Oregon State University
Western Oregon
Peppermint Irrigation Guide

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Total Seasonal Evapotranspiration [in]	20.1
Peak Evapotranspiration Rate [in/day]	0.21
Maximum Allowable Depletion [percent]	35
Critical Moisture Deficit Period	continuous

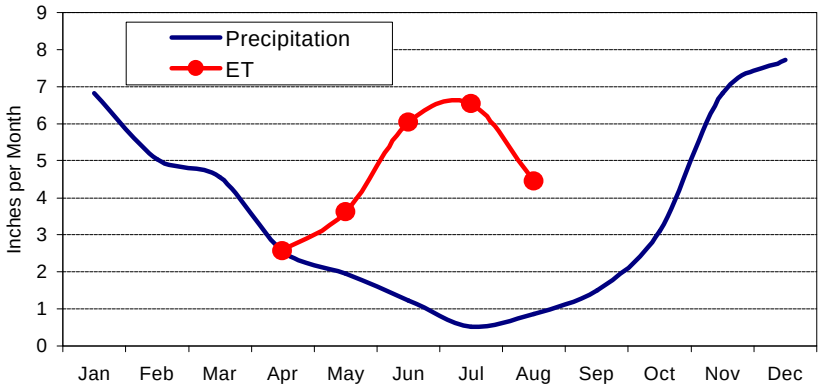

Figure 1: Typical precipitation and peppermint evapotranspiration (ET) in the Willamette Valley. Tabulated values of ET are provided on the back of this sheet.

Peppermint is highly sensitive to moisture stress and can experience serious yield reduction when available soil moisture is depleted by more than 35 percent.[2] The critical moisture period is continuous, thus moisture stress at any time during the growing season may produce the same result in decreasing yields. Although adequate moisture is necessary to achieve maximum yields, excessive soil moisture may actually decrease oil yields promoting excessive leaf and stem mass low in oil content.[1] Therefore, the tallest stands of mint are not necessarily the highest yielding. Soil moisture must also be maintained after harvest, beginning immediately after flaming, which encourages fall re-growth and prevents yield reduction in the following season. As there is little leaf mass after harvest, irrigation mostly supports the demand of surface evaporation at this time and can be reduced significantly. Note that the total seasonal evapotranspiration in the table above is for the pre-harvest period only.

The peak water use occurs in July, prior to flowering, and is approximately 0.21 inches per day. 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. For a much more complete presentation of irrigation considerations for peppermint, please see EM 8662, "Irrigating Peppermint".

On the back side of this page is a worksheet to aid in calculating irrigation schedules for peppermint. 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. Another point of caution is that schedules calculated for August apply only to the pre-harvest period. As soil type will be most influential for water use after harvest, water should be applied according to soil moisture and at rates adequate to maintain moisture near the surface.

References

1. Mitchell, A.R. 1994. *Irrigation and Nitrogen Fertility of Peppermint in Central Oregon, I. Yield and Oil Quality*, Ag. Exp. Station Special Report 930:52-65 (Oregon State University, Corvallis).
2. Mitchell, A.R. 1997. *Irrigating Peppermint*, EM 8662 (Oregon State University, Corvallis).

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

Irrigation Schedule Worksheet: Peppermint

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.***	35
Effective Rooting Depth [in]	***c.***	24
Peak ET [in/day]	***d.***	0.21
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

		April	May	June	July	August
Monthly Evapotranspiration Rate [in/day]	***i.***	0.09	0.12	0.20	0.21	0.14
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
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:

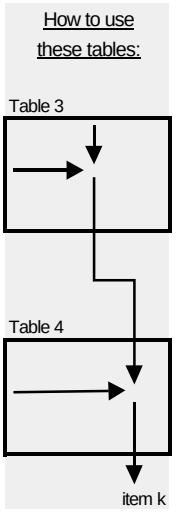

Table 4

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.