FERTILIZER EFFICIENCY WITH DRIP IRRIGATION

Tony Roth

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- Crop Consultant at G.S. Long Co- 18 years
- Mainly Hops and Wine Grapes
- Have been consulting on drip irrigation for 20+ years in tree and vine
- Fortunate to have been involved in drip and micro-irrigation as they have grown in our area
- The California Tour

Past- Present- Future

-PAST-

Past/Present Fertilizer Techniques-

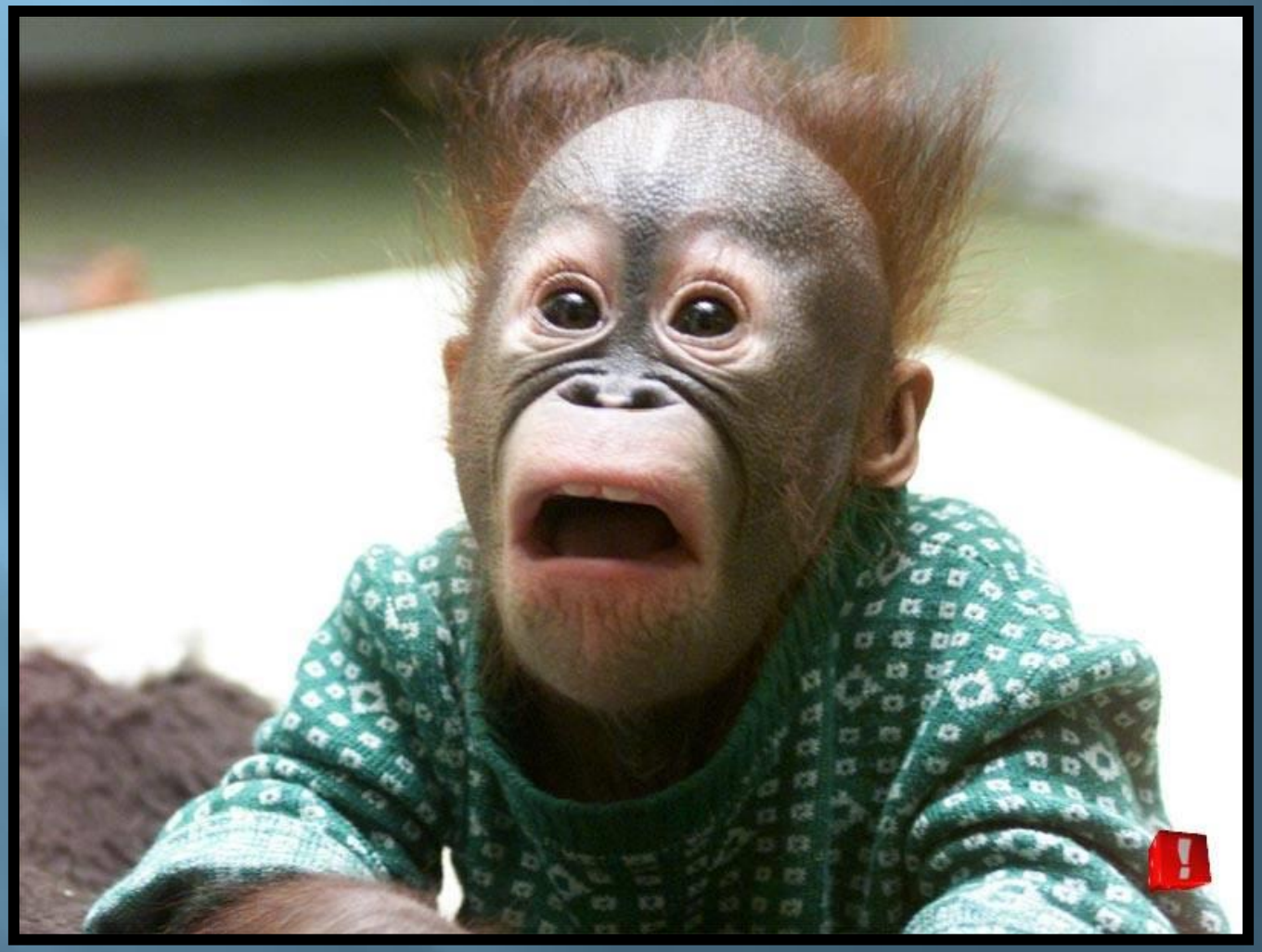
The old standard

N-P-K ALL THE WAY!

Honestly, dry has it's place-

- But, is it the most efficient for your application and crop?

Liquid Fertilizer!!



- In the past we used mainly dry fertilizer but also started exploring the use of liquid fertilizer in perennial crops-

-PRESENT-

Present Fertilizer Techniques

- Comfortable with fertigation via drip or micro-sprinklers
- Using more soil amendments
- More efficient soil sampling
- We think we are being more efficient today and we are however will it be good enough in the future?
- We are doing a better job today than we were 25 years ago
- Liquid fertilizer in combination with dry where it makes sense

A Few Negative Observations

- Water logged or anaerobic soils cause increased disease issues
- Decrease in boron levels
- Irrigation systems under-designed
- Higher sodium(Na) levels in certain situations
- Lack of good soil structure causing minimal lateral water movement

-LIQUID FERTILIZER-

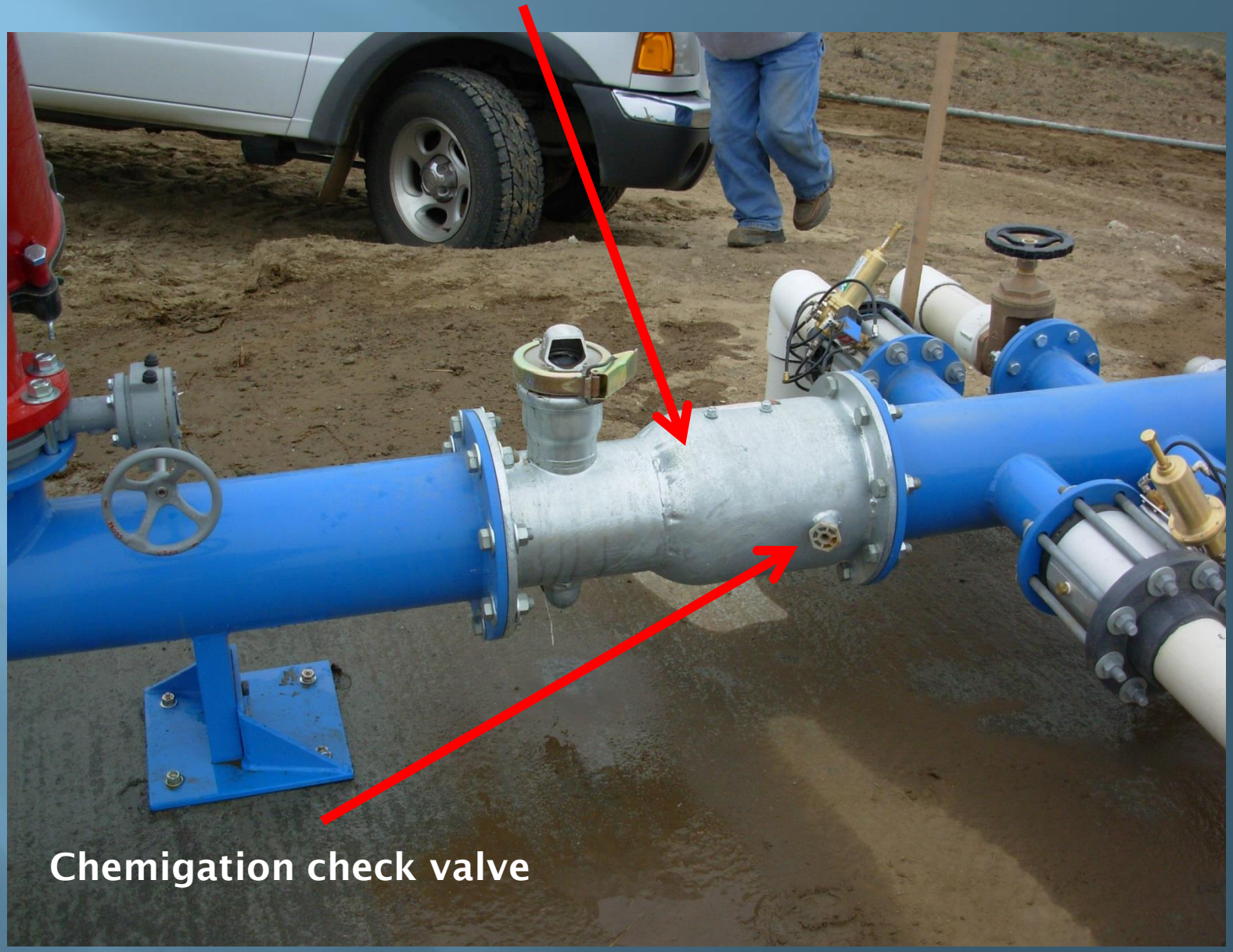
Liquid Fertilizer Can Be Very Efficient

- Maybe 30-50% more efficient than dry due to application technique
- Certainly true on a perennial crop like trees, hops and wine grapes
- Easy to apply but it does take more management
- Cost per unit can be higher but offset in increased efficiency
- Drip and Micro are the perfect tools for using liquid fertilizer

Liquid Fertilizer Advantages

- Less soil compaction
- Energy savings, less equipment needed
- Labor savings
- Worker safety
- Application not dependent on field conditions
- Site specific placement
- Less material usage
- More regulations being imposed!
- Low maintenance, high management systems

Irrigation injection check valve



-FUTURE-

FUTURE FERTILITY CONSIDERATIONS

- Due to future regulations we will be more governed on what we CAN apply
- We will need to use higher, more efficient fertilizer materials
- And, less of them to do the same job!
- We will pay more attention to feeding the soil and providing proper nutrition to the root zone
- Increased water efficiencies will be a must due to decreased water reserves
- Increased use of micro-nutrients via drip
- Will sub-surface drip be re-born?

LET'S TALK ABOUT THE SOIL FOR A MINUTE

- We will need to be even better stewards of the soil than we are today
- We will need the soil to help us lower our fertility inputs even more so in the future
- In our low organic soils(1-2%) we will need additional amendments to help facilitate this to increase production
- High density plantings bring an even bigger need to soil health when using drip irrigation

SOIL AMENDMENTS

Compost or Aged Manure

Straw

Other Amendments

- Lime
- Gypsum
- Crop Residues
- Bio Solids
- Cover Crops

Soil Amendments

- Will allow us to increase the biological presence in our soils
- Will allow for improved fertility
- Will improve water movement
- Will improve soil health and tilth
- All these will help increase our fertilizer efficiency

WE CAN'T FORGET THE WATER!

- As we move forward in agriculture we will need to use less water and be EVEN more efficient with what water we have

Nice soil soak with drip

THE BETTER WE MANAGE THE SOIL/WATER THE MORE EFFICIENT WE WILL BECOME WITH OUR FERTILITY PROGRAMS!

- Probably nothing new however are we really doing our best today?
- What we think is good today won't be good enough in the future
- Can we do better?

WE WILL NEED TO PAY BETTER ATTENTION TO ROOTS!

Roots need air too!

Healthy roots can withstand insects and disease better

WE WILL NEED TO MANAGE THE SOIL, WATER AND ROOTS BETTER AS WE MOVE FORWARD

Then, our fertilizer program will also have to be managed better too

HOW DO WE DO THAT?

- More carbon, carbon based materials(microbial food)
- Higher efficiency fertilizers
- Applications at the greatest times of need
- Highly efficient materials applied at the highest usage timings will allow us to use LESS and be more efficient
- Increased root zone ecosystem management via soil amendments, proper watering and air

Con't

- We are at interesting times right now considering fertility and future regulations
- Calcium will be even more important in the future than it is today, not just in tree fruit either
- For those of you who think this is nothing new you are ahead of the curve however you will be required to do even more as we move forward

Things to think about ahead

- Properly managed soil, water and roots!
- Highly efficient fertilizer materials applied at key growth and need timings!
- Soil amendments
- Using the water we will have more efficiently
- Think soil health!
- Government regulations!

Thank you

Questions?

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Nitrogen

- Nitrogen will be more regulated in the future
- We will need to use less to do more
- Future regulations will dictate it's usage
- Calcium based nitrogen will continue to grow

Phosphorus

- Very immobile but better materials are available
- A little goes a long ways if you use a more soluble form

Potassium

- Very immobile as well however very valuable to the crops we grow
- Soils are loaded however, not much availability
- Ground applications without incorporation doesn't solve the problems
- Better sources are available with lower application rates