Sugarbeet tissue culture media differentially support the growth of sugarbeet pathogens *Rhizoctonia solani, Pythium ultimum, Cercospora beticola*, and *Aphanomyces cochlioides.*

Joseph W. Saunders
USDA-Agricultural Research Service
Sugarbeet and Bean Research Unit
East Lansing MI

ABSTRACT

Co-culture of pathogen and host plant tissue in vitro offers prospects for studying host defense gene expression, and opportunities for identification and cell selection of resistant genotypes, but pathogen growth characteristics on the medium used to culture the host tissue can determine the feasibility of such systems. Single isolates of sugarbeet pathogens *Rhizoctonia solani* (RZT) and *Pythium ultimum* (PYT) grew well (about 2 cm/day) from mycelial plugs on Murashige-Skoog agar medium with standard 60 mM nitrogen from nitrate and ammonium. *Cercospora beticola* (CER) grew more slowly (about a tenth as fast), and *Aphanomyces cochlioides* (APH) spread rapidly but sparsely. Pathogen growth was also evaluated on nitrogen source variations of MS medium, where the most noteworthy observation was that RZT, PYT and CER grew well with only nitrate as nitrogen source. In general, growth of RZT, PYT, and CER in liquid forms of the media corresponded to growth quantity on the agar versions. APH did not grow at all in liquid MS media with inorganic forms of nitrogen nor with urea, and its sparse growth on corresponding agar media appears due to nitrogenous and sulfurous impurities in the Difco Bacto agar. All pathogens grew to, over, and into sugarbeet tissue cultured on the same plate, leading to host tissue death. CER (due to slow extension growth) and APH (due to sparse growth) should be suitable for future co-culture research with sugarbeet tissue cultures.