

Diseases of Vegetable Crops in Arizona Caused by Pythium ssp.

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Pythium aphanidermatum, a soil-borne fungus, has been identified as the cause of root rot of watermelons, stem and tuber rot of potatoes, and root rot of hydroponically grown spinach and cucumbers. No effective chemicals are currently registered for use in the control of this fungus.

However, alternative methods of reducing losses due to this fungus are being investigated. For example, ultraviolet irradiation of fungus-infested reservoir water, used in recirculating hydroponic systems, was shown to be effective in control of root rot caused by P. aphanidermatum (1).

This control method is obviously not applicable to field conditions. However, results of studies on the epidemiology of P. aphanidermatum under field conditions indicate that control may be achieved by avoiding the planting of susceptible crops in fields which are infested with the fungus.

Determination of the presence or absence of the fungus in fields was accomplished by the development of a sensitive biological assay (2). The presence or absence of the fungus can be determined prior to planting. Our results indicate that approximately 40% of the fields surveyed to date do not contain this fungus. Thus, fields known to be infested with the fungus could be avoided.

In addition to identification of P. aphanidermatum as the cause of root rot of various vegetable crops, which are characterized by obvious disease symptoms, we have also found that yield reductions in lettuce may be occurring as the result of root infection by Pythium dissotocum in the absence of any disease symptoms.

Yield reductions of approximately 40%, in the absence of any root rot symptoms, were recorded in lettuce grown under hydroponic conditions. In view of the extent of this yield loss, studies were undertaken to determine if P. dissotocum, a fungus not previously recognized as a pathogen of lettuce, was associated with roots of field-grown lettuce.

Results showed that Pythium spp. were consistently isolated from asymptomatic roots of almost all plants sampled from three commercial lettuce fields. Pythium dissotocum was identified as the predominant species isolated from roots from two of the fields and P. uncinulatum, a known seedling pathogen of lettuce not previously reported in the United States, was the predominant species isolated from roots from the third field.

In addition to the above two species, five other Pythium species were also isolated from healthy-appearing lettuce roots. These results suggest that undetected, but significant, yield reductions may be occurring in the production of lettuce under field conditions as a result of subclinical diseases caused by Pythium spp. Such studies are currently under investigation.

References

Stanghellini, M. E., L. J. Stowell and M. L. Bates. "Control of root rot of spinach caused by Pythium aphanidermatum in a recirculating hydroponic system by ultraviolet irradiation. Plant Disease, 68:1075-1076, 1984.

Stanghellini, M. E. and W. C. Kronland. "Bioassay for quantification of Pythium aphanidermatum in soil." Phytopathology, 75:1242-1245, 1985.