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Irrigation Scheduling Tables For Florida Citrus[1]

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INTRODUCTION TO TABLES

The following tables were developed from average soil conditions in the ridge and flatwoods. Soil characteristics and water penetration rates can vary within a grove, but these tables apply to general citrus growing areas in Florida.

Generally speaking, flatwoods soils are finer textured and have more organic material in the surface layers. This gives them a higher water holding capacity but a lower conductivity. Hence, water moves more slowly through flatwoods soils than coarser ridge soils.

A moist soil has a higher hydraulic or water conductivity than a dry soil. Thus, water will penetrate deeper into a soil that is already partially wet than will water that is applied to a dry soil. Water applied to a soil at 20 percent depletion will go deeper than it would if the soil were at 40 percent depletion.

The point to remember from these Tables is that a trickle system that is operated for too many hours will drive much of the water and nutrients below the main tree root system.

We know that about 80 percent of the roots of a mature citrus tree are in the top three feet in ridge sands, and 98 percent of the roots are in the top 1.5 to two feet in flatwoods soils. Young trees in the ridge will have an even higher percentage of roots in the top three feet. Hence, it makes sense to run your trickle system frequently and not for long durations.

Work with overhead sprinklers (100 percent coverage) showed it is best to irrigate at 33 percent depletion in the spring and 67 percent depletion in the fall. During the spring and summer months, it is a good idea to run microsprinklers two or more times a week, except immediately after rainy periods.

A good way to check soil water status and your irrigation schedule is to use tensiometers. Units cost $40 to $45 each and are available at most irrigation supply companies.

Water movement into the soil will depend on the application rate. A spray jet that puts out the same gallonage with a 180° pattern has an application rate twice as high as a jet with a 360° pattern. The 180° jet delivers the same amount of water, but covers just half the soil surface area. The following tables are based on a 360° spray pattern. Modifications will need to be made for spray patterns that are less than 360°.

MICROSPRINKLER WATER PENETRATION

Table 1 shows estimated water penetration from a microsprinkler (10 gal/hr at 20 psi with a 360° spray pattern) into soil in two areas when applied at 20%, 30%, and 40% soil moisture depletion.

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Table 1. Estimated microsprinkler water penetration

Irrigation Time	RIDGE Depletion %			FLATWOODS Depletion %		
	20%	30%	40%	20%	30%	40 %
	Penetration of Water in Feet					
2 hr	3.0	2.2	1.5	1.0	0.7	0.5
4 hr	6.0	4.5	3.0	2.0	1.5	1.0
6 hr	10.0	7.5	5.0	4.0	3.0	2.0
8 hr	16.0	12.0	8.0	6.0	4.5	3.0

DRIPPER WATER PENETRATION

Table 2 shows estimated water penetration from a dripper (1 gal/hr) in two areas when applied at 20%, 30%, and 40% soil moisture depletion.

Table 2. Estimated dripper water penetration

Irrigation Time	RIDGE Depletion %			FLATWOODS Depletion %		
	20%	30%	40%	20%	30%	40 %
	Penetration of Water in Feet					
2 hr	2.0	1.5	1.0	0.8	0.6	0.4
4 hr	4.4	3.3	2.2	2.0	1.5	1.0
6 hr	7.2	5.4	3.6	3.2	2.4	1.6
8 hr	10.0	7.5	5.0	4.5	3.3	2.2

IRRIGATION FREQUENCY ASSUMING NO RAINFALL

Young Trees

For young trees, increased growth is the main advantage of irrigating frequently for short durations. The upper soil layer where most of the roots are located is thereby kept moist and tree stress is minimized. Growth is one of the first things affected by water stress. Mild water stress slows growth and more prolonged stress stops growth entirely. The idea of irrigating approximately twice a week from March through June for short durations is to keep the upper soil horizon near field capacity, maximize growth, and minimize deep soil water loss. Table 3 shows a schedule designed to promote optimum growth so trees reach production size sooner and become profitable at an earlier age.

Table 3. Irrigation schedule for young trees

	FREQUENCY (times per week)	
MONTHS	DRIPPER	JET
Nov-Feb	2-4	1-2
Mar-Oct	3-7	2-3
Duration (hours)	3-6	2-3

Mature Trees

If coverage is inadequate on mature trees, the microirrigation system may not be able to meet the water requirements of the large trees. Running the system for a longer time will probably not make up for the lack of coverage, and the longer running time will drive more of the water below the main root zone. Hence, design the system to cover as much area under the tree as is affordable. In that way, better growth and yields can be obtained. Table 4 shows an irrigation schedule for mature trees.

Table 4. Irrigation schedule for mature trees

	FREQUENCY (times per week)			
	DRIPPER		JET	
MONTH	RIDGE	FLAT WOODS	RIDGE	FLAT WOODS
Sep-Feb	1-2	2-3	1-2	2
Mar-Aug	2-4	3-5	2-3	3
Duration (hours)	6-10	6-10	4-6	2-4