Welcome To The 2015 Fluid Fertilizer Technology Roundup

Louisville, KY
December 8-9, 2015
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Tessenderlo Kerley

Simplot
Bringing Earth’s Resources to Life

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Solutions for Agriculture
“Studies conducted on a Parkdale soil show that a shift from single surface broad-casting of dry nitrogen (N) and phosphorus (P) to split N and P fertigation benefits fruit yield and size as well as reduces fruit scald and N and P consumption. In addition, banding N and P also increases fruit yield and size and reduces fruit scald when compared with surface broadcasting.”

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**Why UAN Solution?**
Adaptability and Flexibility!

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**Summary:** The popularity of urea-ammonium nitrate solution (UAN) in the U.S. has increased steadily and substantially over the past 50 years. While direct-applied anhydrous ammonia dominated the overall U.S. nitrogen (N) marketplace through the 1980s, UAN and anhydrous ammonia have each had about the same market share (nutrient basis) in the U.S. over the past decade (Figure 1). While UAN consumption is not as high in other places across the globe as in North America, the global popularity of UAN continues to increase, especially in Europe and the former Soviet Union.
What About Foliar K On Soybeans?

Despite a relatively inconsistent soybean response to foliar K, studies show an opportunity may exist to provide growers with a cost-effective method of applying foliar K.

“Among the conclusions reached by this research is that foliar potassium (K) fertilization may be a supplemental practice to long term K fertilization practices that build up and maintain soil test K levels.”

by Dr. Derrick M. Oosterhuis
Foliar Fertilization of K On Cotton Shows Potential
Results of three-year Beltwide study to correct K deficiencies in soil through foliar fertilization indicate need for more basic research.

…………… foliar application of KNO3 appears to offer some potential for supplementing preplant soil applications of potassium fertilizer. The results have been variable and somewhat unpredictable. Significant yield differences, as stated earlier, have occurred about 40 percent of the time.”
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Foliar K Makes Difference On Muskmelon Fruit Quality

Even though soil K concentrations were high, supplemental foliar K treatments improved fruit quality in Texas studies.

“Studies in south Texas show that supplementing soil K with foliar K can improve fruit quality characteristics. Fruit from plots receiving supplemental foliar K had higher external and internal fruit tissue firmness than control fruit and this was associated with generally higher soluble solids concentrations (SSC) in both years.”

by Dr. Brain J. Boman
Fertilization Enhances Grapefruit Yield

When combined with single broadcast fertilization, fertilization of orchards produces results superior to several conventional broadcast applications.

“During a four-year trial on grapefruit trees, fertilization, combined with a broadcast treatment, outproduced three conventional broadcast applications in three of the four years. .... The production increases by the combined treatment over the conventional treatment represented an 8 percent advantage. The combination treatment also provided a higher fertilizer-use efficiency than the conventional treatments.”

Dr. T.K. Hartz
Drip Irrigation Improves N Efficiency

Trend in California is drip irrigation to improve water/N management and protect environment.

Dr. Brain Boman
University of Florida
Thank You Sponsors !!
Welcome To The 2014 Fluid Fertilizer Technology Roundup

Sacramento, CA
December 9-10, 2014
Are Critical Values For Nutrient Management In Almond And Pistachio Orchards Invalid?  
Or has there been a systematic misuse of sampling methodology and an industry- (and university-) wide misinterpretation of results?

Summary: Ninety percent of growers and consultants participating in recent grower and consultant focus groups on nutrient management in tree crops, and the majority of respondents to an industry-wide survey, felt that the University of California (UC) “critical values” (CVs) for nutrient management in almond and pistachio were inadequate for modern production levels based on 1) current CVs are limited in application or 2) there are systematic errors in use of critical values. Review of current and historic data, however, indicates that the University of California established CVs for almond and pistachio production were reasonable and unlikely to be sufficiently incorrect to warrant the largely negative industry perceptions. It is apparent, however, that there has been a systematic misuse of sampling methodology and industry- (and university-) wide misinterpretation of results. Discussions with plant nutritionists working in high-value crops in the U.S. and in the international community suggest that this “simple” misinterpretation of the use and interpretation of tissue samples is widespread.
Surface Dribbled N, P and S On Bromegrass

R. Lamond, KSU – 3 yr. average

<table>
<thead>
<tr>
<th>N</th>
<th>P2O5</th>
<th>S</th>
<th>Yield</th>
<th>Protein</th>
<th>P</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2530</td>
<td>7.2</td>
<td>0.17</td>
<td>0.15</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
<td>0</td>
<td>4720</td>
<td>7.9</td>
<td>0.15</td>
<td>0.13</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>0</td>
<td>5320</td>
<td>7.6</td>
<td>0.18</td>
<td>0.13</td>
</tr>
<tr>
<td>80</td>
<td>0</td>
<td>0</td>
<td>5380</td>
<td>8.9</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>80</td>
<td>30</td>
<td>0</td>
<td>6310</td>
<td>8.5</td>
<td>0.18</td>
<td>0.13</td>
</tr>
<tr>
<td>80</td>
<td>30</td>
<td>20</td>
<td>6710</td>
<td>8.8</td>
<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td>120</td>
<td>0</td>
<td>0</td>
<td>6100</td>
<td>10</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>120</td>
<td>30</td>
<td>0</td>
<td>6930</td>
<td>9.7</td>
<td>0.17</td>
<td>0.14</td>
</tr>
</tbody>
</table>

"...surface banding of P and K performs very well compared to surface banding in traditional conventional-till systems with annual crops. The concentrated zones of P and K on the soil’s surface associated with banding minimize contact of the applied nutrients with soil constituents, delay reversion to less soluble P forms and, as a result, improve nutrient availability and uptake."

Effect Of UAN Application Method On Bermudagrass Production

Habey et al., Texas A&M - 3 year average

<table>
<thead>
<tr>
<th>UAN Method</th>
<th>Bermudagrass Yield Lbs/A</th>
<th>Forage N %</th>
<th>Apparent NUE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Broadcast</td>
<td>13,927</td>
<td>1.55</td>
<td>51.7</td>
</tr>
<tr>
<td>Surface Band</td>
<td>15,007</td>
<td>1.60</td>
<td>61.9</td>
</tr>
<tr>
<td>Subsurface Band</td>
<td>14,110</td>
<td>1.62</td>
<td>55.8</td>
</tr>
</tbody>
</table>
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Crop Production Services

Simplot

Tessenderlo Kerley
From The Fluid Journal

Subsurface Placement Best In Reduced-Till

Kansas research shows importance of nutrient management/hybrid selection in boosting crop yield.

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**Yield (bu/A)**

<table>
<thead>
<tr>
<th>Yield</th>
<th>Check</th>
<th>Broadcast</th>
<th>Dribbled</th>
<th>Knifed</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>110</td>
<td>130</td>
<td>140</td>
<td>150</td>
</tr>
</tbody>
</table>

Results suggest that responses to starter fertilizer can be very economical even on high P soils—at least with some hybrids when corn is planted early in a high-residue production system. (Lamond et al.)

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Dr. Alan Blaylock

**Micronutrient Response Enhanced By Fluid Starters**

Mixed solutions create intimate contact between nutrient compounds in the various carriers combined.

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**Yield - lbs/A**

<table>
<thead>
<tr>
<th>Yield</th>
<th>Check</th>
<th>20+0+0</th>
<th>20+20+0</th>
<th>20+20+1</th>
<th>20+20+1</th>
</tr>
</thead>
<tbody>
<tr>
<td>3050</td>
<td>3100</td>
<td>3150</td>
<td>3250</td>
<td>3350</td>
<td>3400</td>
</tr>
</tbody>
</table>

Fluid Journal Spring 2002

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**Does N-P Starter Composition Affect Phosphate Availability in Cotton Soils?**

Louisiana researchers find that N-P starters increase soil supply of phosphate even in soils that test very high, and that the amount of phosphate in the material, rather than the N:P,O ratio, is important.

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**Yield of Cotton Seed - lbs/A**

<table>
<thead>
<tr>
<th>Yield</th>
<th>1990</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,200</td>
<td>4,100</td>
<td>3,900</td>
</tr>
<tr>
<td>4,100</td>
<td>3,800</td>
<td>3,700</td>
</tr>
<tr>
<td>4,000</td>
<td>3,700</td>
<td>3,600</td>
</tr>
</tbody>
</table>

**Starter Treatment**

- OTT = Surface band, 12 gal/A
- IFL = in-furrow, 1.5 gal/A
- IFH = in-furrow, 2.5 gal/A

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Figure 1. Effect of ammonium polyphosphate (11-37-0) starter application rate and placement on cotton yields, Kovar and Funderburg, Louisiana State University.

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From The Fluid Journal

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Fluid Journal 1994

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Figure 1. Yield and maturity response of dry beans to starter fertilizer applications, average of two years (1994-1995), two cultivars, four planting dates and four replications.
From The Fluid Journal

Potassium Fertigation Improves Soil K Distribution, Builds Pistachio Yield and Quality

Drs. D.Q. Zeng, P.H Brown, B.A. Holtz

“Potassium is rapidly depleted in pistachio orchards where it is not applied, adversely affecting pistachio yield and quality.”

“We initiated a three-year study to soil apply K through a microsprinkler in pistachio orchards .......... Subsequent observations showed that K content increased significantly throughout the 0 to 30-inch soil profile, even though movement of surface-applied K in the soil profile was slow. Thus, more K accumulated in the fruit and leaves of the pistachio trees, appreciably improving pistachio yield and quality.”

Drs. Zeng, Brown, Holtz
University of California

Micronutrient Availability Improved With Fluids

“The results support our conclusion in the 2005 issue of the Fluid Forum Proceedings, which shows that the best practice for cereal production on the highly calcareous soils of South Australia should involve the use of NP fluid fertilizers containing micronutrients—principally Zn, Mn, and Cu, although Cu was not used in these experiments.”

Fluid Journal
2006

Surface Band (Dribble) Performance On Bromegrass
Lamond and Whitney, Kansas State University

<table>
<thead>
<tr>
<th>UAN Treatment</th>
<th>5 yr Average Yield (DM lbs/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>2610</td>
</tr>
<tr>
<td>Broadcast, 60 lbs N/a</td>
<td>4780</td>
</tr>
<tr>
<td>Surface Band, 60 lbs N/a</td>
<td>5424</td>
</tr>
<tr>
<td>Broadcast, 120 lbs N/a</td>
<td>6000</td>
</tr>
<tr>
<td>Surface Band, 120 lbs N/a</td>
<td>6017</td>
</tr>
</tbody>
</table>

Significant differences 4 of 5 years
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