Oregon State University
Western Oregon
Cucumber Irrigation Guide

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Total Seasonal Evapotranspiration [in]	12.0 (mean)
Peak Evapotranspiration Rate [in/day]	0.17
Maximum Allowable Depletion [percent]	50
Critical Moisture Deficit Period	Flowering and fruiting

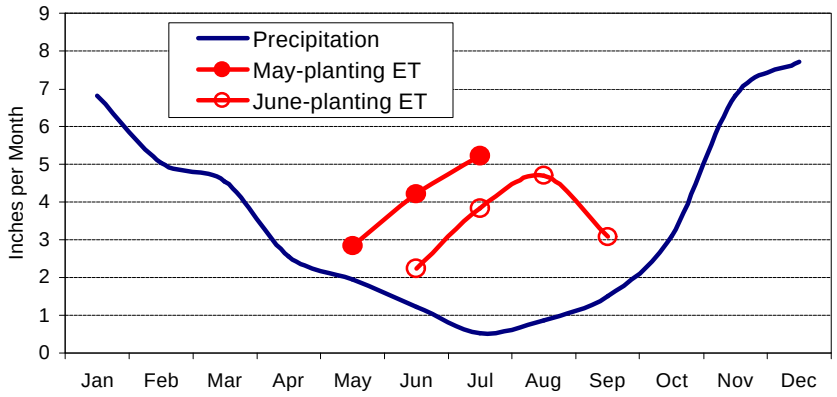

Figure 1: Typical precipitation and cucumber evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

All cucumbers are sensitive to and may be damaged by excess moisture between seeding and emergence. Pickling cucumber fields intended for hand harvest may be hand harvested 10-12 times and need to be kept growing adequately. Irrigation sets need to be coordinated with picking schedules and bee pollination. When possible, irrigate very early in the morning to avoid interfering with bee activity, and terminate irrigation before nightfall to allow vines to dry. Adequate, uniform water applications are necessary to produce high quality fruit. Water stress contributes to higher incidence of nubs and reduced fruit length. Water stress coupled with high night temperatures also results in rapid seed development and softening of cucumber internal tissues.

Observations in fields intended for machine harvest indicate that as harvest approaches (when fruit reaches a mean grade of 2.0), irrigation and soil moisture can have a dramatic effect on fruit sizing. When irrigation is applied at this time, especially during warm temperatures, fruit grade size can increase by 0.2 of a grade per day, necessitating harvest in 2 to 2.5 days. Conversely, if fruit sizing needs to be slowed or delayed, irrigation should be delayed, as long as it does not result in fruit wilting or crop damage.

The peak water use for cucumbers is approximately 0.17 and 0.15 inches per day for the early May and the mid June planting dates, respectively.

On the back side of this page is a worksheet to aid in calculating irrigation schedules for cucumbers. 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 both the early May and the mid June plantings 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: Cucumber

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.***	50
Effective Rooting Depth [in]	***c.***	24
Peak ET [in/day]	***d.***	0.17
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	May	June	July	August	September
Monthly Evapotranspiration Rate [in/day]	***i.***	*May 1*	0.09	0.14	0.17		
		Jun.15		0.07	0.12	0.15	0.10
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.						
		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: