

Take-all

(Gaeumannomyces graminis var tritici)

SYMPTOMS

Characteristic root symptoms appear as early as four weeks and typically are seen as a black central cylinder within the root. Severely infected plants may show blackening of the crown and stem bases. As the plant matures, severe infection results in premature ripening, plant death and shriveled grain.



HOSTS

Wheat is susceptible, barley susceptible to moderately resistant, and rye and triticale moderately resistant. Oats will host a related organism, *G. graminis var avenae*. Most grass weeds host the disease; other crops do not.

CONTROL

- Rotate with a broadleaf crop
- Provide good plant nutrition
- Use fungicide seed treatment
- Biological control agents are in use outside of the U.S.



Blackened center of roots infected with take-all fungus

Take-all

**ROOT
AND
CROWN**