

BIOPRYME™

Providing the Precursors and Essential Nutrients to Support the "Grow to Fill Transition" in Your Crops

BioPryme™ is designed to promote the conversion from growth and vegetative phase to a fill and yield phase of crop growth. The drought resistance traits and hybridization have led to today's incredible crop yield potentials, which far exceed the yields of our grandparents with much less effort. However, the demands of these high yielding crops have begun to exceed the availability of nutrients and molecular co-factors available through traditional agriculture. The energy facilitating molecules and nutrients in BioPryme™ are balanced to promote the plant's to more completely achieve its genetic potential.

This technology is intended for use primarily in conjunction with Agrovive™ Microbiological products to form a synergistic program to maximize your profitability. BioPryme™ increases the efficiency and effectiveness of native microbes including Rhizobium sp. for nitrogen fixation and mycorrhizae for soil building. These combinations will employ millions of unseen laborers to bring your best yields to the bin.

AGROVIVE™

315 North Heritage Parkway,
Tea, South Dakota 57064
(888) 638-2861

www.agrovive.com
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SOIL TESTING

Soil and tissue testing for all essential nutrients can be provided to you and your Agronomist at a reduced cost through the Agrovive™ Lab Testing Program. Your Agrovive™ dealer can assist your agronomist to obtain all essential nutrients to meet the needs of your crop.

Soil and tissue test results will help your agronomist to determine the nutritional needs of your corn crop, and how best to provide these nutrients to maximize your yields and profitability.

AGROVIVE™

NUTRITIONAL GUIDELINES



IN PARTNERSHIP WITH  **AGRIGUARDIAN**

RECOMMENDATIONS TO MAXIMIZE YOUR RESULTS!

- Fertilize for the yield you want to harvest.
- Micronutrients, including molybdenum, are important to achieve maximum yields.
- Tissue tests are the only way to know for sure what your plants need.
- Testing for a deficiency in your plants after seeing symptoms is too late.
- Soil nitrate tests by themselves are a poor indicator of a soil's nitrogen content.
- Just because something has always been done a certain way doesn't mean you have to perpetuate an outdated strategy.
- Talk to your agronomist often, and ask for recommendations early.
- Yield at the end of the year is dependent on the effort you put in well before you plant.



GREAT PRODUCTS WITH EVEN GREATER YIELDS

Agrovive™ has developed numerous biological products proven to produce large, strong plants with exceptional high yield potentials. These yields are only possible when nutrients and other essential inputs are available to the growing crop. Your agronomist or crop consultant plays a vital role to ensure that the need for these inputs have been identified and provided to the crop.

Nutritional guidelines should be developed with your agronomist or crop consultant using crop production programs to meet the needs of the projected yields. Nutrient management strategies recommended include the use of complete soil tests to determine preplant baseline nutritional levels to determine the nutritional needs of the soil for the crop being grown. Include in these tests all essential macronutrients and micronutrients required by crops, as well as other soil parameters, such as pH, Cation Exchange Capacity, Percent Base Saturation, etc.

Season long monitoring of the crop is recommended when you use a biological program with your operation. Such a plan would include using tissue testing to confirm that the nutritional program is on track. Shortages or imbalances can be corrected by nutrient applications, typically through foliar fertigation. This process is to maximize your success using any biological management strategy. If irrigation is used, water nutritional tests help to determine the contribution of nutrients contained in the irrigation water, as well as salts and other compounds dissolved in the water that may impact the crop. These test results along with crop observations give insights as to factors that may limit the potential yields of the crop.

The information from testing and technical support from your agronomist or crop consultant are your greatest assets to achieve the high yield potentials provided by Agrovive™ biological products. Visit with your agronomist or crop consultant on how to successfully implement an Agrovive™ biological and nutrient management plan for your operation.

For additional information contact your Agrovive™ dealer, or Agrovive's™ at 888-638-2861 or by email at sales@agrovive.com.

SOYBEAN PRODUCT RECOMMENDATIONS

High quality soybeans contain high protein and oil content. Soybeans require proper nutrition, and rhizobium for nitrogen fixation, to achieve high yields. The use of biological stimulants, such as the seed treatment *Soyfx*™ goes beyond good nutrition to greatly increase bean yields and quality. The targeted biologicals in *Soyfx*™ are formulated to enhance the biological mechanisms that increase overall plant health and yield performance of soybeans.

Biological stimulants can greatly increase yields, but good plant nutrition is still required to produce both high yields and quality beans. The essential 17 nutrients are the building blocks of harvestable beans. *Soyfx*™ increases the yield response to available nutrients, but the nutrients still must be available for the crop.

BioPryme™ enhances the benefits of *Soyfx*™, including enhancing nitrogen fixation, nitrogen utilization, and the physiological transition from vegetative growth to reproductive development. BioPryme™ also enhances the transfer of carbohydrates and protein from plant tissues - leaves, shoots and roots - into pods to promote larger beans and more complete pod fill. More of the energy and nutrients contained in the plant are converted into harvestable yields. It also helps move nutrients and usable compounds back into the plant before the dropping of dying leaves. BioPryme™ helps to make essential nutrients and growth promoting compounds more available to the growing crop.

Soil testing is the first step to understanding nutrient availability in your soybean crop. Include all essential macronutrients and micronutrients in your soil and tissue tests. Soil tests tell which nutrients are needed to prevent losses due to nutrient deficiencies. Tissue testing will provide nutritional information to know what your soybean crop needs to achieve the crop's potential. All essential micronutrients, including molybdenum and cobalt for nitrogen fixation and nitrogen utilization, are needed to reach your soybeans crops' yield potential.

Soyfx™ used as a seed coat enhances the efficient solubilization and transport of these nutrients, which can lead to greater yield potential in your soybeans. Maximize this yield potential by using *Soyfx*™, BioPryme™ and AgriGuardian™ nutritional products as part of a well-planned nutritional program.

SOYBEAN TISSUE NUTRITIONAL STANDARDS

NUTRIENT	SEEDLING > 4" TALL	EARLY FLOWERING	PRIOR TO POD SET	POD-FILLING
MACRONUTRIENTS (%)				
NITROGEN	3.5 - 5.5	3.25 - 5	4 - 5.5	3.5 - 5
PHOSPHORUS	0.3 - 0.6	0.3 - 0.6	0.25 - 0.5	0.24 - 0.45
POTASSIUM	1.7 - 2.5	1.5 - 2.25	1.7 - 2.5	1.7 - 2.5
CALCIUM	1.1 - 2.2	0.8 - 1.4	0.35 - 2	0.35 - 1.35
MAGNESIUM	0.03 - 0.6	0.25 - 0.7	0.25 - 1	0.25 - 0.6
SULFUR	0.3 - 0.8	0.25 - 0.6	0.2 - 0.4	0.2 - 0.35
MICRONUTRIENTS (PPM)				
BORON	22 - 55	20 - 60	20 - 55	20 - 50
COPPER	5 - 15	4 - 30	10 - 30	10 - 25
IRON	45 - 300	25 - 300	50 - 350	45 - 200
MANGANESE	23 - 133	17 - 100	20 - 100	20 - 100
MOLYBDENUM	1 - 10	1 - 2	1 - 5	1 - 2.5
ZINC	20 - 86	21 - 80	20 - 50	20 - 50

These ranges serve as a guide for the addition of nutrients to a growing crop. Maximum benefit of Agriove™ requires the use of BioPryme™ and AgriGuardian MicroMx Complete™ that include microbial and plant growth promoting ingredients. AgriGuardian™ products, such as Moly®, Nutra-Boost® and AgriCal®, provide additional essential nutrients beyond N-P-K.

Additional fertilization of micronutrients is recommended as per the trifoliate tissue sample handout. Adapted from Plant Analysis Handbook III, © 2014 Micro-Macro Publishing, used with permission. Analytical Services provided by Micro-Macro International Laboratories, Athens, GA. www.mmilabs.com, info@mmilabs.com, 706-548-4557. Agriove™ offers special pricing on analytical services from MMI Labs, use the code "Agriove" to receive discounts.

CORN PRODUCT RECOMMENDATIONS

The biological stimulants in the seed treatment IONfx™ increase yields, but help to maximize test weights, carbohydrate and oil content of the grain, and in silage. As with other Agriove™ products, IONfx™ is formulated to enhance overall plant health and crop performance. IONfx™ also results in more grain at harvest through reduced lodging and increased leaf area for photosynthesis.

These beneficial effects of IONfx™ still require proper plant nutrition to produce high yields and quality grains. The 17 essential nutrients are needed at critical stages in plant growth, such as zinc and molybdenum at V3-V4 to form the final number of kernels on an ear, nitrogen and phosphorus for leaf and stalk development, and potassium and magnesium for kernel fill. IONfx™ increases the yield response in relation to available nutrients, but the nutrients need to be available, especially at critical time periods in the plant's growth.

BioPryme™ was designed to enhance the effects of IONfx™, including photosynthesis, grain set and fill. BioPryme™ promotes the transfer of carbohydrates and protein from plant tissues - leaves, shoots and roots - into ears to promote complete ear fill and larger, heavier kernels. The result is that more of the energy and nutrients contained in the plant are converted into harvestable yields. As with soybeans, BioPryme™ helps to enhance the efficient transport of available nutrients, including nitrogen, resulting in producing higher yields and higher test weights.

As with all crops, soil testing is needed to understand nutrient availability to your corn crop. Include all essential macronutrients and micronutrients in your soil and tissue tests. Soil tests are often done before planting, but may be done midseason as well to determine nutrients still available in the soil. However, tissue testing is needed to know if these nutrients are getting into the plant, especially micronutrients. All essential micronutrients, including molybdenum which is required for nitrate utilization, must be present in the plant to achieve the full yield potential in corn crops.

IONfx™ used as a seed coat enhances the efficiency of many nutrients, which can lead to greater yield potential in your corn crop. Maximize this yield potential by using IONfx™, BioPryme™ and AgriGuardian™ nutritional products as part of a well-planned nutritional program.

CORN FERTILIZER REQUIREMENTS

NUTRIENT	SEEDLING < 4" TALL	PLANTS < 12" TALL	PRIOR TO TASSELLING	INITIAL SILK
MACRONUTRIENTS (%)				
NITROGEN	4 - 5	3.5 - 5	3 - 4	2.8 - 4
PHOSPHORUS	0.4 - 0.6	0.3 - 0.5	0.25 - 0.45	0.25 - 0.5
POTASSIUM	3 - 4	2.5 - 3.5	2 - 2.5	1.8 - 3
CALCIUM	0.3 - 0.8	0.3 - 1	0.25 - 0.5	0.25 - 0.8
MAGNESIUM	0.2 - 0.6	0.15 - 0.65	0.13 - 0.3	0.2 - 0.65
SULFUR	0.18 - 0.5	0.15 - 0.4	0.15 - 0.5	0.15 - 0.4
MICRONUTRIENTS (PPM)				
BORON	5 - 25	5 - 25	4 - 25	5 - 25
COPPER	6 - 20	5 - 20	5 - 25	6 - 25
IRON	40 - 250	30 - 250	30 - 250	20 - 250
MANGANESE	25 - 160	20 - 150	20 - 150	15 - 150
MOLYBDENUM	0.1 - 0.25	0.2 - 2	0.1 - 0.3	0.1 - 0.2
ZINC	20 - 60	20 - 70	20 - 60	20 - 70

These ranges serve as a guide for the addition of nutrients to a growing crop. Maximum benefit of Agriove™ requires the use of BioPryme™ and AgriGuardian MicroMx Complete™ that include microbial and plant growth promoting ingredients. AgriGuardian™ products, such as Moly®, Nutra-Boost® and AgriCal®, provide additional essential nutrients beyond N-P-K.

Additional fertilization of micronutrients is recommended as per the trifoliate tissue sample handout. Adapted from Plant Analysis Handbook III, © 2014 Micro-Macro Publishing, used with permission. Analytical Services provided by Micro-Macro International Laboratories, Athens, GA. www.mmilabs.com, info@mmilabs.com, 706-548-4557. Agriove™ offers special pricing on analytical services from MMI Labs, use the code "Agriove" to receive discounts.

SPRING WHEAT PRODUCT RECOMMENDATIONS

High quality wheat contains high protein as well as high test weight. Wheat requires proper nutrition to achieve high yields. The use of biological stimulants, such as the seed treatment Crownfx™, go beyond good nutrition to greatly increase wheat yields and quality. Crownfx™ stimulates early and extensive tillering, and extensive grain head formation. It also enhances overall plant health.

Biological stimulants can greatly increase the number of wheat grains formed, but good plant nutrition is still required to fill these grains to produce high yields and quality grain. Balanced essential nutrients are the building blocks of harvestable wheat. Crownfx™ increases the yield response to available nutrients. With high yielding premium quality wheat, nutritional needs must be monitored to ensure consistent quality and high yields resulting from use of Crownfx™.

BioPryme™ is used with a Crownfx™ program to help support the metabolic transition from vegetative to reproductive growth, leading to grain fill. It helps to enhance grain fill by helping to overcome folic acid (B9) deficiency to maximize carbohydrate mobilization from the plant to the kernel. BioPryme™ helps to make essential nutrients and growth promoting compounds readily available to the growing crop.

As with all crops, soil testing and tissue analysis are needed to ensure that the correct amount and balance of nutrients, including micronutrients, are available to crops. Soil tests tell which nutrients are needed to prevent losses due to nutrient deficiencies. Tissue testing will provide nutritional information to know what your wheat crop needs to achieve the crop's potential. Include all essential micronutrients - including molybdenum for nitrate utilization - in your soil and tissue to help reach wheat yield potential.

Crownfx™ used as a seed coat enhances the efficiency of these nutrients, which can lead to greater yield potential in your wheat crop. Maximize this yield potential by using Crownfx™, BioPryme™ and AgriGuardian™ nutritional products as part of a well-planned nutritional program.

SPRING WHEAT FERTILIZER REQUIREMENTS

NUTRIENT	AS HEAD EMERGES FROM BOOT	JUST BEFORE HEADING
MACRONUTRIENTS (%)		
NITROGEN	2 - 3	1.75 - 3
PHOSPHORUS	0.2 - 0.5	0.2 - 0.5
POTASSIUM	1.5 - 3	1.5 - 3
CALCIUM	0.2 - 0.5	0.2 - 1
MAGNESIUM	0.15 - 0.5	0.15 - 1
SULFUR	0.15 - 0.4	0.15 - 0.65
MICRONUTRIENTS (PPM)		
BORON	6 - 10	1.5 - 4
COPPER	5 - 25	5 - 20
IRON	25 - 100	10 - 300
MANGANESE	25 - 100	16 - 200
MOLYBDENUM	0.09 - 0.18	0.1 - 0.5
ZINC	15 - 70	20 - 70

These ranges serve as a guide for the addition of nutrients to a growing crop. Maximum benefit of Agriovive® requires the use of BioPryme™ and AgriGuardian MicroMix Complete™ that include microbial and plant growth promoting ingredients. AgriGuardian™ products, such as Moly™, Nutra-Boost® and AgriCal®, provide additional essential nutrients beyond N-P-K.

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AGRI GUARDIAN™

1224 Sykes Street
Albert Lea, MN 56007
Phone 507-373-1559
Fax 507-373-1661

www.AgriGuardian.com
info@agriguardian.com

MicroMix™ Complete by AGRIGUARDIAN
Moly™ by AGRIGUARDIAN
Nutra-Boost™ by AGRIGUARDIAN
Zinc™ by AGRIGUARDIAN
Boron™ by AGRIGUARDIAN
IgniteS²™ by AgriGro
FoliarBlend™ by AgriGro
Ultra™ by AgriGro
AgriCal™ by AgriGro
Ful-Grow™ Fulvic Acid

NUTRIENT DISCUSSION

Soil tests tell which nutrients are available in the soil. Tissue tests tell which nutrients are actually in the plant immediately available to promote growth and yield. Both are needed to understand the nutrition status and needs of crops. Essential and beneficial micronutrients are needed in these tests.

While micronutrients are needed in very small amounts, they are just as important to crop performance and yield as are N-P-K. Micronutrients are the "keys" to biochemical pathways, similar to the keys to your automobile. Without them, these biochemical pathways do not produce the compounds required for growth and productivity of crops.

Here are some of the major functions of micronutrients in plants.

Boron (B) has a primary role in the formation of cell walls in new growth. Without adequate boron, leaves are small, there is poor apical (shoot tip) growth, weak or brittle stems and shoots, abortion of flowers, retarded growth of fruiting structures and seed. Many other problems are associated with B deficiency as a result of poor cell wall and membrane formation.

Copper (Cu) is involved in the formation of many enzymes in plants and also plays a role in cell wall formation. Cu has a role in photosynthesis and the formation of carbohydrates, which can influence flowering, pollination and fruit set. Cu deficiency fruit can be of poor quality. Cu deficiency can also reduce nodulation and N-fixation in legumes. Plants severely low in Cu can be deformed and have weak stems, as well as dying shoot tips. Some crops are particularly sensitive to Cu deficiency such as wheat and oats.

Iron (Fe) is also involved in many enzymatic reactions in plants, but is best known for its involvement in photosynthesis and protein formation. Fe is involved in chlorophyll formation, and its deficiency is often associated with yellowing leaves. Fe is also involved with nitrogen fixation (gives the red color to nodules) and ethylene production. Fe deficient plants often have reduced root growth as well. Water logged soils are conducive to Fe deficiency.

Manganese (Mn) is also involved in activating many enzymes. Deficiency symptoms begin with yellowing between veins (interveinal chlorosis) of young leaves. Symptoms are similar to both Fe and Zn. High levels of Fe in soils or foliar applied can induce Mn deficiency, and high levels of Mn can induce Fe deficiency. High pH soil can suppress uptake of Mn, Fe, Cu and Zn.

Molybdenum (Mo) is the most frequent micronutrient deficiency, partly because it is leachable like nitrate. It is required for nitrogen fixation, conversion of nitrate in plants to usable ammonium, and the formation of indoleacetic acid (IAA). Mo deficiency looks like N-deficiency, because of its role in nitrogen utilization. Mo is not toxic to plants, but high levels in forages can be harmful to ruminant animals. Mo is more available at high soil pH, and is virtually unavailable when soil pH is below 5.5.

Nickel (Ni) is the most recently recognized essential micronutrient. It is required by all plants for the conversion of urea into usable ammonium.

Zinc (Zn) is also required in many enzyme pathways, including energy production, protein formation and growth regulation. Zn is required for the formation of indoleacetic acid, which controls the size of corn ears and wheat heads. Zn must be available prior to the formation of these structures. Zn deficiency often appears as interveinal chlorosis. High phosphorus soils or fertilization can induce Zn deficiency.

Cobalt (Co) is required by legumes that fix nitrogen. The form of nitrogen produced by nitrogen fixation are ureides. Plants cannot directly use ureides as a nitrogen source. It must be converted to ammonium first. The enzyme that converts ureides to ammonium must have cobalt to function.

GENERAL RECOMMENDATIONS AND DISCLAIMERS

The Biological Products provided by Agriovive™ cause increased biomass, larger leaf area, faster canopy, increased head count and kernels per inch of head, increased pod count with beans and increased kernels per cob. If cob can support them.

Nutrient deficiencies in the plant will cause reductions in bean count per pod. Even if there are three locos for beans, a limitation of Mo will reduce the number of beans per pod. A reduction in N, P, K will drag yield.

We recommend an additional NPK load to support a 10 bushel or greater in yield overall in most crops as a basic starting point.

We recommend a micronutrient supplementation at planting or early growth as well as a Mo supplement at V4 on Soybeans, based on tissue tests.

Micronutrients should be monitored at each change in growth stage as it will be the most likely limiting factor if NPK supplementation was done at planting.

Mo is a critical nutrient in corn during the hot summer months for conversion of Nitrate and should be supplemented and monitored to prevent drag.

Micronutrients as well as NPK should be supplemented and monitored in Small grain programs.

Nitrogen supplementation and Nitrogen fertilization should be delayed until jointing as the Agriovive™ products promote tillering and the early addition of Nitrogen could cause an erratic tillering and could lead to disease later when heading is not even due to differences in tiller maturity.

The Fungicide propiconazole (Trit/Slant) should only be applied after jointing unless disease pressure is seen before. The use of this fungicide prior to jointing will negate the effects of the biologic and will kill the live microbes in the plant.