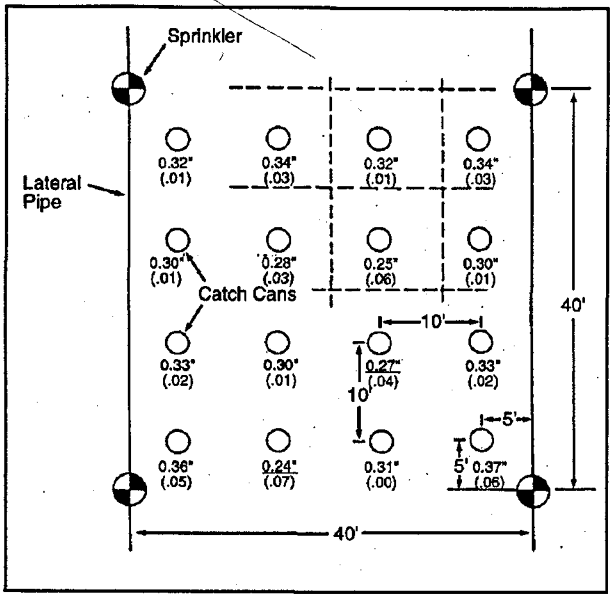

Figure 2. Typical layout of catch cans for sprinkler uniformity measurements.

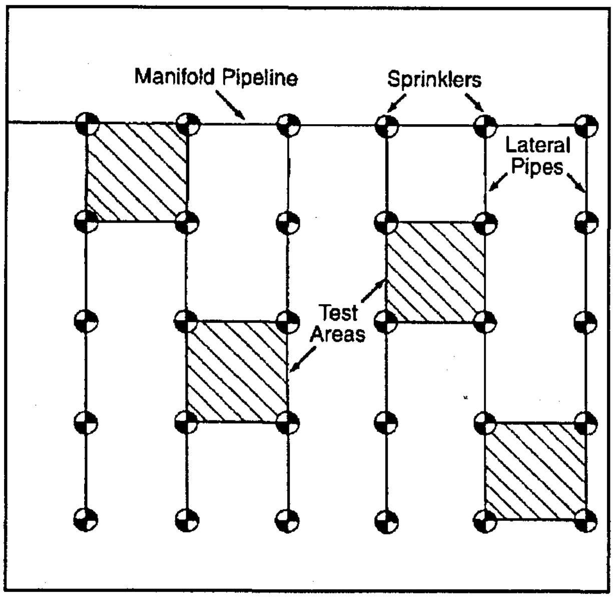

Figure 3. Example distribution of test locations in a large field.

Emitter Discharge Rates

Microirrigation systems apply water in a discrete manner, without covering the entire area of the nursery. It is much easier to discuss the discharge rate for these system in terms of volume/time applied by each emitter rather than an application rate in inches/time as in overhead sprinkler systems. The flow rates from emitters must be known for irrigation scheduling and management. The tests should be performed to verify design and installation and changes in application rates that may occur with time. The techniques to perform these tests in the nursery are similar to techniques for measurement of discharge rates from the sprinkler nozzles. The following measurements can be used to determine emitter flow rates:

- Measuring water application into the zone and calculating the rate of application from number of emitters within the zone.
- Collecting a known volume of water from randomly selected emitters throughout the system and calculating the flow rate by dividing the volume by time in which it was collected.

Nursery Evaluation of Sprinkler Irrigation Uniformity

Uniformity of water application with sprinkler irrigation systems is usually reported as either the Distribution Uniformity (DU) or Christiansen's Uniformity Coefficient (UC). Distribution Uniformity is based on the low quarter of irrigated area. This implies that the lowest 1/4 of the measurements is used for the calculations (Equation 2).

$$DU = (\text{avg. low qtr depth} \,/\, \text{overall avg. depth}) * 100\% \qquad (2)$$

Example 3.

To demonstrate how Equation 2 is used, DU is calculated for the measurements presented in Figure 2. The average of all measurements is 0.31 in.

$$DU = ((0.24 + 0.25 + 0.27 + 0.28)/4) \,/\, 0.31 * 100\% = 83.9\%$$

Another widely-used method is Christiansen's Uniformity Coefficient which is expressed in Equation 3.

$$UC = (1-(\text{avg. deviation from avg. depth} \,/\, \text{overall avg. depth})) * 100\% \qquad (3)$$

Example 4.

Again, using measurements presented in Figure 2, the average deviation can be calculated by averaging the absolute values of the differences between each measured depth and the average depth for 16 points (0.46/16 = 0.029 in). This is divided by the overall average depth (0.31 in). From Equation 3: