



FLUID FERTILIZER SOLUTIONS AND OPPORTUNITIES

MARKETING THE VALUE OF FLUIDS

FLUID FERTILIZER TECHNOLOGY WORKSHOP

Armando Campos December 8, 2009 Sheraton Tampa Riverwalk





FLUID FERTILIZER USE

LIQUID TONS AS A% OF TOTAL FERTILIZER TONS SOLD IN FLORIDA



SOURCE: FDACS, AES Bureau of Compliance Monitoring



A few things to consider...

Annual Average Precipitation

United States of America

SPRING WHEAT

WINTER

WHEAT

SORGHUM CORN BELT

Legend (inches)

R

Less than 5	📕 40 to 50
5 to 10	50 to 60
10 to 15	📃 60 to 70
📕 15 to 20	📃 70 to 80
20 to 25	📒 80 to 100
📃 25 to 30	🔜 100 to 140
30 to 35	🔜 140 to 180
35 to 40	More than 18

Period: 1961-1990

Modelingperionner by Christopher Daly using the PRISM model, based on 1961-1990 normals from NOAA Cooperative stations and NRCS SNOTEL sites. Sponsored by USDA-NRCS Water and Climate Center, Portland, Oregon.

Oregon Climate Service George Taylor, State Climatologist (541) 737-5705

COTTON BELT

Soil carbon content as a reflection of CEC



Source: www.fao.org/WAICENT/FAOINFO/AGRICULT/AGL/lwdms.htm

4R Nutrient Stewardship ENVIRONMENTAL Source Rate Time Place ECONOMIC SOCIAL

SOURCE: International Plant Nutrition Institute (IPNI)



Right Source

Ensure a balanced supply of essential nutrients.

Fluids can be blended in a wide variety of combinations to offer complete and balanced nutrition of essential nutrients

Supply plant-available forms.

- Fluids in general and especially solutions offer the plant the most available form of nutrients.
- Nutrients must be in solution in order to be absorbed
- Suit soil physical and chemical properties.
 - In light soils with limited nutrient holding capacity, fluids present an opportunity to spoon feed the plant for the highest efficiency of use



Right rate

Assess:

- Soil nutrient supply
- All available nutrient sources;
- Plant demand.
- Predict fertilizer use efficiency

Responding to in-season changes in nutrient supply and demand is better achieved with fluids that can provide immediately available nutrients to a plant or provide a management tool for optimum decision making to delay, defer, spread out or cancel fertilizer applications.







Right Time

"The best form of `controlled release fertilizer' is when the grower controls with a switch, the release of nutrients from his liquid fertilizer tank into the irrigation system for a precision application of nutrients through fertigation"







Right Time

- Match timing of crop uptake.
 - See prior slide
- Assess dynamics of soil nutrient supply.
 - With Fluids there is no need to wait for nutrients to become available, unless so desired.
 - Dissolution
 - Biological activity
 - Watering-in, movement through soil profile
- Recognize timing of weather factors influencing nutrient loss.
 - Can apply under adverse conditions
 - Accurate control of rate
 - Dribble or spray
 - Subsurface band
 - Fluids best allow for the timing of application in order to minimize nutrient loss and maximize nutrient use efficiency
- Evaluate logistics of field operations.
 - Ease of handling
 - Closed systems=environmentally safe
 - Bases, valves and pumps could be all the application equipment needed



Right Place

- Recognize root-soil dynamics.
- Manage spatial variability.
- Limit potential off-field transport of nutrients.







Liquid Fertilizer Placement While Seeding





row at seed level.

rr Liquid fertilizer and to banded to each side seed and above the level o the seed.

Liquid fertilizer placed below and in the middle of a paired seed row.



Liquid Fertilizer Placement While Seeding





Fertilizer is shown as a green hand, seed is represented as yellow dot.

Fertilizer is shown as a green band, seed is represented as yellow do



Right place

Fluids provide superior homogenous blends

The same content in every drop

More efficient micronutrient distribution in the soils

Less "streaking" and "leopard spotting"

- Fluids allow for foliar applications of the appropriate forms of nutrients
 - Can mix insecticide, herbicide, fungicide, and other additives.

Other considerations

- Fluids provide an opportunity to add value for the end user through specialized expertise
- Complete plant nutrition programs combining soil and foliar applications provide an advantage in addressing nutrition challenges







Fighting common misconceptions



- Transportation of 'too much water'
 - 🗈 AN 34% N vs. UAN 32% N
- Suspensions as a means to higher analysis
 i.e. 18-6-12
- Requires specialized transportation/application equipment



Continued...



 Need for storage tanks are 'extra cost'
Dry storage requirements
Nutrients will 'wash away' in a liquid form
Education of end users on the dynamics of plant

uptake from soil nutrient solution



So what does the future hold?

In the US, between 2003 and 2008, the total quantity of water applied increased 5 percent to 91.2 million acre-feet of water. With the corresponding increase in acres irrigated the average acre-feet applied by all methods remained the same.

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	2008	2003	% Change	
Irrigated Farms	206,834	210,106	-1.6	
Acres irrigated	54.99 Million	52.5 Million	+4.6	
Acre feet applied	91.2 Million	86.8 Million	+5.2	
Sprinkler only	1.2 acre-ft	1.3 acre-ft	NA	
Gravity flow only	2.2 acre-ft	2.0 acre ft	NA	

Source: 2008 Farm and Ranch Irrigation Survey



.. opportunities continued

- Florida and Georgia are in the Top 5 States in the country with the most Microirrigated acreage and in the Top 10 in total irrigated acres
- Water resources however will need to be used more efficiently
- This means more pressurized irrigation (drip, microsprinkler, pivots, etc.)
- These systems are all very conducive to the use of fluids over other fertilizers
- BMP's and other regulations that require "frequent, light applications of fertilizer" will favor the use of fluids as the best means to achieve this.





...opportunities continued



Growth in perennial crops and vegetable and small fruit crops will be followed by adoption of these technologies into extensive crops.





...opportunities continued

Crops like cotton and peanuts are becoming bigger and bigger targets for fluids as the adoption of pressurized irrigation systems enables farmers to use fertigation





Conclusions

- There are many advantages in the use of Fluid Fertilizers that will open opportunities for growth
- Current trends in BMP's, watering restrictions as well as innovations in science and technology point towards increasing usage of fluids, especially in the Southeast US.
- The industry need to be prepared to educate the market on the advantages of fluids. Training of sales and other support staff is essential.
- Precision management of plant nutrition will ultimately lead to higher yields and better quality crops and the role that fluids will play in achieving that will be critical.





THANK YOU!

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