

## SOP 14 Distribution uniformity evaluation for micro-sprinklers

Updated 7/28/14

### Materials needed:

1. GPS or measuring wheel
2. Clip board
3. Data sheet
4. Sharpie pen
5. 12 ft tape measure
6. Flags
7. 20, 0.5-L water collection cups (flat bottom)
8. 2 of each: 100 ml , 250 ml , and 500 ml graduated cylinders
9. 2 funnels
10. 10 Schrader valves with barbs
11. Stop watch
12. Calibrated pressure gauge with Schrader adapter

### Procedures:

#### Description of field:

1. Measure longest and shortest row of field (irrigation block).
2. Determine width of field (irrigation block)
3. Determine area of field (irrigation block)
4. Determine between row spacing
5. Determine in row spacing of trees
6. Determine number of micro sprinklers per tree
7. Determine lateral (polyethylene hose) diameter
8. Determine manufactures discharge rate for microsprinkler head, microsprinkler head pattern (ex. 270 degrees), and if pressure compensating
9. Map block to be evaluated and location of measurements

#### Micro-sprinkler head flow rate, pattern uniformity, and pressure evaluation (before irrigating):

1. Identify 6 areas to measure lateral line pressure, micro-sprinkler flow rates, and sprinkler pattern uniformity (areas should represent different elevations and distances from water source [pump or mainline] such as the head, middle, and lower end of irrigation block, as well as the middle and sides of the field ). Identify each evaluation area on map by codes A,B,C, etc. Estimate distances between the areas and a reference point (distance from submain and tree row number ). Place flags to identify evaluation area.
2. Record starting flow meter reading and start time of the irrigation

#### After the irrigation system is turned on and fully pressurized:

1. Measure flow rate of the system and time.

2. Measure discharge rate of sprinkler heads and pressure of lateral lines in each area:
  - a. Remove a micro sprinkler and install a barbed Schrader valve.
  - b. Record starting pressure with calibrated pressure gauge.
  - c. Place a micro-sprinkler in the 1<sup>st</sup> collection cup and start stop watch.
  - d. After 30 seconds place the next micro-sprinkler into a collection cup.
  - e. Repeat step "d" until 5 micro sprinklers are measured.
  - f. Remove the first micro sprinkler after 10 minutes.
  - g. Remove the other cups @ 30 second intervals.
  - h. Record ending pressure with calibrated gauge.
  - i. Measure volume of water in each collection cup and record cup number by area (A, B, C) and cup number.
  
3. Measure uniformity of micro sprinkler pattern in each area:
  - a. Remove a micro sprinkler and install a barbed Schrader valve.
  - b. Record starting pressure with calibrated pressure gauge.
  - c. Place 4 shallow collection cups at 4 predetermined distances from the micro sprinkler (Figure 1).
  - d. After 60 seconds place the next 4 collection cups near another micro-sprinkler
  - e. Repeat step "d" until 5 micro sprinklers are evaluated.
  - f. Remove the first group of cups after 10 minutes.
  - g. Remove the other cups @ 60 second intervals.
  - h. Record ending pressure with calibrated gauge.
  - i. Measure volume of water in each collection cup and record cup number by area (A, B, C), position, and cup number.

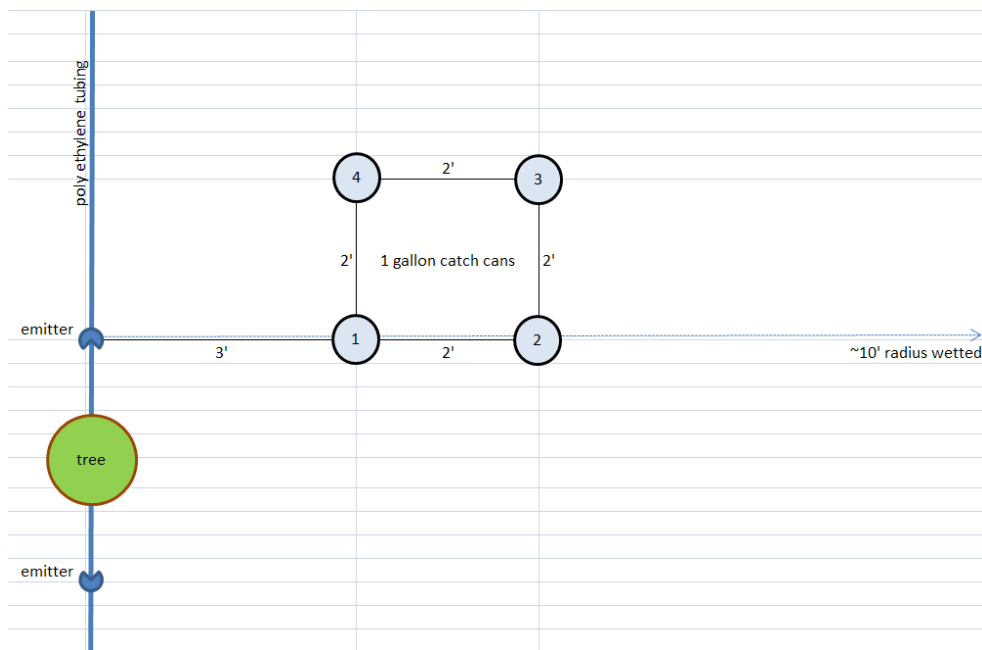


Figure 1. Position of catch cans to evaluate micro-sprinkler pattern.

4. After all areas are evaluated:

- a. Remove Schrader valves and reconnect microsprinklers
- b. Remove all flags

Calculations:

1. Calculate overall micro-sprinkler discharge rate (gal/minute/emitter)
2. Calculate regional micro-sprinkler discharge rate (each area or groups of areas)
3. Calculate field application rate (overall and regional) (inches/hour)
4. Evaluate pressure vs micro-sprinkler discharge rate
5. Calculate overall micro-sprinkler discharge rate DU lowest quarter for the irrigation block
6. Calculate regional micro-sprinkler discharge rate DU lowest quarter (group of at least 20 cups)
7. Calculate overall micro-sprinkler discharge rate 10% scheduling coefficient for the irrigation block
8. Calculate regional micro-sprinkler discharge rate 10% scheduling coefficient (group of at least 20 cups)
9. Calculate overall micro-sprinkler pattern CU for the irrigation block
10. Calculate regional micro-sprinkler pattern CU (group of at least 20 cups)

Comments

Grower \_\_\_\_\_  
Ranch \_\_\_\_\_

Date \_\_\_\_\_  
Block \_\_\_\_\_

**crop and field dimensions**

crop/tree

between row spacing (feet)

In row tree spacing (feet)

shortest row length (feet)

longest row length (feet)

irrigation block (field) width (feet)

Irrigation block (field) area (acres)

slope of field (%)

number of sprinklers per tree

microsprinkler discharge rate

pressure compensating

sprinkler pattern (eg. 270°)

diameter of polyethylene hose

Grower \_\_\_\_\_ Date \_\_\_\_\_

Ranch \_\_\_\_\_ Block \_\_\_\_\_

Area A	Area B	Area C
time (min)	time (min)	time (min)
start pressure	start pressure	start pressure
(psi)	(psi)	(psi)
----- collection volume (ml) -----		
cup A1	cup B1	cup C1
cup A2	cup B2	cup C2
cup A3	cup B3	cup C3
cup A4	cup B4	cup C4
cup A5	cup B5	cup C5
cup A6	cup B6	cup C6
cup A7	cup B7	cup C7
cup A8	cup B8	cup C8
cup A9	cup B9	cup C9
cup A10	cup B10	cup C10
cup A11	cup B11	cup C11
cup A12	cup B12	cup C12
end pressure	end pressure	end pressure
(psi)	(psi)	(psi)

Area D	Area E	Area F
time (min)	time (min)	time (min)
start pressure	start pressure	start pressure
(psi)	(psi)	(psi)
----- collection volume (ml) -----		
cup D1	cup E1	cup F1
cup D2	cup E2	cup F2
cup D3	cup E3	cup F3
cup D4	cup E4	cup F4
cup D5	cup E5	cup F5
cup D6	cup E6	cup F6
cup D7	cup E7	cup F7
cup D8	cup E8	cup F8
cup D9	cup E9	cup F9
cup D10	cup E10	cup F10
cup D11	cup E11	cup F11
cup D12	cup E12	cup F12
end pressure	end pressure	end pressure
(psi)	(psi)	(psi)

Grower \_\_\_\_\_  
Ranch \_\_\_\_\_

Date \_\_\_\_\_  
Block \_\_\_\_\_

		Area A _____	Area B _____	Area C _____
		time (min) _____	time (min) _____	time (min) _____
		start	start	start
		pressure	pressure	pressure
		(psi) _____	(psi) _____	(psi) _____
	position	-----	collection volume (ml)	-----
sprinkler 1	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 2	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 3	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 4	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 5	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____

Grower \_\_\_\_\_  
Ranch \_\_\_\_\_

Date \_\_\_\_\_  
Block \_\_\_\_\_

		Area D	Area E	Area F
		time (min)	time (min)	time (min)
		start	start	start
		pressure	pressure	pressure
		(psi)	(psi)	(psi)
	position	-----	collection volume (ml)	-----
sprinkler 1	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 2	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 3	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 4	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____
sprinkler 5	1	_____	_____	_____
	2	_____	_____	_____
	3	_____	_____	_____
	4	_____	_____	_____
	5	_____	_____	_____