

WHY IS IRRIGATION IMPORTANT?

- Avocados are native to the humid sub-tropical and tropical regions of central and northern South America where rainfall is abundant
- In California avocados are grown in an arid Mediterranean climate with a low rainfall
- For best growth and yields avocado trees need a minimum amount of water each year, approximately 40-50 inches of rain
- A lack of water can reduce yields
- Irrigation can be the greatest cost of production so needs to be used as efficiently as possible
- The exact amount of water differs for each grove due to differences in soil type, micro-climate tree size and health, and the aspect of the grove
- The avocado tree does not search for water therefore water needs to be provided to the trees at the right times
- Moist soils are needed to support the large numbers of roots needed for healthy trees
- Most of the avocado roots are in only the top six inches of soil and are under the canopy out to the drip line
- The soil where the roots are is prone to drying out



WHEN TO IRRIGATE:

- Before the trees become water stressed
- At key phenological times like flowering and fruit set followed by the rapid fruit growth phase
- Deciding when to irrigate can be done using weather-based methods, soil-based schedules or a fixed frequency every so many days
- Often the depth of irrigation matches the location of the avocado roots
- To calculate the amount of water and the best irrigation schedule for your grove, the CIMIS system can be used to calculate the daily water use
- Access CIMIS through the website: www.cimis.water.ca.gov/cimis/welcome.jsp
- To further refine the amount of irrigation water needed for your grove measure the soil moisture directly then make adjustments to the CIMIS calculations



- Properly maintained 12" and 24" tensiometers can be used for direct soil measurement to refine when to start irrigating and to see if you are over irrigating
- Depending on the soil type irrigation can generally start when 12" tensiometers read 25-30 centibars, earlier if the soil is very sandy and later if the soil has high clay content



HOW MUCH WATER TO USE:

- Over irrigation often occurs in California avocado orchards which wastes growers money and can be harmful to tree health
- Avocado roots are sensitive to water logging where they can drown
- Different soils need different amounts of water as sandy soils hold less water and have less lateral movement of water than clay based soils

Tree age (years)	Approximate Irrigation Water Needs in Gallons per Tree per Day (add extra water for leaching, inefficiency and very hot weather)											
1	1	1	2	3	4	5	6	5	4	2	1	1
2	2	2	4	6	8	10	12	10	7	5	3	2
3	3	3	6	9	12	14	17	15	11	7	4	3
4	4	4	8	12	15	19	23	20	14	9	5	4
5	5	5	10	15	19	24	29	25	18	11	6	5
6	6	6	12	18	22	28	34	30	21	14	8	6
7	7	7	14	21	26	33	40	35	24	16	9	7
8	8	8	16	24	30	38	46	40	28	18	10	8
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Source: Avocado Growers Handbook, Frank D. Koch, 1983.

- Use less water on sick or defoliated trees as they have smaller root systems than healthy trees
- Take care not to irrigate for too long on slopes or there is a risk of washing soil away
- Large and small trees require different amounts of water, enough water for a large tree with a good layer of mulch can be less than for a small tree

HOW TO APPLY THE WATER:

- The efficiency of the irrigation system is important, aim for about 80% efficiency with a high distribution uniformity
- Most California growers use under tree individual low-volume sprinklers for high distribution uniformity and to minimize over-wetting the soil potentially spreading root rot
- Many growers irrigate in 24 hour increments
- The design of an irrigation system is a job for a professional, seek advice when deciding what irrigation system to install



SAVING WATER:

- Cap off sprinklers to diseased and damaged trees
- Stump canopied trees
- Thin crowded groves before they canopy over
- Top-work over from an undesirable to a desirable variety
- Apply mulch and remove weeds
- Keep skirts low on the trees
- Check and recheck your irrigation system for leaks and measure the sprinkler output as meeting design specifications

FURTHER READING:

Avocado Growers Handbook, Frank D. Koch, 1983.

Irrigation and Mineral Nutrition, E. Lahav and A.W. Whiley, *The Avocado: Botany, Production and Uses*, 2002, CAB International Publisher