Oregon State University
Western Oregon
Blueberry Irrigation Guide

Mario Hess, Bernadine Strik, Jason Smesrud, and John Selker
Department of Bioresource Engineering
116 Gilmore Hall, (541) 737-6304
Corvallis, OR 97331-3906

November 1997

Total Seasonal Evapotranspiration [in]	37.5
Peak Evapotranspiration Rate [in/day]	0.25
Maximum Allowable Depletion [percent]	50
Critical Moisture Deficit Period	Fruit Expansion

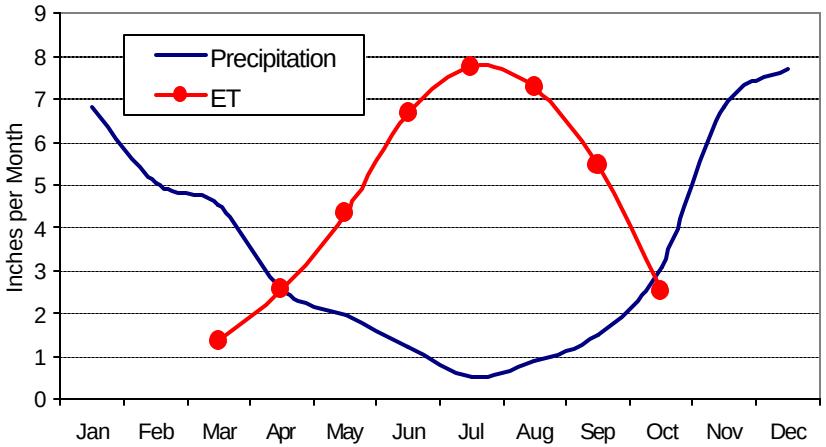

Figure 1: Typical precipitation and blueberry evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

Blueberries have most of their effective rooting system in the upper 18 inches of soil. Since they are relatively shallow-rooted, blueberries are subject to drought injury. A uniform and adequate supply of moisture is essential for optimum growth. In most areas of Western Oregon, irrigation is required to maintain adequate soil moisture from mid-June to mid-September. The demand for moisture is greatest from the time of fruit expansion until harvest. July and August are the lowest rainfall months and this is the period when the developing fruit produces the greatest plant water demand. This is also the period when floral initiation for next year's crop begins. If soil moisture is lacking at this time, a reduced set of buds will occur. Some cultivars are sensitive to fruit cracking. However, with a continuous supply of moisture, the fruit skin remains elastic and cracking is less likely to occur. Cracking often occurs after a period of drought. Fruit growth is slowed and the skin becomes less elastic. Then, if precipitation or a period of high humidity occurs, the fruit flesh swells faster than the skin can accommodate and the skin splits. Fruit may also shrivel under periods of water stress. Growers should be aware however that excessive, standing water in blueberry fields can reduce root growth and promote root diseases like phytophthora.

The peak water use for blueberry is approximately 0.25 and 0.23 inches per day for July and August, respectively.

On the back side of this page is a worksheet to aid in calculating irrigation schedules for blueberries. 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. Although the rooting depth is already supplied in the worksheet, if you have reason to believe your site is an exception (e.g. shallow restrictive layer), this may be altered. Evapotranspiration rate estimates for the growing season are listed in the worksheet.

References

1. Oregon State University Extension Publication PNW 215. 1993. Highbush Blueberry Production.

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

Irrigation Schedule Worksheet: Blueberry

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.***	50
Effective Rooting Depth [in]	***c.***	18
Peak ET [in/day]	***d.***	0.25
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

		April	May	June	July	August	September
Monthly Evapotranspiration Rate [in/day]	***i.***	0.09	0.14	0.22	0.25	0.23	0.18
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

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.

How to use these tables: