

# Strawberry Systems at Brookdale



By Trevor Hardy and Zoe Stapp  
Brookdale Fruit Farm Inc



# Brookdale History

- Brookdale Fruit Farm established in 1847
- Currently managed by the 6<sup>th</sup> and 7<sup>th</sup> generations
- Farming hundreds of acres
  - Certified Organic 6+ Acres
- 4 major business units
  - Wholesale, Retail, Pick Your Own, Farm Supplies







1. Planting systems
2. Irrigation Systems
3. Soil Moisture
4. Renovation
5. Mulching





# Planting

- June bearing matted row Process
  1. Lay black bio360 4-4000 0.6 mil with eafc5150850 flow control drip tape and special blend dual coated fertilizer for timed slow releases during growing season
  2. Transplant double row 12 inches through bio with water wheel.  
Note plant root care and J rooting.
  3. Specs 6' row centers transplanted in 12 inch spacing double row





# Why Bio System

- First Season Weed control biggest expense strawberry establishment
- Using bio allows plants to warm and grow with less competition
- Runner setting process uses Hillside cultivator or pitchfork to poke holes right before run in bio for establishment
- Cleaner weed free field
- Between rows mulch or weed mat
- Need dual coated slow release fert







Overhead Meganet

BIO

Drip



- Raised bed June bearing production 2<sup>nd</sup> and 3<sup>rd</sup> year renovation need to throw dirt on crowns. Only works with hillside cultivator
- Plants can grow very well dry years need to control row to row plant growth
- Bio plastic in active soils can break down too soon need pick correct thickness
- Elevates plants for weather conditions such as excessive rain allows water to drain



# Why Need raised beds





# Overhead Irrigation



Frost Protection

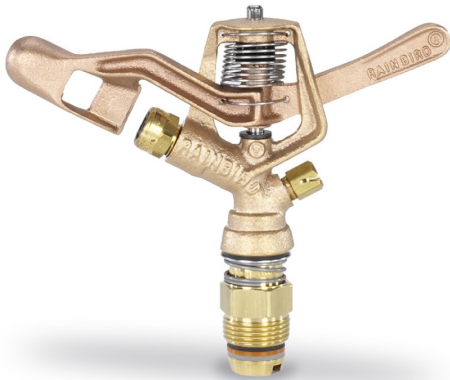
Heat released as water freezes

Spacings 30 x 30 48 sprinklers/ acre

60 x 60 13 sprinklers / acre

Target range 80 to 90 GPM per acre

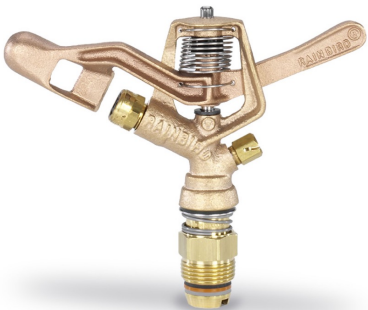
Depends site location and weather





- Gaskets
- Run over pipe
- Sprinkler plugs
- Sprinkler springs
  - Break or ice up
- Sprinkler nozzles clog

233B



2 inch to 6 inch CLO Clamp  
on Hook Latch repair coupling



# MEGANET Sprinklers

Frost protection apples, blueberry, strawberry  
Seed germination Carrots, radish, lettuce  
General Overhead Irrigation

Precise application of overhead  
water at 90%+ uniformity  
conserves water by having  
shorter run time



MegaNet Sprinkler



MEGANET SPRINKLER UNIFORMITY - HIGH TRAJECTORY - 24°																
UPRIGHT POSITION, 3.3' HEIGHT, 33 psi			SPACING BETWEEN ROWS													
NOZZLE COLOR	NOMINAL FLOW	DISTANCE BETWEEN SPRINKLERS	10'		16'		22'		28'		34'		40'			
			SQ	PR	SQ	PR	SQ	PR	SQ	PR	SQ	PR	SQ	PR		
YELLOW	0.88 GPM	10'	95%	0.89	95%	0.54	96%	0.40	85%	0.31	67%	0.26	52%	0.22		
		16'	93%	0.54	93%	0.33	91%	0.24	82%	0.19	67%	0.16	52%	0.13		
		22'	96%	0.40	91%	0.24	90%	0.18	85%	0.14	66%	0.11	50%	0.10		
		28'	85%	0.31	82%	0.19	85%	0.14	79%	0.11	66%	0.09	52%	0.08		
		34'	67%	0.26	67%	0.16	66%	0.11	66%	0.09	62%	0.07	47%	0.06		
		40'	52%	0.22	52%	0.13	50%	0.10	52%	0.08	47%	0.06	33%	0.06		
PURPLE	1.10 GPM	10'	96%	1.09	95%	0.67	94%	0.48	93%	0.38	76%	0.31	61%	0.27		
		16'	95%	0.67	94%	0.41	93%	0.30	89%	0.24	76%	0.19	61%	0.17		
		22'	94%	0.48	93%	0.30	90%	0.22	91%	0.17	75%	0.06	59%	0.15		
		28'	93%	0.38	89%	0.24	91%	0.17	89%	0.13	75%	0.11	60%	0.09		
		34'	76%	0.31	76%	0.19	75%	0.14	75%	0.11	71%	0.09	58%	0.08		
		40'	61%	0.27	61%	0.17	59%	0.15	60%	0.09	58%	0.08	46%	0.07		
GREEN	1.54 GPM	10'	99%	1.42	95%	0.89	97%	0.65	94%	0.51	92%	0.42	79%	0.35		
		16'	95%	0.89	93%	0.56	93%	0.40	92%	0.32	90%	0.26	78%	0.22		
		22'	97%	0.65	93%	0.40	93%	0.29	89%	0.23	88%	0.19	79%	0.16		
		28'	94%	0.51	92%	0.32	89%	0.23	91%	0.18	89%	0.15	76%	0.13		
		34'	92%	0.42	90%	0.26	88%	0.19	89%	0.15	84%	0.12	75%	0.10		
		40'	79%	0.35	78%	0.22	79%	0.16	76%	0.13	75%	0.10	73%	0.09		
BLUE	1.98 GPM	10'	99%	2.03	98%	1.27	94%	0.92	93%	0.73	91%	0.60	91%	0.51		
		16'	98%	1.27	98%	0.79	94%	0.59	91%	0.45	91%	0.37	91%	0.32		
		22'	94%	0.92	94%	0.58	91%	0.42	90%	0.33	85%	0.27	84%	0.23		
		28'	93%	0.73	91%	0.4	90%	0.33	85%	0.26	87%	0.21	88%	0.18		
		34'	91%	0.60	91%	0.37	86%	0.27	87%	0.21	90%	0.17	85%	0.15		
		40'	91%	0.51	91%	0.32	84%	0.23	88%	0.18	85%	0.15	79%	0.13		
BROWN	2.42 GPM	10'	99%	2.53	99%	1.58	95%	1.15	91%	0.90	88%	0.74	92%	0.63		
		16'	99%	1.58	98%	0.99	95%	0.72	91%	0.56	88%	0.46	92%	0.40		
		22'	95%	1.15	95%	0.72	92%	0.52	90%	0.41	85%	0.34	87%	0.29		
		28'	91%	0.90	91%	0.56	90%	0.41	85%	0.32	85%	0.27	90%	0.23		
		34'	88%	0.74	88%	0.46	85%	0.34	85%	0.27	86%	0.22	84%	0.19		
		40'	92%	0.63	92%	0.40	87%	0.29	90%	0.23	84%	0.19	80%	0.16		
ORANGE	2.86 GPM	10'	99%	2.68	98%	1.67	95%	1.22	90%	0.96	86%	0.79	91%	0.67		
		16'	98%	1.67	98%	1.05	95%	0.76	90%	0.60	86%	0.49	91%	0.42		
		22'	95%	1.22	95%	0.76	92%	0.56	89%	0.44	84%	0.36	86%	0.31		
		28'	90%	0.96	90%	0.60	89%	0.44	84%	0.34	83%	0.28	89%	0.24		
		34'	86%	0.79	86%	0.49	84%	0.36	83%	0.28	84%	0.23	82%	0.20		
		40'	91%	0.67	91%	0.42	86%	0.31	89%	0.24	82%	0.20	78%	0.17		
RED	3.30 GPM	10'	99%	2.80	98%	1.75	96%	1.27	91%	1.00	89%	0.83	94%	0.70		
		16'	98%	1.75	98%	1.10	96%	0.79	91%	0.63	89%	0.52	93%	0.44		
		22'	96%	1.27	96%	0.75	95%	0.58	90%	0.46	87%	0.37	90%	0.32		
		28'	91%	1.00	91%	0.63	90%	0.46	86%	0.36	86%	0.29	90%	0.25		
		34'	89%	0.83	89%	0.52	87%	0.37	86%	0.29	86%	0.24	85%	0.21		
		40'	94%	0.70	93%	0.44	90%	0.32	90%	0.25	85%	0.21	82%	0.17		

22 to 28 foot spacing

90+% uniformity

Install into drip tape header  
pipe

Cheaper than aluminum pipe

Better coverage

Built in strainer prevent  
clogging

90 GPM to acre for frost

48 sprinklers per square acre

6 laterals per square acre







# Flexnet Header

- Multi purpose hose
  - Sprinkler
  - Drip
- Holes close as 3'
- Light easy to move
- Easy repair hose clamp & barbed coupler
- 2 inch thru 8 inch





# Flexnet Winder





# Frost with meganet







# Flexnet Meganet vs Pipe

- Drive over header / lines
- Repairs with barbed coupler clamps
- Threaded plastic install
- Light weight
- Hydraulic retrieve
- Custom lateral lengths
- Solid pipe limit access field
- Reduced line friction
- Pipe gaskets
- Longer to install
- Requires more fittings



# Strawberries Drip





# Flow Control Drip Tape



## ADVANTAGE

1

## MORE UNIFORM OUTPUT FOR ANY TERRAIN

### STANDARD TAPE

Standard tapes stress plants and reduce yield and efficiency by over- or under-watering as pressure changes throughout the run.

**RESULT:** Wasted water and fertilizer, stressed plants and reduced yields.

### AQUA-TRAXX® FC

Toro Aqua-Traxx FC gives you uniform output regardless of elevation changes. So now you can adjust the amount of water you give your plants on hilly terrain, and they'll all receive the same amount through our uniform delivery system.

**RESULT:** More uniform plants and higher yields even in hilly terrain that might otherwise be impractical to farm.





# UNIFORMITY

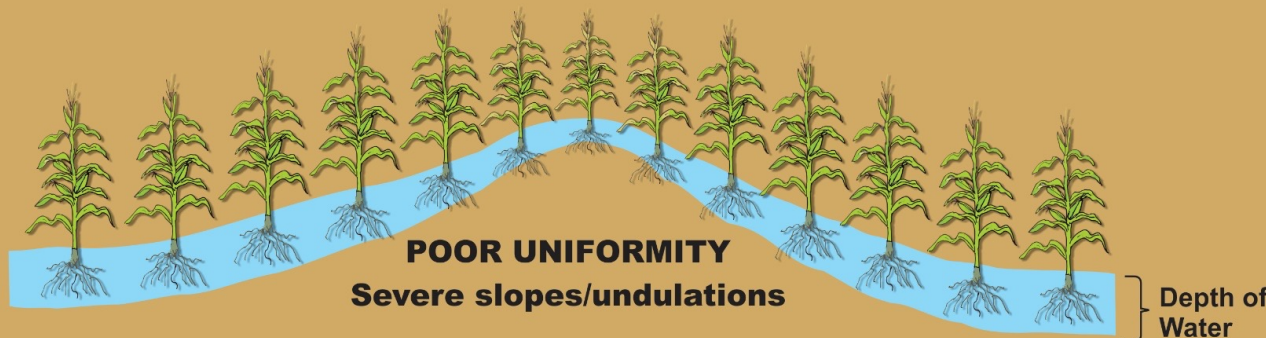
## Needed for Successful Irrigation



**GOOD UNIFORMITY**

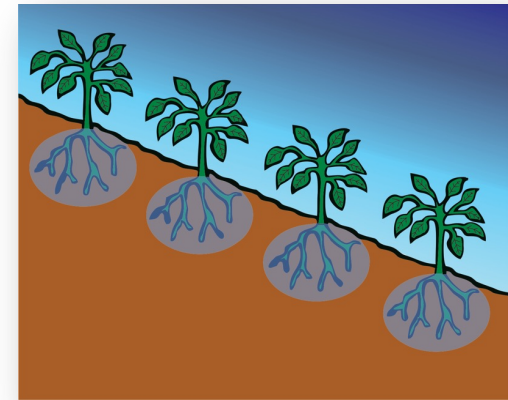


**POOR UNIFORMITY- Dripline Length-of-Run Too Long**

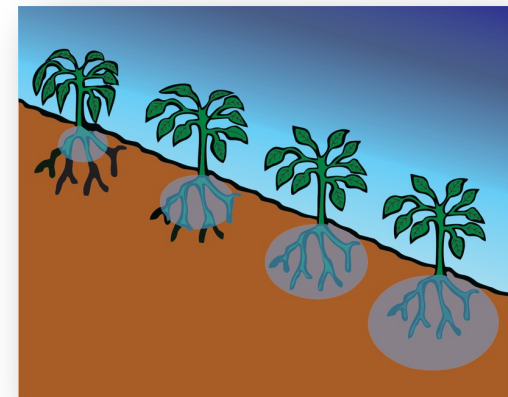


**POOR UNIFORMITY  
Severe slopes/undulations**

TORO FP 1/2015



*Moderating Emitters  
(Flow Control)*



*Non-Compensating  
Emitters*

# Flow Control Length

## 5/8" DIAMETER

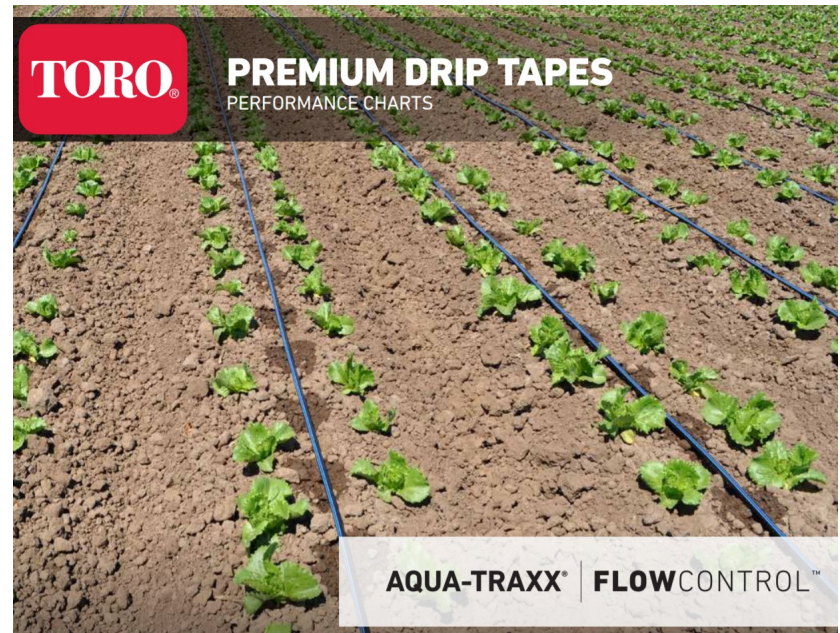
Length of Run (ft) @ 10 psi for 90% EU

Q-100	Slopes				
	-2%	-1%	0%	+1%	+2%
0.09	240	456	1441	1874	318
0.11	259	481	1298	1719	368
0.13	237	442	1148	1523	337
0.14	256	462	1074	1424	1249
0.17	255	454	999	1324	1216
0.22	249	424	835	1095	1074
0.25	246	411	762	987	996
0.28	243	397	699	910	924
0.29	243	392	687	885	907
0.30	243	387	674	874	896
0.34	240	381	645	824	849
0.38	236	362	586	737	774
0.42	231	347	544	683	772
0.44	231	343	537	674	712
0.45	230	341	524	650	695
0.50	224	324	487	608	649
0.56	218	311	449	555	597
0.66	212	291	410	499	537
0.67	212	293	412	505	544
0.84	196	261	349	418	449
0.88	193	256	341	406	437
0.90	193	255	337	399	431
1.00	187	240	312	372	399
1.12	180	228	291	341	368
1.33	169	211	262	305	330
1.34	168	209	259	299	324
1.68	155	186	224	256	277
2.65	128	145	168	187	202

## 5/8" DIAMETER

Length of Run (ft) @ 10 psi for 90% EU

Q-100	Slopes				
	-2%	-1%	0%	+1%	+2%
0.11	386	691	1568	2072	1970
0.17	374	629	1191	1547	1572
0.22	367	586	1008	1290	1338
0.25	360	555	921	1166	1222
0.30	349	524	820	1024	1085
0.34	343	504	762	949	1012
0.45	322	448	633	770	824
0.50	312	424	591	712	769
0.67	290	374	493	583	629
0.90	261	324	406	472	506





# Tape Comparisons

All tapes shows 12 inch spacing 0.45 to 0.5 gpm/100 at 10 psi 90% eu

Max Length Run

490'

492'

528'

524'

470'

501'

633'

- Rivulis (T Tape ) 515-12-450



- Rivulis (Ro Drip) 515-12-400



- Jain (Chapin dlx) 5151250



- Toro (aquatraxx) ea5151245



- Netafim (Streamlinex) slx63810212

- Irritec (Exxtreme) FND5121203

- FLOW CONTROL EAFC5151245



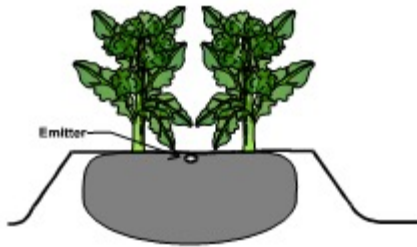
# Flush Drip Lines Spring and after Renovation



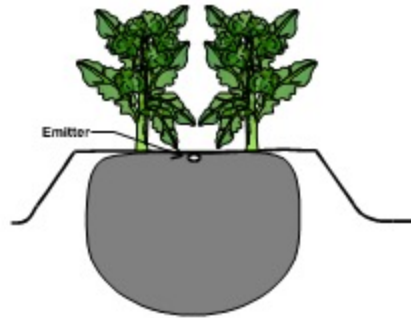


# Soil Type Considerations

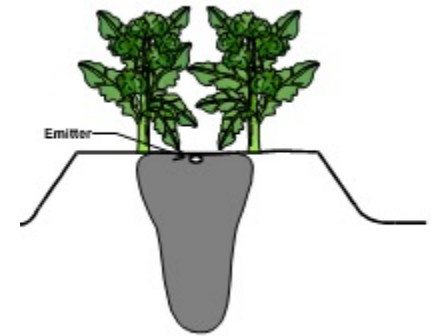
- Water holding capacity varies in different soil types CLAY LOAM SAND
- Water holding capacity helps determine drip tape emitter spacing



**Clay**  
ONE DRIP LINE



**Loam**  
ONE DRIP LINE



**Sand**  
TWO DRIP LINES



- How to check moisture level
  - Moisture meter
  - Feel method
- Trees measure at 20" and 40"
- Blues Raspberry at 12" and 24"
- Strawberry at 6" and 12"

Taking Data is only good if you act on it



**25 to 50 percent available 1.6 to 0.8 inches per foot depleted**

Slightly moist, forms a weak ball with rough surfaces, no water staining on fingers, few aggregated soil grains break away.



**50 to 75 percent available 1.1 to 0.4 inches per foot depleted**

Moist, forms a ball, very light staining on fingers, darkened color, pliable, forms a weak ribbon between the thumb and forefinger.

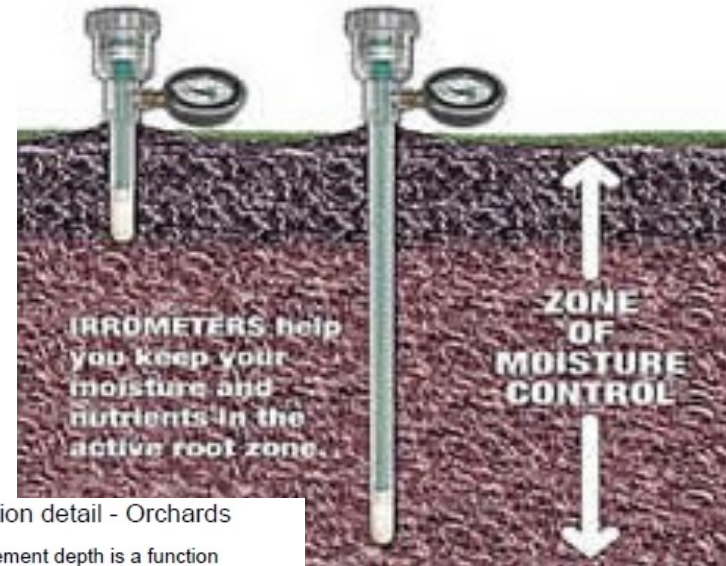


**75 to 100 percent available 0.5 to 0.0 inches per foot depleted**

Wet, forms a ball with well-defined finger marks, light to heavy soil/water coating on fingers, ribbons between thumb and forefinger.

Available Soil Moisture Percent	Coarse Texture	Moderately Coarse Texture	Medium Texture	Fine Texture
Soil Texture	Fine Sand and Loamy Fine Sand	Sandy Loam and Fine Sandy Loam	Sandy Clay Loam, Loam, and Silt Loam	Clay, Clay Loam, or Silty Clay Loam
Available Soil Moisture Percent	Available Water Capacity 0.6 to 1.2 inches per foot	Available Water Capacity 1.3 to 1.7 inches per foot	Available Water Capacity 1.5 to 2.1 inches per foot	Available Water Capacity 1.6 to 2.4 inches per foot
0 to 25	Dry, loose, will hold together if not disturbed, loose sand grains on fingers with applied pressure. SMD 1.2 to 0.5	Dry, forms a very weak ball, aggregated soil grains break away easily from ball. SMD 1.7 -1.0	Dry. Soil aggregations break away easily. no moisture staining on fingers, clods crumble with applied pressure. SMD 2.1-1.1	Dry, soil aggregations easily separate, clods are hard to crumble with applied pressure SMD 2.4-1.2
25 to 50	Slightly moist, forms a very weak ball with well-defined finger marks, light coating of loose and aggregated sand grains remain on fingers. SMD 0.9-0.3	Slightly moist, forms a weak ball with defined finger marks, darkened color, no water staining on fingers, grains break away. SMD 1.3-0.7	Slightly moist, forms a weak ball with rough surfaces, no water staining on fingers, few aggregated soil grains break away. SMD 1.6-0.8	Slightly moist, forms a weak ball, very few soil aggregations break away, no water stains, clods flatten with applied pressure SMD 1.8-0.8
50 to 75	Moist, forms a weak ball with loose and aggregated sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon. SMD 0.6-0.2	Moist, forms a ball with defined finger marks. very light soil/water staining on fingers. darkened color, will not slick. SMD 0.9-0.3	Moist, forms a ball, very light water staining on fingers, darkened color, pliable, forms a weak ribbon between thumb and forefinger. SMD 1.1- 0.4	Moist. forms a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger. SMD 1.2-0.4
75 to 100	Wet, forms a weak ball, loose and aggregated sand grains remain on fingers, darkened color, heavy water staining on fingers, will not ribbon. SMD 0.3-0.0	Wet, forms a ball with wet outline left on hand, light to medium water staining on fingers, makes a weak ribbon between thumb and forefinger. SMD 0.4-0.0	Wet, forms a ball with well defined finger marks, light to heavy soil/water coating on fingers, ribbons between , thumb and forefinger. SMD 0.5 -0.0	Wet, forms a ball, uneven medium to heavy soil/water coating on fingers, ribbons easily between thumb and forefinger. SMD 0.6-0.0
Field Capacity (100 percent)	Wet, forms a weak ball, moderate to heavy soil/water coating on fingers, wet outline of soft ball remains on hand. SMD 0.0	Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers. SMD 0.0	Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers. SMD 0.0	Wet, forms a soft ball, free water appears on soil surface after squeezing or shaking, thick soil/water coating on fingers, slick and sticky. SMD 0.0

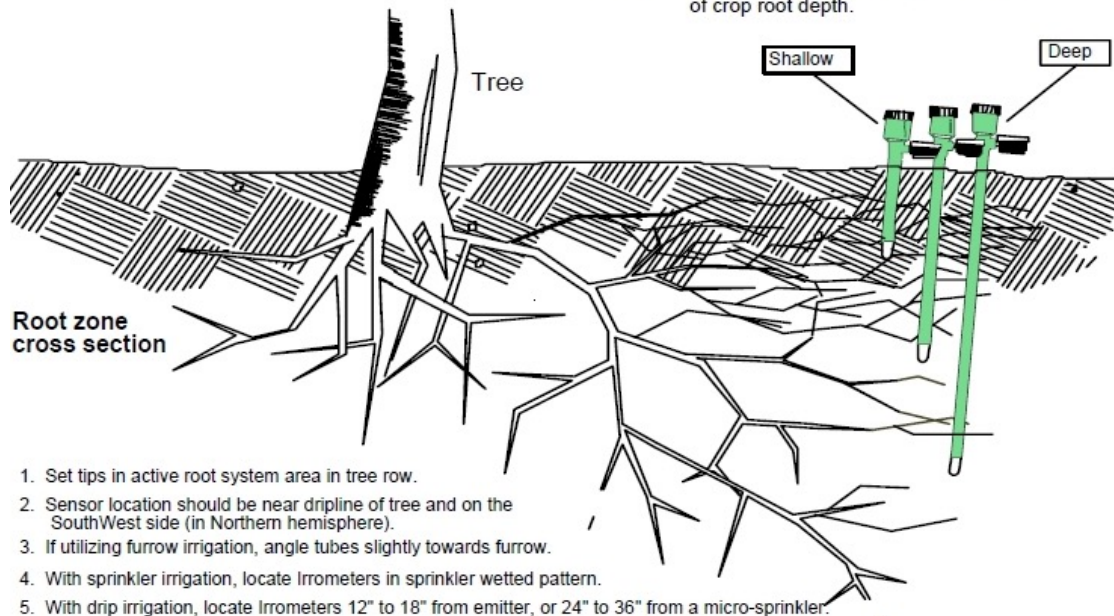




Irrometer installation detail - Orchards

**NOTE:** Irrometer placement depth is a function of crop root depth.

## Watermark and Irrometer



Watermark and Irrometer  
Scale 0 to 100  
0 is wet 100 is dry  
Above 40 turn water on  
Shut off when hit 20

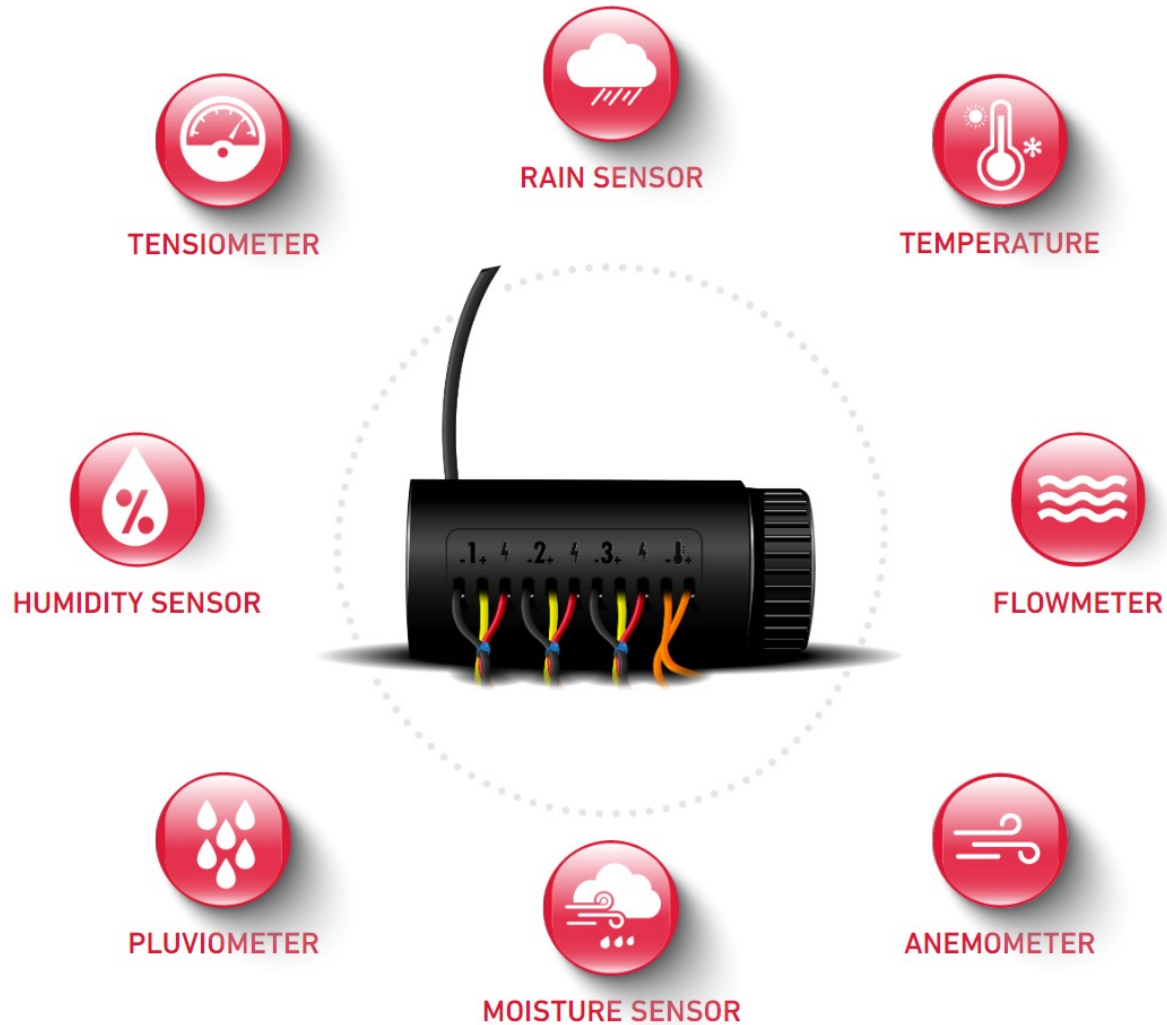


# Tempus Automation





# Tempus Automation



# Fertigation





# Spoon Feed Schedule

## FIRST YEAR ESTABLISHMENT

Stage	Fertilizer	Amount- ACRE
Transplant	12-45-10	1/2 bag (12.5 lbs)
Week 1-3	12-45-10	1/2 bag (12.5 lbs)
Week 4-SEPT	12-5-19	1/2 bag (12.5 lbs)
SEPT-OCT	15-5-30	1/2 bag (12.5 lbs)

## Year 2 and on June Bearing

Stage	Fertilizer	Amount- ACRE
April-June	26-8-15	1/2 bag (12.5 lbs)
Renovation	12-45-10	1/2 bag (12.5 lbs)
JULY-SEPT	12-5-19	1/2 bag (12.5 lbs)
SEPT-OCT	15-5-30	1/2 bag (12.5 lbs)

- Prior to putting the fertilizer through fill the lines for 20-30 minutes!
- Rinse with clear water for 15 minutes after

**26-8-15**

**Berry Blend**

- Low Nitrate Nitrogen.
- Highly acidic to promote low pH.
- Increased chelated iron.
- Excellent alternate feed for many crops.

Formulated specifically for the unique requirements of blueberry crops of the genus *Vaccinium* which includes cranberry, lingonberry, bilberry and for other crops such as blackberry, raspberry, strawberry and any crops sensitive to nitrate nitrogen. The NPK ratio meets the nutritional demands of small fruit bearing plants while providing the other elements needed for abundant fruit set.

The high acid forming ability of this formula will help hold soil pH values in the 4.0 to 5.2 range when used regularly. When dissolved in water this product becomes readily available for uptake by the plant both as a foliar feed and through the roots and can temporarily overcome nutrient complications in the soil. It is ideal for Spoon-Feeding applications on a constant feeding schedule through drip irrigation or fertigation.

It is recommended that this product be used in conjunction with comprehensive water, soil and/or tissue tests.

### MIXING RATE FOR 100 PPM

HOSE END SPRAYER: 1:15 ratio-Premix 0.77 oz. per gallon (5.77 grams per liter).

TANK: 0.05 oz. per gallon (.38 gram per liter).

PROPORTIONER: 1:100 ratio use 5.13 oz. per gal. of concentrate (38 grams per liter).

OTHER RATIOS: Multiply ratio times weight divided by 100.

OTHER PPM: Multiply desired PPM times weight divided by 200. Increase or decrease PPM according to crop response.

Available in standard 25 lb bag.

To Order Use Code:  
25 lb Bag: 260815+

For Continuous Liquid Feeding			
26-8-15+	Percent	Lbs/Ton	Concentration at 200 PPM as N
Total Nitrogen (N)	26%	520	
2.52% Ammoniacal Nitrogen			
2.91% Nitrate Nitrogen			
20.57% Urea Nitrogen			
Available Phosphate (P <sub>2</sub> O <sub>5</sub> )	8%	160	61.54 PPM as P <sub>2</sub> O <sub>5</sub>
Soluble Potash (K <sub>2</sub> O)	15%	300	115.38 PPM as K <sub>2</sub> O
Magnesium (Mg)	0.17%	3.4	1.31 PPM as Mg
0.17% Water Soluble Magnesium (Mg)			
Sulfur (S)	3.2%	64	24.62 PPM as S
3.2% Combined Sulfur (S)			
Boron (B)	0.02%	0.4	0.15 PPM as B
Copper (Cu)	0.01%	0.2	0.08 PPM as Cu
0.01% Water Soluble Copper (Cu)			
Iron (Fe)	0.31%	6.24	2.4 PPM as Fe
0.31% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1	0.38 PPM as Mn
0.05% Water Soluble Manganese (Mn)			
Molybdenum (Mo)	0.01%	0.20	0.08 PPM as Mo
Zinc (Zn)	0.02%	0.42	0.16 PPM as Zn
0.02% Water Soluble Zinc (Zn)			
Derived from Ammonium Sulfate, Potassium Phosphate, Potassium Nitrate, Urea, Magnesium Sulfate, Boric Acid, Sodium Molybdate, Iron EDTA, and the sulfate form of Copper, Manganese and Zinc.			
CAUTION: This fertilizer is to be used on soils which responds to molybdenum. Crops high in molybdenum are toxic to grazing animals. Potential acidity equivalent to 883 lbs. Calcium Carbonate per ton.			

### Suggested application rates:

#### Intermittent feeding:

Applications can be made every week or two but not to exceed more than once per week.

	Lbs/Acre	PPM	For proportioner set at 100:1	EC mmhos
New planting	2.5	100	(5.13 oz to gallon of concentrate)	0.29
2 to 4 year old plants	3.5 - 4	150	(7.69 oz to gallon of concentrate)	0.44
4+ year old plants	5	200	(10.25 oz to gallon of concentrate)	0.58

Constant Spoon-Feeding: use at 1/2 the rates recommended above. Feed at each watering.

NITROGEN PARTS PER MILLION CHART							
Parts per Million	50	100	150	200	300	400	
Injector Ratios	Ounces required per gal of concentrate						
1:15	0.38	0.77	1.15	1.54	2.31	3.08	
1:50	1.28	2.56	3.84	5.13	7.69	10.25	
1:100	2.56	5.13	7.69	10.25	15.38	20.5	
1:200	5.13	10.25	15.38	20.50	30.76	41.0	
1:300	7.69	15.38	23.07	30.76	46.15	61.54	

EC 1+ = 10% mhos/cm 0.15 0.29 0.44 0.58 0.87 1.16

\*Maximum solubility approx. 60 oz. per gallon



Phone: (800) 524-7031 E-Mail: info@plantmarvel.com  
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**Nutriculture®**



- Like use rotary mower Cut high avoid tape





# Hillside Cultivator



# Mulching

- Square bails on trailer right over row
- Machine is used in spring and fall for straw applications
- New model at brookdale booth















- One pass bed prep through mustard cover crop using Forigo Multi Machine
- Water Wheel transplant through plastic





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# Questions

