Managing Brigation in 2020

Terence Robinson and Mario Miranda Dept. of Horticulture, Cornell University







The Need for Irrigation in 2020:

• Since May 18 soils moisture in WNY has been decreasing with limited rainfall in June and July.

Water Balance in 2020 (so far) for a Mature Tall Spindle Orchard (3X12ft)



Water Balance in 2020 for a Mature Tall Spindle Orchard (3X12ft) – Orleans County

Water Balance in 2020 (so far) for a Mature Tall Spindle Orchard (3X12ft)



Water Balance in 2020 for a Mature Tall Spindle Orchard (3X12ft) – Wayne County

The Need for Irrigation in 2020:

- Since May 18 soils moisture has been decreasing with limited rainfall in June and July.
- Fruit size has already been slightly reduced in unirrigated orchards.
 - Unirrigated NY1=35.7g, Gala=37.6g
 - Irrigated NY1=39.2g. Gala=38.1g
- If the drought continues, fruit size will be reduced considerably at harvest.



Effect of Irrigation on Fruit Growth

Using the Cornell Apple Irrigation Model via the Web:

Grower chooses weather station

(NEWA)

Cornell Web Server _____ Evapotranspiration Model (scales output for orchard age and for leaf area development)

Grower inputs: Green tip date Tree spacing (in-row x between row) Orchard age



Model Provides:

Water balance daily since bud break

Forecasts water balance for 7 days

NEWA Apple ET Model



NEWA Apple ET Model

Weather Station: Williamson (Demarree) + Select Date: 07/08/2012 Continue	Map Result Change green t	ts Help Apple tip date or tree d Orci	ET Model for Wi ensity and click "Cal hard" will automatics	lliamson (Den lculate" to recalc ally recalculate t	narree) culate results. Cha table.	nging "Age of
	Green tip date	In row spacing	Between row spacing	Trees per acre	Age of orchard	Water balance
	3/18/2012	3 feet	12 feet	1210	(Mature \$)	

Apple Evapotranspiration Model Results											
Date	Model ET (liters/tree)	Orchard ET (liters/tree)	Orchard ET (gallons/acre)	Rainfall (inches)	Available Rainfall (gallons/acre)	Water Balance (gallons/acre)					
Jul 1	24.07	10.3	3294	0.00	0	-3294					
Jul 2	31.92	13.66	4368	0.00	0	-4368					
Jul 3	20.25	8.67	2771	0.00	0	-2771					
Jul 4	34.99	14.98	4788	0.00	0	-4788					
Jul 5	30.88	13.22	4226	0.00	0	-4226					
Jul 6	33.82	14.48	4628	0.00	0	-4628					
Jul 7	15.19	6.5	2079	0.20	3802	1723					
Jul 8	30.33	12.98	4150	0.00	0	-4150					
Jul 9	33.01	14.13	4517	0.00	0	-4517					
Jul 10	31.96	13.68	4373	0.02	380	-3993					
Jul 11	35.32	15.12	4833	0.00	0	-4833					
Jul 12	29.31	12.55	4011	0.00	0	-4011					
Jul 13	28.90	12.37	3955	0.00	0	-3955					
Jul 14	31.48	13.48	4308	0.00	0	-4308					

You can enter your own rainfall amounts and click "Calculate" to recalculate the water balance.

newa.cornell.edu (under crop management menu) or malusim.org



NEWA

Using the Model: Replace water lost each week



Water loss on hot days for a mature Tall Spindle orchard is = 4,000-5000 gal/day

Available water in the soil varies by soil type Sand=27,000 gal/acre ~ 7days supply Loam=81,000 gal/acre ~ 20 days supply Clay=108,000 gal/acre ~ 27 days supply

The last available water (bottom of tank) is harder to extract than the first available water (top of the tank

Using the Model: Keep the Tank Full or 90% Full

Wait to begin irrigating until 5,000-10,000 gal/acre has been used

Sand=27,000 gal/acre Loam=81,000 gal/acre Clay=108,000 gal/acre



Water Balance in 2020 (so far) for a Mature Tall Spindle Orchard (3X12ft)



Water Balance with twice weekly replacement irrigation for a Mature Tall Spindle Orchard (3X12ft)

Water Stress with Young Trees or Nurseries

Limited root system

Rapid Leaf area development with branched trees

Highly feathered trees experience water stress in late May and June due to limited root systems and extensive leaf area

Water must be applied frequently to limit water stress on newly planted trees or in nursery.

Trickle irrigation must be installed within 2 weeks of planting



Water Balance in 2020 (so far) for a Mature Tall Spindle Orchard (3X12ft)



Water Balance in 2020 for a 1st Year Nursery (8inX3ft) – Wayne County

Water Balance in 2020 (so far) for a Mature Tall Spindle Orchard (3X12ft) Water Balance in 2020 for a Mature Tall Spindle Orchard (3X12ft) – Wayne County



Water Balance in 2020 for a 2nd Year Nursery (8inX3ft) – Wayne County

Precision Irrigation

- 1.Weekly or twice per week calculate ET for your orchard using the Cornell ET model.
- From Mid-May until Mid-June, begin irrigation when cumulative water deficit is ~5,000-10,000 gal/acre. Apply 100% of the amount used per week. Frequency of irrigation during this early period should be <u>once per week</u>.
- 3.From Mid-June to end of August apply proper amount of irrigation (100% of the amount used) <u>twice per week</u>.



What you can take home to the farm?

- Mature Tall Spindle orchards use about 4,000-5,000 gallons of water per acre on hot days.
- First year trees in the nursery or the orchard use about 400-500 gallons of water per acre on hot days.
- Second year trees in the nursery (grow-through) or orchard use about 1200-1500 gallons of water per acre on hot days
- Using the Cornell Apple Irrigation ET model to precisely replace the water used by the tree will help ensure that proper fruit size is achieved each year and will minimize bitter pit of Honeycrisp.



Cornell Cooperative Extension Lake Ontario Fruit Program

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Fruit Size Comparisons by July 3rd 2020

33

(mm)

38

NY-1										
Non-irrig	ated	Irrigated								
Fruit weight (gr)	Fruit size (mm)	Fruit weight (gr)	Fruit size (mm)							
25	36	34	39							
Gala										
Non-irriga	ted	Irrigated								
Fruit weight (gr)	Fruit size	Fruit weight (gr) Fruit siz								



Cornell Cooperative Extension Lake Ontario Fruit Program

(mm)

37

29

Next week CCE LOF Webinar on <u>Tuesday July 14</u> (noon to 1pm).

Drs. Cheng and Robinson will announce the 2020 Peel SAP Analysis for Early Prediction of Bitter Pit in 'Honeycrisp' – How to Prepare and Submit Peel Samples via CCE LOF this Season.

Link to register for the webinar:

https://cornell.zoom.us/webinar/register/WN jmcWYoA6RHyLlix DD-a3w

Thanks to our Sponsors thus far! Niagara Fresh, Inc. (Chris Bucolo), Sun Orchard Fruit Co. (Steve Riessen), Lake Ontario Fruit, Inc. (John Russell & Scott Henning), LynOaken Farms (Chris Oakes), Wayne County Fruit Sales (Scott VanDeWalle), and Pomona Packing, Inc. (Phil Smith).

July 7th, 2020

Irrigation Techniques Discussion Points

- 1. Zoning based on varietals- i.e. honey crisp & gala separated
- 2. Consolidated above ground zone valves- for efficient zone changing.



3. Run times for an acre inch

			Gallons/Acre/Hour 1 hour															
	Lateral	Gallons				Run												
	movem	for Acre			1 hour:	Time 1"			1 hour:	Run time			1 hour:	Run time			1 hour:	Run time
Spacing	ent (ft)	Inch	24" x .4	GPM	Acre/Inch	acre	24" x .6	GPM	Acre/Inch	1" acre	36" x .4	GPM	Acre/Inch	1" acre	36" x .6	GPM	Acre/Inch	1" acre
9	3	9,076.48	970.69	16.18	0.11	L 9.35	1,456.03	24.27	0.16	6.23	647.13	10.79	0.07	14.03	970.69	16.18	0.11	9.35
10	3	8,168.83	873.62	14.56	6 0.11	L 9.35	1,310.43	21.84	0.16	6.23	582.41	9.71	0.07	14.03	873.62	14.56	0.11	9.35
11	. 3	7,426.21	794.20	13.24	0.11	L 9.35	1,191.30	19.86	0.16	6.23	529.47	8.82	0.07	14.03	794.20	13.24	0.11	9.35
12	3	6,807.36	728.02	12.13	0.11	L 9.35	1,092.03	18.20	0.16	6.23	485.34	8.09	0.07	14.03	728.02	12.13	0.11	9.35
13	3	6,283.71	672.02	11.20	0.11	L 9.35	1,008.02	16.80	0.16	6.23	448.01	7.47	0.07	14.03	672.02	11.20	0.11	9.35
14	. 3	5,834.88	624.01	10.40	0.11	L 9.35	936.02	15.60	0.16	6.23	416.01	6.93	0.07	14.03	624.01	10.40	0.11	9.35
15	3	5,445.89	582.41	9.71	0.11	L 9.35	873.62	14.56	0.16	6.23	388.28	6.47	0.07	14.03	582.41	9.71	0.11	9.35
16	3	5,105.52	546.01	9.10	0.11	L 9.35	819.02	13.65	0.16	6.23	364.01	6.07	0.07	14.03	546.01	9.10	0.11	9.35

4. Sub-surface drip

Benefits:

- Water more beneficially used by the tree and not surface weeds
 - Out of the way from above ground implements
 - Emitters are designed to be buried; anti-clogging, self-cleaning, antisiphon

