Late Season Management of Late Blight in the Columbia Basin

Dennis A. Johnson, Mel Martin, and Tom Cummings

Washington State University, Pullman, WA 99164-6430, and J. R. Simplot Company, Moses Lake, WA.

Potato tuber rot due to late blight has been a major problem in storage in the Columbia Basin during the fall of 2000. Several storages had 7% of the tubers infected with late blight and one storage had 35% infected tubers. Tubers from a field near Soap Lake had to be processed immediately after harvest because an estimated 5% of the tubers had symptoms of late blight. Strips of rotten tubers in several storages were associated with fungicide application misses in the field. Additional examples could be cited illustrated the severity of late blight tuber rot in the Basin after the 2000 harvest.

Potato tubers become infected in the field when sporangia or zoospores of the late blight pathogen, *Phytophthora infestans*, are either dislodged by air currents or washed from infected foliage and come in contact with tubers in or on the soil. Infection occurs mainly through tuber buds (eyes) and wounds. Tuber infections are increased when soils are water saturated for extended time periods, when tubers are on or near the soil surface, when soil cracking occurs, when foliage is moderately to severely infected, when minimum daily temperature are below 59F and zoospore production is increased, and when harvest is done during wet weather. Large proportions of late blight infected tubers frequently originate near the pivot center (Figs 1 and 2) and low areas in the field where the soil is water saturated for extended periods of time.

Late season management of late blight requires successful early season management of late blight. Therefore, planting seed tubers free of late bight and treating seed tubers with cymoxanil (Evolve) or mancozeb (Maxim MZ or Tops MZ), destroying tuber refuse, reducing numbers of potato volunteers, judicious management of irrigation water management and timely fungicide applications are crucial in managing late blight. Judicious management of irrigation water includes eliminating water application overlaps, eliminating low areas in fields where water puddles, and not growing potatoes within 80 to 100 ft of the pivot center where many pivot systems deliver extra water. Scheduling of irrigation water should be based on plant evapo-translocation or soil moisture measurements; sprinkler irrigation, whenever possible, should not be done during rainy weather.

Timely fungicide applications require application of an efficacious material before infection and then successive applications until harvest. The Late Blight Columbia Basin Forecasting Model is useful in determining when initial applications should begin. Consult the late blight information line, 1-800-984-7400, for disease forecasts and management strategies. Applications of fungicides that inhibit sporulation (Curzate plus mancozeb or Acrobat MZ) during and after tuber bulking when soils crack may reduce tuber infections. Severe tuber losses in storage in 2000 were correlated with poor fungicide management in the field. These practices included terminating fungicide

applications on late season russets in early August, using copper fungicides by themselves, and applying too much irrigation water. Recent research over a four year period has demonstrated that chemical defoliation of potato vines in the semiarid environment of the Columbia Basin does not reduce late blight tuber rot when the crop has been judiciously watered (soils are not water saturated for extended time periods) and when fungicide applications are continued until harvest. In studies in the Columbia Basin, the amount of tuber rot due to late blight did not differ in plots in which potato foliage was and was not chemically defoliated before harvest, when plots were more than 80 ft from the pivot center (Fig 3). However, incidence of tuber rot was greater in two of four studies when tubers were harvested from green vines compared to defoliated vines within 80 ft of the pivot center (Fig 3). Late blight tuber rot was favored by additional water delivered within the center most area of the pivots. Tuber yield and quality are also usually low near the center of the pivot (Fig 4). As a result, we recommend that potatoes not be grown within 80 to 100 ft of the pivot center. Vine killing is recommended for late blight management in fields or sections of fields that have been "over watered" either by irrigation or by natural rainfall. In summary, defoliation of potato vines is not needed for management of late blight when the crop has been judiciously watered, when fungicide applications have been continued until harvest, and when harvest is done during dry weather. This does not apply to other potato growing regions receiving substantial rainfall during the growing and harvesting season.

Figures:

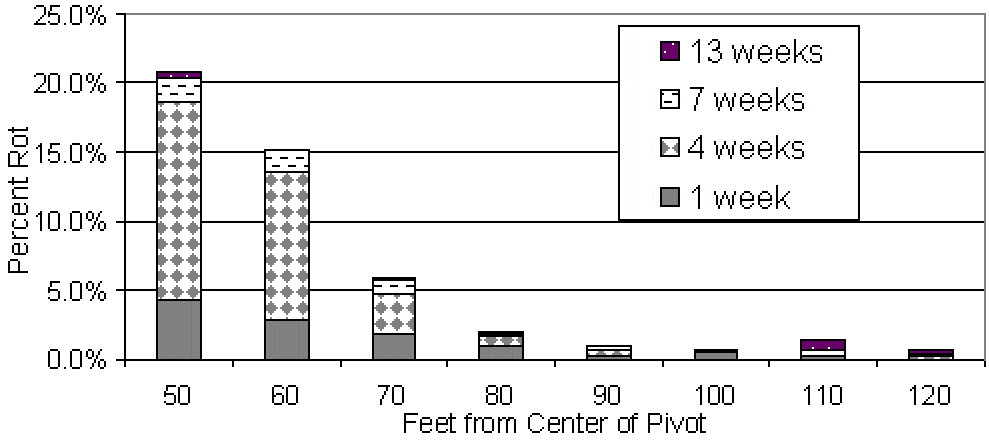

Fig.1. Percentage of rotten tubers in storage harvested at various distances from center of pivot near Bruce WA 1999.

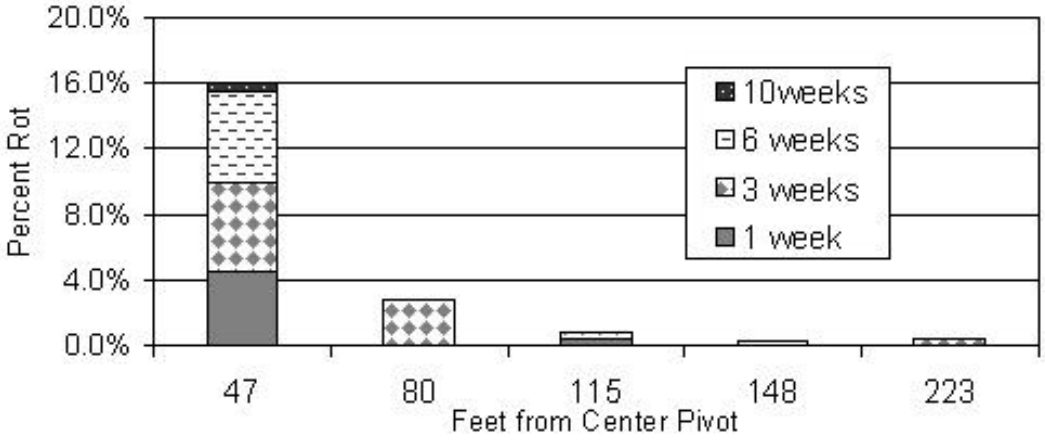

Fig. 2. Percentage of rotten tubers in storage harvested at various distances from center of pivot near Cunningham Rd. WA 1999.

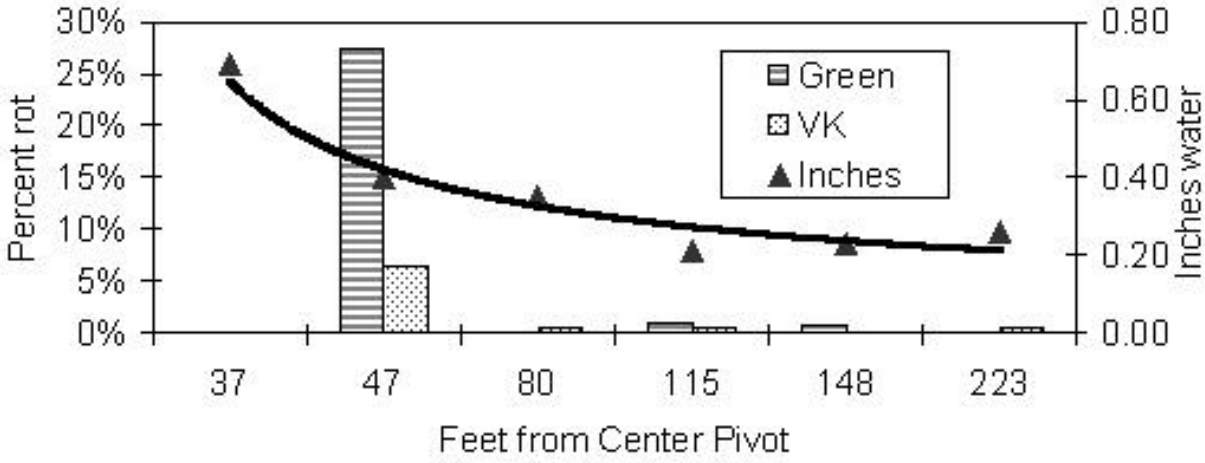

Fig. 3. Amount of water and percentage of tuber rot by treatment (green=no defoliated, VK=defoliated) at various distances from center of pivot near Cunningham Rd.WA 1999.

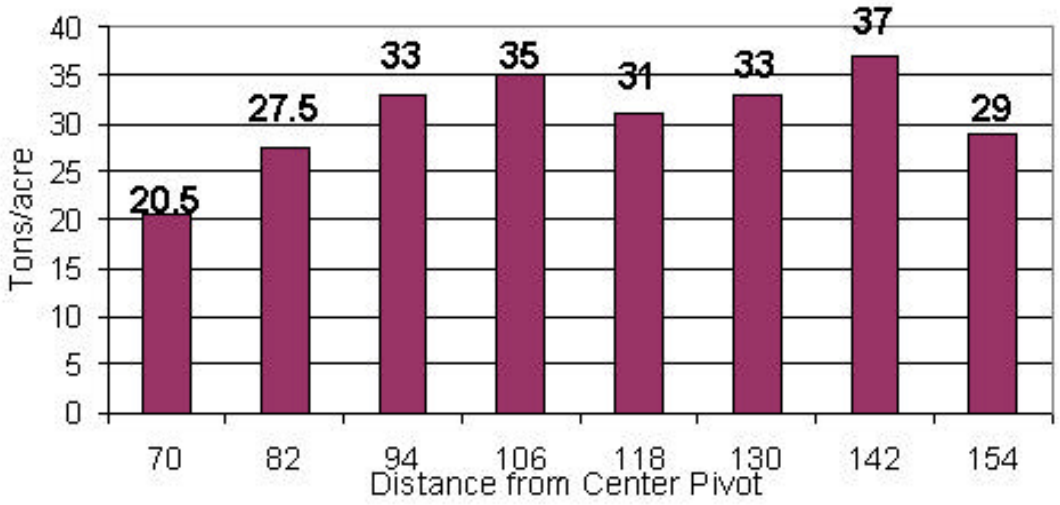

Fig. 4. Yield of Russet Burbank potato harvested at various distances from center of pivot location 1998.