Slide 1

Interpret your water quality report

and diagnose water problems…

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Slide 2

CleanWater3.org tools you can use…

- CleanWater3.org

- Select "Tools"

Slide 3

CleanWater3.org tools you can use…

- CleanWater3.org

- A range of tools are available

Slide 4

I got my water tested – now what?

- WaterQual

  - Rosa Raudales (Univ of Connecticut)
  - Bruce MacKay (ThomasBaine Ltd.)
  - Paul Fisher (Univ of Florida)
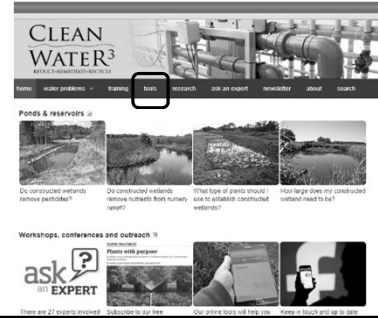
Linked Videos

Linked videos ▶

Alkalinity of irrigation water

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WaterQual – enter water test results into the tool

Also in Spanish

- WaterQual

Interpretation for greenhouse & nursery use

Measurement	Test value	Result	Explanation of result
pH	8	High (>7)	pH and alkalinity levels this high means some pH adjustment (addition of acid) will be required in the spray tank with certain agrichemicals - check the pesticide label.
Alkalinity	279 ppm CaCO₃	High(>150 ppm CaCO₃)	
			For use in irrigation, injection of acid is recommended to reduce alkalinity and avoid an increase in substrate-pH over time.
			You may also need to include ammonium or urea nitrogen at 40% or above of total N in fertilizer to help avoid a rise in pH when using hydroponics or a container substrate.

- Check it out at CleanWater3.org

You probably know poor quality water when you see it…

- Chemical issues:
  - High electrical conductivity, Na, Cl
  - High alkalinity
  - High boron…
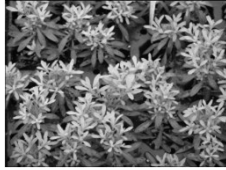
Can you diagnose this grower's issue?

- Two locations same water source & type of irrigation system

- In one, pipes filling up with brown chunky & slimy material

Quick tests for plugged up pipes & emitters

- Biological
  - Slimy organic material

- Chemical:
  - Soak in vinegar (low pH)
  - Send solution to testing lab to analyze specific ions

- Sediment:
  - When soak in water, solid particles drop out
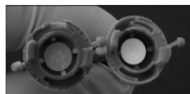
What information do you need?

- Chemical analysis of source
- Type of water source
- Bacteria
- Particles & suspended solids
- Water treatment
- Detailed iron manganese
- Solved!

Chemical lab test of water source

Components		Results		Target Ranges	Acceptable
		mg/L	meq	(mg/L)	(mg/L)
MAJOR CATIONS					
Potassium	K	3.83	0.10		<100
Calcium	Ca	31.35	1.57	25 - 75	<150
Magnesium	Mg	7.07	0.59	10 - 30	<50
Sodium	Na	5.09	0.22	0 - 20	<50
MAJOR ANIONS					
Phosphate	PO4	1.52	0.05		<90
Sulfate	SO4	27.50	0.57	0 - 120	<240
Chloride	Cl	12.00	0.33	0 - 20	<140
HCO3 Alkalinity	HCO3	92.72	1.52		
CO3 Alkalinity	CO3	0.00	ND		
Ammonium Nitrogen	NH4-N	ND			<10
Nitrate Nitrogen	NO3-N	ND			<75
pH	pH	7.26		5.50 - 7	4-10
Soluble Salts	EC	0.24		0.20 - 0.80	0-1.5
Total Alkalinity	CaCO3	76.00		40 - 160	0-400
Iron	Fe	0.01		< 1	<4
Manganese	Mn	ND		< 1	<2
Boron	B	0.03		< 0.10	<0.5
Copper	Cu	0.04		< 0.10	<0.2
Zinc	Zn	0.07		< 0.50	<1
Molybdenum	Mo	0.02		< 0.10	<0.2
Aluminum	Al	0.16			

Return
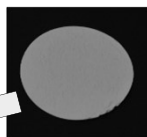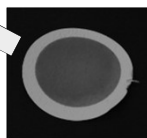
Water Source

- Municipal supply
- Chlorinated 1 ppm
- From well water

pH	EC (mS/cm)	CaCO$_3$ (mg/L)
7.26	0.24	76

Return

Particles & Suspended Solids

Return
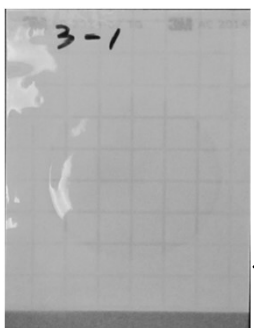
Samples	Turbidity (NTU)	Total suspended solids (TSS, mg/L)
Raw water "near source"	1.5	0.1
Raw water "far outlet"	14.0	6.5
Ideal range	<29	<5 mg/L
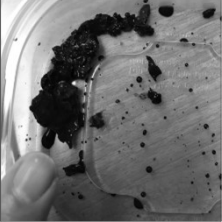
Bacteria count

Samples	Bacteria count (CFU/ml)
Raw water "near source"	0
Raw water "far outlet"	1
Ideal range	<5000 CFU/ml

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Return

Detailed iron/manganese

Samples	Iron (ppm)	Manganese (ppm)
Raw water "near source"	0.0	0.0
Raw water "far outlet"	3.8	0.0
Ideal range in raw water	<0.1	<0.1

Return

Water treatment: sodium hypochlorite (bleach)

Problem greenhouse	Free chlorine (ppm)
Raw water "near source"	5.5
Raw water "far outlet"	0.7
Other greenhouse (no problem)	
Raw water "near source"	0.7
Raw water "far outlet"	0
Ideal range	<2.0

Return

What can we learn from this case study?

- Problem: Overdosed chlorine (an oxidizer) corroding pipes. Solution: Turn the injector down and monitor!

- Multiple aspects of water quality
  - Salts, particles, microbes, agrichemicals
  - Don't jump to a solution until you know the problem

- There is a risk and cost in every water treatment system.
  - Have a preventative monitoring system in place
  - More isn't always better!

For more information…

- CleanWateR3.org for tools and resources

- hort.ifas.ufl.edu/training/ for online extension courses
  – "Water Quality & Treatment" begins November 5

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