Oregon State University
Western Oregon
Potato Irrigation Guide

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Total Seasonal Evapotranspiration [in]	17.0 (Mean)
Peak Evapotranspiration Rate [in/day]	0.24
Maximum Allowable Depletion [percent]	35
Critical Moisture Deficit Period	Tuber bulking

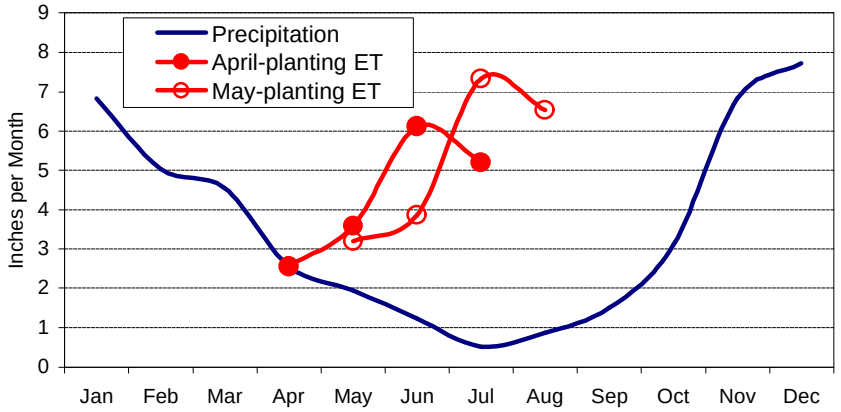

Figure 1: Typical precipitation and potato evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

Potatoes are much more responsive to minor variations in soil moisture than most crops. Soil moisture levels strongly affect plant emergence and final stands, plant and tuber health, and both yield and quality. Efficient irrigation will not only eliminate these potential problems and maximize yield and quality, but also reduce production costs and conserve water and nitrogen fertilizer.

Potatoes are propagated by dividing seed tubers into 1.5 to 2.0 oz pieces. Under wet soil conditions, cut surfaces of these seedpieces are highly susceptible to decay caused by soft rot bacteria and certain fungi. Seedpiece decay can lead to extreme stand loss under wet conditions. Therefore, potatoes generally should not be irrigated between planting and emergence. Excess moisture late in tuber development causes tuber lenticels to enlarge permitting easier entrance of disease organisms. Wet conditions also aggravate both foliar and tuber phases of late blight. It is therefore imperative that soils not be excessively wet during either early or late stages of crop development.

Dry conditions can be harmful to potato crop performance during any phase of the season, but are probably most destructive during active tuber bulking. Low or uneven moisture during tuber bulking is more detrimental to tuber quality and appearance than total yield. It is important that soil moisture level is held at 65-85% of the available soil moisture throughout the growing season until shortly before vine killing and/or harvest for storage. The peak water use for potatoes is 0.20 and 0.24 inches per day for the April and May plantings respectively.

On the back side of this page is a worksheet to aid in calculating irrigation schedules for potatoes. These calculations are most straightforward for those using side-roll, hand-move, or solid set sprinkler irrigation. For those with linear move or center pivot systems, all information applies except for the set time, which must be gauged to the tower travel speed. For basic schedule information, sprinkler nozzle diameters, operating pressures, and spacing and soil type must be known. To more accurately describe individual systems, the uniformity coefficient of the system and available water capacity of your soil is also needed. This worksheet was designed to be progressed through sequentially starting with item *a*). Equations listed under item headings use item letters for reference. Typical rooting depth, 18 inches, is supplied in the worksheet. However, if you have reason to believe your site is an exception (e.g. shallow restrictive layer), this may be altered. Evapotranspiration rate estimates for both April and May plantings are listed in the worksheet. Use estimates from the closest planting date.

References

1. King, B.A. and J.C. Stark. 1997. Potato Irrigation Management – Bulletin 789. University of Idaho College of Agriculture.

Note: For additional background information and references, see "Western Oregon Irrigation Guides: Background and References."

Irrigation Schedule Worksheet: Potato

Use values for your specific soil and depth range from the Appendix, if available.

Otherwise use Table 1 below.

Table 1

Soil Texture	AWC [in/in]
Sandy	0.07 to 0.10
Sandy Loam	0.09 to 0.15
Loam	0.14 to 0.19
Clay Loam	0.17 to 0.22
Clay	0.20 to 0.25

A. Determine Irrigation Interval

Available Water Capacity [in/in]	***a.***	
Maximum Allowable Depletion [percent]	***b.***	35
Effective Rooting Depth [in]	***c.***	18
Peak ET [in/day]	***d.***	0.24
Maximum Irrigation Interval [days]	***e.***	
e = (a * b * c) / (d * 100)		
Your Irrigation Interval [days]	***f.***	

Note: f should be equal to or shorter than e.

Table 2

Irrigation System	Uniformity Coefficient (*)	
Solid set	70	63
Hand move or Side-roll	82	74
Pivot or Linear Move	90	81
Offset Managed Handm.	90	81

B. Determine Combined Efficiency

Uniformity Coefficient	***g.***	
Combined Efficiency	***h.***	
h = (0.01583 * g) - 0.6327		

C. Determine Depth of Irrigation

		Planting	April	May	June	July	August
Monthly Evapotranspiration Rate [in/day]	***i.***	*Apr.1*	0.09	0.12	0.20	0.17	
		May10		0.10	0.13	0.24	0.21
Depth of Irrigation per Set [in]	***j.***						
j = (i * f) / h.							

D. Determine Set Time

Application Rate [in/hr] ***k.*** _____

Measure or see Tables 3 and 4 below to determine your application rate.

		April	May	June	July	August	September
Irrigation Set Time [hrs]	***l.***						
l = j / k							

Table 3

Pressure [psi]	Discharge [gpm] Standard Tapered Nozzle Diameter [in] 3/32	1/8	9/64	5/32	11/64	3/16	13/64	7/32
35	1.5	2.7	3.40	4.16	5.02	5.97	7.08	8.26
40	1.6	2.9	3.63	4.45	5.37	6.41	7.60	8.87
45	1.7	3.2	3.84	4.72	5.70	6.81	8.07	9.41
50	1.8	3.1	4.04	4.98	6.01	7.18	8.49	9.88
55	1.9	3.3	4.22	5.22	6.30	7.51	8.87	10.30

How to use these tables:

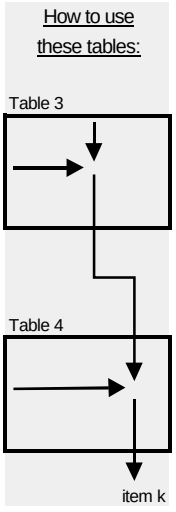

Table 4

Sprinkler Spacing [ft] -by- [ft]	Application Rate [in/hr] Discharge per Nozzle [gpm] 2	3	4	5	6	8	10
20 20	0.48	0.72	0.96	1.20	1.44	1.93	2.41
20 40	0.24	0.36	0.48	0.60	0.72	0.96	1.20
30 30	0.21	0.32	0.43	0.54	0.64	0.86	1.07
30 40	0.16	0.24	0.32	0.40	0.48	0.64	0.80
30 50	0.13	0.19	0.26	0.32	0.39	0.51	0.64
40 40	0.12	0.18	0.24	0.30	0.36	0.48	0.60
40 50	0.10	0.14	0.19	0.24	0.29	0.39	0.48
40 60	0.08	0.12	0.16	0.20	0.24	0.32	0.40

(*) If your sprinkler spacing/discharge combination falls into gray-shaded area, use uniformity coefficient from the right, also gray-shaded column. Otherwise use values from the left column.