

MAJUMDAR, AYANAVA^{1*}, MARK A. BOETEL¹, STEFAN T. JARONSKI², ROBERT J. DREGSETH¹ and ALLAN J. SCHROEDER¹, ¹Department of Entomology, North Dakota State University, Fargo, ND 58105 and ²USDA-ARS, Northern Plains Agricultural Research Laboratory, Sidney, MT 59270. **Bio-based management of sugarbeet root maggot by integrating an insect pathogenic fungus and cereal cover crops.**

ABSTRACT

The sugarbeet root maggot (SBRM), *Tetanops myopaeformis*, is the most damaging insect pest of sugarbeet in the Red River Valley. Field trials were conducted at two sites, St. Thomas and Minto, ND, to evaluate the efficacy of the insect-pathogenic fungus *Metarhizium anisopliae* (strain F52) as a stand-alone tool and as integrated with oat or rye cover crops for SBRM management. The fungus was applied as planting-time granules or as a postemergence spray. Cover crops were planted at 0, 187, or 374 seeds/m². The average root injury (RI) rating in untreated check plots at St. Thomas was 6.5 on a 0 to 9 scale (i.e., 0 = no injury and 9 = severe injury); plants in untreated control plots at Minto had an average root injury rating of 4.3. At St. Thomas, stand-alone oat or rye cover crop plots or those treated with *M. anisopliae* only incurred root injury levels of about 4.2. However, combining the rye cover crop at 374 seeds/m² with the *M. anisopliae* spray maintained root injury at only 3.2, which was significantly lower than the injury sustained in the rye-only plots (RI = 5.0). In general, plots established with an oat cover crop had RI levels below 4.0 indicating good potential of this cover crop; however, the spray formulation of the biocontrol fungus did not significantly improve SBRM control in those plots. At Minto, plots that received oat at 374 seeds/m² plus *M. anisopliae* spray had significantly lower SBRM feeding injury (RI = 2.2) than the corresponding integration with rye cover crop (RI = 3.7). It appears that the oat cover crop provided more consistent SBRM control than rye at the rates tested. Root protection provided by the spray formulation of *M. anisopliae* seems to be enhanced by an oat cover crop.