Oregon State University
Western Oregon
Broccoli (for processing) Irrigation Guide

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

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Total Seasonal Evapotranspiration [in]	13.9 (mean)
Peak Evapotranspiration Rate [in/day]	0.27
Maximum Allowable Depletion [percent]	30
Critical Moisture Deficit Period	Head development

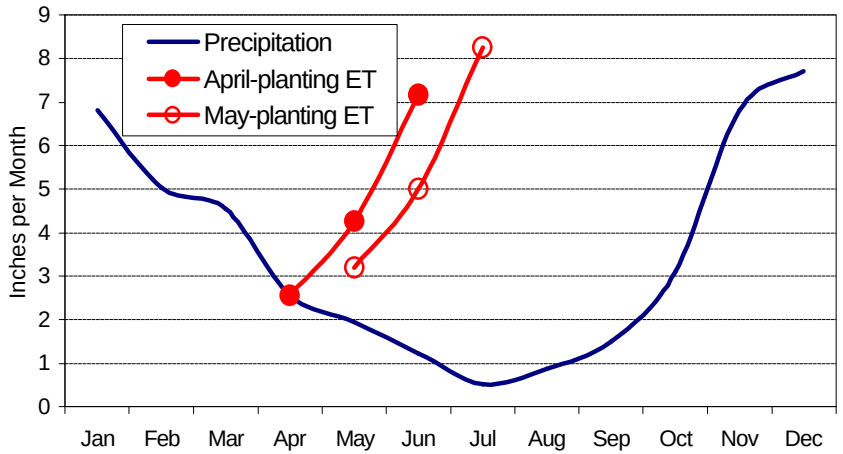

Figure 1: Typical precipitation and broccoli evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

Broccoli is sensitive to soil crusting. After stands have been established, provide uniform moisture throughout the growth of the crop. Do not over-water in the first 2-3 weeks after transplanting, or 4-5 weeks after direct-seeding, especially if club root is suspected. However, any moisture stress, especially when broccoli reaches the 6-7 leaf stage, may cause these crops to button or form heads prematurely. Such heads will be too small for market. Total amount of water needed will depend on seasonal variation, variety, planting or transplanting date and the number of times the field is to be harvested.

The peak water use for broccoli is approximately 0.24 (in June) and 0.27 (in July) inches per day for mid April and mid May plantings, respectively.

On the back side of this page is a worksheet to aid in calculating irrigation schedules for broccoli. 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. Use estimates from the closest planting date.

References

1. Sanders, D.C. 1993. Vegetable Crop Irrigation, Leaflet No: 33-E (North Carolina State University, Raleigh).

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

Irrigation Schedule Worksheet: Broccoli

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

Otherwise use Table 1 below.

A. Determine Irrigation Interval

Available Water Capacity [in/in]	***a.***	
Maximum Allowable Depletion [percent]	***b.***	30
Effective Rooting Depth [in]	***c.***	18
Peak ET [in/day]	***d.***	0.27
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 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

B. Determine Combined Efficiency

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

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

C. Determine Depth of Irrigation

		Planting	April	May	June	July
Monthly Evapotranspiration Rate [in/day]	***i.***	*Apr.15*	0.09	0.14	0.24	
		May 15		0.10	0.17	0.27
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
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: