

YU, YI, and J. MITCHELL M^CGRATH*, USDA-ARS, Sugar Beet and Bean Research Unit, 494 PSSB, Michigan State University, East Lansing MI 48824-1325. **Progress towards understanding the genetic basis of *Aphanomyces* resistance in beets.**

Seedling damping-off and chronic root loss due to *Aphanomyces* infection continue to be problems for many sugar beet growers. Genetic resistance, or more accurately tolerance, has been available for many years and has been deployed where economic loss to *Aphanomyces* regularly occurs. Other than the observation that tolerance is heritable and dominant (i.e. expressed in hybrid progenies), little is known of the genes responsible for tolerance. In part, the lack of inheritance information stems from difficulty in scoring disease reaction, despite many efforts to establish testing methods. As a starting point to breed for improved resistance to seedling diseases, we assumed that any measure of *Aphanomyces* resistance that is heritable can help improve testing and selection for increased resistance. We have examined varieties with different levels of tolerance and constructed populations that segregate for tolerance using as many different screening strategies as possible. One method appeared to reflect the relative ranking of varieties and germplasm; a method based on an *in vitro* inoculation of 2 week old seedlings with zoospores. Heritability and genetic localization of these gene(s) responsible, if present, is in progress. However, one firm conclusion is that tolerance to *Aphanomyces* damping-off *per se* is closely associated with seedling vigor. The components responsible for seedling vigor need to be considered separately from the components specific for *Aphanomyces* tolerance.