Benefits Of The FFF

A history trip is in order.

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Summary: The FFF remains a fruitful source of cutting edge research to provide strong product and technique benefit statements and an outstanding forum for agronomic and production information via the annual Technology Round Up and Fluid Forum.

To fully understand the role of the Fluid Fertilizer Foundation (FFF) in modern fertility practices and the current benefits of membership and association, a history trip is in order. This should be of particular benefit to the miners and MBA's that currently proliferate the industry. The recent stock quote and "value proposition" (whatever that is) so commonly pursued and held as the Holy Grail of business achievement would, in many cases, not be possible without the endeavors of a select few brilliant minds and pioneers that birthed the fluid fertilizer industry.

The early post WWII years were full of bright graduates looking for a role in a revolutionary new industry--namely, agriculture! A generation of American entrepreneurs could call agriculture "home" at this time--we had engineers returning from Princeton, chemists from Iowa State, Merchant Navy veterans and many more in my circumstance. As a privileged youngster with no particular pedigree in the early 80's, this history enthralled me.

As crop yields continued an inexorable rise upwards to feed the post-war generation, fertilizer became of massive significance. Land Grant institutes and extensions did their part. Soil testing, and to some extent tissue testing, started to evolve. Subsequent diagnosis and calibration experimentation provided massive advances in crop productivity. Similarly, the availability of fertilizers began to evolve: super-phosphate, ammonia (aqua and anhydrous) and mined potassium salts.

Potential

Since the production of dry P and N involved liquid intermediaries (K was mined but soluble K became important as the latter two grew), potential for fluid fertilizers came to mind. Several key points here:

- Why take a fluid and make a solid that needs to be fluid again after soil application? As a preeminent fluid pioneer, Bill Lohry and his company Nutraflo, always said, "plants drink their food, not eat it"
- Mixed grades--the demands of modern production were calling for multiple nutrient mixes, not just straight. Agronomic research also placed demands on timing considerations: how long to sidedress corn at knee high?
- Solubility is an issue
- Industrial by-products such as ammonium sulfate in surfeit
- Unabated pollution in the US culminating in the Love canal and EPA
- Post-War Tennessee Valley Authority: what to do with all this urea and ammonium nitrate nitrogen? Urea,

as essentially a stable storage for ammonia and ammonium nitrate, used as an explosive nitrate? Both would be sought in alternative markets in agriculture as obvious fertilizer candidates

- Mix dry urea and ammonium nitrate and stand back! However, mix fluids of both and voila!: fluid urea/ammonium nitrate--a eutectic taking 18 percent N material to 32 percent
- How do we make a stable NP solution? Use anhydrous N and super phosphoric acid and voila!: 10-34-0 via a T-Reactor
- What about K? Simple. We suspend it using bentonite clay to get the 3-9-27 grades, since solubility of K is limited
- We need zinc. Pioneers such as Glen Brandt opened the metal chelate market in fluid fertilizer in the late 60's.

Driving force

Irrespective of the phenomenal efforts of the TVA and later the National Fertilizer Development Center (NFDC), there was an upsurge in agricultural production and nutrient requirements. The driving force behind these developments? A nascent fluid fertilizer industry and pioneers such as Lohry, Tinsman, Hopwood, Stutsman, Simplot, Abell, Garrett, Willard, Brandt, and many others. In our office, for example, we have a picture of Glen Brandt and a host of others, including Orville Redenbacher as a part of a delegation to the TVA/NFDC in Alabama to discover the next great fluid invention.

At about this time, in the 1960's, the Nitrogen Institute morphed into The Fertilizer Institute (TFI). Other players became the Potash and Phosphate Institute (PPI), but among certain cadre of independents, the role of fluid fertilizers needed a focus. Hence, the formation of the National Fertilizer Solutions Association (NFSA). The pioneers who pushed the TVA now pushed the NFSA in the interest of fluid fertilizers.

The industry had phenomenal support and momentum at this time from the likes of Texas Sulphur, Arcadian, Agrico, IMC, PCS, and Texas Gulf--an era when oil companies were entering and exiting the fluid fertilizer business at a whim.

Contributors

Agronomic research in fertilizer use was probably unprecedented, but few land grants dabbled in fluid sources, despite the attention of the NFSA and its members. A notable exception here was Arcadian corporation and agronomist Don Johnson. These folks made significant advances in nitrogen technology via applications from aqua to UAN solutions. Early slow release work and foliar nitrogen studies--split applications, and starter fertilizers--owe their origin to these pioneers. Other significant contributors at this time were Dr. Larry Murphy (Kansas State) and Dr. Stanley Barber (Purdue) who both elaborated the role and efficiencies of fertilizer placed close to the seed or developing plants that essentially gave rise to the modern era of "strip, starter, split" applications.

Despite the obvious implications of nutrient efficiencies (yield, economics, environment, and so forth) fluids carried a premium price in the field, for the most part, that required a little more attention than the usual NPK peddlers.

The NFSA, through its annual Round-Up and Convention gatherings, sought to include agronomic research and data but primarily through member companies. Similarly, the events became excellent opportunities for industry chemists and engineers to exchange experiences and assist one another in this fledging industry. However, widespread recognition and acceptance, in a largely dry fertilizer, anhydrous N business, was a significant hurdle, not so much at the independent dealer level, but particularly at the Land Grant university research level.

Formation of FFF

I recall talking to several university and consultant researchers at the time about doing fluid research. The major stumbling blocks were measurement and application of treatments (coffee can) versus no application equipment for fluids. It was too expensive and I couldn't get the controls I needed (e.g. P vs APP). These were mostly cop-outs and ignorance but also an issue. The NFSA thus commissioned Scott Tinsman to chair a committee to address these issues and in 1981 the Fluid Fertilizer Foundation was born, a tribute to the independent pioneers of 30 years before and the foresight of the major nutrient producers who saw a route to farms via the informed dealer and crop consultant.

Its value

The value of the FFF is still crystal clear today. We have a research and education foundation dedicated to fluid fertilizer research--a unique organization still serving dealers, consultants, land grants, and major nutrient producers.

Some of the early work included:

- Fluid education in the university systems
- Through member support, donation of application equipment and custom blends to facilitate research
- Multi-nutrient starters (NPKS and Zn)
- East coast phosphate rate recalibrations
- Slow release nitrapyrin, DCD, and NBPT research
- Split N regimes in multiple crops
- DRIS
- Foliar nutrition related to pesticide
- Weed N' Feed--actually the origins of the AMS/glyphosate surfactant business
- Seed N' Feed
- Chelated micronutrients
- Resolution of late K deficiency in cotton
- Pioneering fertigation work
- High yield systems agriculture
- Precision ag systems

Summing up

And the work continues with millions of dollars granted to high yield, economically viable, and environmentally sensitive agronomic research.

For me personally, one of the most significant founding and existing benefits of the FFF is the interaction between industry colleagues and the very important personal relationship between business and academia. It's still a people business.

Many companies in this business owe their products to the pioneers and pioneering research of the FFF. A little dose of history would help. Moreover, the FFF remains a fruitful source of cutting edge research to provide strong product and technique benefit statements and an outstanding forum for agronomic and production information via the annual Technology Round Up and Fluid Forum.

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