Frost control with sprinklers

Department of Agriculture, Western Australia
SIMPLE EVAPORIMETER FOR TIMING TRICKLE IRRIGATION

By C. R. COFFMAN, Irrigation Adviser, Manjimup.

DIFFERENCES in soil types and size of trees in orchards make it impossible to give a single recommendation for trickle irrigation running time.

Daily running time for each situation can be simply and fairly accurately calculated from weekly readings of an easily constructed evaporimeter.

Construction

A tank is made from a half 12 gallon drum, painted white inside and out and supported on 3 legs. A vee cut is made in the rim so that water will overflow to a constant level and a ruler is fixed, or a series of graduations painted, with the zero mark at this level. When sited in the orchard the evaporimeter must be levelled and this will be easy if the graduations are opposite the overflow notch and the legs are positioned as shown in the diagram.

Operation

The evaporimeter is filled and the water loss over the following week measured from the scale. It is re-filled each week.

The trickle irrigation needed to replenish soil moisture will be between 50 and 75 per cent of the water loss from the evaporimeter. Use 60 per cent to start with and adjust this to suit the soil conditions and tree size after a few weeks running.

If the evaporation reading for a week was 1½ inches the irrigation required is 60 per cent of this, or 90 points to be applied over the next week.

Drippers at 20 ft. x 20 ft. spacings supplying 2 gallons each per hour, apply a total of 1 point per hour. To supply 90 points the system must be run for 90 hours per week or 13 hours per day.

Running time calculated for a given week should not be interrupted on account of rain. Rainfall adds to the water level in the evaporimeter and normally results in some reduction in running time the following week.

When to start

Irrigation should be started in early September and continued throughout the growing season. The rates may be small at the start of the season but will ensure that the trees are never stressed and soil moisture near the field capacity is maintained throughout the season.

A new trickle system installed in the middle of the growing season should be run for approximately 200 hours “non-stop” to establish a soil moisture pattern before starting daily applications based on evaporation.

FROST CONTROL WITH SPRINKLERS

Low volume irrigation can be used to protect vegetables and trees against frost. With only 12 points per acre per hour frost damage should not occur when temperatures drop to 22°F.

With some changes, most overhead sprinkler systems can be used to give frost protection. The main things needed are:

1. Complete coverage about once every minute. Sprinklers must be positioned to wet the highest foliage.
2. Smaller sprinkler nozzles are usually needed to avoid excessive watering and enable more sprinklers to be run at the same time.
3. An accurate frost warning device or good guessing. Most farmers can predict when a frost is likely in their area, but low lying sections in a planting may be injured by frost without the whole planting being affected. If a frost warning device is used it should be placed in the area most likely to be first affected.

Irrigation is started when frost is imminent and continued until air temperatures rise above the danger point (33°F at ground level). If ice forms on the plants being protected, watering is continued until all the ice melts.

Soils should be well drained as waterlogging could be a hazard after prolonged high rates of application.

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