DETERMINING YOUR APPLICATION RATE
MICRO-IRRIGATION SYSTEMS

An important part of irrigation water management is replacing the soil water used by the almond tree since the last irrigation. The amount of almond tree water use, often called the almond tree evapotranspiration (ET), is available to you and is provided in inches of water used.

To determine how many hours you should run your micro-irrigation system during an irrigation, you can compare the tree ET in inches (in) since the last irrigation event with the micro-irrigation system application rate (in/hr):

$$\text{Irrigation Set Time (hrs)} = \frac{\text{Irrigation Amt. to be Applied (in)}}{\text{Microirrigation Application Rate (in/hr)}}$$

Measuring Emission Device Discharge

It is relatively easy to collect the discharge from either drip emitters or microsprinklers.

- Measure 10 to 20 (or more) drippers or microsprinklers throughout the orchard.
- Measure emission devices at the head of the system, end of the system, head of the lateral lines, and end of the lateral lines.
- Collect water for 30 seconds and then remove the container from below the emitter.

DRIP EMITTERS:

- Measure the collected water using a 100-ml graduated cylinder.
- Collecting the discharge is as simple as sliding a low-profile container under the emitter.
- Make sure that the inflow into the container is only from the single dripper being measured, as sometimes water will run along the hose due to surface tension.

MICROSPRINKLERS:

- Pull the microsprinkler/stake assembly out of the ground and place the microsprinkler head into a graduated cylinder.
- A 500-ml or 1000-ml graduated cylinder usually works well.

The emission device discharge can be determined in gallons per hour (gph) using the formula below:

____ mL of water collected in 30 seconds x 0.032 = ____ gph

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Determining the Average Application Rate

Follow these steps to estimate the average application rate:

1. Determine the average of all the individual, field-collected emission device discharge rates.
2. Using the average emitter rate (gph) and the number of emitters per tree, determine the average tree discharge rate (gph).

   Drip emitter example:
   The average emitter discharge rate for a drip emitter system, was 1.1 gph, and there were 5 drip emitters per tree; therefore, the average tree discharge rate (gph) would be 5.50 gph (5 drippers/tree x 1.1 gph/dripper = 5.50 gph).

   Microsprinkler example:
   The average emitter discharge rate for a microsprinkler system was 8.0 gph, and there was a single microsprinkler per tree; therefore, the average tree discharge rate would be 8.0 gph (1 microsprinkler/tree x 8.0 gph/microsprinkler = 8.0 gph).

3. Calculate the micro-irrigation system average application rate (in/hr) using the following formula:

$$\text{Micro-irrigation System Average Application Rate (in/hr)} = \frac{\text{Average Tree Discharge Rate (gph)}}{\text{Tree Spacing (ft}^2\text{)}} \times 1.6$$

Drip emitter example:
For an almond orchard with a tree spacing of 16 feet x 22 feet and a drip system with an average tree discharge rate of 5.50 gph (from above), the average application rate would be:

Tree spacing = 16 feet x 22 feet = 352 ft²

$$\text{Micro-irrigation System Average Application Rate (in/hr)} = \frac{5.50 \text{ (gph)}}{352 \text{ ft}^2} \times 1.6 = 0.025 \text{ in/hr}$$

Microsprinkler example:
For an almond orchard with a tree spacing of 16 feet x 22 feet and a microsprinkler system with an average tree discharge rate of 8.0 gph, the average application rate would be:

Tree spacing = 16 feet x 22 feet = 352 ft²

$$\text{Micro-irrigation System Average Application Rate (in/hr)} = \frac{8.0 \text{ (gph)}}{352 \text{ ft}^2} \times 1.6 = 0.04 \text{ in/hr}$$

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