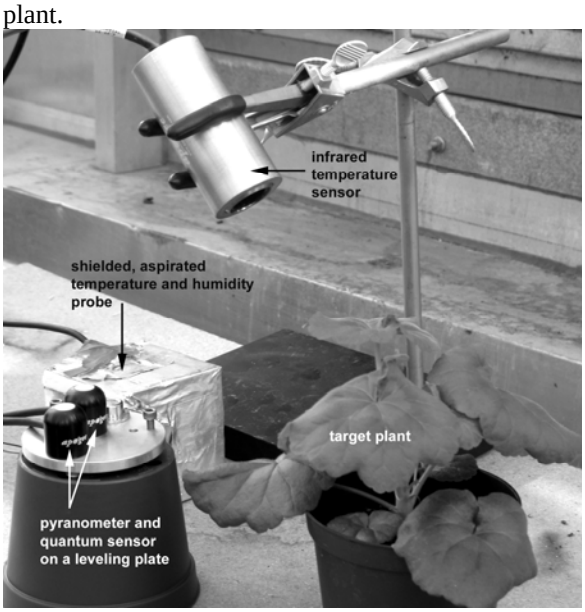
Using Leaf Temperature to Detect Root Rot Stress in Geranium

Visual diagnosis of incipient root –rot of geraniums is often difficult. Such plants tend to be asymptomatic until late in the infection cycle when control methods are less effective and aesthetic value is diminished. To circumvent such a problem and to be able to predict the susceptibility of the plants to infection, we used infrared transducers to measure temperature in addition to other parameters in leaves of geranium plants exposed to a number of soil pathogens that are commonly associated with greenhouse production.

Figure 1. An infrared transducer is pointed at a target leaf or leaves to measure the surface temperature. Data is recorded once per second for about 10 s per plant.



Differences in leaf temperature among treatments were noticeable by week 2 and they were the greatest in week 7. However, visual disease symptoms were detected 3 weeks after inoculation. Environmental conditions changed significantly from day to day, but did not differ between the measurement time of the controls and inoculated plants.

Many factors could play a role in causing plant stress e.g., water stress, nutrient deficiency, insects and diseases. In our trials, all of these factors, except disease, were similar between inoculated and uninoculated plants. We can conclude that the increase in leaf surface temperature in response to stress was caused by the exposure of geranium to root stress pathogens. This is the first report to our knowledge that addressed the use of environmental sensors to detect disease stress on a geranium-water mold pathosysytem. Results of this study suggest that leaf temperature measurements are a potential tool, coupled with other measurements, to rapidly examine plants for root pathogen stress.

For more information, contact: Medani Omer, medani.omer@ars.usda.gov, USDA-ARS-ATRU, Greenhouse Production Research Group, University of Toledo, Mail Stop 604, 2801 W. Bancroft, Toledo, OH 43606

Figure 2 The difference in temperature between *P. ultimum* inoculated and control plants after inoculation and environmental conditions during the test.