

Can Management Strategies for *Rhizoctonia solani* of Sugar Beet in the US be Adopted in Europe?

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Abstract

Damping off, crown rot and root rot of sugar beet (*Beta vulgaris* L.), caused by *Rhizoctonia solani*, are the most important diseases for growers in Minnesota and North Dakota. Multiple genes are required for resistance to *R. solani*, and it is difficult to develop varieties with *R. solani* resistance that is high yielding. Most commercial sugar beet varieties are susceptible to or have only partial resistance to *R. solani*. In fields with a history of moderate to severe Rhizoctonia root rot, fungicides are needed to provide protection for acceptable yields. Research was conducted at Hickson, North Dakota, USA, to evaluate fungicide treatments in controlling *R. solani* in an artificially inoculated site. Penthiopyrad, a succinate dehydrogenase inhibitors, was evaluated as a seed treatment at different rates alone, and with a post application of azoxystrobin, a quinone outside inhibitors. Azoxystrobin was applied in-furrow at planting followed by a post application; and as a post application. *R. solani* resistant and susceptible cultivars were used in the experiment. Plant populations were recorded during the season. Roots were harvested, weighed and analyzed to determine recoverable sucrose. Both *R. solani* resistant and susceptible varieties had significant reduction in population which adversely impacted recoverable sucrose. Azoxystrobin applied in-furrow followed by a post application consistently resulted in significantly high plant populations and recoverable sucrose compared to the non-treated control. Penthiopyrad provided early season control by protecting plant populations compared to the nontreated check, but was not effective during the latter part of the season as populations were reduced. Penthiopyrad followed by azoxystrobin resulted in higher populations and recoverable sucrose compared to the control. The use of penthiopyrad as a seed treatment followed by azoxystrobin will serve as a fungicide resistance management strategy while providing effective disease control. *R. solani* is also becoming a major problem for some European sugar beet growers, especially in Netherlands and some parts of Germany, where there are stringent requirements on fungicide usage. Seed treatments require very low fungicide dosage and azoxystrobin is a relatively benign fungicide with a pre-harvest interval of zero days. It may be possible for Europeans to use a strategy similar to growers in the US for managing *R. solani* in the short term while breeders are developing highly resistant varieties with acceptable recoverable sucrose.