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Source of Late Blight Epidemics

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The late blight pathogen, *Phytophthora infestans*, survives in infected potato tubers, which potentially represents an inoculum source the following season (19,23). However, infected tubers frequently rot during winter months and cease being a threat as an inoculum source when decomposed. Contemporary strains of *P. infestans* are highly aggressive and rapidly rot tubers, limiting the availability of viable host tissue (16). Epidemics of late blight characteristically start from low levels of initial inoculum originally arising from infected seed tubers, volunteer potato plants developing from infected tubers in the field, or from infected tuber refuse (13,16,24). The relative importance of the three types of late-blight-infected tubers as inoculum sources varies and depends in part on microclimates, local conditions, and the extent of infection the previous fall (7,24).

Epidemics in the Columbia Basin have been traced to infected seed tubers, refuse tubers and volunteers (13). Observations in commercial fields and surrounding areas early in the course of epidemics revealed that volunteers are especially likely to pose a threat when potato plants in the field were infected the previous season, moreover, infected volunteers have been found in a field two years after an infected potato crop. Cull piles formed in late winter or early spring from tubers taken from storages can be a serious threat because infected tubers in storage are protected from external environmental variations in temperature and moisture, which may increase rot. Infected tubers may survive in cold storage at temperatures used to store seed tubers with little to no rot or symptom development (14). Latent infections in seed tubers are a particular threat in generating new epidemics.

Transmission of *P. infestans* from infected tubers to plant tissues the next season may occur during seed-tuber handling, cutting and planting (18) or in the field (9,19). For secondary infection to occur during seed tuber handling and cutting, the pathogen must survive in intact tubers during the winter, sporulate, be dispersed, and infect additional tubers or foliage. Temperature and humidity within piles of cut seed tubers often favor sporulation, and sporangia have been observed on infected seed pieces within 19 hours of cutting (21). Sporangia are readily transmitted by direct contact from infected tubers or seed pieces to non-infected seed pieces (5). Tubers infected prior to planting may be more likely to produce viable shoots than those infected in the field near harvest because of less time for rot to develop before shoot emergence. Under experimental conditions, transmission occurred from tubers to shoots when tubers were inoculated in the spring before planting, but not when tubers were inoculated in the fall (7). Infection during seed-tuber cutting and handling increases the threat of late-blight outbreaks on foliage in the field. Fungicide seed piece treatments potentially reduce transmission from infected seed tubers (11,22).

The exact pathway by which *P. infestans* progresses from planted, infected seed tubers to plant foliage has been disputed (1,3,19). De Bary (4) originally proposed that the pathogen spread by

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Up-Coming Field Days

Oregon

Oregon State University, Hermiston
Potato Field Day, June 24, 8 am – lunch time.

Washington

Washington State University, Othello
Potato Field Day, June 25, 8:30 am – lunch time.

Have you other field days or events you'd like announced? Send me an email: ajensen@potatoes.com.