

# Water for Profit



WATERFORPROFIT

## When and for how long should I irrigate?

### Row crop micro-irrigation systems (drip) without overlap of water from emitters along the row

#### You need to know:

- how much water is available in the soil? (requires soil texture, decision on the maximum level of water stress to be applied to the crop and a measure of the crop rooting depth)
- how much water should the crop be using? (requires type of crop, stage of crop growth, measure of climatic conditions including evaporation)

#### Step 1: you need to calculate the readily available water (RAW) in the crop root zone.

Soil type (texture):	Crop rooting depth:	
	Month 1:	m
Crop stress willing to be applied: kPa	Month 2:	m
	Month 3:	m
	Month 4:	m

Table 1: effect of soil texture on readily available water content

Soil Texture	Readily Available Water (mm <sub>water</sub> per m <sub>soil</sub> ) between field capacity and;					
	Crop Stress Level	-20 kPa	-40 kPa	-60 kPa	-100 kPa	-200 kPa
Sandy		30	35	35	40	45
Loamy Sand		45	50	55	60	65
Sandy Loam		45	60	65	70	85
Loam		45	65	75	85	105
Sandy Clay Loam		40	60	70	80	100
Clay Loam		30	55	65	80	105
Light Clay		27	46	57	70	90
Medium Clay		24	43	55	65	83
Heavy Clay		21	40	53	60	81

#### To calculate the RAW in the crop root zone

$$= \text{RAW (in mm/m)} \times 3.14 \times \text{radius} \times \text{radius (in m)} \times \text{crop rooting depth (in m)}$$

$$\text{Early} \quad \text{mm/m} \times 3.14 \times \quad \text{m} \times \quad \text{m} \times \quad \text{m} = \quad \text{L/emitter}$$

$$\text{Mid} \quad \text{mm/m} \times 3.14 \times \quad \text{m} \times \quad \text{m} \times \quad \text{m} = \quad \text{L/emitter}$$

$$\text{Late} \quad \text{mm/m} \times 3.14 \times \quad \text{m} \times \quad \text{m} \times \quad \text{m} = \quad \text{L/emitter}$$

#### To calculate the RAW available per unit length of lateral

$$= \text{RAW (L/emitter)} \div \text{emitter spacing (in m)}$$

$$\text{Early} \quad \text{L/emitter} \div \quad \text{m} = \quad \text{L/m of row}$$

$$\text{Mid} \quad \text{L/emitter} \div \quad \text{m} = \quad \text{L/m of row}$$

$$\text{Late} \quad \text{L/emitter} \div \quad \text{m} = \quad \text{L/m of row}$$



## When and for how long should I irrigate? Continued

**Step 3: use the data from steps 1 and 2 to work out the expected period between irrigations for each month**

<b>Readily available water (in soil) ÷ crop water use = irrigation interval</b>			
Early:	L/m of row ÷	L/day/m of row =	days
Mid:	L/m of row ÷	L/day/m of row =	days
Late:	L/m of row ÷	L/day/m of row =	days

### Calculating how long to irrigate

**You need to know:**

- Readily available water content of the area/volume wetted by the irrigation system
- Water application rate or discharge from the irrigation emitter/sprinkler

**Step 1: you need to calculate the readily available water (RAW) in the crop root zone.**

Use the same steps as for Step 1 in the section calculating when to irrigate above.

**Step 2: measure the discharge from your irrigation application nozzle/emitter**

Discharge (L/hr) =	
volume in container (in litres) ÷	time to fill container (in minutes) x 60 mins/hr
L ÷	mins x 60 mins/hr
Discharge rate =	L/hr
To calculate the discharge per metre of tape:	
Discharge rate (L/m/hr) =	discharge rate (L/emitter/hr) ÷ emitter spacing (m)
=	L/emitter/hr ÷ m
=	L/hr/m of row

**Step 3: use the data from steps 1 and 2 to calculate how long to irrigate.**

To calculate the period of irrigation			
= readily available water (L/m of row) ÷ discharge (L/hr/m of row)			
Early:	L/m of row ÷	L/hr/m of row =	hrs
Mid:	L/m of row ÷	L/hr/m of row =	hrs
Late:	L/m of row ÷	L/hr/m of row =	hrs

For more details contact the Growcom members access line on 1800 654 222

**Disclaimer:** This information is provided as a reference tool only. Seek professional advice for irrigation specifics.



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