Update
Response of Six Potato Cultivars to Drought and Potato Early Dying

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Potato early dying (PED), caused by the soilborne fungus *Verticillium dahliae,* is a major constraint to potato production in the irrigated fields of the Pacific Northwest. Traditionally, this disease has been controlled by soil fumigation. Recently, cultivars with resistance to this disease have been released. In addition, modification of irrigation practices early in the season has resulted in significant disease suppression.

Our laboratory has a continuing interest on the effect of moisture on disease development, particularly its management for disease suppression. We have shown that PED is favored by moist soils. If, however, soil moisture is maintained at 65 percent available soil moisture (mild drought stress) between emergence and tuber initiation, the disease is suppressed and yields are enhanced in the cultural variety (cv) Russet Burbank. This mild drought stress during the time frame when most root infections are occurring enhanced host resistance to this disease.

Drought is defined as a shortage of water sufficient to adversely affect crop production. It can be caused by either lack of soil water or blockage of its transport by a pathogen. In potato infections of *Verticillium,* the plant responds to a limitation in water in a variety of ways. The end result is reduced growth and lower yields.

We are interested in exploring the relationship between drought tolerance and resistance to PED for several reasons. First, some potato cultivars are both drought tolerant and resistant to PED, some are drought tolerant, and a very few are resistant to PED. It is the combination of tolerance and resistance that is of interest to us. Second, a goal is to provide a tool that will simplify breeders' efforts to identify germplasm resistant to PED. Third, water management guidelines for suppression of PED in a diversity of potato cultivars may be developed.

Field plots were established at the Central Oregon Agricultural Research Center in May 1995. The experimental design was a split-plot randomized block with three factorial treatments replicated six times. Treatments include six potato cultivars, three irrigation levels, and two inoculum densities of *Verticillium.* Irrigation levels were established using line-source irrigation. Various disease and plant growth parameters were measured during the season to provide information on response of the cultivars to both moisture and disease. These data are currently being analyzed. The experiment will be repeated in 1996.