**Update on the variation of the downy mildew pathogen**

Jim Correll1, Chunda Feng1, Kat Kammeijer2, Steve Koike2

University of Arkansas, Fayetteville, AR 72701

2University of California Cooperative Extension, Salinas, CA 93901

Downy mildew disease, caused by the obligate pathogen *Peronospora farinosa* f. sp. *spinaciae* (Pfs) (= *P. effusa*), is the most economically important disease of spinach. The fast emergence of new races of Pfs continue to be a threat to the spinach industry thwarting the best efforts of spinach breeders to develop complete robust and durable resistant to all of the known races of the pathogen. Currently, 15 races of Pfs have been identified, 12 of which were found in the past 25 years. The emergence of new races in recent years may be the result of a more favorable environment for the pathogen in the current spinach production system, the selection pressure of modern resistant hybrids, and the point mutation or sexual reproduction of the pathogen. We continue to evaluate the virulence variation of the pathogen based on disease reactions on differential sets of spinach germplasm with known resistance genes, as well as novel germplasm with uncharacterized resistance genes. Fortunately, many of the known sources of resistance are effective against a subset of the races of Pfs including the most recently characterized races. Novel strains which aggressively attack all known sources of resistance have not been identified. Examination of isolates in recent years has indicated that quite a few “novel” or “deviating races were the result of a mixture two or more known races. However, deviating isolates of Pfs continue to be identified. One isolate in particular, UA1014APLP, was able to infect cotyledons and true leaves of all of the standard differentials, the cotyledons of most lines tested, but only infect the true leaves of certain spinach lines. In addition, observations indicate the disease reactions are somewhat temperature sensitive and the qualitative disease reaction can vary depending on temperature.