

Atmometer Preparation

USE DISTILLED WATER ONLY AND PROTECT FROM FREEZING

1. Remove top (ceramic cup) from Atmometer. Remove tube and stopper from cup.
2. Pour distilled water into ceramic cup to pre-charge and fill main body of Atmometer (about half a gallon).
3. Create siphon on end of tube with finger and replace rubber stopper on ceramic cup. Avoid allowing air to enter the system, too much air in the system and atmometer will not work.
4. Put top back on the main body taking care not to allow air into the system.
5. Fill Atmometer to zero. Excess can be bled off by detaching the sight tube at upper end and draining until the level is within. Squeeze tubing at bottom of sight tube to get an accurate meniscus reading.
6. Install bird wires. Experience has shown that 4 bird wires or flags on wires will deter birds better. Drill pilot hole in top to hold extra bird wires. Canvas can be removed and cleaned; use only distilled water to clean. Canvas must be kept clean for Atmometer to provide an accurate estimation of Evapotranspiration.

After Irrigation

Reset both rings just after the end of every irrigation when a full soil profile is known.

Choosing a Location

Atmometer measures evapotranspiration (ET) and this is impacted by the vegetation near the Atmometer. Atmometer should be installed in open areas near field edge, away from dusty roads, water, ditches, etc. Best location is at field edge in grass. Do not install in an area devoid of vegetation. Install above crop canopy and at least 39 in above the ground, road sign posts work well.

Atmometer Operation

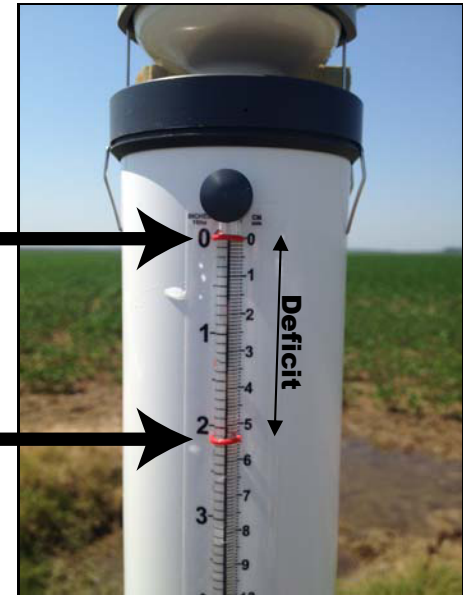
Difference between rings is the deficit or available soil water.

Set top ring to liquid level just after irrigation or rain. This is the reference point for a known full soil moisture profile.

Set second ring to deficit depth. This ring is the trigger point for irrigation.

Account for Rainfall

Slide this ring down to add effective rainfall. For example if a one inch rain is experienced, and half of the rain is absorbed and half runs off, then slide ring down, 0.5" to add moisture to the soil profile.

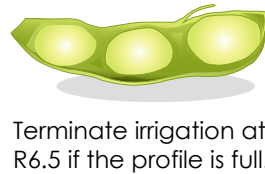
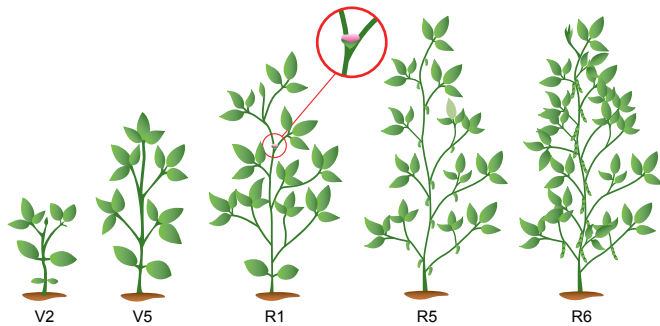


Scheduling Irrigation using an Atmometer (ET Gauge) for Arkansas Soybeans

Table 1. Allowable Deficits-Soybeans

Predominant Soil	Flood, Furrow, Border (inches)	Sprinkler/Center Pivot (inches)
Clay	2	1.5
Silt loam w/pan	1.75	1.25
Silt loam wo/pan	2.5	2
Sandy loam	2.25	1.75
Sandy	2	1.5

Use alfalfa ET reference #54 canvas for this chart.



Terminate irrigation at R6.5 if the profile is full.

Table 2. Atmometer Setting ←Set Atmometer to this value based on soil type→

Move to this value if canopy closes before growth stage is reached

Stage of Growth	1.25	1.5	1.75	2	2.25	2.5
V1 1st Node	5.4	6.5	7.6	8.7	9.8	10.9
V2 2nd Node	3.1	3.8	4.4	5.0	5.6	6.3
V3 3rd Node	2.1	2.5	2.9	3.3	3.8	4.2
V4	1.9	2.3	2.7	3.1	3.5	3.8
V5	1.7	2.0	2.3	2.7	3.0	3.3
V6	1.6	1.9	2.2	2.5	2.8	3.1
R1 Begin Bloom	1.5	1.8	2.1	2.4	2.6	2.9
R2 Full Bloom	1.4	1.7	1.9	2.2	2.5	2.8
FULL CANOPY	1.3	1.6	1.8	2.1	2.4	2.6
R3 Begin Pod	1.3	1.6	1.8	2.1	2.4	2.6
R4 Full Pod	1.3	1.6	1.8	2.1	2.4	2.6
R5 Begin Seed	1.3	1.6	1.8	2.1	2.4	2.6
R6 Full Seed	1.3	1.6	1.8	2.1	2.4	2.6

Description of Vegetative Stages

Stage	Stage Title	Description
V1	First node	Fully developed leaves at unifoliate node
V2	Second Node	Fully developed trifoliated leaf at nodes above the unifoliate node
V3	Third Node	Three nodes on the main stem with fully developed leaves beginning with the unifoliate node
Vn	nth-node	n number of nodes on the main stem with fully developed leaves beginning with the unifoliate nodes
R1	Beginning Bloom	One open flower at any node on the main stem
R2	Full Bloom	Open flower at one of the two uppermost nodes on the main stem with a fully developed leaf
FULL CANOPY		If full canopy closure occurs before R3, then use full ET. Narrow row soybeans may reach full canopy sooner than row watered soybeans
R3	Beginning Pod	Pod 3/16th inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
R4	Full Pod	Pod 3/4 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
R5	Beginning seed	Seed 1/8 inch long in a pod at one of the four uppermost nodes on the main stem with a fully developed leaf
R6	Full seed	Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf
R6.5	Irrigation Termination	About 10-14 days after beans touch in pod. Terminate irrigation if good soil moisture exists in soil profile, if not another irrigation will be beneficial
R7	Beginning maturity	One normal pod on the main stem that has reached its mature pod color
R8	Full maturity	95% of the pods have reached maturity

Step 1. Select Allowable Deficits based on soil type and irrigation system (Table 1).

Step 2. Select deficit based on growth stage of crop (Table 2). Set upper orange ring on gauge sight tube to water level just after last irrigation or when the profile is full (such as a rain that fills the soil profile and brings deficit to zero). For example for furrow irrigated clay soil at the V4 stage, the deficit is 3.1 inches. As growth stage changes, adjust deficit accordingly on the atmometer.

Chart developed by C.G. Henry, L. Espinoza, M. Ismanov, P. Francis and J. Ross

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