DOES GLYPHOSATE INFLUENCE MANAGEMENT OF RHIZOCTONIA CROWN AND ROOT ROT IN GLYPHOSATE-RESISTANT SUGARBEET? Kelly A. Barnett, Christy L. Sprague, William W. Kirk, and Linda E. Hanson, Graduate Student, Associate Professor, Department of Crop and Soil Sciences, Associate Professor, Department of Plant Pathology, Michigan State University, Adjunct Assistant Professor, USDA-ARS and Department of Plant Pathology, East Lansing, MI 48824.

Previous greenhouse research with glyphosate-resistant sugarbeet has indicated that host plant resistance to Rhizoctonia crown and root rot could be compromised in certain varieties when plants were exposed to glyphosate. In order to improve disease management recommendations, field research was conducted in 2008 and 2009 to: 1) examine the response of glyphosate-resistant sugarbeet varieties to the interaction of herbicide treatment and *Rhizoctonia solani*, and 2) examine the interaction of weed and disease management strategies on Rhizoctonia crown and root rot in four glyphosate-resistant sugarbeet varieties. The four glyphosate-resistant sugarbeet varieties examined were ACH 827RR, Hilleshog 9027, Hilleshog 9028, and Hilleshog 9029. Each of these varieties were treated with three different herbicide programs: 1) no herbicide, 2) a standard-split herbicide program (two applications of desmedipham & phenmedipham + triflusulfuron + clopyralid + non-ionic surfactant), and 3) three applications of glyphosate + ammonium sulfate. Non-inoculated and plots inoculated with *Rhizoctonia solani* AG-2-2 IIIB at 6-leaf sugarbeet were compared for each variety by herbicide program combination. Additional treatments included inoculated plots treated with the fungicide azoxystrobin in-furrow or postemergence to 6-leaf sugarbeets combined with the three herbicide programs. The experiment was arranged as two split-split plot designs to address the two objectives and plots were replicated four times. For the first objective, Rhizoctonia inoculation was the main plot factor, sugarbeet variety was the sub-plot factor, and herbicide program was the sub-sub plot factor. For the second objective, sugarbeet variety was the main plot factor, herbicide program was the sub-plot factor and fungicide treatment was the sub-sub plot factor. Ten weeks after Rhizoctonia inoculation sugarbeet roots were harvested and each root was evaluated for disease severity on a scale from 0 to 7, with 0 = healthy and 7 = dead sugarbeets. Disease severity ratings of 1 or less are considered healthy sugarbeets and ratings of 3 or less are considered harvestable. Inoculation was a significant factor for Rhizoctonia disease severity. Plots that were not inoculated with Rhizoctonia had a disease severity rating of less than 1 and were not included in further statistical analysis. Herbicides and interactions with herbicide programs were not significant. However, sugarbeet variety was significant for disease severity and harvestable sugarbeets. ACH 827RR was the most susceptible to Rhizoctonia crown and root rot and only 36% of the sugarbeets were considered harvestable. The other three varieties had similar disease severity ratings (3.5 to 3.9) and Hilleshog 9027 and Hilleshog 9029 had the highest percentage of sugarbeets that were considered harvestable (>55%). In 2008, there was a significant variety by fungicide interaction. Foliar applications of azoxystrobin provided the greatest protection from Rhizoctonia crown and root rot. The sugarbeet varieties Hilleshog 9027 and Hilleshog 9029 combined with in-furrow applications of azoxystrobin provided similar Rhizoctonia suppression as the foliar azoxystrobin applications to three of the four sugarbeet varieties. In 2009, there was not an interaction between variety and fungicide and the main effects variety and fungicide treatment were significant for disease severity. All three Hilleshog varieties were more tolerant to Rhizoctonia compared with ACH 827RR and foliar applications of azoxystrobin provided the greatest suppression of Rhizoctonia crown and root rot. Results indicate that weed management strategy had little impact on Rhizoctonia crown and root rot. However, a combination of planting a Rhizoctonia-tolerant variety and foliar azoxystrobin applications were the best options for managing Rhizoctonia crown and root rot.