

Dry Bean

Rhizoctonia Root Rot

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Identification and Life Cycle

Rhizoctonia root rot is caused by the fungus *Rhizoctonia solani*. The fungus survives in infected plant debris, and inoculum concentrations in the soil are increased by continually cropping fields to susceptible crops such as dry bean, potato and sugarbeet. Rhizoctonia is spread within and between fields by irrigation water and soil movement. Rhizoctonia root rot of germinating seedlings is favored by moderate to high soil moisture and low soil temperatures. Damage is generally restricted to young seedlings, but can affect older plants, especially when the plants are stressed by extremes in temperature between warm soil and cool water from deep irrigation wells.

Plant Response and Damage

Rhizoctonia solani can cause seedling death, root and hypocotyl rot, stem cankers and pod rot. Initial symptoms appear on roots or hypocotyls as linear or circular reddish-brown sunken lesions or cankers delimited by a brown to reddish-brown margin. Rhizoctonia cankers enlarge with age, become darker, rough textured, and retard plant growth. The fungus can invade the central part of the lower stem and produce a brick-red discoloration. Disease symptoms often occur on scattered plants in a somewhat circular field pattern. Severe seedling infection causes plant death. Rhizoctonia cankers enlarge with age, become darker, rough textured, and retard plant growth. Later in the season, mixed infection with *Fusarium* and *Pythium* root rot organisms are common. Lesions may also develop on pods that are in contact with the moist soil surface and cause pod rotting or seed discoloration.

Management Approaches

Biological Control

Deny (*Burkholderia cepacia*) is registered for protection of dry bean roots from *Fusarium*, *Rhizoctonia*, and *Pythium* spp. T-22 Planter Box (*Trichoderma harzianum* strain KRL-AG2) is registered, but cannot be used in alkaline or cold soils. The efficacy of these biological control agents in the High Plains is not known.

Cultural Control

Plant high quality seed in warm (greater than 60°F), well-prepared seedbeds under conditions favorable to rapid seedling emergence; shallow planting can encourage rapid emergence. Avoid excess irrigation and poor drainage. Crop rotation with non-hosts (i.e., small grains) may provide some reduction in *Rhizoctonia* root rot. Conventional tillage that incorporate previous crop residue deeply and early can promote complete decomposition before planting and reduce *Rhizoctonia* root rot.

Chemical Control

Chemical controls are most effective when combined with sound cultural practices.

Product List for *Rhizoctonia* Root Rot:

Pesticide	Rate per 100 lb seed	Application Frequency (days)	Remarks
Azoxystrobin			
Amistar	0.125-0.25 oz/1000 ft		
Quadris	0.4-0.8 fl oz/1000 ft	Planting time treatment	Suppression of <i>Rhizoctonia</i> spp.
Captan			
Captan 75	6-9 oz	Seed treatment	Broad spectrum, but weak against <i>Pythium</i> spp.
Captan 30-DD	1.33-2.33 fl oz	Seed treatment	Broad spectrum, but weak against <i>Pythium</i> spp.
Captan 400	1.5-3.0 fl oz	Seed treatment	Broad spectrum, but weak against <i>Pythium</i> spp.
Captan 400-C	1.5-3.0 fl oz	Seed treatment	Broad spectrum,

			but weak against <i>Pythium</i> spp.
Fludioxinil			
Maxim 4FS	0.08-0.16 fl oz	Seed treatment	Suppression of <i>Fusarium</i> and <i>Rhizoctonia</i> spp.
Fumigants			
Telone II	9-15 gal	Restricted use; Preplant application, aerate 7-14 days.	Broad spectrum
Telone C-17	10-17 gal	Restricted use; Preplant application, aerate 7-14 days.	Broad spectrum
Vapam	40-100 gal	Restricted use; Preplant application, aerate 7 days.	Broad spectrum
Metalaxyl/Mefenoxam			
Apron XL LS	0.085-0.64 fl oz	Seed treatment	Suppression of <i>Pythium</i> and <i>Phytophthora</i> spp.
Allegiance-FL	0.75 fl oz	Seed treatment	Suppression of <i>Pythium</i> and <i>Phytophthora</i> spp.
Ridomil Gold EC	0.5-2 pts	Pre-plant incorporated soil drench or soil band (a 7" band is recommended)	Suppression of <i>Pythium</i> and <i>Phytophthora</i> spp.
Ultra Flourish	2-4 pts	Pre-plant incorporated drench or 7" soil band	Suppression of <i>Pythium</i> and <i>Phytophthora</i> spp.
Thiram			
42-S Thiram	4.5 fl oz	Seed treatment	Broad spectrum
Thiram 50WP	4.5 oz	Seed treatment	Broad spectrum
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