Dr. Tom Davis
Professor of Plant Biology and Genetics
Undergraduate Student: Margaret Mansfield

Tracking the Timeline of *Verticillium* Fungal Infection in Mint Plants

Presented as a poster at the UNH Undergraduate Conference (Spring 2008)
Dr. Tom Davis,
Professor of Plant Biology & Genetics
Tracking the Timeline of Verticillium Fungal Infection in Mint Plants

Intellectual Merit: With support from the New Hampshire Agricultural Experiment Station and the
Confocal Microscopy Facility at the University of New
Hampshire, undergraduate Margret Mansfield is exploring the
infection pathway of an agronomically important disease
organism, the fungus Verticillium dahliae, using the Mentha
longifolia (diploid mint) model system developed in the
laboratory of Dr. Thomas Davis. This research exploits the
unique, square-stem anatomy of mint plants, the availability of a
GFP (green fluorescent protein) strain of V. dahliae obtained
from Lynda Carfagno at Oregon State University, and the NSF-
supported confocal microscope at UNH to trace the stages of
fungal invasion and dissemination throughout the host plant.
Working with increasing independence under the supervision of
technician Mark Townley, Margret is documenting the infection pathway, beginning when the fungal
hyphae colonize the root surface (right), and progressing through fungal invasion of the root and migration
upward into the stem and its vascular tissue. By comparing events in genetically susceptible versus
tolerant plant genotypes, Margret’s work is expected to reveal clues as to the mechanism of host resistance
to the fungal pathogen.

Broader Impacts
Verticillium wilt is a plant disease caused by two deuteromycete species: Verticillium albo-atrum and
Verticillium dahliae. These soil-borne plant pathogens exist worldwide, and are of major economic
importance due to their broad host range and the extensive crop damage they cause. Yet, despite the
substantial economic impact of this disease, little is known about host genes involved in resistance to
verticillium wilt. We are using the mint model system to explore the genetic basis for host plant resistance
to this destructive pathogen. The work being conducted by undergraduate Margret Mansfield nicely
complements genetic research on the Verticillium-mint system conducted by post doc Kelly Vining, who
received her Ph. D. in the Davis lab in 2007, and who has served as Margret’s immediate mentor. Thus,
this project has provided advanced technical and scientific training for a talented undergraduate, and
afforded valuable experience in mentorship to a graduate student and post doc. Margret presented her
results in poster form at the UNH Undergraduate Research Conference (Spring 2008), and they will be
presented in updated form along with other results from our Verticillium project at the 2009 American
Phytopathological Society Annual Meeting in Portland, OR (August 1-5).