C-Irrig App – Basic Concepts

This C-IRRIG app is an irrigation scheduling tool for producing landscape plants in small (trade 1 and 3-gallon) containers with sprinkler irrigation. The app displays irrigation run times for a range of plant sizes and container spacings by calculating the amount of irrigation needed to replace the past 24-hour's estimated water loss taking into consideration the irrigation application rate, any rain, and the plant's ability to capture irrigation water.

Estimating evapotranspiration

C-Irrig app uses a modified Penman equation that calculates a potential ET (ETo) value based on a modified temperature function that is specific for plants grown in containers. When container-grown plants are spaced to insure adequate lighting around the plant canopy, black, non-radiating groundcloth and container surfaces can absorb solar radiation resulting higher air temperatures around the plant than would be otherwise indicated by weather station data. Higher temperatures in turn result in higher evaporation rates. C-Irrig estimates the effect of container spacing and plant size on temperature and calculates an ETo value that is specific for that production situation. Actual evaporative water loss from the container (ETc) is estimated from ETo using a function that depends on plant width, plant canopy density, and the ratio of production area to container top area.

Irrigation Capture

Plants can affect the amount of sprinkler irrigation water that gets into the container. Certain plant species have canopy architectures that channel water away from the container thereby reducing irrigation effectiveness. In this case irrigation rates would need to be increased accordingly. Certain plant species have the opposite effect by channeling water into the container that would otherwise fall un-intercepted between containers. In this case irrigation amounts could be reduced accordingly. Besides plant architecture, irrigation capture is also affected by plant height and width relative to the container top area as well as container spacing. C-Irrig estimates irrigation capture based on the user-selected irrigation capturing ability of the plant and adjusts irrigation rates accordingly. In general, plants with upright, branching habit have a high water-capturing ability while plants with prostrate growth habit and droopy foliage exhibit negative or nil water-capturing ability.

Rain

Rain has the capacity to replace some or all the irrigation requirement. The C-Irrig app determines the effectiveness of the rain based when the irrigation fell. Any rain falling before appreciable ET occurred is considered to not be useful whereas rain falling after appreciable ET is. The C-Irrig app uses FAWN weather which may not provide an accurate rain data. If the user overrides FAWN rain by inputting an observed amount of rain received at the nursery, C-IRRIG will assume that the distribution of the rain during the past 24-hours at the nursery was the same as that given by FAWN. If FAWN reported no rain when a nursery override was input, then C-IRRIG assumes that 100% of the nursery rain was effective. In the latter case the user should only input the amount of rain deemed effective.

Leaching Fraction

It is desirable in most cases to have some drainage (leachate) to prevent fertilizer salt build up in containers. The leaching fraction (LF) is the volume of leachate relative to the volume of irrigation water entering the container. The C-IRRIG app adjusts irrigation rates to achieve a target LF of 15%. LF tests

should be routinely performed to monitor the effectiveness of irrigation rates provided by the C-Irrig app. LINK

Spacing and spacing arrangement

C-Irrig outputs irrigation for two spacing situations: jammed (pot-to-pot) or spaced (default is one container diameter apart). For each of the two spacings, C-IRRIG calculates a range of plant sizes that would typically be found at that spacing.