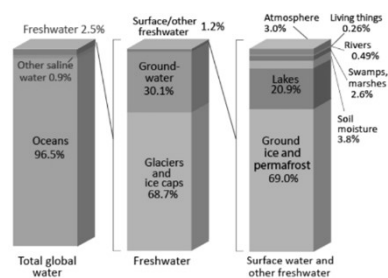


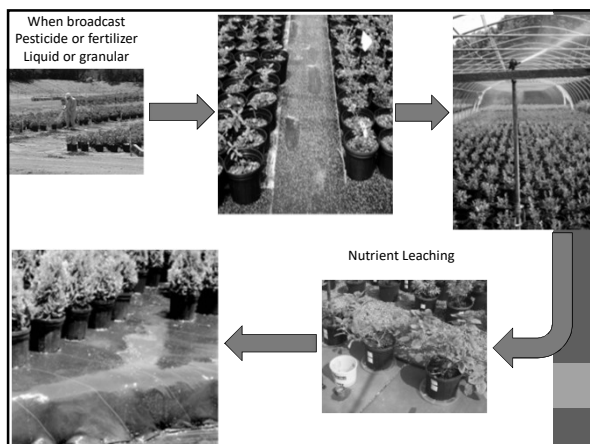
Water and Pesticides Movement in Container Production as Affected by Irrigation Practices

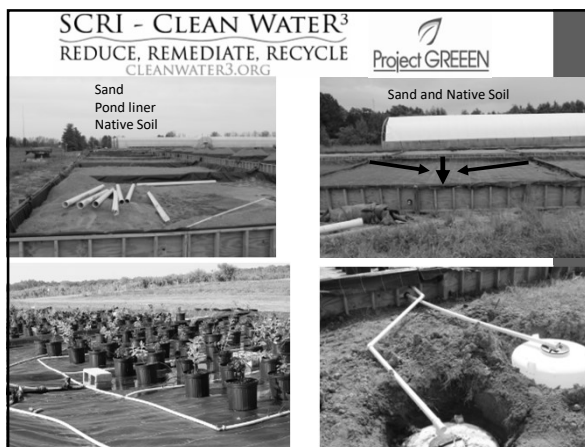
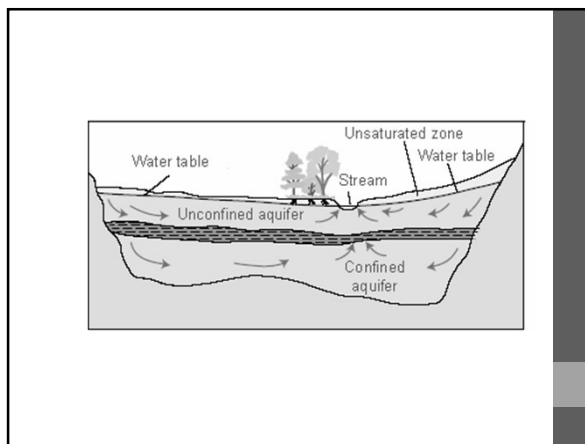
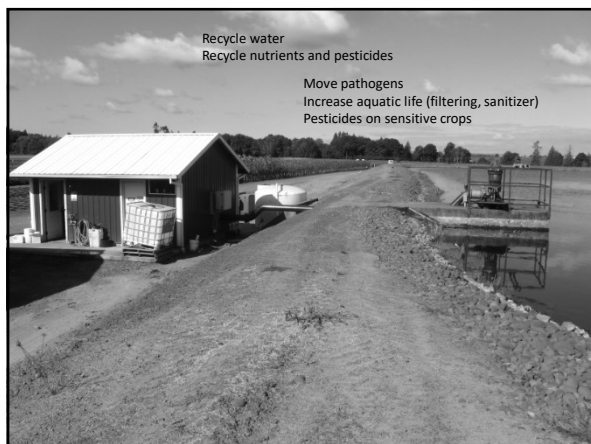
Tom Fernandez
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Global Water Distribution



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, *Water in Crisis: A Guide to the World's Fresh Water Resources*.
NOTE: Numbers are rounded, so percent summations may not add to 100.






Irrigation Treatments:

Control = Overhead $\frac{1}{4}$ acre-inch

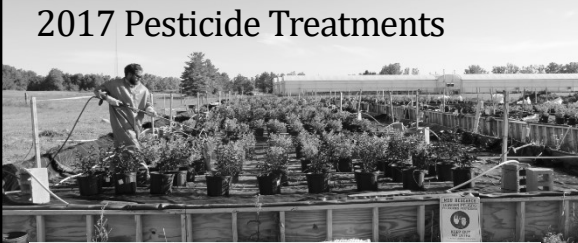
Spray stake at 0.53 gpd
OR
Spray stake at setpoint:
on at 35% moisture, off at
container capacity

All plants fertilized with
complete CRF




Project GREEN
SCRI - CLEAN WATER
REDUCE. REMEDIATE. RECYCLE.

2017 Pesticide Treatments



Application 1 June 27	Application 2 August 8	Application 3 August 29
Acephate 97UP 0.5 lb/acre	Lorsban 4E 1 qt/acre	Thiophanate Methyl 85WDG 8 oz/acre
Talstar 7.9% 21.8 oz/acre	Terraguard SC 8 oz/acre	Barricade 65WG 2.3 lb/acre
Mefenoxam 2AQ 1 oz/acre	Goaltender 2 pint/acre	Roundup PowerMax 1.5%
Gallery 75DF 1 lb/acre	Roundup PowerMax 1.5%	

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Water Sampling from Runoff and Infiltration Tanks:

Tanks emptied 24 hours prior to sampling

Tank volume every time a sample collected

Nutrient samples every 2 weeks

Pesticide samples 0, 1, 2, 4, 8 and 16 days after application

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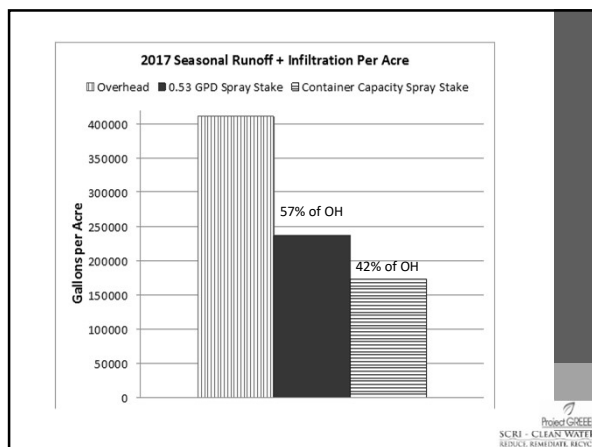
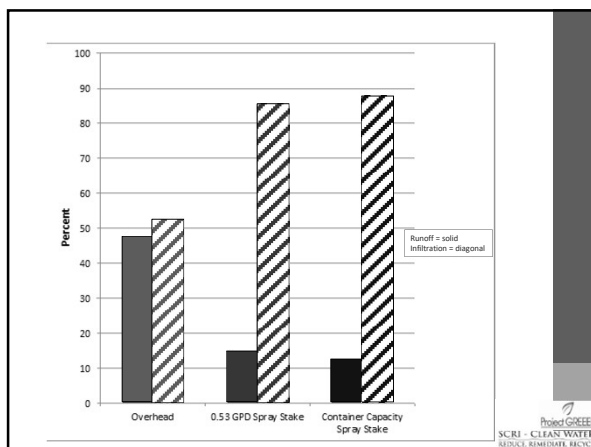
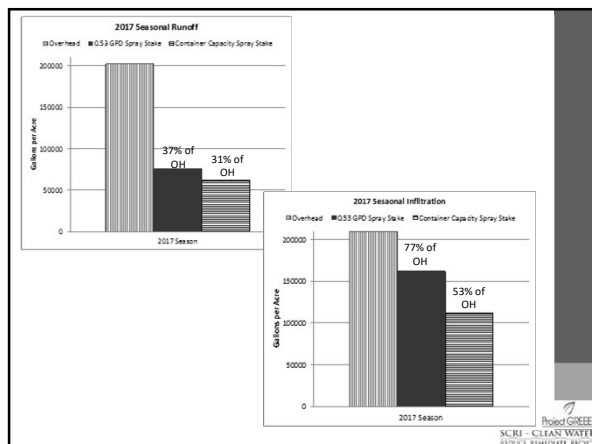
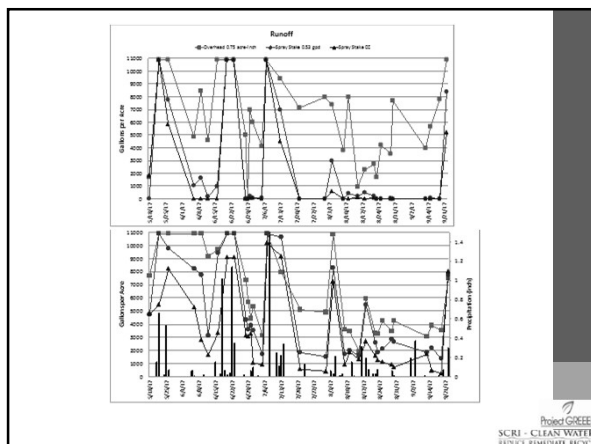
Where the water went

Green squares = Overhead $\frac{1}{4}$ acre-inch

Red circles = Spray stake 0.53 gpd

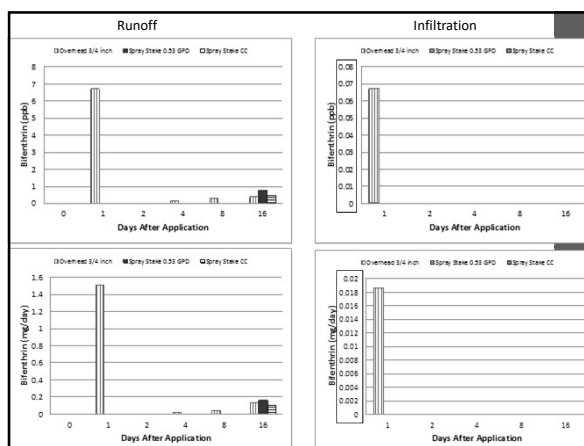
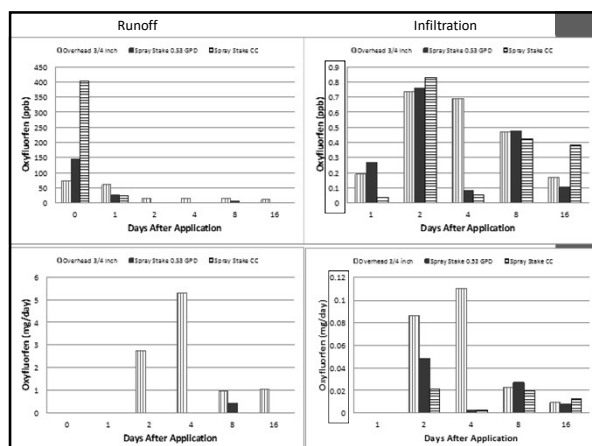
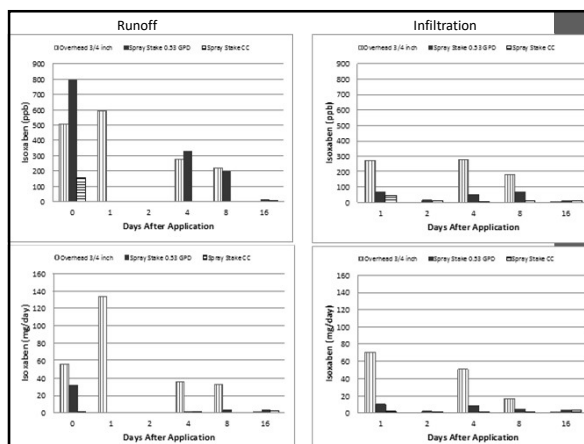
Blue triangles = Spray stake to container capacity

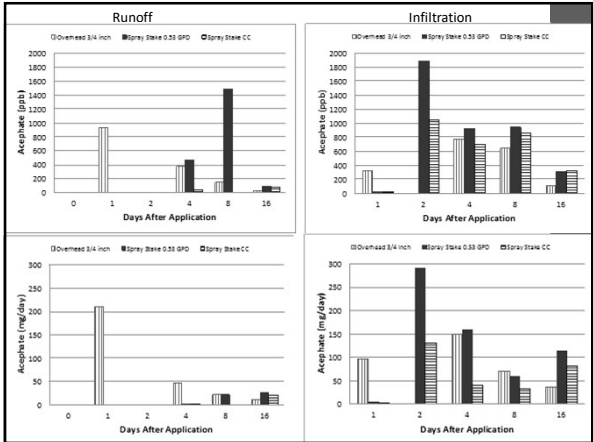
Project GREEN
SCRI - CLEAN WATER
REDUCE. REMEDIATE. RECYCLE.



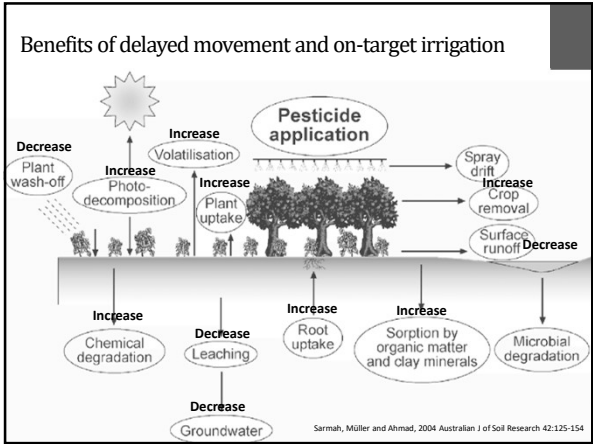
What is in the water

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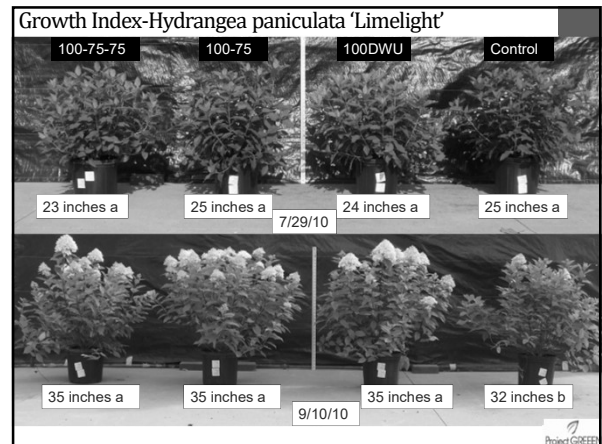
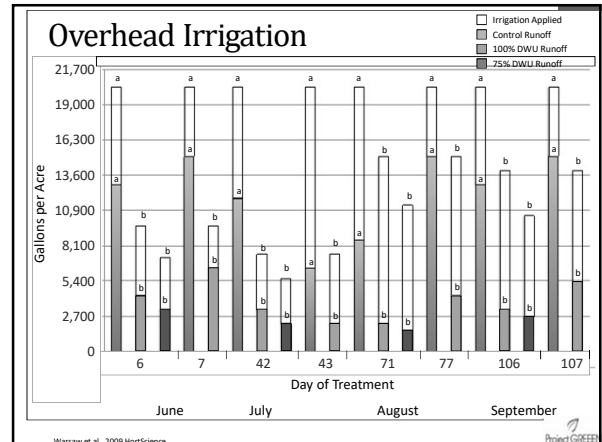


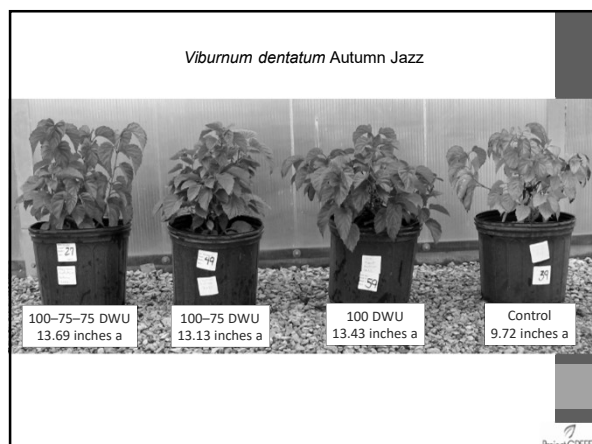


	Acetophate	Bifenthrin	Isoxaben	Mefenoxam	Chlorpyrifos	Oxyfluorfen	Triflumizole
Rate/acre	0.5 lb	1 oz	1 lb	21.8 oz	1 quart	1 quart	8 oz
Applied (g/acre)	227	29	454	685	270	280	70
Amount Recovered (g/acre)							
Overhead	70	0.19	43	1.59	2.07	1.12	1.02
SS 0.53 gpd	73	0.02	7.15	0.12	0.12	0.06	0.04
SS CC	33	0.01	1.13	0.24	0.02	0.01	0.02
% Recovered							
Overhead	31	0.65	9.54	0.23	0.8	0.4	1.5
SS 0.53 gpd	32	0.06	1.58	0.03	0.04	0.02	0.06
SS CC	15	0.04	0.25	0.02	0.005	0.002	0.03



How to improve





		Foliar Nutrient Content			
		Control	100D-WU	100-75	100-75-75
<i>Hydrangea paniculata</i> 'Limelight'					
Day 63					
N (%)	2.87 A	2.88 A	2.99 A	2.96 A	
P (%)	0.24 A	0.29 A	0.30 A	0.29 A	
K (%)	1.06 A	2.23 A	2.07 A	2.07 A	
Day 90					
N (%)	2.24 A	2.35 A	2.38 A	2.31 A	
P (%)	0.14 B	0.17 AB	0.18 A	0.17 AB	
K (%)	0.41 B	0.55 A	0.51 AB	0.57 A	
<i>Ilex virginica</i> 'Marion'					
Day 63					
N (%)	2.50 A	2.69 A	2.46 A	2.55 A	
P (%)	0.22 A	0.22 A	0.22 A	0.24 A	
K (%)	0.66 A	0.55 A	0.58 A	0.66 A	
Day 90					
N (%)	2.37 A	2.74 A	2.59 A	2.55 A	
P (%)	0.16 B	0.20 AB	0.20 AB	0.21 A	
K (%)	0.48 A	0.53 A	0.54 A	0.55 A	
<i>Physocarpus opulifolius</i> 'Seward'					
Day 63					
N (%)	3.19 A	3.19 A	3.19 A	3.33 A	
P (%)	0.31 B	0.37 A	0.37 A	0.38 A	
K (%)	1.09 B	1.48 A	1.59 A	1.66 A	
Day 90					
N (%)	2.15 A	2.20 A	2.28 A	2.28 A	
P (%)	0.21 B	0.23 AB	0.25 A	0.24 A	
K (%)	0.38 B	0.41 A	0.45 A	0.45 A	
<i>Spiraea m. ecia</i> 'Darsnom'					
Day 63					
N (%)	2.27 A	2.38 A	2.23 A	2.42 A	
P (%)	0.53 A	0.67 A	0.66 A	0.66 A	
K (%)	1.26 A	1.63 A	1.66 A	1.64 A	
Day 90					
N (%)	2.40 A	2.70 A	2.63 A	2.74 A	
P (%)	0.72 B	0.81 AB	0.87 A	0.81 AB	
K (%)	1.14 B	1.39 AB	1.52 A	1.32 AB	

Overhead Irrigation and Runoff

Application Rates: N = 123 lb/ac, P = 15 lb/ac (35 lb P₂O₅)

Amount recovered based on 100% land use with #3 containers spaced 1.5 ft on-center over 4 months.

Treatment	Irrigation Applied gal/acre	Runoff volume gal/acre (% Applied, % of Control Applied)	Nitrate recovered lb/acre (% Applied)	Phosphate recovered lb/acre (% Applied)
Control	2.4 million	1.04 million (43%)	12 (10%)	3.1 (21%)
100% DWU	1.6 million	0.48 million (31%, 20%)	7.2 (6%)	1.7 (11%)
100-75% DWU	1.4 million	0.29 million (21%, 12%)	5.9 (5%)	1.2 (8%)
100-75-75% DWU	1.3 million	0.37 million (29%, 15%)	5.7 (5%)	1.2 (8%)

Summary

- Overhead irrigation generates most runoff and infiltration
 - Spray stakes at 0.53 gpd had 63% less runoff, 23% less infiltration
 - Spray stakes using set-point control had 69% less runoff, 47% less infiltration
- Scheduling based on plant needs reduces water use, runoff volume and N & P in runoff
- So far pesticides mostly detected in runoff, not infiltration. Exception is highly soluble pesticides (Acephate)
- Delayed and less pesticide runoff for spray stake versus overhead irrigation
 - Allows more pesticide binding and degradation before entering runoff

Thanks to the team:

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University of Florida



Dr. Chris Wilson



Dr. Francisca Hinz

Virginia Tech



Dr. Jim Owen



Julie Brindley

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AGRICULTURE
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