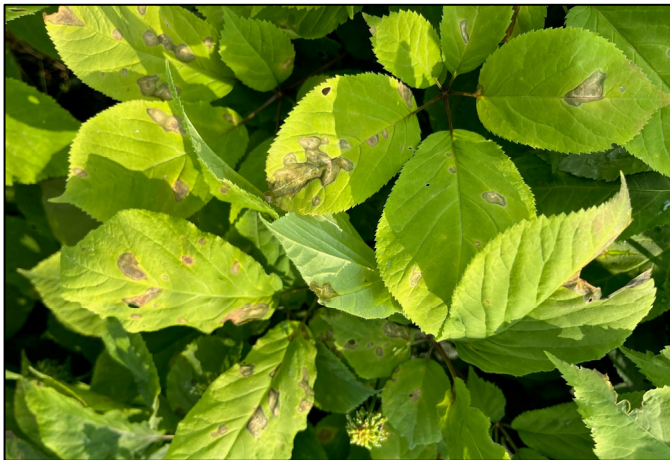


Managing *Alternaria* on Ginseng

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Alternaria panax, a fungus, causes Alternaria blight, the most common disease of ginseng throughout the world. It can attack shoots, leaves, stems and fruits on plants of all ages. Senescing tissue and nutrient-deficient plants are especially susceptible to infection by *A. panax*. The leaf blight symptoms include lesions with yellow-green halos, dark brown margins and pale brown centers. Established lesions may have a “shot-hole” appearance after the tissue in the center disintegrates. Stems become blighted and collapse.



Alternaria on leaves (top) and fruits (bottom).

The potential for repeated widespread and devastating epidemics is great because *A. panax* produces large numbers of conidia (spores) on the surfaces of diseased tissues. When weather is favorable (humid and wet), blight symptoms and reproduction of the fungus can occur in 5 to 7 days. Outbreaks of Alternaria blight in one season greatly increase the potential for epidemics in subsequent seasons, since the fungus overwinters in the infested plant debris. In the spring, conidia that have overwintered can spread to the newly emerging healthy plants via rain or splashing water and begin the disease cycle for the new growing season.

Conidia can travel via air currents, resulting in spread of Alternaria blight from diseased gardens to nearby healthy gardens. Workers may also contribute to the spread of this fungus via contact with clothing and equipment.

If Alternaria blight is not controlled, it can reach epidemic proportions within a month after the plants have emerged in the spring, destroying all of the foliage. Loss of foliage retards root growth in maturing crops, resulting in reduced root yields at harvest. Defoliation of young plants makes them more susceptible to winter kill. Repeated outbreaks of Alternaria blight in subsequent years can reduce root yields further. Yield losses when Alternaria blight is uncontrolled can range from 50 to 100%. In addition, Alternaria blight can damage or destroy the seed crop normally harvested from ginseng gardens. This pathogen can be seed-disseminated.



Early onset of *Alternaria* (top) and dead plants (bottom) as a result of high disease pressure.

Cultural strategies recommended for *Alternaria* blight management are summarized in the table below.

Monitor the ginseng garden and treat preventively with fungicides when environmental conditions favor *Alternaria* blight.

Cultural Management Strategies
<ul style="list-style-type: none"> • Limit garden size to enhance air flow and movement to reduce environmental conditions favoring <i>Alternaria</i> blight. • Avoid sites bordered by woods. • Choose sites with good soil drainage with rows oriented in the direction of prevailing winds. • Dense plant stands promote long periods of wetness after dew or rain.

Resistance to iprodione in the *Alternaria panax* pathogen has been documented in some ginseng-growing areas. Pathogen resistance to Cabrio, Endura, Flint, and Quadris fungicides is suspected to be an issue in Wisconsin. See table below for list of products. Especially effective fungicides are listed under the 'A' Team. If control is not exhibited by applications of a certain product, apply a product with a different active ingredient and mode of action.

Product	A.I.	FRAC Group
<i>Alternaria</i> 'A' Team		
Elatus Fungicide	azoxystrobin + benzovindiflupyr	11/7
Luna Sensation	fluopyram + trifloxystrobin	7/11
Aprovia Top	difenoconazole + benzovindiflupyr	3/7
Luna Flex	fluopyram + difenoconazole	7/3
Merivon Xemium Brand Fungicide	pyraclostrobin + fluxapyroxad	11/7
Cevya SC	mefentrifluconazole	3
Miravis Prime	Adepidyn technology (pydiflumetofen + fludioxonil)	12/7
<i>Alternaria</i> 'B+/B' Team		
Fontelis SC	penthiopyrad	7
Bravo WeatherStik SC, Oranil 6L, Equus 720, Initiate, Echo 720, etc.	chlorothalonil	M05
Dithane, Manzate, Penncozeb, Roper, etc.	mancozeb	M03
Dexter Max	mancozeb + azoxystrobin	M03/11
Quadris SC, Aframe, Satori, Trevo, etc.	azoxystrobin	11
Cabrio EG	pyraclostrobin	11
Innliven Elite	pyraclostrobin + difenoconazole	11/3
Quadris Top, Acadia ESQ, Trevo DCZ, etc.	azoxystrobin + difenoconazole	11/3
Tilt	propiconazole	3
Scala SC	pyrimethanil	9
Switch 62.5WDG, Alterity 62.5WDG	cyprodinil + fludioxonil	9/12
Captan 80WDG	captan	M04
Omega 500F, Orbus 4F, Vantana, Omavo	fluazinam	29
<i>Alternaria</i> 'B-' Team		
Rovral 4FL, Meteor	iprodione	2
Luna Tranquility	fluopyram + pyrimethanil	7/9

Remember that the pesticide label is the legal document on pesticide use. Read the label and follow all instructions closely. 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, and 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.

Visit the IR-4 Project website (<http://www.ir4.rutgers.edu>) for updates on the registration of new products.