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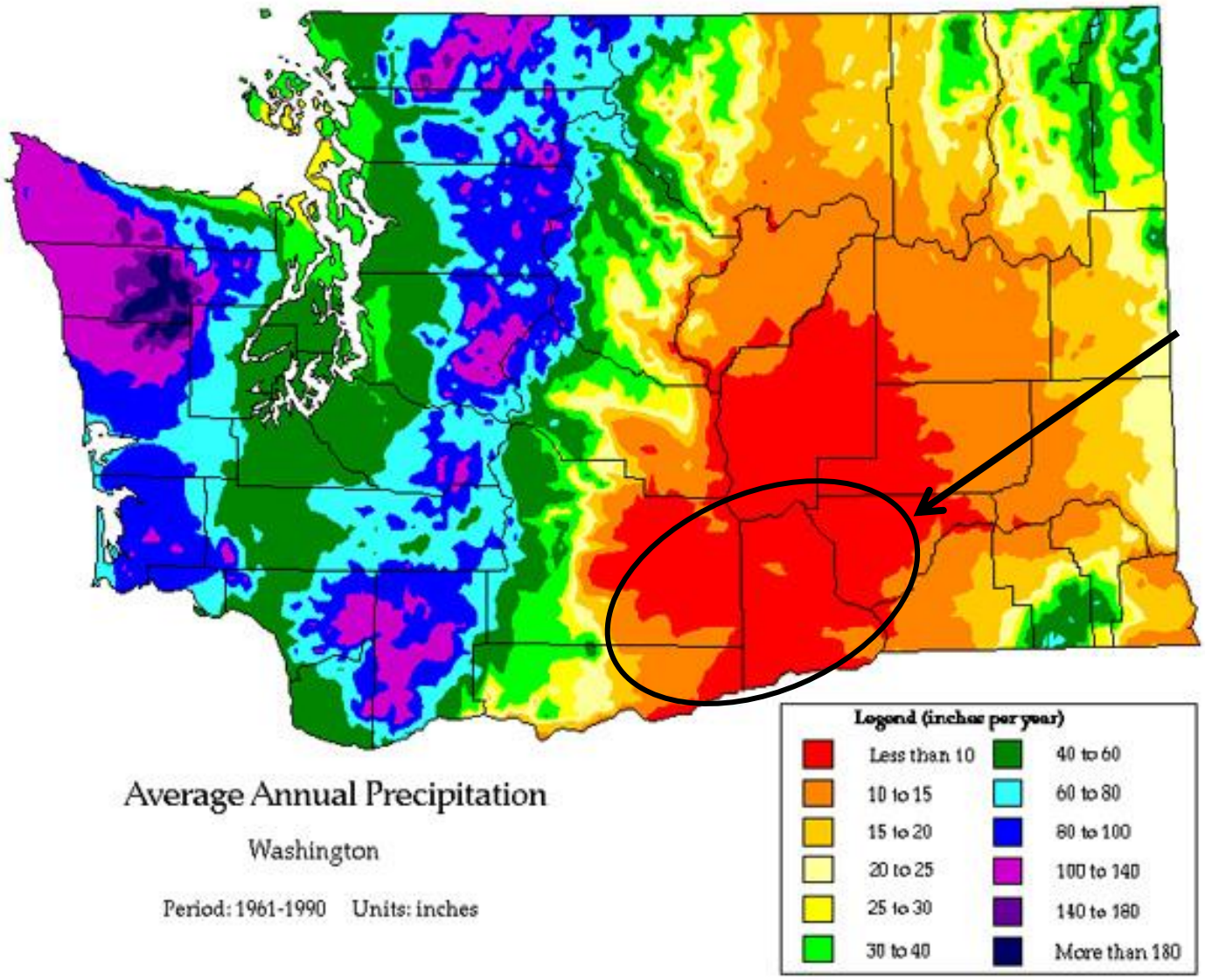
Peach Irrigation During the Dry Seasons

Hemant Gohil, Ph.D.

Gloucester County Agricultural Agent

Co-operative Extension of Rutgers University

Annual precipitation in Washington State



The largest and premium quality apple growing region

http://www.prism.oregonstate.edu/state_products/index.phtml?id=WA

Water affects peach tree and fruit development

- Greater wood structure, potential fruitfulness and fruit sizing
- Replenishing the water lost due to ET
- Fruit gains up to 70% of their final volume during the last 30 days on the tree.
- Less water during this stage of development means smaller fruits and loss in size is irreversible

When to Irrigate
(depends on water stress)

How much to Irrigate
(soil type, irrigation system, age of tree)

How long to Irrigate
(irrigation system and soil type)

Approaches to estimate water stress

- Feel and appearance based
- Soil based (e.g. Tensiometer, resistance)
- Plant based (e.g. Pressure chamber)
- Irrigation model based (e.g. NEWA)

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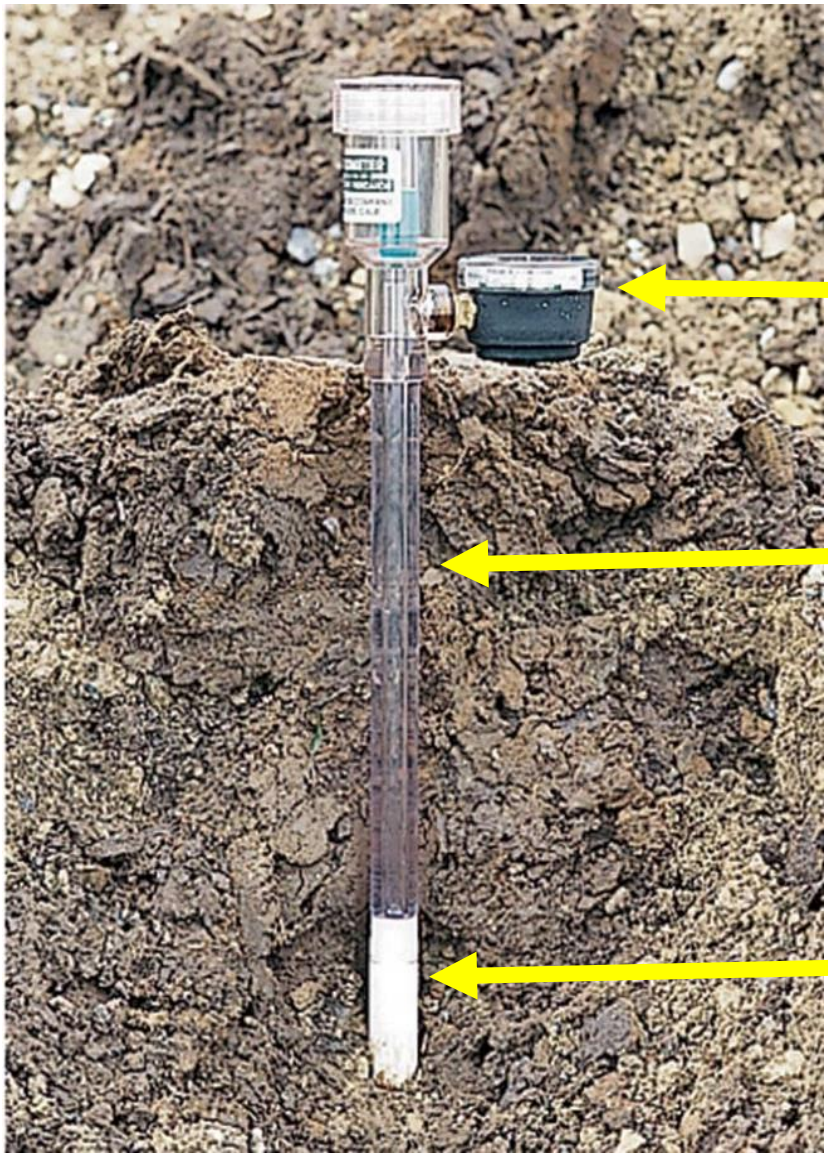
Soil Tensiometer indicates water status from the soil's point of view



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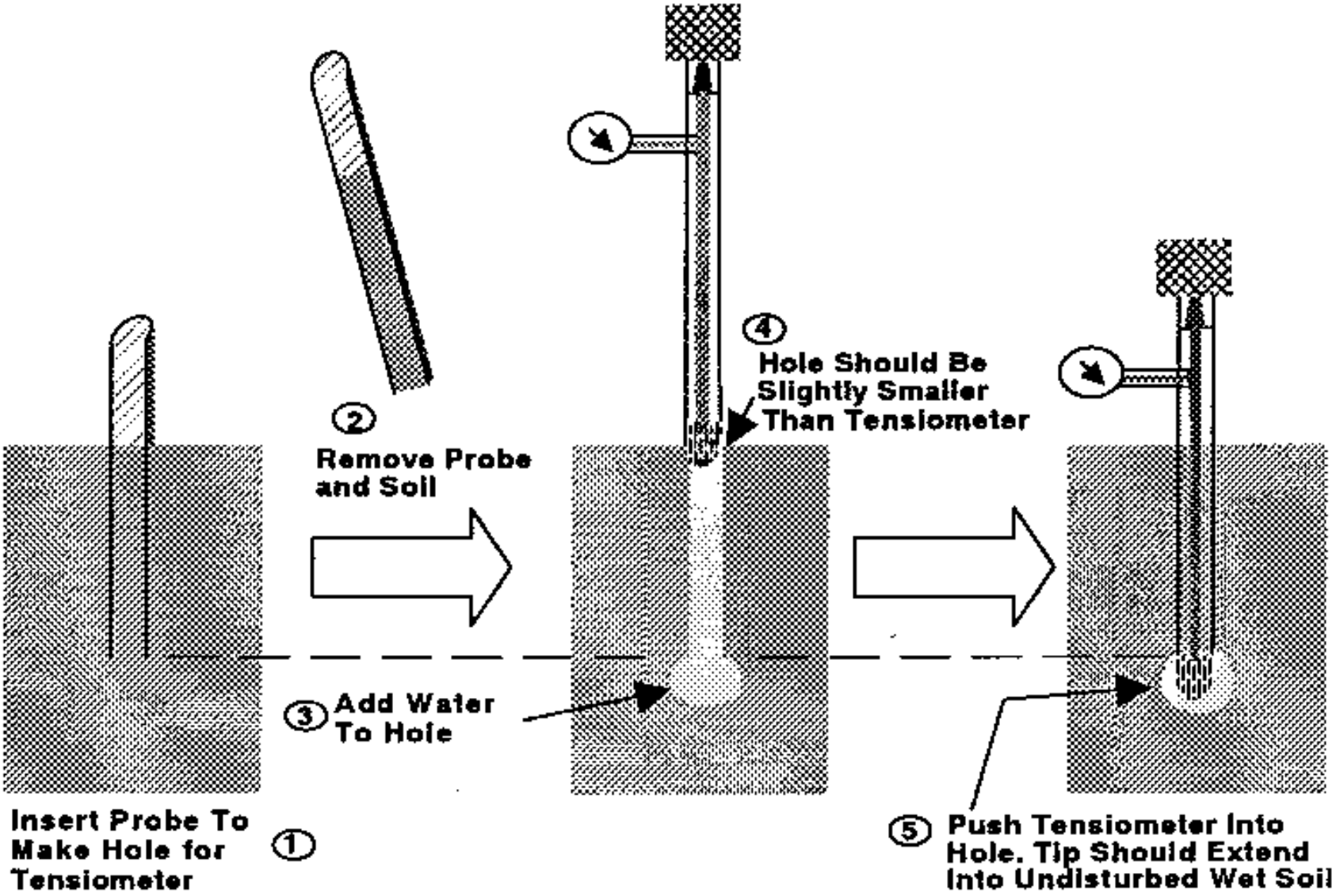
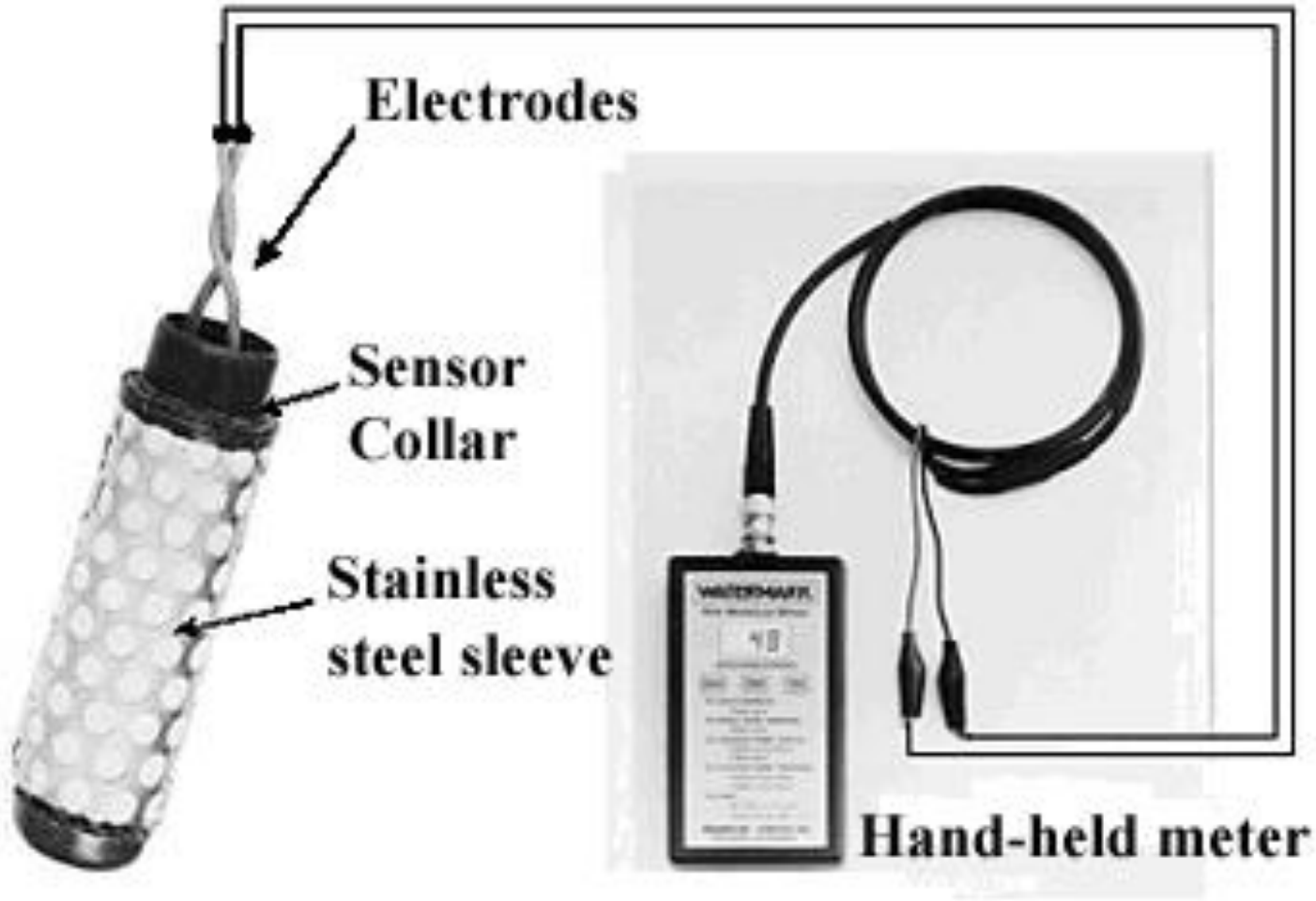
Installation of Tensiometer



https://www.bae.ncsu.edu/programs/extension/evans/ag452-2.html

Electrical resistance blocks



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Soil sensor reading and their meanings

Reading (centibars)	Soil water status	Interpretation
0-10 *Cbr	Saturated	No Stress. Water should be drained.
10-20 Cbr	Field capacity	No Stress. No Irrigation needed.
30-70 Cbr	Limited	Mild-moderate stress. Irrigate depending on soil type.
>70 Cbr	Too dry soil	High-severe stress. Irrigate to Field Capacity.

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Begin Irrigation at 50% moisture depletion

Soil Type	Apprx. centibars reading at 50% moisture depletion
Sand	20 Cbar
Loamy Sand	25 Cbar
Sandy Loam	40 Cbar
Loam	65 Cbar
Silt Loam	90 Cbar

Challenges to soil based sensors

- Manual, requires regular visits
- Regular maintenance (Tensiometer)
  - Purging the air bubble
  - Maintain the water level
  - Organic growth in the tube
  - Interpretation of number
- Annual replacement (resistance block)

Use advanced soil sensors

newer Tensiometer with data logger

newer resistance sensors with data logger

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Pressure Chambers indicate water stress from plants point of view

pressure bomb

Pump-up chambers


IPM

Stem Water Potential values and their meaning

Leaf Water Potential	Interpretation
less than -10 Bars	no stress
-10 to -12 Bars	mild stress
-12 to -14 Bars	moderate stress
-14 to -16 Bars	high stress
above -16 Bars	severe stress

Need transportation for pressure chamber..

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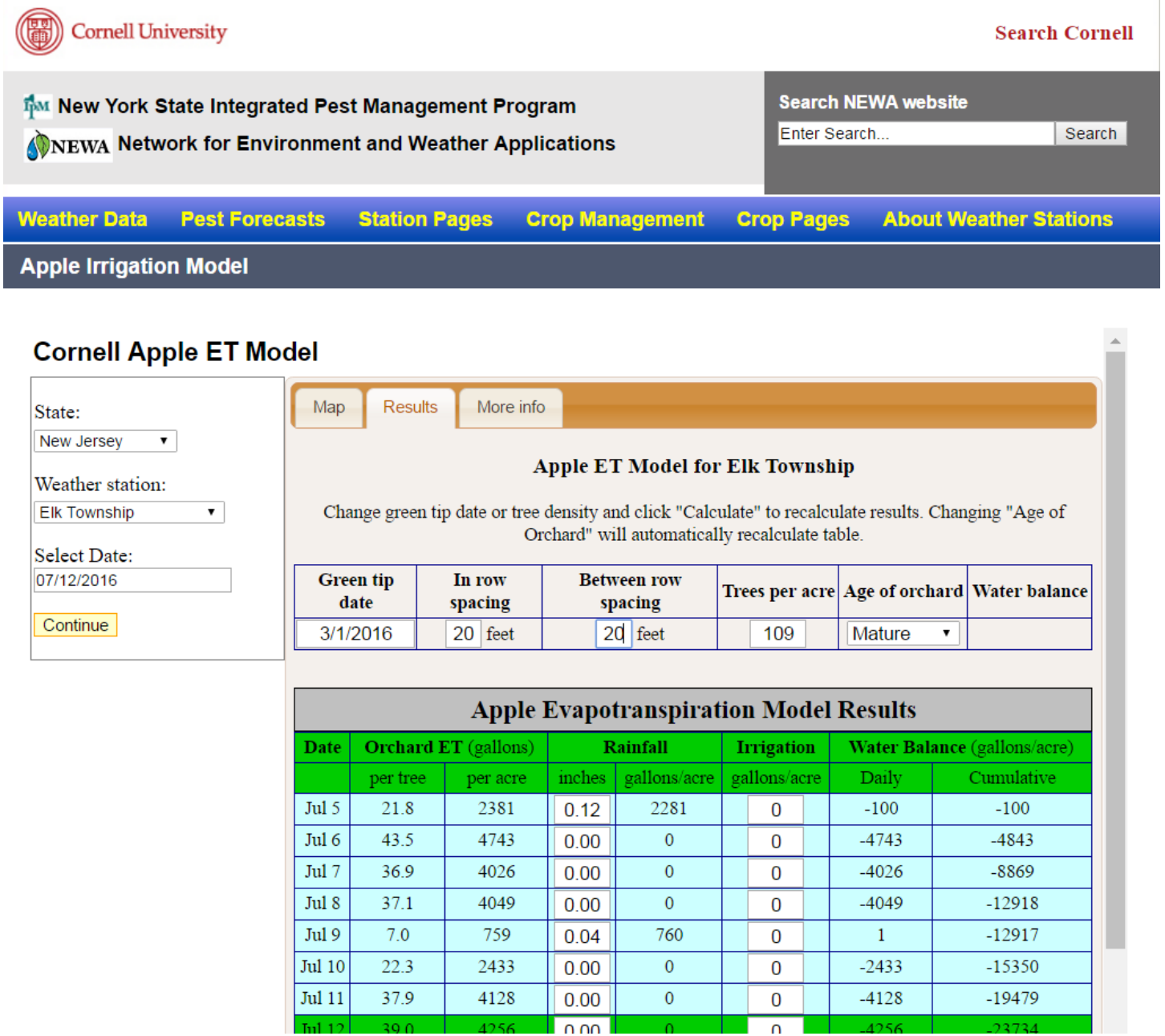
How much to Irrigate in dry season?

- Irrigation amount depends on environmental factors, spacing, stage of growth and an age of a peach tree.

  Mature = 30-45 Gallon/tree/day
  3 Year = 10-20
  4 Year = 20-30
  2 Year = 7-10
  1 Year = 2- 5

- Monitoring the weather



The water use by fruit trees is amazingly similar between tree fruit species – University of California ANR

Table 1: Example of duration of irrigation in peach and apple orchard during the peak of the season

Age	Water requirement	Spacing	Hours based on emitters flow rate		Micro sprinkler flow rate
	Gallons Per Tree		1.0 GPH **x 4***	2 GPH **x 4**	10 GPH **x 1**
Mature	30 - 40 G		8 - 10	4 -5	3 - 4
4	20 - 30 G		5 - 8	3 - 4	2 - 3
3	10 - 20 G	20' x 20'	3 - 5	2 - 3	2 - 1
2	7 - 10 G		2 - 3	1 -2	0.5 - 1
1	2 - 4 G		1 - 2	0.5 - 1	0.3 - 0.5
			1.0 GPH **x 2**	2 GPH **x 2**	5 GPH **x 1**
Mature	10 - 12 G		5 - 6	3 - 4	2 - 3
4	8 - 10 G		4- 5	2 - 3	1.5 - 2
3	6 - 7 G	6' x 12'	3- 4	1 - 2	1 - 1.5
2	2 - 3 G		1-2	0.5 - 1	0.5
1	1 - 2 G		0.5 -1	0.5	0.5

* Number of emitters

Application rates should be based on soil type

Soil Type	Maxi application rates to avoid run-off or deep percolation loses.
Sand	1.0”/hour
Loamy Sand	0.7”/hour
Sandy Loam	0.5”/hour
Loam	0.4”/hour
Silt Loam	0.3”/hour

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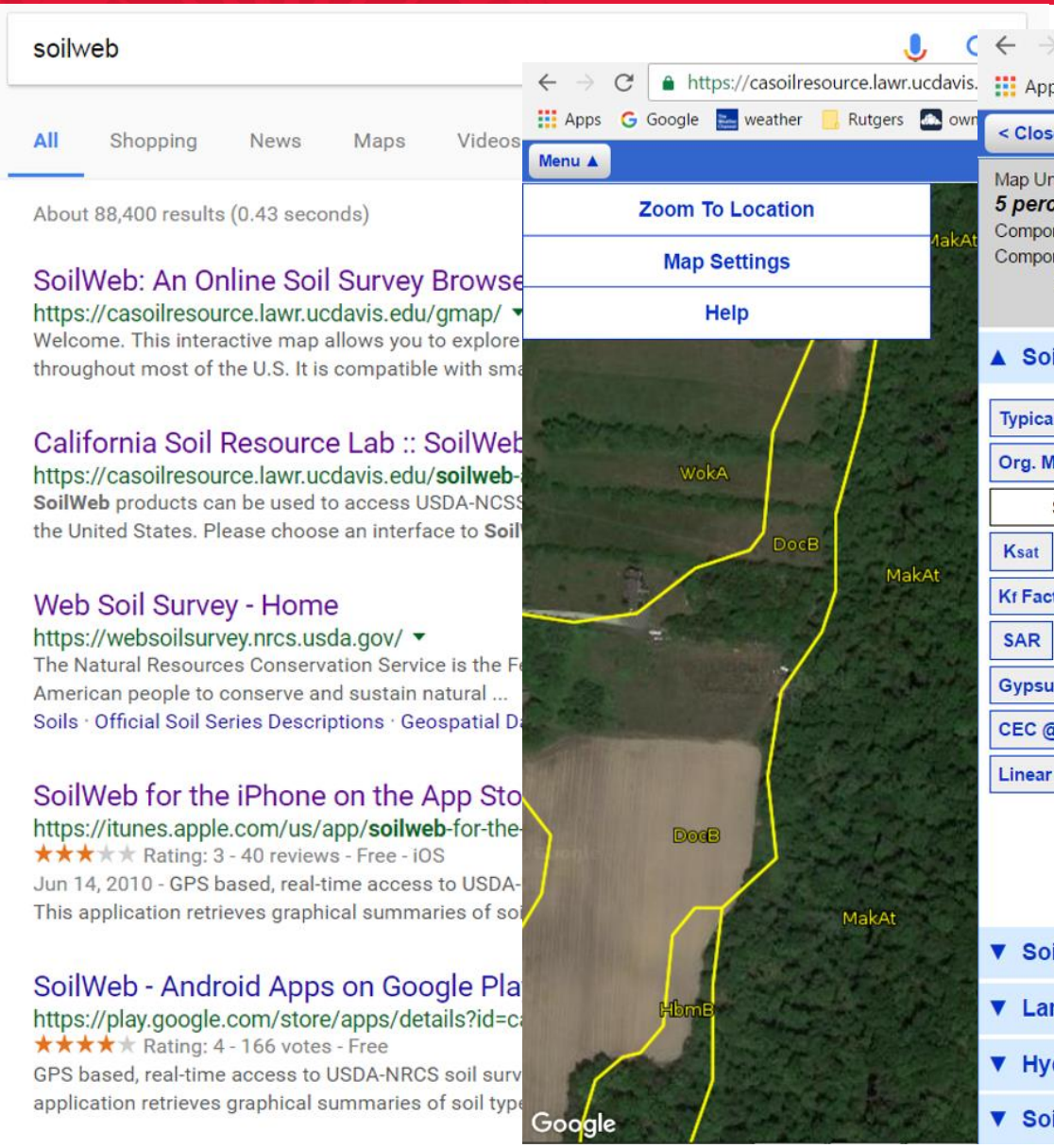
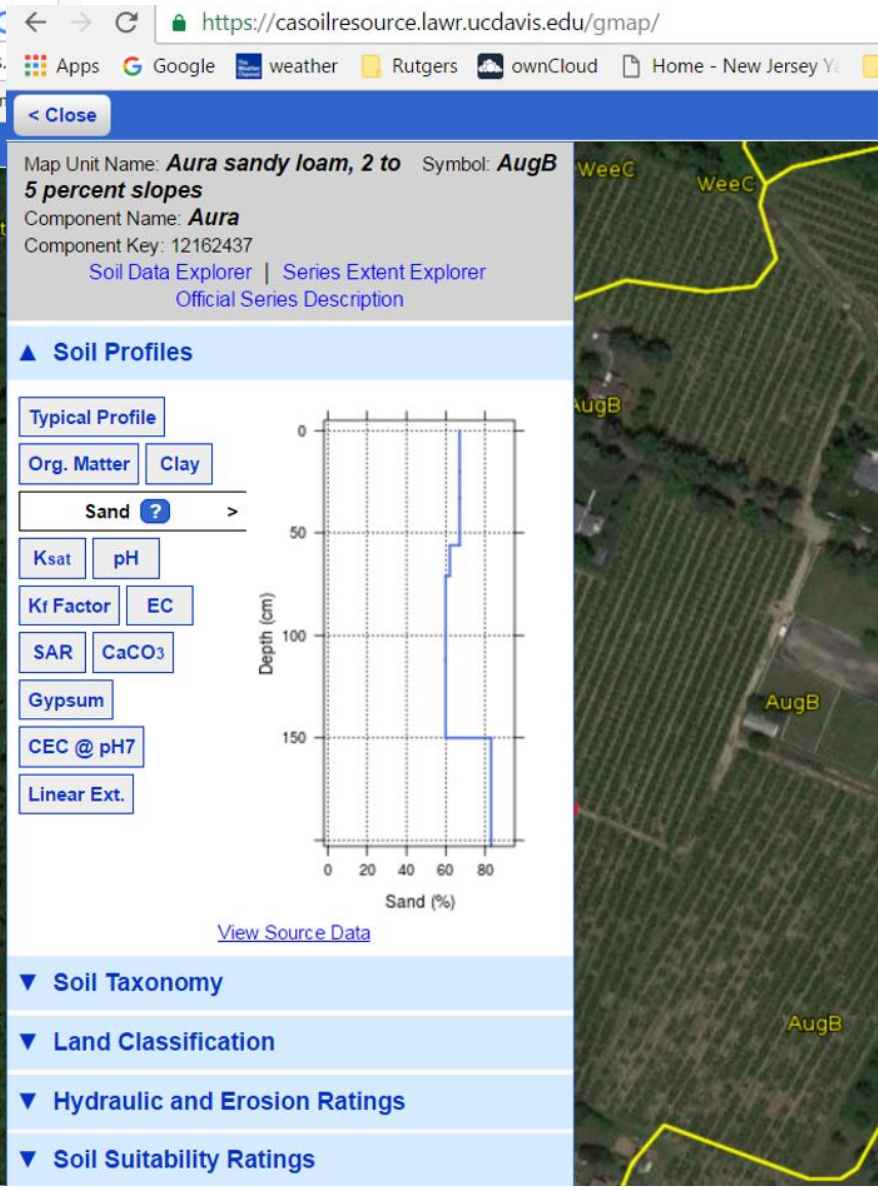
Know you soil profile





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Follow soil moisture conservation practices in dry season

- Fertilize lightly
- Shoot thin heavily
- Reduce weed growth and active cover crop
- Check the efficiency of irrigation systems

Thanks

Dr. Daniel Ward.