Irrigation Scheduling for Citrus – User's Guide for IScitrus

IS002 Quick Answer

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Introduction

IScitrus is an Excel program that helps users to determine an irrigation schedule based on evapotranspiration. To obtain a copy of program, click on IScitrus. There are two worksheets and four charts in the program. Each of the worksheets and charts are opened by clicking on a worksheet or chart name at the bottom, left-hand part of the screen. The irrigation schedule is computed in the worksheet named "Schedule". Historical ETo and rainfall data are entered into the directory "HETo". The first chart has the name "NA" for a plot of the cumulative ETc and net applications during the season. The second chart has the name "ET" and it shows a plot of the daily ETo and ETc rates during the season. The third chart "CET" shows the cumulative ETo and ETc plots for the years. The fourth chart "Kc" is a plot of the annual

Kc curve.

Historical Data

When the program is started, open the HETo worksheet. Then enter the 12 monthly average ETo values in inches per day in the appropriate cells in column B. These data can be found in the ETo zone map for California, which is available from the California Department of Water Resources-CIMIS project in Sacramento ETo Map. Then enter the number of days of rainfall per month in column D. The rainfall data are available from the University of California Integrated Pest Management IPM web page. For the Central Valley citrus growing region (zone 12), the daily mean ETo rates (inches per day) and number of rainy days per month are shown below. When finished entering data, open the Schedule worksheet.

Entering Data

DU is an Excel program for calculating distribution uniformity and the mean application rate of drip and micro-sprinkler irrigation systems. The companion program 'DUm' is the metric version of the same program. To use the DU or DUm programs, you must collect some data from the irrigation system that you are trying to evaluate. Then enter the following information into the 'Input' worksheet. In cells B2 and B3, enter a block number and the date for record keeping. The flow rates from the emitters can be made in ounces or in milliliters for a pre-selected rate of time. Enter the measurement time interval in seconds into cell G2. Based on experience, a measurement time interval of 15 seconds works well for typical micro-sprinklers used for citrus. In the cell below, enter either "O" for measurements in ounces or "M" for measurements in milliliters (cell G3). In the cell G3, enter the number of emitters per acre for the DU program. Enter the emitters per hectare in the DUm program. Then enter the measured flow rates into the table in cells B7 through P26. Row (hose) numbers are listed across the top and emitter numbers are given along the left-hand side. Entering the data in the correct order helps to identify problem emitters in your system. A sample entry table for a system with 121 emitters per acre (299 emitters per hectare) is shown below. Sample flow rates in milliliters per 15 seconds were entered for nine emitters on each of six hoses (rows). The flow rate in milliliters per 15 seconds would also be entered into the DUm (metric) program. Note again that the flow rate can also be input in ounces per 15 seconds if 'O' rather than 'M' is input for the volume measurement in the DU program.

Results

The worksheet named "Output" contains the results of the calculations. The emitter flow rates, converted to gallons per hour per emitter, are shown in the main body of the sample table below. The total number of samples, the number of low quarter

samples, the overall mean flow rate (gph per emitter), and the mean of the low quarter are shown above the sample flow rate data for each row (hose of emitters). The results for all of the emitters, are shown in column A. Above the flow rate data, the distribution uniformity percentage (DU%) and mean application rates in inches per hour and gpm per acre are provided. The overall mean DU% and application rates are given in column A.

Collecting Flow Data

The schematic below shows the laterals and hoses for a typical system. Flow measurements should be taken from a minimum of about 20 emitters. Be sure to measure the flow from emitters from hoses at both the upper and lower end of the lateral. Take one measurement near the riser and one near the end of each hose. Collect at least two measurements equally spaced between the riser and the end.