QUADRIS® (AZOXYSTROBIN) AND VERTISAN™ (PENTHIOPYRAD) FUNGICIDE EFFICACY COMPARISONS ON NATURAL RHIZOCTONIA INFECTIONS IN SUGARBEETS

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ABSTRACT

Rhizoctonia solani has become a significant problem in many sugarbeet producing areas of the United States and Europe. In the past, control of this disease has been mostly limited to resistant varieties and utilization of azoxystrobin fungicide. Recently, approval was given to penthiopyrad for control of Rhizoctonia on sugarbeets. The objective of this study is to compare the effectiveness of both fungicides on Rhizoctonia solani root rot occurring from natural field infections (non-inoculated).

The research was conducted by replicated strip trials in 3 grower fields with a history of high levels of Rhizoctonia. Azoxystrobin and penthiopyrad were applied in-furrow, foliar (6-8 leaf), and sequential application of in-furrow followed by a foliar application of the alternate product. Grower equipment was used for in-furrow applications with an approximate 5 inch T-band width at 6 gallons per acre of water. In-furrow applications rates were 8 oz./acre of azoxystrobin and 16 oz./acre of penthiopyrad. Foliar applications were applied at the 6-8 leaf stage in a 7 inch band with 10 gallons per acre of water. The foliar azoxystrobin rate was 10.5 oz./acre and penthiopyrad was applied foliar at two rates, 16 and 24 oz./acre. Rhizoctonia susceptible varieties were planted at all three locations. Two of three locations had severe Rhizoctonia pressure and one had low amounts in comparison. One trial had only foliar application with no in-furrow. Two trials included both foliar and in-furrow applications of both fungicides. Rhizoctonia dead/dying beet counts were taken on the center 4 rows of 6 row plots, 300 foot long or 1200 total row feet, at two timings. Yield and quality data were also measured on all plots

Trial #1 was replicated 5 times and was a foliar application trial only, no in furrow was used. Trial had severe Rhizoctonia infection that was fairly evenly distributed throughout the trial area. Rhizoctonia counts taken on 06/12/12 and 07/13/12 were as follows: azoxystrobin 34/273, check 51/344, penthiopyrad 16 ounce rate 62/405 and penthiopyrad 24 ounce rate 68/438. The foliar higher or lower rate of penthiopyrad had no effect on efficacy on Rhizoctonia. Yield in RWSA and tons/acre is as follows: azoxystrobin 6492/22.2, check 5162/18.3, penthiopyrad 16 ounce rate 4713/16.9, penthiopyrad 24 ounce rate 4638/16.5. A single azoxystrobin application at the 6-8 leaf stage was significantly better in Recoverable White Sugar per Acre (RWSA), tons and reducing dead or dying beets when compared to check or either rate of penthiopyrad.

Trial #2 was replicated 4 times and was a foliar and in-furrow application trial with severe natural Rhizoctonia infection. Rhizoctonia counts were taken on 06/11/12 and 07/16/12 and were as follows: azoxystrobin 6-8 leaf 51/477, penthiopyrad 6-8 leaf (16 ounce) 122/646, azoxystrobin in furrow 44/656, azoxystrobin IF + penthiopyrad 6-8 leaf 59/613, penthiopyrad IF + azoxystrobin 6-8 leaf-63/586, check 152/717, penthiopyrad 6-8 leaf (24 ounce) 130/734 and penthiopyrad IF 143/839. Treatments that had azoxystrobin applied either in-furrow or foliar appeared to have delayed die off. In the first count of dead beets, treatments that had

azoxystrobin applied in any manner had significantly better efficacy than the check or penthiopyrad applied alone. Neither product or application method/combination was able to give season long control under severe conditions.

Yield for trial #2, in RWSA and tons/acre, was not significantly differenct between treatments at a 5% LSD. Yields were as follow (RWSA/Tons): azoxystrobin 6-8 leaf 3194/14.9, penthiopyrad 6-8 leaf (16 ounce) 2685/12.3, azoxystrobin IF 2508/11.9, azoxystrobin IF + penthiopyrad 6-8 leaf 2476/11.4, penthiopyrad IF + azoxystrobin 6-8 leaf 2389/11.4, check 2294/10.8, penthiopyrad 6-8 leaf (24 ounce) 2167/10.4, penthiopyrad IF 1945/9.1. Generally, treatments that had azoxystrobin were higher in yield. All direct comparisons of foliar and in-furrow applications of azoxystrobin to penthiopyrad showed higher yield and less dead beet counts with azoxystrobin.

In trial #3, only 3 of 4 replications were used and include the same treatments as trial #2. This trial had relatively low levels of natural Rhizoctonia infection. Infections occurred later in the season than trial #1 or #2. Rhizoctonia counts taken on 7/20/12 and 09/28/12 were as follows: azoxystrobin IF 7/23, azoxystrobin IF + penthiopyrad 6-8 leaf 11/44, penthiopyrad 6-8 leaf (16 ounce) 22/55, penthiopyrad 6-8 leaf (24 ounce) 17/82, penthiopyrad IF + azoxystrobin 6-8 leaf 9/42, penthiopyrad IF 41/105, azoxystrobin 6-8 leaf 10/24 and check 42/107. All direct comparisons showed less dead or dying beets for azoxystrobin treatments. All combination treatments containing azoxystrobin also trended better but not at the LSD 5% significance level.

Trial #3 yield in RWSA and tons/acre was not significantly different between treatments at a 5% LSD. Yields were as follow: azoxystrobin IF 11523/37.4, azoxystrobin IF + penthiopyrad 6-8 leaf 11517/20.5, penthiopyrad 6-8 leaf (16 ounce) 11351/37.9, penthiopyrad 6-8 leaf (24 ounce) 10956/36.5, penthiopyrad IF + azoxystrobin 6-8 leaf 10793/36.7, azoxystrobin 6-8 leaf 10768/35.8 and check 10603/34.9. The check had the lowest yield and highest number of dead or dying beets. In trials with low levels of Rhizoctonia it is difficult to sort out the efficacy of products on Rhizoctonia.

In summary, under natural Rhizoctonia infections occurring in grower's fields, it appears that penthiopyrad is not as effective as azoxystrobin in controlling disease. For dead or dying beet counts, in all direct comparisons of an in-furrow or foliar application, azoxystrobin was better than penthiopyrad, though not always significantly better. Increasing the product rate of penthiopyrad from 16 to 24 ounces per acre had no effect on efficacy. When either product was applied in-furrow followed by the opposite product foliar, no increase or synergistic effect in Rhizoctonia control was seen beyond the single effect of azoxystrobin. In heavy Rhizoctonia infested fields, die off in azoxystrobin treatments occurred later than check and penthiopyrad. Single applications of either product did not last season long. In two trials, penthiopyrad applied in-furrow had subtle improvements in final stand compared to other treatments.