



Extension

UNIVERSITY OF WISCONSIN-MADISON

Provided to you by:

Rusty Root

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What is rusty root? Rusty root is slow-developing root rot of ginseng that typically attacks older ginseng plants (two-year-old ginseng or older). While the disease can destroy the plant's entire root system and kill the plant, often rusty root is more important because it leads to roots that are unmarketable due to low quality.



Rusty-brown, corky, dry tap-root decay typical of rusty root

What does rusty root look like?

Ginseng plants with rusty root often do not exhibit aboveground symptoms of the disease, although foliage of infected plants can exhibit a red, orange or yellow discoloration. Roots of infected plants are often only partially decayed. Decayed areas are rusty-brown and remain firm with a dry, corky, but never mushy texture. While rusty root can occur anywhere on a ginseng root, it often occurs at the tip of the root and progresses upward.

Where does rusty root come from?

The most commonly cited cause of rusty root is *Cylindrocarpon destructans*, a soil-borne fungus that appears to survive readily in soils where ginseng has been grown. Other fungi, such as *Fusarium* spp. may also be involved. In addition, some researchers suggest that a boron deficiency may also contribute to rusty root

development.

How do I save ginseng with rusty root? Once a ginseng plant has been affected by rusty root, little can be done. There are currently no fungicide treatments available to control this disease.

How do I avoid problems with rusty root? Avoidance of rusty root fungi is the only current means of disease control. Select a site not previously used for ginseng production. Be sure not to track soil or plant material from infested gardens into non-infested gardens. Clean equipment, hand tools and footwear after working in infested gardens. Use high-pressure water or a detergent solution to clean large equipment, and a 10% bleach solution or alcohol to clean hand tools and shoes. Soil fumigation has been used by some growers to successfully manage rusty root, even in areas where ginseng has been produced in the past. However, other growers have found this technique ineffective.

For more information on rusty root: See the UW-Madison Ginseng Home Page (www.plantpath.wisc.edu/ginseng) or contact your county Extension agent.