



Fig. 1. *Rhizoctonia* hyphal strands growing on the surface on an onion root (a). Normal and stunted onions of the same age (b). Irregular patches of stunting in the field (c). Aerial view of stunted patches in an onion pivot (d).

Disease: *Rhizoctonia solani* on onions, Onion Stunting

Classification: K: Fungi, P: Basidiomycotyta, C: Basidiomycetes O: Polyporales F: Corticiaceae

Rhizoctonia solani AG 8 is a soilborne fungal pathogen which is consistently associated with stunted onion seedlings (Fig 1a, 1b) and recovered from soil of stunted areas. South Australia produces 40% of Australia's onions, and onion stunting causes major economic loss in the industry. Patches of stunted onions occurs adjacent to normal healthy onions in the same planting (Fig 1 c).

The Pathogen: *Rhizoctonia* spp. are divided into binucleate or multinucleate. Multinucleate fungi are further divided by anastomosis groups (AG) based on the ability to fuse between compatible groups. AG 8 causes the most severe stunting to onions and was consistently found in soil collected from stunted patches compared to other AG's 2.1, 2.2 and 3 found associated with stunted onions in South Australia (Wicks *et al* 2008).

Morphologically *Rhizoctonia* is colourless when young and browns as it ages. Mycelium is branched, 6-14µm wide, often right angled at 90° with a dolipore septum. Basidiospores rarely form.

Distribution: *Rhizoctonia solani* has been found worldwide (Sneh *et al.* 1996). Onion stunt was identified in South Australia in 2005 and stunting of onions similar has been observed in Oregon in the USA.

Host Range: Over 35 orders, 52 families, 125 genera and > 142 species are hosts to *Rhizoctonia* infection. The *Rhizoctonia* AG 8 strain also causes 'bare patch' disease of cereals which are grown in rotation with onions.

Impact: *Rhizoctonia solani* AG 8 mycelium constricts and causes root rot at the crown. Stunted plants never recover to full size resulting in economic loss.

Stunted plants occur in irregular patches adjacent to normal onion plants. Distinctive dark hyphal strands are often observed on the surface of roots and stunted plants (Fig 1a).

Detection and Control: *R. solani* can be identified from root isolations or using a toothpick assay for soil similar to that described by Paulitz and Schroeder (2005) and plating onto *Rhizoctonia* specific media such as Ko and Hora (1971). Morphological and cultural characteristics of *Rhizoctonia* are obvious under microscopic examination and further identification is available through PCR and DNA sequencing.

The use of aerial photography has assisted in identifying irregular fungal patches in large onion plantings (Fig 1d).

This disease is difficult to control and strategies using chemical and biological seed and soil treatments are currently under evaluation.

Further Reading: Pederick SJ, Wicks TJ, Walker GE, Hall BH, Walter A (2007). Studies on the cause of Mallee Onion Stunt in South Australia. In: 'Proceedings of the 16th Biennial Australasian Plant Pathology Society conference' South Australia, p 59; Schwartz and Mohan (2008) Compendium of Onion and Garlic Diseases and Pests, second edition. APS Press p10; Sneh *et al* (1996) *Rhizoctonia* species: Taxonomy, Molecular Biology, Ecology, Pathology and Disease Control Kluwer Academic Publishers; Wicks T, Pederick S, Walker G (2008) Studies on the cause of onion stunting in South Australia. Journal of Plant Pathology 90: (2, supplement) abs 38.106. pp S2.425-S2.426.

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