

AgroLiquid NEWS

SPRING 2020

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Expecting the Unexpected

By Galynn Beer, National Sales Manager

In agriculture, we are used to dealing with uncertainty. Weather, markets, the level of uncertainty that exists in our geography, all are factors in making crop input decisions. Trade wars and tariffs, along with Market Facilitation Programs (MFPs), have been harder to predict and factor into decisions and has caused some frustration. But we've persevered. Now enter COVID 19, the amped up coronavirus. This has ramped up uncertainty for the 2020 growing season.

Agriculture Presses On

While much of the country, and world for that matter, ground to a halt as a result of COVID 19, agriculture presses on. Farmers continue to quarantine themselves in their tractors and isolate themselves in fields. The one thing to remember is that COVID 19 is not transmitted through the phone while sound advice can be. Technology provides us a mode of communication that delivers access to resources of expertise and inputs.

The Weight of Uncertainty

With all of the financial news being reported, a great deal of uncertainty exists. This can cause farmers to go in to survival mode and want to scale back input costs to a minimum. Emotionally charged decisions may override rational business decisions. AgroLiquid has personnel that ranks at the top of the industry when it comes to making recommendations and matching fertilizer needs to expectations and economic conditions. While there won't be room for frivolous spending, a nitrogen only program—which I would consider a survival decision—won't be the answer either. AgroLiquid aims to add value through guidance from trusted advisors. Someone who is a step removed from the weight of uncertainty can provide insights to help fight off the risk-averse tendencies that creep in with unanticipated risk. The AgroLiquid team can help in a couple of ways:

- 1) we have a culture of constant improvement to elevate our skills for times like this and
- 2) we want the farmer to be able to emerge from the uncertainty as an entity that will be on-going... surviving and producing profits for years to come.

As a result, it is in our best interest to make fertilizer recommendations that

are in the grower's best interest. We are used to balancing the expense of crop nutrition with expected revenue, which accounts for current risk.

Evaluating Risk

In times like this, normal risk-takers can turn very conservative. And it is a sound practice to evaluate levels of risk. But as unexpected as this virus and all of the negativity has been, there are often surprise glimmers of opportunity. I'm sure the toilet paper industry never forecasted the demand they are experiencing! Many businesses have been affected.

Virtually every aspect of the economy that generates tax revenue for local governments are going to take a serious hit. We've seen the Fed set a target Fed Funds rate of 0% in order to make risk-taking less costly. The potential exists for us to see significant spend packages to jump start the economy once the impact of the virus has subsided.

But as unexpected as this virus and all of the negativity has been, there are often surprise glimmers of opportunity.

I wouldn't be surprised to see some quantitative easing as we did after the housing bubble burst, which is just the Fed buying back longer term securities to hold on their balance sheet and replaces those securities with cash in the economy to be spent. These actions could devalue the dollar, which then can prop up commodity prices and make our agricultural products more affordable for countries like China. If indeed we see a bump in prices, it will likely be delayed; in other words we'll have to wait and deal with added uncertainty in the interim.

But if a producer faced with difficult decisions cuts too many corners, and then commodities rally to better levels, there won't be the optimum production to capitalize on the opportunity.

The Path Forward

You've heard it before, but we are in unprecedented territory. While quantitative easing could help lower the value of the dollar, currency is still comparative. This means if other currencies don't come up compared to the USD, then there won't be much of a benefit. Also, demand will matter and it is difficult (impossible) to know what the consequences of most of the world hiding in their houses will do to demand for commodity products, even once recovery starts. A case can be made for a rally at some point in the future, but it's hard to predict to what levels we could expect if it does. However, a scenario does exist that a rally could occur that is hard to imagine today. Rational thinking that can weigh the potential for an upside can be an offsetting entry for the brain to balance the thoughts that it will be a long free fall; it might not be.

Your AgroLiquid Team

Agriculture is generally counter-cyclical to the rest of the economy. Agriculture often benefits from the government spending our way out of a recession. So, as you manage through this season, make sure that the irrational behavior that is occurring around you doesn't lead to a bunch of ill-advised decisions. More surprises may be lurking, but we will emerge. Outside guidance on crop nutrition from the AgroLiquid team can help buffer emotions as the growing season is thrust upon us. AgroLiquid can add value that extends beyond the nutrients we manufacture. Incorporate outside opinions from a variety of experts to make rational, business decisions in an environment that is loaded with emotion.



Growers, in general, do not intentionally under-fertilize their crops. So, in many cases, deficiencies in one or more nutrients on a tissue test can be indicative of a larger problem.

Stay Ahead of Changing Conditions with Tissue Testing

By Reid Abbott, Regional Agronomist

The 2019 crop is thankfully in the rearview mirror. When looking back at last year's growing season as a whole, many of the variables growers dealt with were simply out of their control. Poor or delayed planting conditions, flooded fields, untimely fertilizer and pesticide applications, and late harvests were just some of the challenges that growers faced. While it is tempting to throw up your hands and move on to 2020, there are some lessons to be learned to be better prepared when Mother Nature throws a wrench in our plans. One effective way to stay ahead of changing conditions throughout a growing season is to enroll in a tissue sampling program.



Evaluate a Crop In-Season

While tissue sampling should never replace a sound soil sampling program, routine sampling throughout a growing season can very successfully indicate trends in plant health and nutrient efficiency as a crop is dealing with its environment.

Nutrient deficiencies can dramatically limit a grower's yield potential in many cases. But "hidden hunger" (a term we use for nutrient deficiencies that show little to no outward symptoms) can be yield limiting as well. Tissue sampling can catch those deficiencies early in a plant's life cycle while there is still time to take corrective action. Even though

tissue testing generally looks strictly at nutrient levels, when paired with proper field scouting and an understanding of nutrient relationships, a grower can radically improve their ability to recognize all kinds of variables that are limiting their crop.

Growers, in general, do not intentionally under-fertilize their crops. So, in many cases, deficiencies in one or more nutrients on a tissue test can be indicative of a larger problem. Using 2019 as an example, you could bet there were many tissue tests that came back low in nitrogen when adequate nitrogen was applied to start the season. In many areas, farmers were scrambling to figure out how to rescue-apply nitrogen to crops that had endured heavy leaching. But, what about other leachable nutrients like boron, sulfur, and in some cases potassium.

To the untrained eye, some of these deficiencies could have even been mistaken for nitrogen deficiency or maybe they did not drop below the threshold of hidden hunger. A tissue test can provide that answer and allow a grower to better stay ahead of those needs amid challenging environmental hurdles.

Compaction, drought, disease, insect and weed pressure, to name a few, can all contribute heavily to a crop's efficient (or inefficient) use of applied nutrients. Tissue testing can be another tool in your toolbox to successfully navigate all of the trials your crop must undergo to reach physiological maturity.

The Proper Steps

For all of the benefits tissue sampling can bring to an operation, careful planning and execution must be taken to be able to rely on the results. Unfortunately, despite popular theory, there is more to tissue sampling than throwing some leaves in a bag and waiting for 3-5 days for the results.

One of the most common mistakes is taking the wrong plant part for the designated growth stage or misreporting the crop's growth stage altogether to the

lab. Labs report nutrient levels by what is sufficient for that crop at a particular point in that plant's growth cycle. For example, you can imagine the sufficiency range for many nutrients in vegetative growth stages differs from that of reproductive growth stages.

Reporting the proper growth stage and collecting the correct plant part for that respective growth stage is imperative to getting accurate results. Of course, as with any sample work, collecting a representative sample of a given area is many times overlooked or lackadaisically done.

Questionable or unexplainable results are often the result of statistical outliers that played too big of a role in the average. In addition, care should be exercised when considering the condition of the samples received at the lab. A few basic hints:

- Use paper bags to hold the plant tissue instead of sealed plastic to avoid mildew
- Avoid keeping samples on the dashboard of a pickup or even in the toolbox where they risk drying out
- Do not take samples too soon after a foliar application has occurred to avoid skewing the results. Instead give the plant time to absorb and metabolize the supplied nutrients before measuring the effect they had on the tissue levels.

A Part of the Plan

After a proper soil test and solid fertility recommendation, tissue testing is the next step a grower can take to improve nutrient management and efficiency on their operation. While tissue samples only represent a single point in time during a growing season, when taken at multiple intervals, trends can be recorded and multiple angles of crop health diagnostics can be investigated. When planning your nutrient management strategy for 2020's cropping season, investigate the possibility of deploying tissue testing on your operation with your local retailer or crop advisor.

Feeding my crop right requires more than just N?

PRECISELY.



Formulated with proprietary

FLAVONOL POLYMER TECHNOLOGY

Prevents nutrient
tie-up in soil



Releases nutrients
as plants need them



Works in soil and
foliar applications

Pro-Germinator®

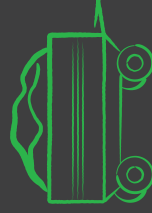


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Liquid Fertilizer

*gets plants growing faster, earlier,
with Flavonol Polymer Technology (FPT)*

CORN



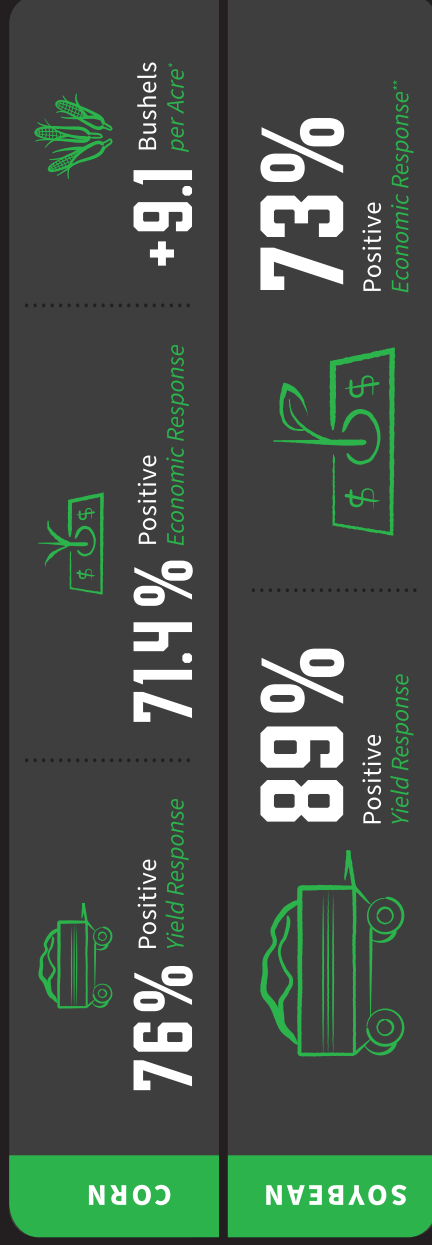
81%

Positive
Yield Response



+8.4

Bushels
*per Acre**



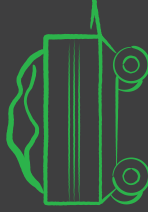
76% Positive Yield Response



71.4% Positive Economic Response



+9.1 Bushels per Acre*



89% Positive Yield Response



73% Positive Economic Response**



Sure-K®

2-1-6

Soluble Potash
with Flavonol Polymer Technology (FPT)

To correct potassium deficiencies or optimize yields, **Sure-K®** or **Kalibrate®** can be combined with **Pro-Germinator®** at planting to give crops a fast start and good overall nutrition. Or they can be used throughout the growing season to provide an extra boost.

Kalibrate®
Precision Potassium

2-0-10-6S

Soluble Potash

with Flavonol Polymer Technology (FPT)



CORN



+4.5 Bushels per Acre*

SOYBEAN



+3.5 Bushels per Acre***

FLEXIBILITY | VERSATILITY | RESULTS

Ask us about a precision crop nutrition program for your crop.



Pro-Germinator, Sure-K and Kalibrate are registered trademarks of AgroLiquid.

*Pro-Germinator: 42 trials, 1996-2018, Sure-K: 21 trials, 2011-2018, Kalibrate: 4 trials, 2014-2016.

**Sure-K: 159 trials, 1998-2018.

***Kalibrate: 15 trials, 2014-2018.

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Increase Tonnage and Feed Quality

By Dan Peterson, Regional Agronomist

How do we grow healthy, resilient forages which will maximize milk production or rate of gain, while maintaining the soil? AgroLiquid has studied these challenges and we have solutions to address not only the macronutrient needs of alfalfa, but also provide the essential secondary and micronutrients to bolster plant strength, reduce time between cuttings, and improve feed digestibility. This, in turn, has been shown to increase alfalfa tonnage, improve feed nutritional quality, and improve milk production as well as rate of gain.

Potassium and Forage Quality

Potassium (K) plays a large role in the yield and quality of forage crops. Potassium plays a key role in the photosynthesis, respiration, translocation and many enzyme systems in plants, and also increases disease resistance. For alfalfa, K strongly influences yield, and improves the level of carbohydrates stored in alfalfa roots which results in greater stand persistence.

The most common source of potassium fertilizer is potassium chloride, a pure salt. It's well known that high rates of potassium chloride often create a chloride toxicity, particularly where significant soil chloride levels are already present, which is often the case where manure is spread. Excess chloride can also reduce plants' uptake of other vital nutrients like nitrogen, sulfur, phosphorus, boron and others, which often takes a heavy toll on yields and forage quality. The very high salt of potassium chloride can also lead to reduced soil microbiological activity and poor germination of new seeding.

Liquid Fertilizer for Alfalfa, Tonnage and Feed Quality Study



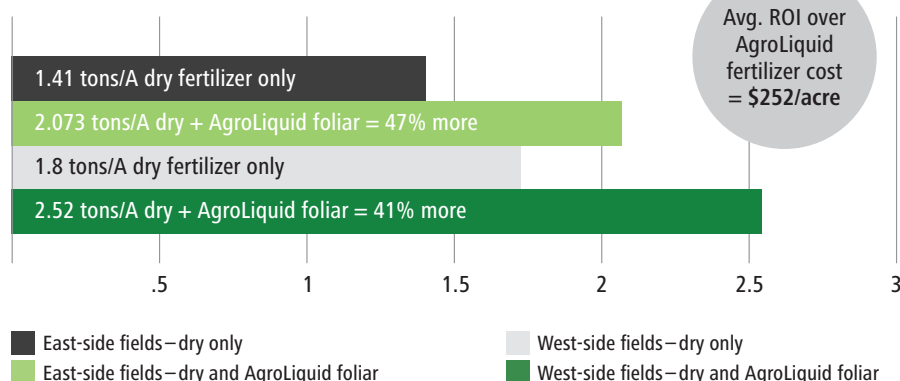
AgroLiquid's alfalfa fertilizer program yielded:

- ✓ 40% more milk per acre
- ✓ 37% more yield per cutting
- ✓ 6% lower lignin
- ✓ 5% more protein
- ✓ 4 days quicker to maturity

AgroLiquid foliar treatments are showing very consistent yield and quality increases when applied to 2nd and 3rd cuttings.



Mitchell Dairy–Winnebago, IL 3rd Cutting Yields



AgroLiquid treatments applied at 6" growth.
2 gal/A Sure-K + 1 gal/A fertiRain + 1 gal/A accesS +
24 oz/A microLink Manganese + 24 oz/A microLink Boron

Sure-K® Kalibrate™ Precision Potassium

Sure-K® and Kalibrate® are clean, chloride- and hydroxide-free potassium solutions. The unique formulations of these products provide increased crop utilization, allowing lower total product application volume to produce the same results as other conventional potassium fertility products when applied at typical rates.

Pro-Germinator®

Pro-Germinator® is used primarily for the application of phosphorus, but is partnered with nitrogen, potassium, and micronutrients for maximum performance. Phosphorus is a nutrient that is critical for early plant development in a crop as well as in the reproductive stages. Phosphorus is the key nutrient in getting a pasture stand established, and in forages, the primary task of phosphorus is transforming protein, fat, and carbohydrates into energy.

microLink Linking yield to potential

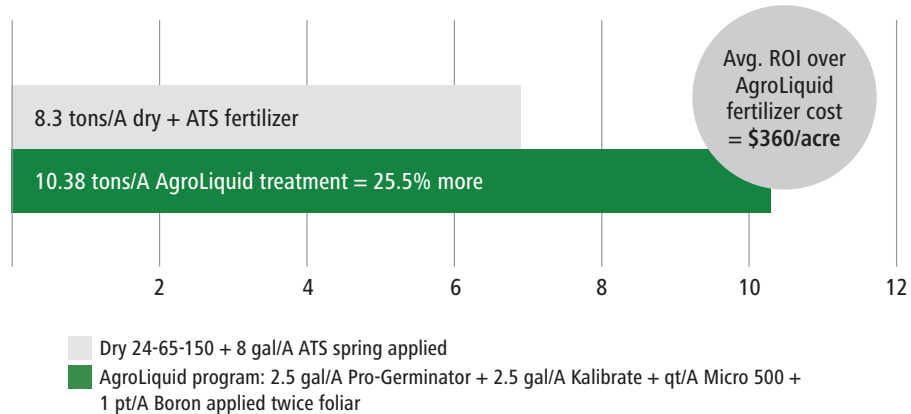
Most farmers focus on macronutrients to improve yields and crop quality. However, micronutrients also play a pivotal role in crop development. If micronutrient deficiencies persist year after year, they will continue to damage crops regardless of the nitrogen, phosphorus and potassium applied. That's where our microLink family of products can come in. From boron to molybdenum, we have a full line of micronutrients.

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In the Great Plains, we are also experiencing consistent yield increases whether applied once in the spring, or split into two or more foliar treatments during the season.

Scott Ward Trial–Deerfield, KS Season Total Yields



Note: Hay value per ton of dry matter calculated using reported alfalfa hay prices of \$140/ton (\$165 DM basis).



Most AgroLiquid products can be applied in combination with other crop production or protection products and present a very low risk of crop injury. Always consult all relevant manufacturer/supplier information and perform a jar test to ensure compatibility.



"Can I Mix...?"

AgroLiquid Research and Development Team

"Can I mix fertilizer A with fertilizer B?" This is a big deal in agriculture. We know we need to make hay while the sun shines and when it's time to go—it's time to roll! No one wants to be slowed down because a bad mix has gummed up the works. AgroLiquid spends a lot of time making sure the products we call compatible won't cause those slow downs. But, before we delve into this topic, let's set some ground rules on what can be described as "compatible:"

1. It mixes into either a clear solution with no solid fallout (ideal) or a suspension where the suspended material can stay suspended for longer than a few days. If the suspndant falls out of solution, it can be easily agitated back into suspension.
2. When mixed, it does not produce any gas such as ammonia or carbon dioxide. Off-gassing like this changes the materials in the mix, and not usually in a good way.
3. When mixed, the solution doesn't get very hot. This can be dangerous!
4. When mixed, it does not produce a fallout of solids. This could drastically change the analysis of the remaining solution.
5. It can be used in farming equipment without plugging filters, screens, or nozzles.



AgroLiquid spends a lot of time making sure the products we call compatible won't cause slow downs.

One reason for our superior compatibility is due to our Flavonol Polymer Technology. This proprietary technology acts as a chelant or encapsulation agent, and keeps the different compounds in solution from reacting with each other, resulting in an inert, clean mix. This may not be the case with products that use acetates, citrates, or amino acids as their chelating agents.

Another reason is the fact that most of our products have fairly neutral pH. Attempting to mix products that are alkaline may result in either the production of gasses, heat, and/or

significant fallout. Care must also be taken with acidic products, especially when being mixed with alkaline products.

To help prevent unnecessary headaches, always perform a jar test. We cannot stress this enough! This is especially true when adding agrochemicals; there are many off-brands that use different additives and carriers that can cause adverse reactions. Remember: there is always a chemical reaction when you do a jar test, so proceed with care!

If a fertilizer product (AgroLiquid or otherwise) is to be used in fertigation,

we also suggest that growers submit water samples to an accredited lab for analysis, specifically for pH, hardness, and bicarbonate. Most alkaline or hard irrigation water will cause fertilizer products to react and gradually create a buildup of fallout in lines and emitters. This can be solved by neutralizing your water with a sulfuric or carboxylic acid injection system.

If you still have questions, such as “can I mix fertilizer A with fertilizer B?”, do not hesitate to contact your AgroLiquid representative. We are here to support you and your operation.



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Apply less, expect more?

PRECISELY.

It's time for a crop nutrition plan that gets more return from every drop. One that starts with a full line of crop nutrients, from nitrogen to molybdenum, features custom formulas that deliver the right nutrients at the right time, and keeps going with robust agronomic knowledge and customer support. AgroLiquid has precisely what it takes to help you succeed like never before.

Find an AgroLiquid dealer near you. **AgroLiquid.com**



Pro-Germinator®

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Precision Potassium

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