



Trickle irrigation: the water needs of young peach trees

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Young peach trees can grow vigorously when irrigated regularly. However, too much water will retard their growth and can often kill them. Therefore, a knowledge of the water needs of young trees will help you to get maximum growth of trees under trickle irrigation without the risk of waterlogging.

It is hard to predict the water needs of young, rapidly-growing peach trees. A peach tree may grow to eight to 10 times its size at planting by the end of its first season in the orchard. The tree grows most rapidly around the middle of summer when the weather is hot, just when water is needed to compensate for the heat as well as to provide for growth. Thus, you need some idea of the changing size of the tree and some measurement of the climate to use trickle irrigation successfully.

Measuring the size of a tree

The butt of the tree is an accurate measure of tree size, while evaporation from an exposed water surface gives a good indication of what effect the weather has on the tree's need for water.

Determine the water use of a young tree by recording the area of the butt, calculated from the butt circumference, and by using a class A pan evaporimeter, a meteorological instrument, to measure evaporation.

Young peach trees need 2 to 3.5 litres of water for each square cm of butt area after every 10 mm of evaporation.

Trees available from nurseries generally vary greatly in size. The water requirement of a young tree depends directly on its size, so planting blocks of uniform trees simplifies management of trickle irrigation. The bigger nursery trees are preferable because the bigger the tree at planting, the bigger it will be at the end of the season, if it gets enough water.

Water needs in the first year

As mentioned before, some idea of the size of the trees is needed for successful irrigation. Measure the butts of a few average-sized trees soon after planting. A tree with a butt size close to 30 mm in circumference needs about 4.5 litres of water per week in cool to mild November weather. The tree needs 23 litres of water a week if the butt size is nearer

75 mm. Table 1 shows the water needs of trees whose butt sizes range between these two figures.

The rates may double if, as often happens in northern Victoria, a hot spell occurs in late spring. Evaporation figures and daily temperatures are a regular feature on radio and TV news bulletins and it pays to keep a note of these figures. The 4.5 litres and 23 litres mentioned as the water requirements of two possible sizes of peach trees at planting are based on a weekly evaporation figure of 25 mm. This figure can double in hot weather.

Do not wait for the soil to dry out before starting to irrigate but start in late October or early November after two weeks without rain.

Growth in the first year is slow early in the season and increases rapidly by mid-season. Change the watering rates more often as the season progresses.

Measure the butts of a few trees again during January, when the water requirements of trees normally increase steeply along with increasing growth rate, to make certain that they are getting the right amount of water. Failure to adjust the rate of watering when the butt is either larger or smaller than that anticipated in Table 1 can result in either under-watering or over-watering.

When to water

Applying the right amount of water when the trees are watered daily, or at least every second day, gives the most benefit. A time clock is needed to do this successfully. A time clock also makes watering at night possible. Watering at night results in wider wetting patterns and wider areas of active root growth. The tree stops absorbing water from the sod after sunset and the water supplied then merely wets the ground. The dense mat of roots near the trickle outlets absorb most of the water applied in the day during midsummer, so less water is available to wet the soil and a small wetting pattern results.

Trickle irrigation is designed to apply water regularly but some period of drainage is needed between irrigations. The poorer the drainage, the longer the time needed, and 16 hours of drainage per day may be needed in the Goulburn Valley Irrigation Area.

Table 1 gives a simple guide to the trickle irrigation needs of peach trees in the first year in the orchard. The trees must be growing vigorously if this table is used, otherwise the predicted figures will result in over-watering and, on poorly-drained soil death of the trees.

Inspect trees at least once a week. Look at the tips of the tree. Probe around outlets if the leaves stop expanding from the tips before March. You will probably find a wide wetting pattern with little resistance to the probe. Stop watering until the wetting pattern retracts, then start again but at a lower rate chosen from the table (that is, a fortnight or month behind, or the rate for a smaller tree).

Allowance for rainfall

Rain may only supplement trickle irrigation for several days. The tree largely relies on the moisture in the dripper wetting zones and the dense root system in these areas quickly extracts most available moisture.

The following table gives figures which can be used as a guide for withholding irrigation after rain.

Number of days without irrigation following rain

Rainfall	Before December	After December
10-20 mm	3	1
20-30 mm	6	3
30-40 mm	8	4
40-50 mm	10	5
50 mm	10	5

In many soils, the ground outside the wetting pattern will crack by mid-season in a dry year and water will drain rapidly out of the root zone.

The figures shown in the table err on the light side. This is necessary for many orchards, especially in the Goulburn Valley, which have surface soils that drain slowly. It is possible to double the rates shown in Table 1 and obtain faster growth where trees are planted in sandy soil with no restricting clay layers, or in friable soil on a good slope.

Water needs in following years

Peach trees grow rapidly until they start to produce heavily and the irrigation procedure outlined before is still valid for at least the first three seasons in the orchard if the planting distance between trees is at least 5 m along the tree line.

Table 2 predicts watering rates in the second and third season. Measure the butt circumferences of a few average trees in winter and calculate the irrigation schedule before the start of the season .

This Agriculture Note applies specifically to peach trees but the same principles apply to trickle irrigation of other crops.

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Table 1. Water needed for vigorous peach trees in the season following planting expressed to the nearest litre. To use the table, estimate the average tree size at planting and use the appropriate column.

Each column allows for the anticipated increase in tree size from month to month with a second butt circumference measurement taken in mid January to correct for any deviation from the assumed growth rate.

Month	Climate	Butt circumference at planting			
		30 mm	50 mm	60 mm	75 mm
		Weekly water requirements in litres			
November	Cool (25 mm evap)	5	9	18	23
	Warm (37 mm evap)	7	14	27	34
	Hot (50 mm evap)	9	18	36	45
December	Cool	7	14	27	34
	Warm	11	20	41	50
	Hot	14	27	54	68
Early January	Cool	11	20	41	50
	Warm	16	31	59	74
	Hot	23	40	81	99
		Butt circumference in January			
		75 mm	90 mm	115 mm	125 mm
		Weekly water requirements in litres			
Late January	Cool	18	31	54	68
	Warm	27	47	81	101
	Hot	36	63	108	135
Early February	Cool	27	41	72	77
	Warm	41	61	108	115
	Hot	54	81	144	153
Late February	Cool	34	47	81	90
	Warm	50	72	112	135
	Hot	68	95	162	180
March	Cool	41	54	90	99
	Warm	61	81	135	149
	Hot	81	108	180	198

Table 2. Weekly irrigation requirement in the second and third season

Month	Climate	Average butt circumference at planting			
		100-110 mm	130-140 mm	150-170 mm	180-200 mm
		Weekly water requirements in litres			
November	Cool (25 mm evap)	32	82	77	132
	Warm (37 mm evap)	50	123	118	200
	Hot (50 mm evap)	68	164	155	264
December	Cool	41	90	109	164
	Warm	64	135	164	246
	Hot	82	180	218	328
January	Cool	50	114	132	191
	Warm	77	173	200	287
	Hot	100	228	264	382
February	Cool	77	132	187	223
	Warm	118	200	282	337
	Hot	155	264	373	446
March	Cool	109	164	246	287
	Warm	164	246	369	432
	Hot	218	328	491	578

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