

Management of Soybean Root Diseases in Multiple Planting Dates and Environments of North Dakota

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A two year field study (2014 and 2015) was conducted with an objective of evaluating the efficacy of fifteen seed treatment chemicals against the prevalent root rot and damping off causing pathogens in soybeans in North Dakota. The benefit from this research is to pin point a specific chemistry or mix of seed treatments that are efficient in controlling all root disease causing pathogens. A knowledge gap exists in understanding the efficacy of the seed treatments at multiple planting dates and environments in North Dakota. With soybean acres increasing, it is imperative to study root disease so growers will have sufficient information available for successful soybean production.

The study was conducted in three locations (Langdon, Minot and Carrington) in North Dakota with two planting dates at each location at least fifteen days apart. Cultivar selection was based on each location's environment and growing conditions. Langdon and Minot planted Syngenta SY007-Y4, maturity group 00.5, while Carrington planted Syngenta S04-D3, maturity group 0.4.

This two year research trial gave us an opportunity to test two soybean varieties, two planting dates under three environmental conditions and two tillage options (Langdon and Carrington were done under conventional tillage, whereas, no-till conditions in Minot). Current research has met all the conditions to evaluate the efficacy of a seed treatment chemical. The early planting date at each location was seeded when soil temperatures were below 50°F, exposing the seed to different pathogens and varying temperatures before it emerged. Fifteen seed treatment chemical products that contain the active ingredients metalaxyl or mefenoxam, which are effective against *Pythium* and *Phytophthora*, were used. Other active ingredients, e.g., azoxystrobin, trifloxystrobin, ipconazole, captan, carboxin, fludioxonil, thiram, sedaxane and thiophanate methyl, which are effective against *Fusarium* and *Rhizoctonia*, were also used in this study.

Our preliminary results indicate that the root rot and damping off incidence and severity in all locations was very low. There were no significant differences observed in the disease incidence and severity in any of the locations but there were significant differences observed in incidence and severity among the planting dates. Differences existed between the yields among the planting dates across locations but no significant differences were seen among treatments. This was more evident in 2015. It is difficult to determine what the risk of soybean root rots might be prior to planting in any season and not all seed treatment fungicides are equally effective against all fungal pathogens. Preliminary data indicated that *Pythium* and *Rhizoctonia* were the major pathogens in the three locations tested. Results from this research have generated specific information on the most efficient seed treatments to control root diseases, and their impact on yield and quality of soybean in multiple planting situations. This information can now be used by growers as a guide in the decision making process to select appropriate seed treatment depending on the prevalent pathogens specific to a location for the control of root diseases. Yield data generated provides additional information to decide on the selection of seed treatments.

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