

# Managing *Botrytis* on Ginseng

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*Botrytis cinerea* is an extremely common fungus, and can grow and survive on virtually any dead plant material found in a ginseng garden. *Botrytis* blight or gray mold also infects a wide variety of crops, including greenhouse bedding plants and cut flowers, fruits and vegetables. *Botrytis* infects leaves, stems, flowers and fruits of ginseng, and is a particularly severe problem in plantings older than 2 years.

*Botrytis* blight symptoms on leaves include rapidly-enlarging, water-soaked, tan lesions that often have concentric rings, giving them the appearance of a bull's eye. Lesions often start at the leaf tips and spread back along the leaf midrib. *Botrytis* can infect stems late in the growing season and may form small black bodies (sclerotia) on infected tissues that allow the fungus to overwinter.

Infection of flowers and fruits leads to discoloration, followed by abortion of these plant parts or infection of the developing seed. When conditions are favorable, plant death occurs. This pathogen can be seed-disseminated.

During periods of high humidity, frequent rainfall and extended dew periods, the fungus produces high numbers of small, single-celled, colorless conidia (spores) on diseased or dead plant tissue. Conidia are released and disseminated when infected leaves or fruit clusters are disturbed by air currents or human activities. Field observations also suggest that the fungus can grow from leaf to leaf and plant to plant in densely planted gardens when diseased leaves and flowers and healthy leaves come into contact.



**Water-soaked lesions (top) and lesion with concentric rings extending along leaf midrib (bottom) due to *Botrytis* blight.**



**Infection and sporulation of *Botrytis* on leaves (top) and fruits (bottom).**

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

Resistance in *Botrytis* to benzimidazole or dicarboximide (iprodione) classes of fungicides and multiple resistances to both classes have been documented. Fungicide resistance can severely limit chemical control options. Many products must be used in alternation with protectant fungicides, such as chlorothalonil or mancozeb.

See table below for list of products. Especially effective fungicides are listed under the 'A' Team.

## Cultural Management Strategies

- Limit garden size to enhance air flow and movement to reduce environmental conditions favoring Botrytis blight.
- Avoid wounding plants as *Botrytis* readily infects damaged tissues.
- Avoid foliar fertilizers or products that cause plant burn.
- 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.

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

Product	A.I.	FRAC Group
<b>Botrytis 'A' Team</b>		
Bravo Weather Stik 6SC, Equus 720 SST, Chlorothalonil 720, Echo 720, Oranil 6L, Initate, etc.	chlorothalonil	M05
Luna Sensation	fluopyram + trifloxystrobin	7/11
Captan 80WDG	captan	M04
Quadris Top	azoxystrobin + difenoconazole	11/3
Elevate 50WDG	fenhexamid	17
Omega 500F, Orbus 4F	fluazinam	29
<b>Botrytis 'B' Team</b>		
Fontelis SC	penthiopyrad	7
Scala SC	pyrimethanil	9
Luna Tranquility	pyrimethanil + fluopyram	9/7

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.