

Irrigation Water Management on Potatoes

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Correct irrigation water management on potatoes is important for both crop yield and quality. Because both over and under-irrigation can cause problems for a potato crop, irrigation water application should be matched to crop water use. Water use for potatoes starts low, at about 0.05 to 0.1 inch per day from planting until crop emergence. This water use is by evaporation from the bare soil surface. After the crop emerges, water use increases over about a one-month period to the peak use of 0.3 to 0.35 inches per day under Idaho conditions. Peak use will be higher in hotter or more windy areas or less in cooler, lower-wind areas. The peak use period continues for about one month (mid-June to mid-July in Idaho) and water use then gradually decreases during late bulking

Because water use starts out low in early season, it is possible to over-irrigate. This produces conditions that promote disease and can also leach nutrients in light-textured soils. However, water stress, particularly during the first tuber set, can reduce the number of large tubers.

Correct water management during tuber bulking, when combined with proper nutrient management, will provide optimum tonnage of good quality potatoes. Results of several years of field research in Southern Idaho indicated that for optimum yield and quality, both fertility and water must be well managed. Optimum fertility management cannot compensate for inadequate irrigation water management and optimum water management cannot compensate for inadequate fertility. Water stress during the tuber bulking period can induce knots on tubers and cause irregular tuber shape. These deformities will reduce tuber grade and significantly reduce crop value.

Most set-move and solid set systems are designed to meet peak mid-season crop water use. However, almost all center pivots and linear move systems are designed to meet only about 80-90% of peak water use. This means that in mid-season, the crop is mining water from the soil profile to make up for the deficit in irrigation water. If the pivot or linear system enters this period "behind", it is impossible to "catch up" until after the peak use period. Under these conditions, the crop will be water stressed and yield and quality will suffer. To avoid mid-season water stress, pivots and linears should be managed so that the soil profile is full at the beginning of the peak water use period (by about June 15 in Idaho).

Because potatoes are a water-sensitive crop, excessive variation in the amount of irrigation water applied within the field can produce areas of poor quality crop. This is particularly true for hand line, wheel line, and solid set systems where wind skips, poor nozzle pattern or excessive lateral spacing can produce poor water application uniformity. To produce a consistently good quality crop throughout the field, these set-move and

solid set systems should be operated at the correct pressure for the nozzle type used – about 45-50psi for brass nozzles and 35-40psi for nozzles designed for low-pressure systems. Replacement of worn nozzles and repair of system leaks is essential for the best application uniformity. Nozzles specifically designed for windy conditions should improve uniformity in windy areas. Lateral spacing should not exceed 50 feet for hand or wheel lines.

In contrast, application uniformity of properly-nozzled center pivot or linear move systems is usually quite good. The areas of possible concern on a pivot are the probable over-application of water on the first span and possible application in excess of soil infiltration rate on the outer spans. If runoff from certain areas of a field occurs due to excess application rate, the crop in those areas may become water stressed.

In summary, proper irrigation water management to avoid both over-irrigation and crop water stress, and proper system management and maintenance to assure good water application uniformity are necessary to grow a high quality potato crop. A variety of soil moisture sensors, or techniques for measuring soil moisture, are available to “fine tune” irrigation water management.