SOP 11 Distribution uniformity evaluation for surface drip in vineyards

Updated 8/17/10

Estimated completion time: field: 20 person hours, data analysis: 4 person hours

Materials needed:

1. GPS or measuring wheel
2. 12 ft tape measure
3. Clip board
4. Data sheet
5. Sharpie pen
6. 10-20 0.5 L water collection cups with hangers
7. 100 ml and 250 ml graduated cylinders
8. funnel
9. Hose pieces to isolate emitters (if necessary)
10. Calibrated pressure gauge
11. 10 Schrader valves with barbs
12. Stop watch
13. Calibrated pressure gauge with Schrader adapter

Procedures:

Preparations before irrigating (recommend completing the day before irrigating)

Description of field and drip system (skip if also completing SOP 23):

1. Measure longest and shortest row.
2. Determine width of field
3. Determine area of field
4. Determine vine row spacing
5. Determine in row spacing of vines
6. Determine number of emitters per vine
7. Determine emitter flow rate and if pressure compensating
8. Determine diameter of polyethylene hose
9. Map block to be evaluated

Emitter and pressure evaluation (before irrigating):

1. Determine 6 areas to conduct measure pressure and emitter flow rates (areas should represent different elevations and distances from water source [pump] such as the head, middle and tail of irrigation block).
2. Identify each area on map by codes A,B,C, etc. (estimate distances from reference point such as the head of field and submain and vine row number)
3. Record beginning flowmeter reading and time irrigation begins

After irrigation begins (allow time for full pressurization of the system):

4. For each area do the following:
    a. Remove an emitter and install barbed Schrader valve.
    b. Record starting pressure with calibrated pressure gauge.
    c. Place 1st collection cup below an emitter and start stop watch.
    d. After 30 seconds place next cup below an emitter.
    e. Repeat step "d" until 10 cups are positioned.
    f. Remove the first cup 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.
    j. Remove barbed Schrader valve and replace removed emitters

5. After irrigation system is turned off or after all areas are evaluated:
    a. Remove Schrader valves and replace emitters
    b. Remove hose pieces and cups
    c. Remove all flags

6. Record end flow meter reading and time.

Calculations: Enter data into **DU SOP 11 drip vineyard spreadsheet**

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

Comments

1. Place hose pieces on each side of the emitter if water is not dripping into the collection cups.
2. Use 15 second intervals between positioning collection cups to speed up data collection.
3. Use GPS to determine elevation of collection area on hilly blocks.

Field Map

Grower _____ Date _____

Ranch _____ Block _____

crop and field dimensions

variety	
trellis system	
between row spacing (feet)	
In row vine spacing (feet)	
shortest vine row (feet)	
longest vine row (feet)	
field width (feet)	
field area (acres)	
slope of field (%)	

drip system characteristics

number of emitters per vine	
emitter discharge reate (gal/hr)	
pressure compensating	
inside diameter of polyethylene hose (inches)	

Grower _____ Date _____

Ranch _____ Block _____

Area A		**Area B**		**Area C**	
time (min)		**time (min)**		**time (min)**	
start pressure (psi)		start pressure (psi)		start pressure (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 (psi)		end pressure (psi)		end pressure (psi)	

Area D		**Area E**		**Area F**	
time (min)		**time (min)**		**time (min)**	
start pressure (psi)		start pressure (psi)		start pressure (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 (psi)		end pressure (psi)		end pressure (psi)	

Grower _____ Date _____

Ranch _____ Block _____

	flowmeter 1	flowmeter 2
initial flow meter reading (gallons)		
start time		
end flow meter reading (gallons)		
end time		