



MORRAL
COMPANIES^{LLC}

SPECIALTY
PRODUCTS

guide





LEADING THE WAY

Morrall Companies was founded in 1963 as a family business serving the local farm community. Since that time, our organization has grown into several business groups that offer solutions for every need. In addition to retail operations serving our country's farmers, Morrall Companies offers manufacturing, packaging and wholesale distribution of a wide range of agriculture products, and beyond.

Today, Morrall is one of the country's largest formulators and manufacturers of liquid fertilizer serving farmers and professionals in the agricultural and lawn/garden industries. In addition, we formulate and package a wide assortment of liquid and dry products.

We take pride in our knowledge of the products we manufacture, package and distribute, as well as our ability to provide our customers with the highest levels of service. Our products reach retail, wholesale, professional and industrial markets and can be found anywhere from a local fertilizer dealer's warehouse to the shelves of national and international retailers. **For over 55 years, we have always believed in pursuing three principals: Innovation, Quality and Service.**



MORRAL IS COMMITTED TO TOTAL CUSTOMER SATISFACTION.

“Morrall Companies operates safely with respect to our employees and environment. We will meet or exceed the expectations of our customers, employees, vendors, stakeholders and the communities we live in. We strive for mutually beneficial business relationships while operating with integrity and honesty.”

-MISSION STATEMENT
Morrall Companies, LLC



MORRAL LOCATION
PO Box 26 / 132 Postle Ave.
Morrall, OH 43337
Phone: (740) 465-3251
Toll Free: (800) 554-3251
Fax: (740)465-9781

CALEDONIA LOCATION
1592 Columbus-Sandusky Rd. N
Caledonia, OH 43314
Phone: (419) 845-2052
Toll Free: (800) 569-8027
Fax: (419) 845-3375

WWW.MORRALCOMPANIES.COM



FOLIARS

Foliar Fertilization is one of the most efficient way to increase yield and plant health. Your crops are capable of taking in nourishment through their leaves as well as their roots, and foliar fertilization is a technique of feeding plants by applying liquid fertilizer directly to their leaves. Foliar sprays work quickly to give your plants the micronutrients they need. Foliar supplements are an effective way to compensate for soil deficiencies and poor soil's inability to transfer nutrients to the plant.

Coming soon!

BIOSTIMULANTS

A biostimulant is a substance or micro-organism that, when applied to seeds, plants, or the rhizosphere, stimulates natural processes to enhance or benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, or crop quality and yield. Biostimulants operate through different mechanisms than fertilizers, regardless of the presence of nutrients in the products and they differ from crop protection products because they act only on the plant's vigor and do not have any direct actions against pests or disease. Biostimulants work to improve the efficiency of the plant's metabolism to induce yield increases and enhanced crop quality.

POP UP'S

Pop-up fertilizers have a low salt index, meaning that they won't injure germinating seed, reduce soil bacteria, or burn young roots. They are used to apply some of the micronutrients needed for optimum plant growth. Because it's safe to use in contact with the seed, seedlings get off to a faster start, development of an even stand, which promotes greater health and yield potential. Pop up fertilizers provide excellent compatibility with many companion products and are used to increase seedling vigor.

MICRONUTRIENTS

Some our most popular products include micronutrients, which are key to the health of your plants. Micronutrients are essential for plant growth and play an important role in balanced crop nutrition. They include boron (B), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn), sulfur (S) and chloride (Cl). They are as important to plant nutrition as primary and secondary nutrients, though plants don't require as much of them. A lack of any one of the micronutrients in the soil can limit growth, even when all other nutrients are present in adequate amounts. The micronutrients boron, copper, zinc, and manganese are most often in short supply for growing crops.

SULFUR

Following NPK, sulfur is an essential plant nutrient. It contributes to an increase in crop yields in three different ways:

1. Increase efficiency of nitrogen used by plants.
2. Maximize phosphorus availability.
3. Lower pH of alkaline soils which will increase the availability of other plant nutrients.

SPECIALTY DRY

Morrall Companies offers a wide range of innovative NPK granular fertilizers that combine the advantages of both mineral NPK and water soluble NPK. We have several different types of granular fertilizers, along with an array of formulations which are designed to address specific soil conditions. These products cover the needs of all cultivations in every stage of growth from sowing through harvest. The special needs of the plant and the soil are always considered, resulting in correct fertilization and cost reduction.

FOLIARS

SPECIAL FORMULATION AIDS CROP GROWTH

These blends of special slow release nitrogen are designed specifically for foliar applications, and will supply growing plants with needed nutrients while minimizing the potential for crop injury. In addition to nitrogen and potassium, our soybean foliars contain good levels of manganese which is important for healthy plants and high yields. EDTA micronutrients are compatible with glyphosate herbicide. Our foliars are an excellent supplement to soil applied fertilizer, especially when adverse conditions may interfere with normal nutrient uptake. All of our foliars are made with liquid controlled release nitrogen (CRN). Each product, whether for corn or beans, is a unique liquid formulation of fertilizer containing SRN.

Foliar Fertilization is one of the most efficient ways to increase yield and plant health. Foliar can be designed to meet a plant's specific needs and enables you to correct deficiencies, strengthen weak or damaged crops, help overcome the soil's inability to transfer nutrients to the plant under low moisture conditions, speed growth and grow better plants, which is the ultimate goal. Foliar applications can be targeted to an exact stage of crop development to achieve specific objectives and is a great way to "fine tune" your agronomy program.

BENEFITS

- Non-Burning
- Controlled Release
- Quick Green-Up
- High Analysis
- Low Salt Index
- Easy to handle
- Quick Delivery
- Superior Performance
- Compatible with Chemicals
- Formulated by Morral Companies
- Quality by Morral Companies
- Efficient utilization of nitrogen
- Enhance Growth and quality of crops
- Correct nitrogen deficiencies
- Help plants recover from stressful conditions
- Excellent safe source of supplemental nitrogen
- Increase nitrogen absorption
- Increase translocation within plant

NBN-X

SLOW RELEASE NITROGEN SOLUTION
28-0-0 NON-BURNING NITROGEN SOLUTION

NBN-X is a non burning, clear and colorless nitrogen solution containing a mixture of 72% CRN slow release and readily available forms of nitrogen. When applied, it delivers a quick green up while delivering sustained and non-surge growth. Initially formulated as a non-burning turf fertilizer, NBN-X has shown through it's results that it is a versatile product in applications where a special source of liquid nitrogen is required.

NBN-X30

SLOW RELEASE NITROGEN SOLUTION
30-0-0 NON-BURNING NITROGEN SOLUTION

NBN-30 is a non burning, clear and colorless nitrogen solution containing a mixture of 50% CRN slow release and readily available forms of nitrogen. When applied, it supplies a rapid green up while providing sustained and non-surge growth. Originally formulated as a non-burning turf fertilizer, NBN-30 has proven to be a versatile product in applications where a particular source of liquid nitrogen is required.



NBN-XTRA

26-0-0 0.5% MN
NON-BURNING NITROGEN SOLUTION

NBN-X with Manganese is a non burning, clear and colorless nitrogen solution containing a mixture of 72% CRN slow release and readily available forms of nitrogen. When applied, it delivers a quick green up while delivering sustained and non-surge growth.

NBN-X B

BORON

LIQUID SLOW RELEASE NITROGEN NBN

Morral Companies LLC liquid slow release NBN fertilizer is a unique liquid formulation of fertilizer containing 25% Triazone slow release Nitrogen. This special formulation supplies safe supplemental foliar nitrogen at critical stages of plant growth. Plus, 26-0-0 0.5B is compatible with many crop protection products such as insecticides and fungicides. Always do a jar compatibility test and read label before application.

NK EXTRA

14-0-4 1.2%Mn
FOLIAR FERTILIZER

This blend of special slow release nitrogen and low-salt potassium combined with chelated EDTA Manganese is designed specifically for foliar application. NK Extra will supply growing plants with needed nutrients while minimizing the potential for crop injury. In addition to nitrogen and potassium, N-K Extra contains excellent levels of manganese which is important for healthy plants and high yields.

NK PLUS

14-0-4 0.6%Mn
FOLIAR FERTILIZER

In addition to nitrogen and potassium, N-K Plus contains strong levels of manganese, which is important for healthy plants and high yields. EDTA Manganese is compatible with glyphosate herbicides. N-K Plus is an excellent supplement to soil applied fertilizer, especially when adverse conditions may interfere with normal nutrient uptake.



POP UP'S

BENEFITS

Pop-up fertilizer is formulated for in-furrow application, without damaging germinating seedlings or new roots.

In-furrow applications result in the following benefits:

INCREASED ROOT MASS

Important available nutrients stimulate early root growth and increased mass root formation. Larger, stronger roots absorb more nutrients and water for improved plant health and standability.

EARLY EMERGENCE

Nutrients are available soon after germination and when the root is forming. Early seedling vigor is enhanced.

IMPROVED STRESS MANAGEMENT

Young seedlings are healthier, and better able to withstand wet soil conditions and cool temperatures.

SPECIAL FORMULATION AIDS CROP GROWTH

Pop-up fertilizers have a low salt index, meaning they won't injure germinating seed, reduce soil bacteria, or burn young roots. Because they are safe to use in contact with the seed, seedlings get off to a faster start, and they develop an even stand, which promotes greater health and yield potential. These blends are readily available to seedlings. They supply nutrients to growing corn seedlings up to the fifth leaf stage. Plus, they provide excellent compatibility with many companion products.

EXCELLENT STORAGE QUALITIES AND RETURN ON INVESTMENT

Unlike high salt content fertilizers, Pop-up fertilizers can be stored in mild steel, stainless steel or poly storage tanks. However, storage in aluminum equipment is not recommended. Most of these products do not require heated storage, as they are not affected by cold temperatures. Low application rates require less product handling, allowing for more acres to be planted in less time. Plus, these products are cost competitive with other fertility management systems. Factoring in all the product benefits, it is clear they provide a solid return on investment.

HIGH QUALITY, HIGH PURITY, LOW SALT INDEX, HIGH SOLUBILITY

Pop-ups are high quality complete fertilizers designed and formulated to be applied in the seed furrow. These products contain a highly available form of N, P, K. Micronutrients such as Zinc and Sulfur can be added as needed.

3-18-18

**POP-UP/FOLIAR FERTILIZER
LIQUID NPK**

Encourages rapid seedling emergence and growth, provides nutrients at critical growth periods as a foliar fertilizer. 3-18-18 Pop-up/Foliar is a unique blend of 100% ortho-phosphates which are readily available to seedlings. As a foliar, 3-18-18 can be applied at the same time in combination with other crop protection and nutritional products.

6-24-6

**POP-UP FERTILIZER
LIQUID NPK**

Encourages rapid seedling emergence and growth. 6-24-6 Pop-up is a unique blend of ortho and poly phosphates (80-20), which are readily available to seedlings. When applied, crops emerge earlier and more uniform and there are increases in yield potential. 6-24-6 produces higher quality and drier crops at harvest.



8-19-3 1S .2Zn

**POP-UP FERTILIZER
LIQUID NPK WITH
MICRONUTRIENTS**

Encourages rapid seedling emergence and growth. 8-19-3 Pop-up is a unique blend of poly and ortho phosphates (50-50), which are readily available to seedlings.

9-18-9

**POP-UP FERTILIZER
LIQUID NPK**

9-18-9 Pop-up is a unique blend of 100% ortho-phosphates, which are readily available to seedling and encourage rapid seedling emergence and growth. When applied, crops emerge earlier and more uniform and there are increases in yield potential.

APPLICATION RATE

3-5 gallons per acre, in-furrow with corn. It can be used on several crops; corn, sugar beets, potatoes, tomatoes and others. Check with your Morral Companies area agronomist for specific use recommendations. 3-18-18 and 9-18-9 may also be applied as a foliar fertilizer on most crops including those listed above.

Can be applied with Regent®, Capture®, and other furrow applied pesticides. Always conduct jar test to determine compatibility. Additional information about application equipments is available from your Morral Companies sales representatives. Regent is a registered trademark of BASF • Capture is a registered trademark of FMC Corp.

MICRONUTRIENTS

SMALL BUT MIGHTY

Some of our most popular products include micronutrients, which are key to the health of your plants. Micronutrients are essential for plant growth and play an important role in balanced crop nutrition. They include boron (B), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn), sulfur (S) and chloride (Cl).

They are as important to plant nutrition as primary and secondary nutrients, though plants don't require as much of them. A lack of any one of the micronutrients in the soil can limit growth, even when all other nutrients are present in adequate amounts. The micronutrients boron, copper, zinc, and manganese are most often in short supply for growing crops.



GROWTH STAGE			
GERMINATION AND ESTABLISHMENT	VEGETATIVE GROWTH	FLOWERING AND REPRODUCTION	MATURITY AND SENESCENCE
Fe, Zn, Mn	Fe, Zn, Mn, Cu, B	Fe, B	Cu, Mo, B

MICRONUTRIENTS ESSENTIAL TO SUPPORT GROWTH PROCESSES

BENEFITS

Chelation keeps a micronutrient from undesirable reactions in solution and soil. The chelated fertilizer improves the bioavailability of micronutrients such as Fe, Cu, Mn, and Zn, and in turn contributes to the productivity and profitability of commercial crop production.

CRITICAL TO EARLY GROWTH

100% EDTA chelated micronutrients are designed to be combined with liquid starters and foliar sprays, allowing the product to be placed directly with the seed at planting time, or on the plant foliage. Our products have a neutral pH and are low in both salt index and impurities. Placement with the seed allows the EDTA chelated micronutrients along with the available phosphorus and potassium to be taken up at the critical early stages of growth to maximize yield potential.

RAPID UPTAKE

Our EDTA chelated micronutrients are formulated to mix with fertilizers on the plant foliage, allowing for fast absorption into the plant in a very short period of time. This rapid uptake at critical growth stages promotes plant health and increased yield potential.

IMMEDIATE

Our liquid starters and foliar sprays, when mixed with EDTA chelated micronutrients, are immediately available to the plant during the critical early stages of growth.

WHY IS CHELATED FERTILIZER NEEDED?

Because soil is heterogeneous and complex, traditional micronutrients are readily oxidized or precipitated. Chelation keeps a micronutrient from undesirable reactions in solution and soil. Chelated fertilizers have a greater potential to increase commercial yield than regular micronutrients if the crop is grown in low-micronutrient stress or soils with a pH greater than 6.5. To grow a good crop, crop nutrient requirements (CNRs), including micronutrients, have to be satisfied first from the soil. If the soil cannot meet the CNR, chelated sources need to be used.

WHEAT MIX EDTA

1.8% Zn - 3.5% Mn - 2.5% Cu

Wheat Mix EDTA is intended for the prevention and/or correction of copper, iron, manganese and zinc deficiencies. It can be applied alone or in combination with compatible agriculture chemicals or liquid fertilizers, including those containing 100% orthophosphate and suspensions. This product is compatible with most herbicides and insecticides and promotes maximum yield potential.

CORN MIX EDTA

5.5% Zn - 1.5% Mn - 0.4% Cu

Corn Mix is intended for the prevention and/or correction of copper, manganese and zinc deficiencies. It can be applied alone or in combination with compatible agriculture chemicals or liquid fertilizers, including those containing 100% orthophosphate and suspensions. This product is compatible with most herbicides and insecticides and promotes maximum yield potential.



6.0% EDTA MN

This chelated micronutrient prevents and corrects Manganese deficiencies in crops & ornamentals. It is highly effective under adverse soil conditions unlike inorganic manganese compounds which are tied-up and unavailable to plants. This product is water soluble and moves well in the soil solution. These products may be applied separately or in combination with fertilizers or pesticides.

EDTA ZINC 9%

EDTA ZINC 9% is a fully chelated solution of zinc EDTA and is recommended for the prevention and correction of zinc deficiency in all crops. **EDTA ZINC 9%** is recommended for use on all soil types. The preferred use is soil application to prevent the deficiency although it may also be used as a foliar spray for correction. Designed for use in all liquid fertilizers and suspensions.

AMMONIATED ZINC 20% 16-0-0-20 Zn

AMMONIATED ZINC 20% is designed to mix with ammonium polyphosphate (APP) solutions and is compatible with UAN and ammonium thiosulfate. When applied with a liquid starter in a concentrated band underneath the soil surface at planting, **AMMONIATED ZINC 20%** can be ten times more effective than dry broadcast zinc. Application of zinc with phosphate fertilizer optimizes uptake of P and Zn in plants which enhances fertilizer efficiency and plant utilization when applied at correct rates.

CITRIC ZINC 9%

CITRIC ZINC 9% is a chelated micronutrient formulated for foliar or soil application and helps increase nutrient efficiency and availability. It is recommended for use as an additive in dry or liquid fertilizers and is compatible with most of the herbicides, insecticides, and agricultural chemicals that can be utilized in combination with liquid fertilizers. **CITRIC ZINC 9%** may not be compatible with some liquid fertilizer formulations.

There is little question about the importance of Zinc as a micronutrient. Research has shown Zinc is essential for proper plant growth and maximum production to be achieved. It is especially critical in the early stages of root development. Zinc is required in small amounts but for very critical functions. Zinc is necessary for starch formation and proper root development. Zinc is just as important to plant nutrition as primary and secondary nutrients, though plants don't require as much of it. A lack of Zinc in the soil can limit growth, even when all other nutrients are present in adequate amounts. Our Zinc products mix well with liquid starters and 10-34-0 and are the perfect way to deliver Zinc when it is needed and in a form that is immediately available.

SULFUR

LIQUID SULFUR AMMONIUM THIOSULFATE

12-0-0-26S

Adding thiosulfate to a UAN solution is the economical, effective and convenient way to stabilize and maximize nitrogen efficiency, by slowing the rate of nitrification. Thiosulfate also helps solubilize other nutrients in the soil like phosphorus and micronutrients such as zinc, manganese, iron and copper for better plant utilization.

POTASSIUM THIOSULFATE

0-0-25-17S

Potassium Thiosulfate is a clear, chloride free solution with the highest potassium and sulfur content available on the market. It may be blended with other fertilizers or applied as a foliar treatment on selected crops.

AMMONIUM SULFATE

8-0-0-9

Ammonium Sulfate can be used as an additive to crop protection products to enhance product performance by increasing absorption in the plant.

DRY SULFUR AMMONIUM SULFATE GRANULAR 21-0-0-24S

A source of plant nutrients used in dry blend fertilizers and through direct soil application.

TIGER 90CR SULPHUR

A unique, high analysis sulphur fertilizer that can be applied alone or blended with granular fertilizers.

SULFUR: THE 4TH MAJOR NUTRIENT

Sulfur is an essential nutrient in crop production and plant growth. It is classified as a secondary element, but it is sometimes called "the 4th major nutrient". Some crops can take up as much S as P. Sulfur has become more important as a limiting nutrient in crop production in recent years for several reasons. These include higher crop yields that require more S, less S impurities in modern fertilizers, less use of S-containing pesticides, reduced industrial S emissions to the atmosphere, and a greater awareness of S needs.

SULFUR CONTRIBUTES TO AN INCREASE IN CROP YIELDS IN THREE DIFFERENT WAYS:

- Provides a direct nutritive value
- Provides indirect nutritive value as soil amendments, especially for calcareous and saline alkali soils
- Improves the use efficiency of other essential plant nutrients, particularly nitrogen and phosphorus.

Both the yield and quality of crops grown on sulfur-deficient soils are reduced unless sulfur is included in the fertilizer treatment. Sulfur fertilizer can increase crop yields and quality and result in significant economic returns to producers. Sulfur fertilization also improves overall fertilizer efficiency.

SULFUR IS NECESSARY FOR PLANT GROWTH AND NUTRITION.



SPECIALTY DRY



WHY USE ULTRA P?

- Green Effects Ultra P is a dry phosphate fertilizer with a coating formulated to help protect against phosphate fixation in the soil. Green Effects Ultra P LFS is a liquid phosphate fertilizer containing the same protection to prevent against phosphate fixation.
- Phosphate efficiency is crucial to ensuring the most efficient and effective crop production.
- Protected phosphate helps prevent against applied phosphates becoming unavailable and being lost to runoff.
- Provides great potential for higher yields and return on investment

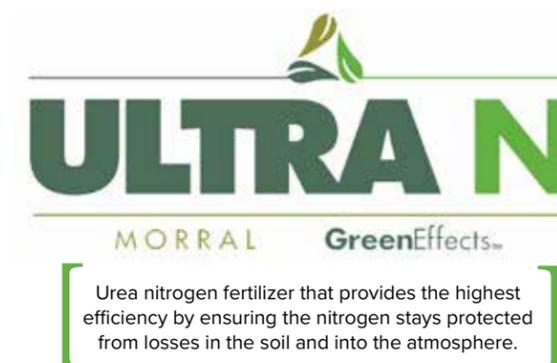
BENEFITS OF ENHANCED PHOSPHORUS EFFICIENCY

- Keeping applied phosphates available leads to the nutrition being more available to the crop for uptake. When a higher amount of phosphate is available to the crop, plants will realize an enhanced plant nutritional status and the potential for higher yields.

HOW DOES ULTRA P PREVENT PHOSPHATE FIXATION?

Ultra P contains a molecule that limits the chemical bonding of negatively charged phosphate molecules with positively charged elements on the soil, water and fertilizer.

As a result applied phosphates, as well as micronutrients, are more available to the plant for uptake.



WHY USE ULTRA N?

- Ultra N helps prevent both above-ground and below-ground nitrogen loss, ensuring that you maximize your investment.
- Ultra N is an environmentally-responsible product with low potential for leaching, denitrification, volatilization and runoff.
- Ultra N increases nitrogen-use efficiency, which is extremely important for plant uptake.
- The longer availability of Ultra N allows time for movement into the root zone for improved and prolonged plant uptake.

BENEFITS OF STABILIZED N

- Keeping nitrogen available longer leads to improved turf density and better overall plant health.
- Increased turf/crop density suppresses weed development and growth.
- Turf/crop achieves quicker greenup and sustains a rich, vibrant color.

UREASE INHIBITION

The coating on Ultra N helps prevent against the conversion of Urea to ammonia gas, which can be lost into the atmosphere. This is known as Volatilization. It does so by protecting the nitrogen against urease enzyme activity.

NITRIFICATION INHIBITION

Ultra N helps protect against the conversion of ammonium nitrogen to nitrate, leading to less nitrogen loss from leaching and denitrification. This protection is achieved by slowing down the Nitrosomonas bacteria in the soil from converting nitrogen into a non plant-preferred form.



FOLIARS
BIOSTIMULANTS
POP UP'S
MICRONUTRIENTS
SULFUR
SPECIALTY DRY

LEADING THE WAY WITH QUALITY AND SERVICE

We are proud to be one of the country's largest formulators and manufacturers of liquid fertilizer serving farmers and professionals in the agricultural and lawn/garden industries.

In addition, we formulate and package a wide assortment of liquid and dry products. Our products and services do not stop there. We are also proud to provide:

AGRONOMY
AG RETAIL
SEED
CUSTOM APPLICATION
GRID SOIL SAMPLING
WHOLESALE
DEF
ICE MELT
TURF AND LAWN PRODUCTS
CUSTOM MANUFACTURING
CUSTOM PACKAGING
ON SITE LABORATORY

and more!



MORRAL OFFICE
132 Postle Ave, PO Box 26
Morrall, OH 43337
(800) 554-3981

CALEDONIA OFFICE
1592 Col. Sand. Rd. N.
Caledonia, OH 43314
(800) 569-8027



WWW.MORRALCOMPANIES.COM

