WG .....	1.0-4.0 lb at 7-day intervals	
<b>LAMINARIN [P4]</b>		<ul style="list-style-type: none"> <li>▪ At a water volume less than 70 gal per acre, apply at 14.0 fl oz per acre. At water volumes above 70 gal per acre apply at 0.15% v/v.</li> </ul>
Vacciplant .....	14.0-22.0 fl oz at 7- to- 14-day intervals.	
<b>PENTHIOPYRAD [7]</b>		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 61 fl oz/acre per season.</li> <li>▪ May be applied day of harvest (PHI=0).</li> <li>▪ DO NOT exceed 2 sequential applications before switching to a fungicide with a different mode of action.</li> </ul>
DuPont Fontelis.....	16-30 fl oz at 7- to 14-day intervals.	

★Products with starred active ingredients are particularly recommended for problem infestations.

## WHITE MOLD LEAF AND STEM BLIGHT AND ROOT ROT continued

Pesticide	Rate of product/acre	Comments
<b>REYNOUTRIA SACHALINENSIS [P5]</b>		<ul style="list-style-type: none"> <li>▪ May be applied on day of harvest.</li> </ul>
Regalia Biofungicide.....	1.0-4.0 qt foliar application in 25-100 gal water at 7- to 10-day intervals.	
<b>STREPTOMYCES LYDICUS</b>		<ul style="list-style-type: none"> <li>▪ For best results use a spreader-sticker.</li> </ul>
Actinovate AG .....	3.0-12 oz at 7- to 14-day intervals.	
<b>TRICHODERMA ASPERELLUM/T. GAMSII</b>		<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>, <i>Phytophthora</i>, <i>Pythium</i>, <i>Rhizoctonia</i>.</li> <li>▪ Two or more applications are recommended</li> <li>▪ See label for details on application methods.</li> </ul>
Bio-Tam <i>-or-</i> Tenet WP .....	1.5-3.0 oz/1000 row feet in-furrow. 2.5-3.0 lb banded application (see label). 2.5-5.0 lb broadcast followed by 0.25-0.5" water irrigation or 0.92-1.8 oz/100 square feet in 3-5 gal water. 0.025-0.075 oz/gal water handheld or backpack drench.	
<ul style="list-style-type: none"> <li>▪ See also fumigation section for preplant chemical control of white mold.</li> </ul>		

**SOIL INSECTS (climbing cutworms, cutworms, white grubs, wireworms)**  
**ABOVE-GROUND INSECTS (aphids, true bugs, cutworms, leafrollers, thrips, white grubs, wireworms)**

**CULTURAL CONTROL:**

Climbing cutworms and cutworms: Cutworms are one of the top three insect problems affecting ginseng. Cutworms are the larvae of night-flying moths and feed on stems, girdling young plants and chewing ginseng tops. These insects are an especially troubling pest in seedling beds. These insects feed on weed species, particular grasses. If a garden site is selected that follows cereals, till the site thoroughly.

White grubs: White grubs feed on the root, resulting in a “hollowing out” of the root. They have a long life cycle and are a common problem. Prior to establishing a new garden, provide a one-year fallow period. Minimize the weeds in the fallow area.

Wireworm: Wireworms feed on roots and ungerminated or newly germinated seeds, especially of cereal crops. Prior to establishing a new garden, provide a one- to two-year fallow period. Minimize the weeds in the fallow area. Choose sites that have not recently hosted cereal crops.

Aphids may infest the berries and leaves and feed via sucking. Aphids may be an occasional problem later in the season, especially when gardens are located near an alfalfa field. Scout and spot-treat infested area.

Pesticide	Rate of product/acre	Comments
<b>★ BIFENTHRIN ★</b>		
Brigade WSB <i>-or-</i> Bifenture 10DF ( <i>MI only</i> ) .....	12.8-16.0 oz at 7-day intervals minimum in a minimum of 25 gal water for aphids, cutworms.	<ul style="list-style-type: none"> <li>▪ RESTRICTED USE PESTICIDE.</li> <li>▪ Apply no more than once every 7 days.</li> <li>▪ DO NOT apply within 21 days of harvest.</li> <li>▪ DO NOT exceed 0.5 lb active/acre per season.</li> </ul>
Bifen 2 AG Gold <i>-or-</i> Bifenture EC <i>-or-</i> Bifenthrin 2EC Insecticide <i>-or-</i> Brigade 2EC <i>-or-</i> Fanfare 2EC <i>-or-</i> Fanfare ES <i>-or-</i> Sniper <i>-or-</i> Tundra .....		
<b>★ CARBARYL ★</b>		
Carbaryl 4L <i>-or-</i> Drexel Carbaryl 4L <i>-or-</i> Sevin Brand 4F <i>-or-</i> Sevin Brand XLR Plus .....	1.0-2.0 qt at 7-day intervals for bugs, cutworms.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 6 applications Carbaryl 4L/Drexel Carbaryl 4L/Sevin Brand 4F/Sevin Brand XLR Plus or 3 applications Lebanon Sevin 7G per season.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ DO NOT apply to when weed flowers are present.</li> </ul>
Lebanon Sevin 7G.....	0.7 lb/1000 sq ft at 7-day intervals.	
<b>★ CHLORANTRANILIPROLE ★</b>		
DuPont Coragen .....	3.5-7.5 fl oz per acre at minimum 3-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 4 applications per growing season.</li> <li>▪ DO NOT apply more than 15.4 fl oz of product per acre per year.</li> </ul>
<b>★ DIAZINON ★</b>		
Diazinon AG500 .....	0.75-1.0 pt applied once for aphids, bugs in 10-100 gal water.	<ul style="list-style-type: none"> <li>▪ RESTRICTED USE PESTICIDE.</li> <li>▪ DO NOT exceed 1 application per growing season.</li> <li>▪ DO NOT apply during flowering on 3- and 4-year-old plants.</li> <li>▪ DO NOT apply within 30 days of harvest.</li> <li>▪ DO NOT graze treated areas or feed treated forage to livestock.</li> </ul>
Diazinon AG600 WBC.....	9.5-12.75 fl oz applied once for aphids, bugs in 10-100 gal/acre water.	

**★Products with starred active ingredients are particularly recommended for problem infestations.**

## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments
<b>ALPHA-CYPERMETHRIN</b>		
Fastac EC <i>-or-</i> Fastac CS.....	1.3-3.8 fl oz/acre minimum 4-day reapplication intervals for aphids and cutworms.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 11.4 fl oz of product per acre per year.</li> <li>▪ DO NOT apply to foliage used for livestock feed.</li> </ul>
<b>AZADIRACHTIN</b>		
Aza-Direct .....	1.0-2.0 pt at 7- to 10-day intervals for aphids, bugs, cutworms, leafrollers, thrips as a foliar spray or soil drench. Up to 3.5 pt for heavy infestations.	<ul style="list-style-type: none"> <li>▪ Best results obtained with 2-3 applications.</li> <li>▪ May be applied on the day of harvest.</li> <li>▪ AzaGuard- use in combination with 0.25-1.0% non-phytotoxic crop oil in sufficient water to cover the undersides of the leaves.</li> </ul>
AzaGuard.....	10.0-16.0 fl oz for thrips, aphids at 7-10-day intervals. 2.0-4.0 fl oz for cutworms, armyworms spray when they first appear.	
AzaSol .....	6.0 fl oz/50 gal at 7-to 10-day intervals for aphids suppression and adult feeding deterrence.	
Ecozin Plus 1.2% ME .....	15-30 oz at 7- to 10 day intervals for aphids, bugs, cutworms, leafrollers, thrips.	
Molt-X .....	8.0 oz for cutworms, leafrollers. 10 oz for aphids, bugs, thrips. <ul style="list-style-type: none"> <li>▪ Apply at 7- to 10-day intervals for aphids, bugs, cutworms, and leafrollers.</li> <li>▪ Apply at 5- to 7-day intervals for thrips.</li> </ul>	
Neemix 4.5.....	5.0-7.0 fl oz for aphids at 7- to 10-day intervals. 4.0-16 fl oz for leafroller larvae/nymphs at 7- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Best results obtained with 2-3 applications.</li> <li>▪ May be applied on the day of harvest.</li> </ul>
<b>AZADIRACHTIN/PYRETHRINS</b>		
Azera .....	1.0-3.5 pt at 5- to 7-day intervals in a minimum of 30 gal water for aphids, true bugs, cutworms, leafrollers, thrips.	<ul style="list-style-type: none"> <li>▪ Use 3-3.5 pt for high populations of adults and/or hard to kill insects.</li> </ul>
<b>BACILLUS THURINGIENSIS</b>		
Dipel DF Insecticide .....	0.5-1.0 lb at 3- to 14-day intervals in a minimum of 20 gal water for cutworms and leafrollers. Or 1-2 lb for armyworms.	<ul style="list-style-type: none"> <li>▪ Under heavy pressure pest population pressure, use higher label rates, shorten the spray interval, and/or raise spray volume.</li> </ul>
Xentari DF Insecticide .....	0.5-1.5 lb at 3- to 14-day intervals in a minimum of 10 gal water for leafrollers and cutworms. Or 0.5-2 lb for armyworms.	

★ *Products with starred active ingredients are particularly recommended for problem infestations.*

## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments
<b>BEAVERIA BASSIANA</b>		
BotaniGard ES .....	0.5-1.0 qt/100 gal at 5- to 10-day intervals in a minimum of 30 gal water for aphids, bugs. 1.0-2.0 qt/100 gal thrips.	<ul style="list-style-type: none"> <li>▪ May be applied on the day of harvest.</li> <li>▪ Aphids may require 2- to 5-day intervals.</li> <li>▪ Use up to 3 qt Mycotrol for extreme insect pressure.</li> </ul>
Mycotrol ESO .....	0.25-1.0 qt at 5- to 10-day intervals for aphids, bugs.	
Mycotrol WPO .....	0.5-3.0 lb/100 gallons at 5- to 10-day intervals for aphids, bugs.	
<b>BEAVERIA BASSIANA/PYRETHRINS [3A]</b>		
BotaniGard Maxx .....	0.5-1.0 qt/100 gal at 5- to 10-day intervals for aphids.	<ul style="list-style-type: none"> <li>▪ May be applied on the day of harvest.</li> <li>▪ Aphids may require 2- to 5-day intervals.</li> </ul>
<b>BURKHOLDERIA SPP.</b>		
Venerate XC .....	1.0-8.0 qt for armyworms, aphids, and thrips.	<ul style="list-style-type: none"> <li>▪ Labeled for control of Armyworms, European corn borer, and loopers.</li> </ul>
<b>CAPSICUM OLERESIN EXTRACT</b>		
Captiva .....	1.0-2.0 pt/100 gal water at 4- to 7-day intervals for thrips and leafhoppers.	<ul style="list-style-type: none"> <li>▪ When pest pressure is heavier, use higher rates and consider tank mixes with other insecticides or miticides.</li> </ul>
<b>CHROMOBACTERIUM SUBTSUGAE</b>		
Grandevo .....	1.0-3.0 lb for armyworms or 2-3 lb for aphids at 3- to 10-day intervals.	<ul style="list-style-type: none"> <li>▪ Under heavy pressure pest population pressure, use higher label rates, shorten the spray interval, and/or raise spray volume.</li> </ul>
<b>CYANTRANILIPROLE</b>		
Exirel .....	13.5-20.5 fl oz at minimum of 5-day interval for aphids.	<ul style="list-style-type: none"> <li>▪ For best performance use with an effective adjuvant.</li> <li>▪ DO NOT apply more than 0.4 lb ai/acre per calendar year.</li> </ul>
<b>DELTAMETHRIN</b>		
Delta Gold .....	1.0 to 2.4 fl oz at 3-day intervals minimum	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 12 fl oz/acre (0.14 lb/acre a.i.) per growing season.</li> <li>▪ DO NOT apply within 3 days of harvest.</li> <li>▪ DO NOT apply to foliage used for livestock feed.</li> </ul>
<b>FLONICAMID</b>		
Beleaf 50SG .....	2.0-2.8 oz at minimum of 7-day intervals in minimum of 10 gal water for aphids, bugs.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2.8 oz/acre per application.</li> <li>▪ DO NOT exceed 8.4 oz/acre per season.</li> <li>▪ DO NOT exceed 3 applications at 2.8 oz/acre per season.</li> <li>▪ Use lower rate for building populations, higher rate for greater populations and/or dense foliage.</li> <li>▪ Scout and retreat as necessary.</li> </ul>
<b>FLUPYRADIFURONE</b>		
Sivanto 200 SL .....	7.0-10.5 fl oz at 10-day intervals in a minimum of 10 gal water for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 7-days of harvest.</li> <li>▪ Maximum amount of product applied per year cannot exceed 28.0 fl oz.</li> </ul>
Sivanto Prime .....	7.0-14.0 fl oz at 10-day intervals in a minimum of 10 gal water for aphids.	

## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments	
<b>IMIDACLOPRID</b>			
▪ Foliar applications			
Prey 1.6 <i>-or-</i> Sherpa.....	3.5 fl oz at 5-day intervals for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 3 applications per season.</li> <li>▪ DO NOT exceed 10.5 fl oz Nuprid 1.6F/Pasada 1.6F/Prey/Provado/ Sherpa per season.</li> <li>▪ DO NOT exceed 8.4 fl oz Macho 2.0FL/ Couraze 2F / AmTide Imidacloprid/Montana 2F/Nuprid 2SC Soil/Foliar per season.</li> <li>▪ DO NOT exceed 4.2 fl oz Agri Star Macho 4.0 Flowable/MANA Alias/Midash Forte/Montana 4F/Nuprid 4F Max per season.</li> <li>▪ DO NOT exceed 3.7 fl oz Admire Pro per season.</li> <li>▪ DO NOT exceed 2.8 oz Malice per season.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>	
Macho 2.0FL <i>-or-</i> Montana 2F <i>-or-</i> Nuprid 2SC Soil/Foliar <i>-or-</i> Advise 2FL.....	0.7-1.7 fl oz/1000 row ft (10-24 fl oz/acre)-Couraze 2F, Macho 2.0FL, Nuprid 2SC		
Malice 75WSP .....	2.8 fl oz at 5-day (minimum) intervals for aphids.		
	0.9-2.8 oz at 5-day intervals (minimum) for aphids.		
Alias 4F <i>-or-</i> Advise Four <i>-or-</i> Macho 4.0 <i>-or-</i> Midash Forte <i>-or-</i> Montana 4F <i>-or-</i> Nuprid 4F Max <i>-or-</i> Provoke ...	1.4 fl oz at 5-day intervals (minimum) for aphids.		
Admire Pro.....	1.2 fl oz at 5-day intervals (minimum) for aphids.		
Imidashot DF.....	1.0 oz at 5-day intervals (minimum) for aphids.		
▪ Soil applications			
Admire Pro <i>-or-</i> Nuprid 4.6F Pro.....	0.31-0.74 fl oz/1000 row ft (4.4-10.5 fl oz/ acre) applied once for aphids, thrips.		<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 application per growing season.</li> <li>▪ DO NOT exceed 10.5 fl oz Admire Pro/Nuprid 4.6F Pro per growing season.</li> <li>▪ DO NOT exceed 12 fl oz Agri Star Macho 4.0 Flowable/Wrangler/Couraze 4F/MANA Alias/MidashForte/Montana 4F/Nuprid 4F Max/Z-Imidacloprid/Admire Flex 4 per season.</li> <li>▪ DO NOT apply within 21 days of harvest.</li> <li>▪ Chemigate through low-pressure drip, trickle, micro-sprinkler; <i>-or-</i> in furrow spray/shanked in 1-2" below seed row during planting; <i>-or-</i> narrow band (2" or less) 1-2" directly below seed row 14 or fewer days before planting.</li> </ul>
Wrangler .....	0.35-0.85 fl oz/1000 row ft (5-12 fl oz/ acre) applied once for aphids.		
Alias 4F <i>-or-</i> Midash Forte <i>-or-</i> Montana 4F <i>-or-</i> Nuprid 4F Max.....	0.35-0.85 fl oz/1000 row ft (5-12 fl oz/ acre) applied once for aphids, thrips		

## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments
<b>IMIDACLOPRID (CONTINUED)</b>		
▪ Soil applications		
Macho 2.0FL <i>-or-</i> Agrisolutions Advise 2FL <i>-or-</i> Alias 2F <i>-or-</i> Malice 2F <i>-or-</i> Nuprid 2SC Soil/Foliar <i>-or-</i> Widow.....	0.7-1.7 fl oz/1000 row-feet (10-24 fl oz/acre) applied once for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 1 application per growing season.</li> <li>▪ DO NOT exceed 24 fl oz Macho 2.0FL/Agrisolutions Advise 2FL/Alias/AmTide Imidacloprid/Couraze 2F/Midash 2SC Ag/Widow/Montana2F/Nuprid 2F/Nuprid 2SC Soil/Foliar per season.</li> <li>▪ DO NOT apply within 21 days of harvest.</li> <li>▪ Chemigate through low-pressure drip, trickle, micro-sprinkler; <i>-or-</i> in furrow spray/shanked in 1-2" below seed row during planting; <i>-or-</i> narrow band (2" or less) 1-2" directly below seed row 14 or fewer days before planting.</li> <li>▪ DO NOT exceed 3.0 oz/acre Imidashot DF</li> </ul>
Montana 2F <i>-or-</i> Nuprid 2SC ..	0.7-1.7 fl oz/1000 row-feet (10-24 fl oz/acre) applied once for aphids, thrips.	
Advise Four <i>-or-</i> Macho 4.0 <i>-or-</i> Provoke .....	0.4-0.9 fl oz/1000 row-feet (5.0-12.0 fl oz/acre) applied once for aphids, thrips.	
Imidashot DF.....	0.25-0.62 oz/1000 row-feet (3.5-8.7 oz/acre) applied once for aphids and thrips.	
<b>METHOXYFENOZIDE</b>		
Intrepid 2F <i>-or-</i> Troubadour 2F <i>-or-</i> TurnStyle .....	8.0-16 fl oz at 14-day intervals for cutworm suppression.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 64 fl oz/acre per season.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>
<b>MINERAL OIL</b>		
Biocover MLT <i>-or-</i> Damoil Dormant & Summer Spray Oil.....	0.75-1.5 gal once or twice per week for aphids and thrips.	<ul style="list-style-type: none"> <li>▪ For BioCover MLT use higher pressure (minimum 400 psi) and ceramic hollow cone nozzles.</li> <li>▪ For Damoil use higher pressure (minimum 100 psi) and ceramic hollow cone nozzles.</li> </ul>
<b>NEEM OIL</b>		
Trilogy.....	0.5-1% in 25-100 gal water at 7- to 14-day intervals for aphids, thrips. 2.0 pt in 5 gal water at 7- to 14-day intervals for aphids, thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 2 gal/acre per application.</li> </ul>
<b>PETROLEUM OIL</b>		
Glacial Spray Fluid .....	0.75-1.0 gal 1-2 times weekly for aphids, thrips.	
Purespray Green.....	0.75-1.5 gal in 50-100 gal water 1-2 times weekly for apids, thrips.	



## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments
<b>POTASSIUM SILICATE</b>		
Sil-Matrix.....	1.0-4.0 qt in 50-250 gal water at 7-day intervals for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than 10 qts per acre per application.</li> <li>▪ DO NOT apply more than 20 gal per acre per season.</li> <li>▪ Only apply this product through drip, sprinkler, furrow, flood, or border irrigation systems.</li> </ul>
<b>PYRETHRINS</b>		
PyGanic EC 1.4.....	1.0 pt-2.0 qt in a minimum of 5 gal water and repeat as needed for aphids, bugs, leafrollers, thrips.	<ul style="list-style-type: none"> <li>▪ Apply in the early morning or late evening to avoid possible harm to honey bees.</li> </ul>
PyGanic EC 5.0 II <i>-or-</i> Tersus Insecticide .....	4.5-17 oz in a minimum of 5 gal water and repeat as needed for aphids, bugs, leafrollers, thrips.	
Evergreen Crop Protection EC 60-6 .....	2.0-16 oz in repeat as needed for aphids, leafrollers, and thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 12 hours of harvest.</li> <li>▪ Apply in the early morning or late evening to avoid possible harm to honey bees.</li> <li>▪ DO NOT exceed 10 applications per season.</li> <li>▪ DO NOT reapply within 3 days; 24 hours only under extreme pest pressure.</li> </ul>
Pyrenone Crop Spray .....	Up to 12 fl oz and repeat as needed for aphids, bugs, cutworms, leafrollers, thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 12 hours of harvest.</li> <li>▪ Apply in the early morning or late evening to avoid possible harm to honey bees.</li> </ul>
<b>SPINOSAD</b>		
Entrust Naturalyte Insect Control .....	1.0-2.0 oz at 5-day (minimum) intervals for thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 3 days of harvest.</li> <li>▪ DO NOT exceed 4 applications (7 oz Entrust Naturalyte/acre, 14.4 oz Blackhawk/acre, 21 fl oz Spintor or Entrust SC/acre) per season.</li> <li>▪ DO NOT exceed 2 consecutive applications of spinosad and spinetoram before alternating with another insecticide with a different mode of action.</li> <li>▪ Before making widespread applications, treat a limited number of plants and observe for phytotoxicity over a 10-day period.</li> <li>▪ Addition of an adjuvant may improve thrips control.</li> </ul>
Blackhawk Naturalyte Insect Control .....	1.7-3.3 oz at 5-day (minimum) intervals for thrips.	
SpinTor 2SC <i>-or-</i> Entrust SC ..	3.0-6.0 fl oz at 5-day (minimum) intervals for thrips.	
Success Naturalyte Insect Control .....	3.0-6.0 fl oz at 7-day (minimum) intervals for thrips.	
Conserve SC .....	8.0 fl oz/100 gal at 5-day (minimum) intervals for thrips.	
<b>SPINETORAM</b>		
Radiant SC.....	6.0-8.0 fl oz at 4-day (minimum) intervals for thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 3 days of harvest.</li> <li>▪ DO NOT exceed 2 consecutive applications of spinosad and spinetoram before alternating with another insecticide with a different mode of action.</li> <li>▪ Use the higher rate for heavy infestations.</li> <li>▪ Addition of an adjuvant may improve thrips control.</li> </ul>

★*Products with starred active ingredients are particularly recommended for problem infestations.*

## SOIL INSECTS, ABOVE-GROUND INSECTS *continued*

Pesticide	Rate of product/acre	Comments
<b>SULFOXAFLOR</b>		
Transform WG .....	0.75-1.5 oz at 7-day intervals for thrips.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 7 days of harvest.</li> <li>▪ DO NOT apply more than 8.5 oz/acre per year.</li> <li>▪ DO NOT make more than two consecutive applications per crop.</li> </ul>
<b>THIAMETHOXAM</b>		
Actara .....	1.5-3.0 oz at 7-day intervals (minimum) for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT use less than 10 GPA.</li> <li>▪ DO NOT exceed 8 oz/acre per growing season.</li> <li>▪ DO NOT apply within 7 days of harvest.</li> </ul>
Platinum.....	5.0-12 fl oz at or within 24 hours of seeding for aphids.	
Platinum 75SG.....	1.7-4.01 oz or within 24 hours of seeding for aphids.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 12 fl oz/acre Platinum or 4.01 oz/acre Platinum 75SG per growing season.</li> <li>▪ At seeding: in-furrow spray or narrow surface band above the seedline and water in to seedling depth within 24 hours.</li> </ul>
<b>ZETA-CYPERMETHRIN</b>		
Mustang.....	1.4-4.3 oz for cutworms or 3.4-4.3 oz for aphids, bugs at 4-day (minimum) intervals.	<ul style="list-style-type: none"> <li>▪ RESTRICTED USE PESTICIDE.</li> <li>▪ DO NOT use less than 10 GPA.</li> <li>▪ DO NOT exceed 0.15 lb active ingredient per growing season.</li> <li>▪ DO NOT use foliage for feed.</li> <li>▪ Apply as required by scouting.</li> <li>▪ Use of this product should conform to resistance management strategies established for the use area.</li> <li>▪ Aids in control of aphids.</li> </ul>
Mustang Maxx.....	1.28-4.0 oz for cutworms or 3.2-4 oz for aphids, bugs at 4-day (minimum) intervals.	
<b>ZETA-CYPERMETHRIN/BIFENTHRIN</b>		
Hero.....	2.6-6.1 oz for cutworms or 4-10.3 oz for aphids, bugs at 21-day (minimum) intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 21 days of harvest.</li> <li>▪ DO NOT exceed 11.2 oz/acre Hero EW or 4.7 fl oz Steed per application.</li> <li>▪ DO NOT exceed 46.35 oz (0.2 lb a.i.)/acre Hero or 50.4 oz (0.45 lb a.i.)/acre Hero EW or 28.1 fl oz (0.33 lb a.i.)/acre Steed per season.</li> <li>▪ DO NOT exceed 2 foliar applications per season.</li> <li>▪ Apply as required by scouting.</li> <li>▪ Use of this product should conform to resistance management strategies established for the use area.</li> </ul>
Hero EW .....	2.8-6.7 oz for cutworms or 4.5-11.2 oz for aphids, bugs at 21-day (minimum) intervals.	
Steed .....	2.5-3.5 fl oz for cutworms or 3.5-4.7 fl oz for aphids, bugs at 21-day (minimum) intervals.	
<b>ZETA-CYPERMETHRIN/BIFENTHRIN/IMIDACLOPRID</b>		
Triple Crown.....	3.2-4.5 fl oz for aphids, cutworms at 7-day (minimum) intervals. 4.5 fl oz for bugs at 7-day (minimum) intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT apply within 21 days of harvest.</li> <li>▪ DO NOT exceed 9.1 fl oz/A or 2 foliar applications per season.</li> </ul>
<ul style="list-style-type: none"> <li>▪ See also fumigation section for preplant chemical control of soil insects.</li> </ul>		

## SLUGS

### CULTURAL CONTROL:

Eliminate shady, damp areas; employ clean cultivation and removal of sheltering sites along hedgerows and fences. Do not plant in low, flat, wet, or recently plowed ground that has been left idle for several years. Keep the perimeter of gardens free of plants and weeds to reduce favorable habitat and keep slugs from moving into gardens.

Pesticide	Rate of product/acre	Comments
<b>★METALDEHYDE★</b>		
Deadline GT .....	33.3 lb per acre at 21-day intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT apply more than six applications per year.</li> <li>▪ DO NOT apply within 21-days of harvest.</li> </ul>
<b>SODIUM FERRIC EDTA</b>		
IronFist Slug and Snail Bait ...	10-40 lb per acre or 0.25-1 lb/1000 sq ft and repeat as needed or at 2-week intervals.	<ul style="list-style-type: none"> <li>▪ Use higher rates when infestations are high.</li> </ul>
<ul style="list-style-type: none"> <li>▪ See also fumigation section for preplant chemical control of slugs.</li> </ul>		

## NEMATODES

### CULTURAL CONTROL:

A high density of nematodes in soil causes areas of missing or stunted plants in a garden. Nematodes attack many different crops. Select nematode-free sites for garden establishment by testing soil samples for nematodes prior to planting.

Pesticide	Rate of product/acre	Comments
<b>AZADIRACHTIN</b>		
AzaGuard <i>-or-</i> Molt-X .....	15 oz at 3- to 4-week intervals.	<ul style="list-style-type: none"> <li>▪ DO NOT exceed 22.5 fl oz/acre per season.</li> <li>▪ Apply in sufficient water to penetrate the soil to a depth of 12".</li> </ul>
Neemix 4.5 .....	1.0 to 3.0 gal at 7-day intervals.	
<b>MYROTHECIUM VERRACARIA</b>		
Ditera DF .....	0.31-2.4 lb/1000 sq ft	<ul style="list-style-type: none"> <li>▪ Apply to the soil as a pre-plant, at planting or post-planting soil treatment.</li> <li>▪ This product must be applied to and incorporated into the soil.</li> </ul>
<ul style="list-style-type: none"> <li>▪ See also fumigation section for preplant chemical control of nematodes.</li> </ul>		

## WEEDS

### CULTURAL CONTROL:

Be sure that beds are adequately covered with weed-free mulch to reduce the chance of moving weed seeds into a garden.

Pesticide	Rate of product/acre	Comments
<b>AMMONIATED SOAP OF FATTY ACIDS</b>		<ul style="list-style-type: none"> <li>▪ <b>DO NOT</b> apply over emerged ginseng.</li> </ul>
Final-San-O .....	26 oz/1 gal water applied at 75-200 gal/acre at 14- to 21-day intervals.	
<b>CLETHODIM</b>		<ul style="list-style-type: none"> <li>▪ <b>DO NOT</b> exceed 8 fl oz/acre in a single application.</li> <li>▪ <b>DO NOT</b> apply within 30 days of harvest.</li> <li>▪ <b>DO NOT</b> exceed 5.33 fl oz/acre of Section Three or Shadow 3EC in a single application.</li> <li>▪ <b>DO NOT</b> exceed 16 fl oz/acre of Tapout in a single application.</li> </ul>
Arrow 2EC <i>-or-</i> Avatar S2- <i>-or-</i> Cleanse 2EC <i>-or-</i> Clethodim 2E <i>-or-</i> Clethodim 2EC <i>-or-</i> Clethodim 2EC <i>-or-</i> Dakota <i>-or-</i> Intensity Post- Emergence Herbicide <i>-or-</i> Shadow <i>-or-</i> Tide Clethodim 2EC <i>-or-</i> Vaquero <i>-or-</i> Volunteer <i>-or-</i> Willowood Clethodim 2EC .....	6.0-8.0 fl oz at 14-day intervals.	
Select Max with Inside Technology .....	5.0-10.0 gal ground application at 14-day intervals 3.0-10.0 gal air application at 14-day intervals	
Section Three <i>-or-</i> Shadow 3EC .....	4.0-5.33 fl oz at 14-day intervals.	
Tapout .....	9.0-16 fl oz annual grass rate or 12-16 fl oz perennial grass rate at 14-day intervals.	
Intensity One <i>-or-</i> TapOut .....	9.0-16 fl oz at 14-day intervals for annual grasses. 12-16 fl oz at 14-day intervals for perennial grasses.	<ul style="list-style-type: none"> <li>▪ <b>DO NOT</b> exceed 16 fl oz/acre in a single application.</li> <li>▪ <b>DO NOT</b> exceed 64 fl oz/acre per season.</li> <li>▪ <b>DO NOT</b> apply within 30 days of harvest.</li> </ul>
<b>DIQUAT DIBROMIDE</b>		
Aceto Diquat 2L AG <i>-or-</i> Dessicash <i>-or-</i> Nufarm Diquat 2L <i>-or-</i> Reglone Dessicant <i>-or-</i> Solera Diquat 2L Dessicant .....	1.5-2.0 pt in a minimum of 15 gal water.	<ul style="list-style-type: none"> <li>▪ <b>DO NOT</b> apply over emerged ginseng.</li> <li>▪ <b>DO NOT</b> use for food or feed within 1 year of application.</li> <li>▪ <b>DO NOT</b> graze treated areas.</li> <li>▪ Can be used during site preparation.</li> </ul>
<b>FLUAZIFOP-P-BUTYL</b>		
Fusilade DX .....	16-24 oz (add 1% crop oil or 0.25% surfactant).	<ul style="list-style-type: none"> <li>▪ <b>DO NOT</b> apply within 1 year of harvest.</li> <li>▪ Effective against grasses only.</li> <li>▪ Apply when grasses are 2-8" tall, before tilling or heading.</li> <li>▪ Direct spray away from ginseng foliage.</li> </ul>

## WEEDS

### CULTURAL CONTROL:

Be sure that beds are adequately covered with weed-free mulch to reduce the chance of moving weed seeds into a garden.

Pesticide	Rate of product/acre	Comments
<b>GLYPHOSATE</b>		
<ul style="list-style-type: none"> <li>▪ Glyphosate is nonspecific and may damage actively growing ginseng.</li> <li>▪ NOTE for all glyphosate products: Rates vary by concentration of the product and by the weeds to be targeted. Refer to weed control tables in label for rates and timing.</li> </ul>		<ul style="list-style-type: none"> <li>▪ DO NOT apply within 1 year of harvest.</li> <li>▪ <b>DO NOT apply over emerged ginseng.</b></li> </ul>
<p>Glyphosate products which are labeled for ginseng include but are not limited to: Abundit Edge, Cornerstone, Agrisolutions Cornerstone 5 Plus, Agrisolutions Cornerstone Plus, Agrisolutions Rascal (<i><b>MI only</b></i>), Aim EC, Alecto 41-S, Alligare Glyphosate 4 Plus, Buccaneer, Buccaneer Plus, Buccaneer 5 Extra, Bullzeye, Credit Xtreme, CropSmart Glyphosate 41 Plus, Duramax, Durango DMA, Envy, Envy Intense, Eraser A/P, FarmWorks 41%, Four Power Plus, GlyStar 5 Extra, GlyStar Original, GlyStar K-Plus, GlyFine Plus, Glyfos X-Tra, Glyphosate Plus, Glyphogan, Glyphogan Plus, Gordon's Pronto Big n' Tuf, Hi-yield Super Concentrate Kill-Zall II, Honcho K6, Honcho Plus, Mad Dog Plus, Makaze, Makaze Yield Pro, Rattler Plus, Roundup Power Max, Roundup WeatherMax, Tomahawk 5, Touchdown HiTech, Touchdown Total, Traxion.</p>		
<b>PELARGONIC ACID/RELATED FATTY ACIDS</b>		
Scythe.....	3-5% or 5-7% or 7-10% depending on weeds to be controlled (see label), repeat as needed.	<ul style="list-style-type: none"> <li>▪ <b>DO NOT apply over emerged ginseng.</b></li> <li>▪ 3-5% for control of annual weeds, mosses and cryptogams.</li> <li>▪ 5-7% for burndown of perennial herbaceous plant, weeds in a later stage of growth, and sucker growth.</li> <li>▪ 7-10% for maximum vegetative burndown, edging or foliar trimming.</li> <li>▪ Can be applied prior to emergence of plants from perennial rootstocks.</li> </ul>
<b>PYRAFLUFEN-ETHYL</b>		
Vida .....	0.5-2.0 fl oz in a minimum of 10 gal of water at 30-day intervals.	<ul style="list-style-type: none"> <li>▪ For preplant burndown.</li> <li>▪ DO NOT make more than 3 applications per year.</li> <li>▪ DO NOT apply within 24 hours of planting.</li> <li>▪ To control grassy weeds, tank mix with glyphosate, paraquat, or glufosinate.</li> </ul>
<ul style="list-style-type: none"> <li>▪ See also fumigation section for preplant chemical control of weeds.</li> </ul>		

## SOILBORNE PESTS/FUMIGATION

**(Fungi: *Cylindrocarpon destructans*, *Fusarium* spp., *Phytophthora cactorum*, *Pythium* spp., *Rhizoctonia solani*, other; Root Knot and Lesion Nematodes; Insects: climbing cutworms, cutworms, white grubs, wireworms; Slugs; Weeds)**

### CULTURAL CONTROL:

Do not reintroduce pests and soils into the fumigated garden. Do not mix soil that has not been fumigated with treated soil. See additional cultural controls listed above for suggestions regarding specific pest problems.

### FUMIGATION: GENERAL COMMENTS

- USE ONLY as a pre-plant treatment, DO NOT fumigate established ginseng gardens.
- After incorporation of fumigants, seal the soil with a plastic sheet. Alternatively, water the soil to wet it to a depth of 0.5-0.75 inches and/or roll the soil.
- Be sure to test fumigant-treated soil using a seed germination test prior to planting to insure that all residues of the fumigant have dissipated.
- Use of soil fumigants may reduce initial levels of soilborne pests, but is unlikely to control these pests throughout the lifetime of a garden.

#### DICHLOROPROPENE

- RESTRICTED USE PESTICIDE.
- Allow fumigant to dissipate completely before planting.

Telone II.....	9.0-12 gal broadcast mineral soil. 26-35 fl oz/1000 row feet/outlet mineral soil. 25 gal broadcast muck/peat. 74 fl oz/1000 row feet/outlet muck/peat.
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Telone EC ( <i>MI only</i> ).....	9.0-18 gal broadcast mineral soil.
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- RESTRICTED USE PESTICIDE.
- Apply using surface or buried drip irrigation and tarp only.
- Leave undisturbed 14 days after treatment.

#### DICHLOROPROPENE/CHLOROPICRIN

- RESTRICTED USE PESTICIDE.
- Allow fumigant to dissipate completely before planting.

Telone C-17 .....	10.8-17.1 gal broadcast mineral soil. 31.8-50.2 fl oz/1000 row feet/outlet mineral soil. 27.4-30 gal broadcast muck/peat. 80.6-88.2 fl oz/1000 row feet/outlet muck/peat.
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Telone C-35 .....	13-20.5 gal broadcast mineral soil. 33-36 gal broadcast muck/peat.
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InLine ( <i>MI only</i> ).....	13-20.5 gal broadcast mineral soil.
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- RESTRICTED USE PESTICIDE.
- Apply using surface or buried drip irrigation and tarp only.
- For *Phytophthora* and *Fusarium* management, increase dosage to 35 gal/acre.
- Leave undisturbed 14 days after treatment.

## SOILBORNE PESTS/FUMIGATION *continued*

Pesticide	Rate of product/acre	Comments
<b><i>METAM POTASSIUM</i></b>		<ul style="list-style-type: none"> <li>▪ RESTRICTED USE PESTICIDE.</li> <li>▪ Soil temperature must be between 40-90°F.</li> <li>▪ Private Pesticide Application Certification and Agricultural Fumigation Certification required to use this product.</li> <li>▪ Use of metam potassium in Wisconsin is restricted beyond the label instructions under ATCP 29.254, Wisconsin Administrative Code. For more information, contact the Wisconsin Department Agriculture, Trade and Consumer Protection at (608) 2245-4500.</li> </ul>
K-Pam HL ( <i>MI only</i> ) -or- Sectagon-K54 ( <i>MI only</i> ).....	30-60 gal.	
<b><i>METAM SODIUM</i></b>		<ul style="list-style-type: none"> <li>▪ RESTRICTED USE PESTICIDE.</li> <li>▪ Soil temperature must be between 40-90°F.</li> <li>▪ Private Pesticide Application Certification and Agricultural Fumigation Certification required to use this product.</li> <li>▪ Use of metam sodium in Wisconsin is restricted beyond the label instructions under ATCP 29.254, Wisconsin Administrative Code. For more information, contact the Wisconsin Department Agriculture, Trade and Consumer Protection at (608) 2245-4500.</li> </ul>
Metam CLR 42% ( <i>WI only</i> ) ...	37.5-75 gal.	
Sectagon 42 ( <i>MI only</i> ) .....	37.5-75 gal.	
Vapam HL.....	37.5-75 gal.	

## SEED TREATMENTS

### CULTURAL CONTROL:

Be sure to harvest seed from healthy gardens. It is recommended that seeds are treated prior to stratification and prior to planting.

Pesticide	Rate/100 lb seed	Comments
<b>AZOXYSTROBIN</b>		
Dynasty .....	0.1-0.38 fl oz/100 lb seed.	<ul style="list-style-type: none"> <li>▪ Apply as a water-based slurry using seed treatment application equipment that will provide uniform coverage on the seed surface.</li> <li>▪ It is recommended that Dynasty be combined with <i>Pythium</i>-active seed treatment such as Apron XL.</li> <li>▪ Allow seed to dry prior to bagging.</li> </ul>
<b>FLUDIOXONIL</b>		
Maxim 4FS -or- Spirato 480FS -or- Dyna-Shield Fludioxonil .....	0.08-0.16 fl oz/100 lb seed.	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i> and <i>Rhizoctonia</i>.</li> <li>▪ Apply as a water-based slurry utilizing slurry seed treatment equipment which provides uniform seed coverage.</li> <li>▪ Allow seed to dry before bagging.</li> </ul>
<b>FLUXAPYROXAD</b>		
Systiva XS .....	0.95-1.9 fl oz/100 lb seed.	<ul style="list-style-type: none"> <li>▪ Apply as a water-based slurry utilizing slurry seed treatment equipment which provides uniform seed coverage.</li> <li>▪ Active against <i>Rhizoctonia</i>, <i>Alternaria</i>, and other seedborne fungi causing seed decay, seeding damping-off.</li> </ul>
<b>MEFENOXAM</b>		
Apron XL.....	0.085-0.64 fl oz/100 lb seed.	<ul style="list-style-type: none"> <li>▪ For protection against (<i>Pythium</i> damping off) other soilborne diseases, such as <i>Rhizoctonia</i> spp., apply in combination with other registered seed treatment fungicides.</li> <li>▪ Apply as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry- or mist-type commercial seed treatment equipment.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
<b>METALAXYL</b>		
Agri Star Metalaxyl 265ST -or- Allegiance-FL -or- Belmont 2.7FS -or- Dyna-Shield Metalaxyl 318FS -or- Startup Metalaxyl..	0.75 fl oz/100 lb seed.	<ul style="list-style-type: none"> <li>▪ Active against <i>Pythium</i>.</li> <li>▪ Use only as a seed treatment.</li> <li>▪ Use of seed treatments for <i>Pythium</i> may provide control of <i>Phytophthora</i>.</li> <li>▪ NOTE: 80% of <i>Phytophthora</i> isolates from the northcentral U.S. tested insensitive to mefenoxam/metalaxyl.</li> </ul>
Acquire .....	0.75-1.5 fl oz/100 lb seed.	
Dyna-Shield Metalaxyl.....	0.75-1.5 fl oz/100 lb seed.	
Metalaxyl 4.0 ST -or- Sebring 480 FS .....	0.5-1.0 fl oz/100 lb seed.	
<b>THIABENDAZOLE</b>		
Mertect 340-F.....	0.002 mg/ai per seed	<ul style="list-style-type: none"> <li>▪ Active against <i>Fusarium</i>.</li> <li>▪ Use only as a seed treatment.</li> </ul>