Oregon State University
Western Oregon
Sweet Corn Irrigation Guide

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Total Seasonal Evapotranspiration [in]	17.0 (mean)
Peak Evapotranspiration Rate [in/day]	0.22
Maximum Allowable Depletion [percent]	50
Critical Moisture Deficit Period	silking to harvest

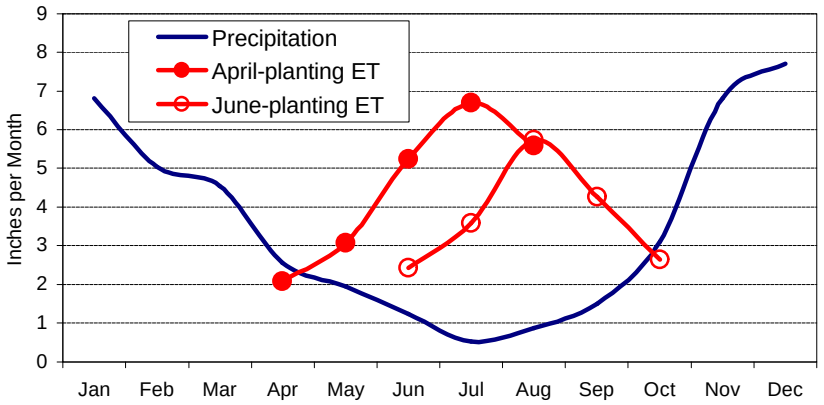

Figure 1: Typical precipitation and sweet corn evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

Irrigation of sweet corn should be managed to supply adequate soil moisture while at the same time maintaining adequate aeration and soil temperatures. In the period between seeding and emergence, low soil temperatures can delay or prevent germination. Thus, it is recommended that fields be irrigated prior to seeding and not again until after emergence whenever possible. In the remainder of the season, available soil moisture should not be depleted by more than 50 percent.[1] Especially critical is the time between silking and harvest. Water deficit during this period will have the greatest negative impact on yields. Excessive irrigation, however, may also negatively impact yields by promoting excessive stalk and leaf mass.

The use of big guns and center pivot systems is common in corn due to difficulties in moving pipe as fields approach maturity. When using big guns, it is critical to pay close attention to the uniformity of water application, which decreases with increasing towpath spacing. With center pivot systems on the other hand, it is excessive application rates that are problematic in the fine-textured soils of Western Oregon. Risk of this problem increases with distance from the pivot and may promote surface sealing and runoff of irrigation water thus shorting the crop of needed soil moisture. Please see *"Western Oregon Irrigation Guides: Background and References"* for more information in these considerations.

The peak water use for sweet corn is approximately 0.22 and 0.18 inches per day for April and June plantings respectively. On most soils, weekly irrigation during the peak is adequate, however with sandy and sandy loam soils, irrigation may be required as frequently as every three days.

On the back side of this page is a worksheet to aid in calculating irrigation schedules for sweet corn. 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 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. In order 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 plantings (early April and late June) are listed in the worksheet.

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: Sweet Corn

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.*	0.22
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	August	September	October
Monthly Evapotranspiration Rate [in/day]	*i.*	*Apr.15*	0.07	0.10	0.18	0.22	0.18		
		Jun.25			0.08	0.12	0.18	0.14	0.09
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	October
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: