

ROLE OF SOIL MICROBIAL EXTRACELLULAR ENZYMES IN SOYBEAN CYST NEMATODE SUPPRESSIVE SOIL

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Soybean cyst nematode-SCN (*Heterodera glycines*) is one of the most destructive diseases in soybean production. Natural suppression is one of the major concepts in sustainable, eco-friendly disease management of SCN. Soil microbial enzymatic activity may be one of the mechanisms for the natural suppression of SCN. A four-year field based study is ongoing in Minnesota to quantify the role of fourteen soil microbial extracellular enzymes in SCN natural suppressive soils. The experiment is replicated and randomized in a split-plot design. Conventional tillage or no-tillage is the main plot treatment and six different crop-biocide combinations are the subplot treatments. Soil samples are collected in three times per year based on the cropping season. We are testing the hypothesis that control treatment-\ with no biocide is going to have greater soil microbial enzymatic activity than the biocide treatments and the enzymatic activity in soils that are no-tilled is greater than those tilled conventionally. From the first three years, we have greater soil microbial extracellular enzymatic activity in the no-tillage than conventional tillage system except for sulphatase enzyme. The number of enzymes involving in SCN suppression is larger in the second year than the first year. From the first year, we have concluded that this natural suppression could be caused by both fungal and bacterial action. However, in the second year, we have concluded this natural suppression is mostly due to the soil fungi. Third year results confirmed the second year finding. In the third year, we have observed a similar pattern as the second year but the profile of enzyme activity contrasted. In the future, we can utilize these enzymes in commercial production of sustainable disease management biocides.