Rhizoctonia Seedling Blight of Onion and Pea Crops in the Columbia Basin

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Problem: There have been increasing reports of problems with development of severely stunted patches of plants in onion bulb and pea crops planted in the Columbia Basin after incorporating cover crops such as wheat and barley (**Fig. 1**). The patches occur primarily when onion or pea seed is planted very soon after incorporation of a cover crop, with strips of the cover crop left between the rows of onion or pea to protect emerging seedlings against wind- and sand-blasting. Patches range from a few feet to >30 feet in diameter (**Fig. 2**). Stunted onion plants have sparse, short roots with a 'spear-tipping' effect (**Fig. 3A**). Roots may be slightly discolored, with more branching than normal. Affected pea plants have sparse, short roots, with sunken, red-brown lesions on the roots and hypocotyl.

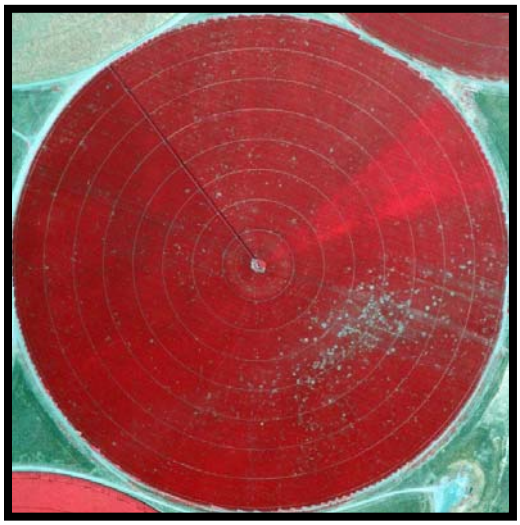

Fig. 1. Aerial, infra-red photo of an onion bulb crop with numerous patches of severely stunted plants.

Fig. 2. A patch of stunted plants in an onion bulb crop.

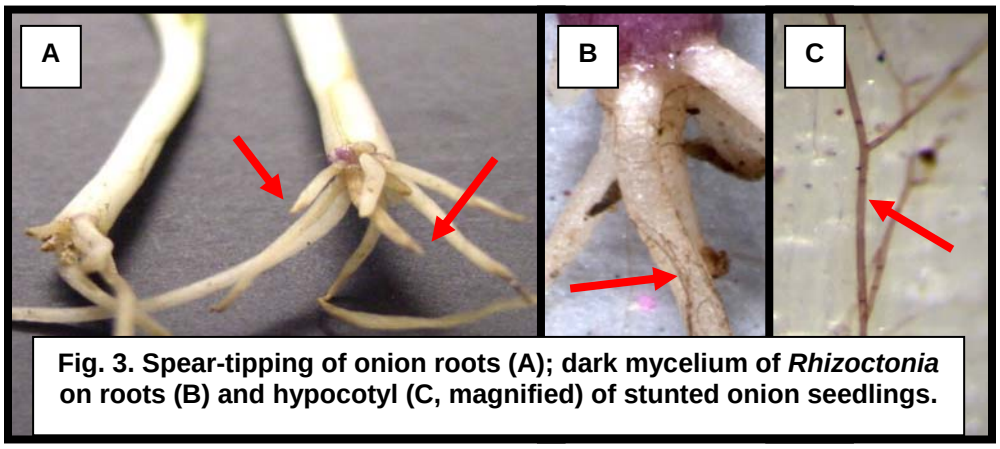

Fig. 3. Spear-tipping of onion roots (A); dark mycelium of *Rhizoctonia* on roots (B) and hypocotyl (C, magnified) of stunted onion seedlings.

Causal agent: Symptoms have been associated with *Rhizoctonia* species, in particular *R. solani* isolates from anastomosis groups AG-8 and AG-4. Affected roots usually have coarse, dark mycelium of the fungus visible microscopically (**Fig. 3B** and **3C**). Symptoms can resemble injury from nematodes and *Pythium* spp. The dark *Rhizoctonia* mycelium is on the surface of roots so care should be taken not to wash roots prior to examination. Surface-sterilizing the roots can prevent the fungus from being detected.

Contributing factors: The over-riding factor associated with crops in which this problem is observed is the presence of significant **decomposing plant material in the soil into which onion or pea seed is planted** within a week or two of incorporating the previous crop. Cover crops are important in fields with sandy soils to prevent wind- and sand-blasting of onion and pea seedlings. *Rhizoctonia* colonizes the dying plant tissue, especially the roots of plants killed by herbicides. After incorporating the dying crowns and roots of cereal cover crops, there is a rapid increase ('flush') in inoculum of this pathogen in the crop residues. When onion or pea seeds germinate in the soil among the residues colonized by *Rhizoctonia* spp., these fungi feed on the roots and hypocotyls of the onion and seedlings. Similar symptoms have also been observed in corn crops in the Basin.

Management options: The problem **does not appear to occur in the absence of significant decomposing plant material in the rooting zone of onion or pea seedlings**. Dr. Tim Paulitz has investigated a similar phenomenon in cereal crops in the Palouse for many years. Their studies suggest that delaying planting of a crop for 3 to 6 weeks after spray-down and/or incorporation of residues of the previous crop could reduce the problem. A longer duration may be needed in cold or dry soils because microbial degradation of residues is slower in cold and/or dry soils.

Current research: Research is in progress to assess fungicide seed treatments, broadcast fungicide applications to the soil, soil fumigation, timing cover crop incorporation prior to planting onion and pea crops, tillage, seed priming, selection of cultivars (screening for resistance), soil testing methods to predict the risk of patching, and other practices for reducing losses to this disease. Results in **Table 1** are for a 2011 field trial in which we evaluated banded and incorporated applications of azoxystrobin (Quadris) applied over the bed just prior to planting onion seed:

Table 1. Evaluation of banded applications of Quadris over the bed just prior to planting onion seed, for management of stunting caused by *Rhizoctonia* spp.

	Patch ratings (6/29/2011)			
Treatment	**Cumulative area of patches/plot (ft^2)**	**Number of patches**	**Severity of patches (0 to 3 scale)**	**Patch index (area x severity rating)**
Control	949 a	35 a	1.89 a	1,990 a
Quadris at 9.5 oz/acre	382 b	17.3 b	1.53 b	487 b
Quadris at 19.0 oz/acre	303 b	15.3 b	1.46 b	379 b

Both rates of Quadris significantly reduced the area of patches by ~60%, number of patches by ~60%, and severity of patches by ~20%. The effects were not significantly different ($P < 0.05$) for 9.5 vs. 19.0 oz/acre rates of Quadris application applied across the beds and incorporated.

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Please contact Lindsey du Toit (dutoit@wsu.edu or 360-848-6140) with your comments and recommendations.