Sysstem-Ready™

AGRO·K®

Science-Driven Nutrition℠

Sysstem-Ready™ is a unique, glyphosate compatible, highly systemic foliar zinc/manganese micronutrient that rapidly penetrates plant tissue to provide plant-available zinc and manganese to developing crops.

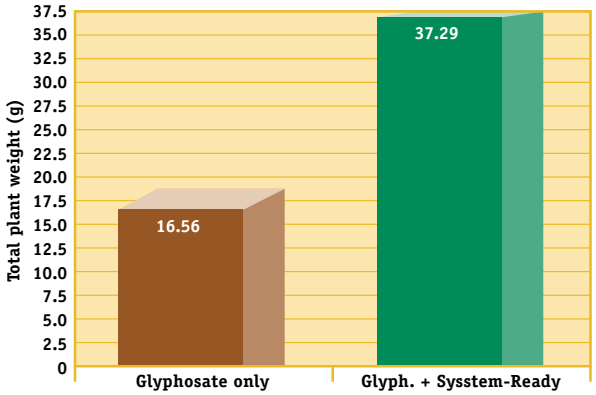
While Sysstem-Ready was developed to meet the specific nutritional needs of glyphosate tolerant crops it is also an excellent fit for a wide variety of conventional row and field crops – such as:

- Alfalfa
- Beans, peas and lentils
- Sweet corn
- Grain crops and seed crops
- Hay and grass crops
- Turf
- Potatoes and other tubers
- Onions

How does it work?

Growing plants experience peak demands for zinc and manganese during rapid leaf and root development when cold wet soils often limit nutrient availability and hinder root growth. Enabling the plant to meet those nutrient needs during peak demand is critical to maximizing yield potential. Zinc is the cornerstone for leaf, root and vascular system development. Manganese plays a key role in nitrogen metabolism and other bio-chemical reactions. Sysstem-Ready™ helps maximize early and rapid plant development by providing highly systemic and available forms of zinc and manganese that can be translocated throughout the plant, when the plant needs them most. Applications of Sysstem-Ready™ prior to or at early season peak demand for zinc and manganese sets the stage for increased yield. The graph below illustrates how early season application(s) of Sysstem-Ready™ can dramatically enhance plant development.

Sysstem-Ready Tank Mixes with Glyphosate Improves Growth in Glyphosate Tolerant Corn

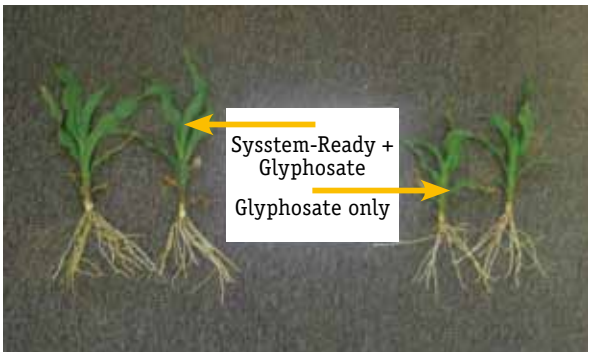


Research Conducted by Dr. Phil Westra - CSU 2008
Average of 4 replicates

Root Growth

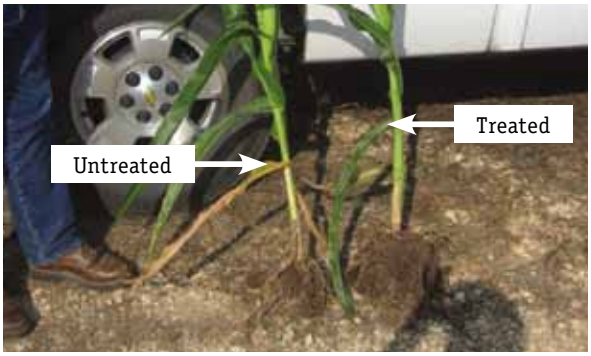
Zinc is extremely important in root development. Spring soil temperatures often limit nutrient availability and consequently root activity and growth. Zinc and phosphorus can be especially difficult for young developing plants to extract fast enough to provide maximum early season growth. To further complicate this situation, even adequate levels of phosphorus and high soil pH can restrict zinc availability even more. Young plants that do not receive adequate zinc during early development are at risk for reduced root mass, leaf size and ultimately - yield.

Foliar application of micronutrients at this time is extremely effective. Because Sysstem-Ready™ is phloem mobile, it provides zinc in a form that not only satisfies the nutrient need, but also promotes strong root and leaf development while encouraging increased moisture and nutrient uptake.



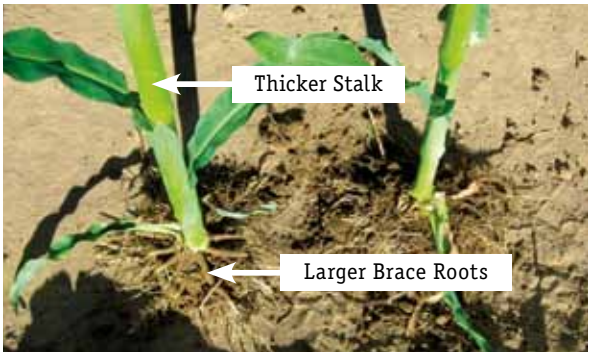
Corn - Sysstem Ready applied at 1qt/acre

Dry Bean Roots - Sysstem Ready applied @ 1qt/acre



Bottom leaf of treated plant still green and functional

Improved root mass



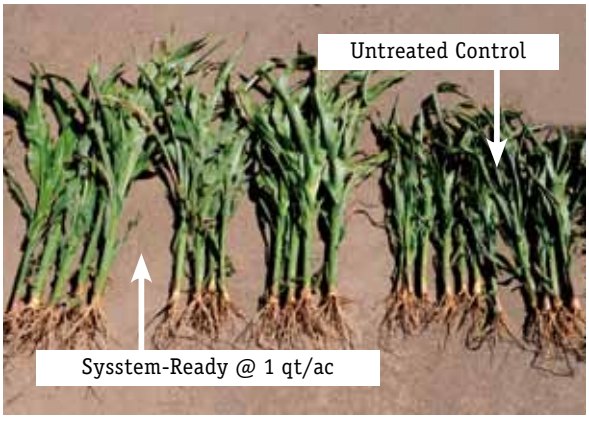
Treated **Untreated**

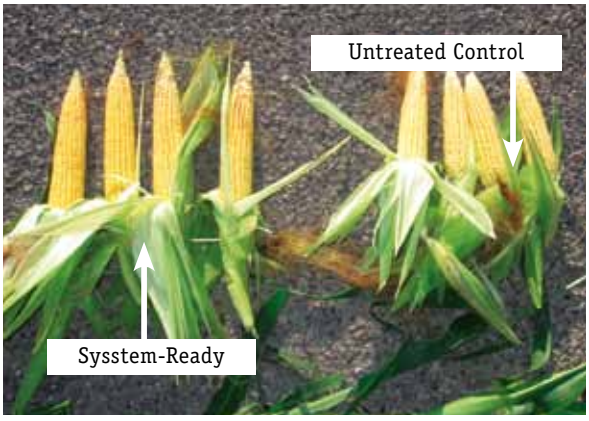
Benefits for Glyphosate Tolerant Crops:

University research has shown that conventional micronutrients, when applied simultaneously with glyphosate have limited benefit, because the glyphosate molecule is a strong chelator and common metal-based micronutrients such as manganese sulfate, amino acid chelates and other weakly chelated metals are easily tied up in tank mixes. This not only can reduce weed control, but it also reduces nutrient availability. Sysstem-Ready™ is designed and proven by university data to be compatible with glyphosate, so growers can save field trips without concern for reduced weed control or reduce nutrient performance.

Many corn and bean growers tend to avoid foliar micronutrient applications when seedlings are small (i.e. V-2 corn). The belief is that too much of the nutrient will miss the plants and therefore the benefits will be limited. However this early growth stage is peak demand timing for zinc and manganese and skipping the micronutrient application at this key window is a big mistake. ***It is not what misses the plant that is important, but rather the product that hits the plant.*** Even a small amount of truly systemic zinc and manganese applied at V-2 or (R-1 in beans) is extremely effective and will push both root and leaf growth.

Varying and often difficult environmental conditions during early spring when developing root systems are small and challenged support applying Sysstem-Ready as early as possible – but especially with each glyphosate spray. In dry years, Sysstem-Ready encourages rooting deeper and more rapidly into the moisture profile. In wet years, Sysstem-Ready enhances early root health minimizing potential future problems. Regardless of plant size, early applications of Sysstem-Ready support maximum early root and vegetative development setting up the crop to achieve its maximum yield potential.

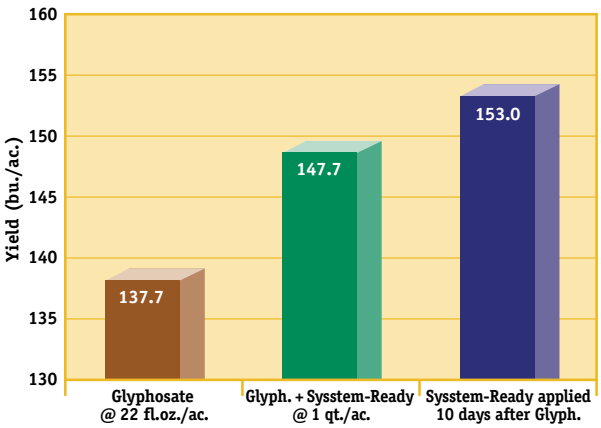




Corn Yield Results

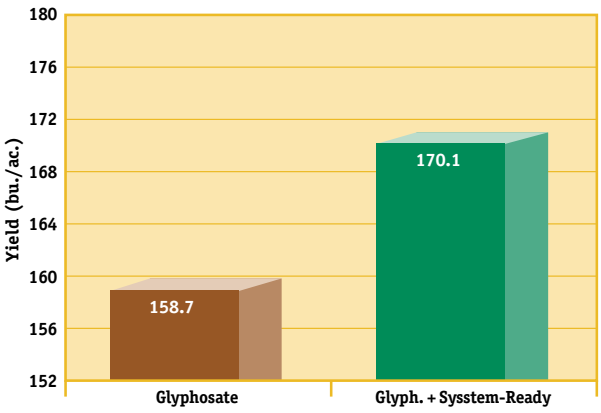
Because Sysstem-Ready™ is phloem mobile, zinc and manganese are rapidly transported to the developing roots and foliage, where they are needed most to support peak nutrient demand. Applied up to V-6 in corn or from the first trifoliate through early bloom in soybeans, with or without glyphosate, Sysstem-Ready™ effectively meets peak demand for zinc and manganese, enhancing plant growth, development and maturation. Whether you're growing glyophosate tolerant crops or conventional varieties, Sysstem-Ready™ encourages maximum growth and yield potential.

Effect of Sysstem-Ready on Corn Yield



Research Conducted by Dr. Phil Westra - CSU - 2008
Average of 4 replicates

Effect of Sysstem-Ready on Corn Yield When Tank Mixed With Glyphosate

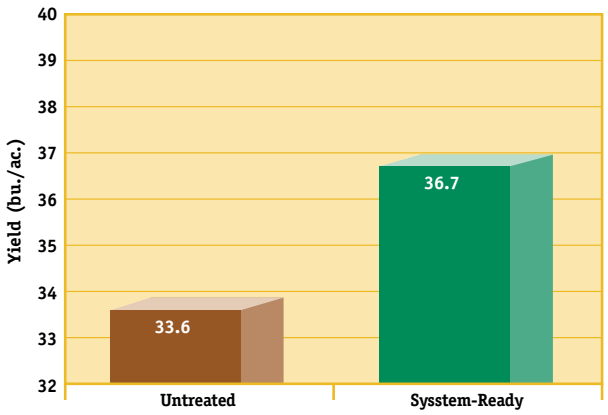


Sysstem Ready applied at 1 qt./ac.
Average of 4 plots

Treated ear displays improved ear length & advanced maturity

Dry Bean Yield Results

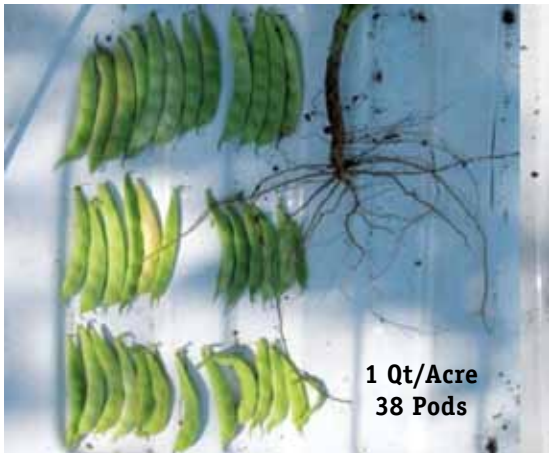
Effect of Sysstem-Ready on Dry Bean Yield

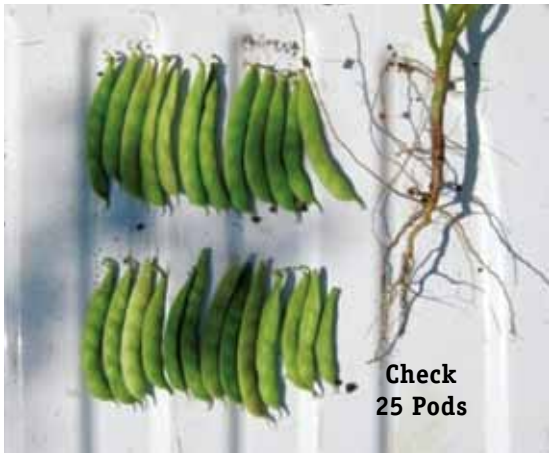


Sysstem Ready applied at 1 qt/ac. at 3rd trifoliate
Aerial application

Maximizing early root and vegetative development in bean crops (also peas and lentils) sets the stage for a healthy plant that can support higher pod numbers and more complete pod fill. Early Sysstem-Ready applications (as early as the first trifoliate) will help push root and vegetative development – especially if environmental conditions are not conducive to good plant growth. Follow up applications of Sysstem-Ready from pre-bloom to early bloom can further enhance pod set and pod fill.

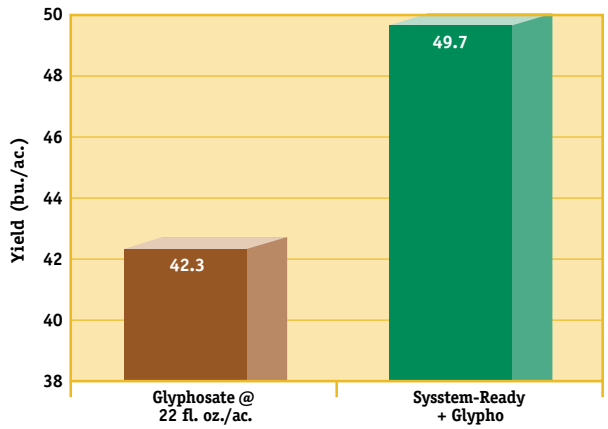
Sysstem-Ready Dry Bean Pod Count





Soybean Yield Results

Effect of Sysstem-Ready on Soybean Yield



Research Conducted by Dr. Phil Westra - CSU - 2008
Average of 4 replicates

Commercial Soybean Trials
Tissue Analysis & Yield Data

1 Qt/A Sysstem Ready w/Glyphosate application

FIELD 1	ZN	MN
Prior to App 6-22-09	14	108
After App 6-27-09	47	628

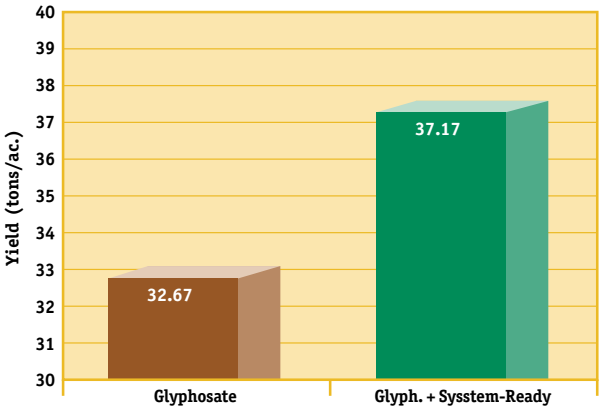
8 bu/A increase

FIELD 2	ZN	MN
Prior to App 6-22-09	16	90
After App 6-27-09	34	483

6 bu/A increase

Sugar Beet Yield Results

Effect of Sysstem-Ready on Sugar Beet Yield When Tank Mixed With Glyphosate



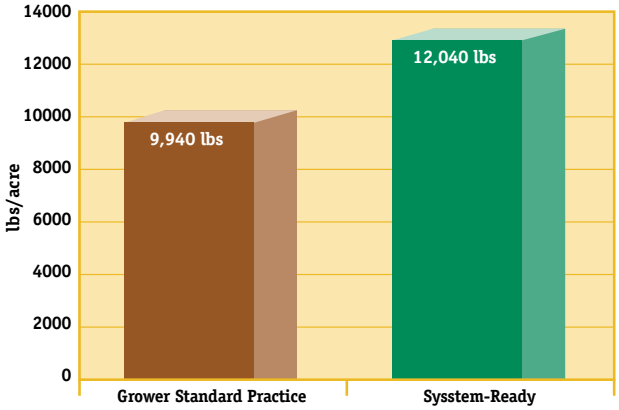
Sysstem Ready applied at 1 qt./ac, in 11 inch band with 2nd glyphosate application

Harvest tonnage depends on how well early-season nutritional needs are met. Peak nutrient demand timing for zinc and manganese overlaps early herbicide applications. Sysstem-Ready is compatible with glyphosate and other herbicides. Sysstem-Ready promotes enhanced root growth and activity for increased nutrient uptake from the soil, maximizing the efficiency and value of ground fertility programs leading to increased tonnage and sugar.

Alfalfa Yield Results

More leaves on lower stem and better leaf to stem ratio

Sysstem-Ready on Alfalfa (2012 - Western Nebraska) Total weight of 3 cuttings



Tonnage is important when growing alfalfa, but feed value is critical. One key component to increasing feed value is the leaf to stem ratio. More leaves, especially on the lower stem, leads to increased feed value and tonnage. Sysstem-Ready applied after each cutting encourages regrowth and maximum leaf development while also stimulating root development to help maintain a healthy productive stand.

Alfalfa Yield Results

Treated side exhibits increased leaf to stem ratio

ALFALFA TRAIL 2008 - WASHINGTON			
	Zinc - ppm	**Iron - ppm**	**Calcium - %**
Check (Pre-App)	34.1	121	1.20
Check (6 DAT)	34.8	100	1.18
Untreated Change	***+0.7***	***-21***	***-0.02***
Treated (Pre-App)	34.6	88.6	1.04
Treated (6 DAT)	44.7	93	1.14
Treated Change	***+10.1***	***+4.4***	***+0.10***

Treated alfalfa showed an increase in nutrient levels due to foliar treatment

Roots on treated alfalfa exhibit larger root mass and increased fine feeding root hairs

Wheat Results

Idaho

Increased vegetative growth and root mass

Nebraska

Increased vegetative growth and root mass

Establishing early vegetative growth and root development are critical to increasing yields in both winter and spring wheat. Zinc and manganese are key nutrients in leaf, vascular and root development. These nutrients are often low or deficient in soils – especially arid dry land acres. Early season applications of Sysstem-Ready or Sysstem-ZN can aid in building a larger more functional root system to help the plant pull more moisture and nutrients as well as developing more leaf surface area for increased photosynthetic capacity.

Potatoes and Onions

Peak demand timing for zinc and manganese in potatoes and onions is early in development. Potatoes have a large vigorous root system and significant top growth. Zinc and manganese are key nutrients needed early in the growth process to maximize the development of this large biomass. Biomass that is critical to setting and sizing tubers. Sysstem-Ready should be applied beginning at the rosette stage and continuing through early tuber development to help support the rapid growth and physiology stages that occur during this time frame.

Onions on the other hand tend to have much smaller and weaker root systems. Maximizing development and efficiency of onion roots is key to maximizing bulb size. Sysstem-Ready delivers zinc and manganese in a systemic form to support both vegetative and root development and overall plant health. In addition to having smaller and weaker roots onions are also a challenge to feed foliarly because the waxy cuticle that develops on the onion leaf reduces the uptake and therefore efficacy of most foliar materials. Not so with Sysstem-Ready. The unique penetrating ability of Sysstem-Ready rapidly delivers systemic zinc and manganese throughout the plant.

Dr. Jeff Miller - University of Idaho - 2006					
Nutrient:	Control	Grower's Standard Potassium Phosphite	Sysstem-ZN™ (1) 3qts/ac	(2) 5qts/ac	Sysstem-ZN™(2) vs Control
Zinc	0.35	0.34	0.51	0.43	22.90%
Calcium	9.12	7.94	9.52	11.41	25.00%
Phosphorus	68.6	73.74	73.26	74.33	8.30%
N/Ca Ratio*	39.72	46.83	39.83	32.7	-17.70%

**N/Ca Ratio (Lower number is better)*
Sysstem-ZN™(1) = 3 qts x 3 apps, at standard timings
Sysstem-ZN™(2) = 5 qts x 3 apps, at standard timings
Potassium Phosphite = 5 qts x 3 apps, at standard timings

Potatoes and Onions

Dr. Jeff Miller – Miller Research - 2007				
		Sysstem-ZN™		Sysstem-ZN™(2)
Nutrient:	Control	(1) 3qts/ac	(2) 3qts/ac	vs Control
Zinc	0.19	0.21	0.22	15.80%
Calcium	13.22	14.27	15.65	18.40%
Phosphorus	42.17	46.75	54.06	28.20%
N/Ca Ratio*	26	26.33	21.86	-15.90%

**N/Ca Ratio (Lower number is better)*
Sysstem-ZN™(1) = 3 qts x 3 apps, starting at standard timings
Sysstem-ZN™(2) = 3 qts x 4 apps, starting at pre-dime + std. timings

Calcium is difficult to get into potatoes because it is only taken up by the stolons and tuber roots and fine root hairs. Calcium taken up by the main root system by-passes the tubers and supports only the foliage. Because potato physiology limits how tubers absorb calcium it is critical that growers maximize soluble calcium in the tuber zone and enhance the efficiency stolons and tuber roots. Sysstem-Ready and Agro-K's Sysstem-Series products can improve calcium and other nutrient levels in the tubers and blubs by improving root function and efficiency.

In the charts on pages 7 and 8, Sysstem-ZN™ increased zinc, phosphorus and most importantly calcium levels in the tubers compared to the control and a standard potassium phosphite material. Applications of foliar potassium during cell division will directly antagonize calcium uptake (as shown in this trial) and once cell division is complete calcium cannot be moved into the cell walls. By linking zinc to a phosphite, Sysstem-ZN™ increases root mass and root function which increases calcium uptake from the soil during cell division leading to increased calcium levels. In addition, the N/Ca ratio in the Sysstem-ZN™ tubers was lower. A low N/Ca ratio can be directly correlated to improved tuber quality and storage life. Conversely, the conventional potassium phosphite application raised the N/Ca ratio relative to both the Sysstem-ZN™ treatment and the control due to potassium antagonizing calcium uptake during cell division.

The same mechanism works in onions. Growers in areas with

low soluble soil calcium often choose to apply calcium (gypsum or calcium chloride usually) to increase available calcium in the soil. Foliar applications of Sysstem-Ready early in the growth cycle (at bulb initiation) push root development and enhance root function leading to more efficient uptake of soil calcium. Improving calcium uptake during cell division (which begins at bulb initiation) is the critical first step to maximizing blub size, quality and storage life.

BIOLOGICALS

Activates the soil's existing microbe base, releases soil-bound nutrients, enhances root zone environment

- Bio-Mulch
- Bio-Max

Seaweed based soil stimulant to increase crop quality and yield

- Symbooster 10X
- K-Booster

Foliar seaweed and micronutrient sprays to enhance crop quality and mitigate plant stress

- Symspray 20X

Seaweed and micronutrient based seed coating to speed emergence, seedling development and increase yield

- Super Symcoat

Seed piece coating to improve tuber set

- Symcoat (potatoes)

PHOSPHITES

Sysstemic phosphite based foliar sprays designed to balance nutrient status leading to enhanced crop quality and overall plant health.

- Sysstem-Cal
- Sysstem-SeaCal
- Sysstem-ZN
- Sysstem-MG
- Sysstem-MN
- Sysstem-K
- Sysstem-ZMag
- Sysstem-Moly Z
- Sysstem Ready
- Sysstem-Pecan

DEXTRO-LAC BASED NUTRIENTS

Unique process that complexes the nutrient cation to a sugar molecule for rapid uptake and maximum availability

- Calcium DL
- Cal-Mag DL
- Copper DL
- Iron DL
- Magnesium DL
- Manganese DL
- Micro-Mix DL
- KDL®
- Potassium Finishing Solution
- Zinc DL

VIGOR ENHANCED NUTRIENTS

Value-added processing builds on the Dextro-Lac base to further enhance product efficacy

- Vigor-Cal
- Vigor-Cal w/Boron
- Vigor-Cal-Bor-Moly
- Vigor-Copper

MACRONUTRIENTS (N-P-K)

Built with 100% food grade, low salt index materials, including ortho phosphoric acid

- 3-18-18
- 9-18-9
- 9-24-3
- 0-18-25 + 1% Boron

A lignosulfonate multi-trace mineral solution for soil use

- Multipurpose Micronutrients

SPECIALITY PRODUCTS

Effectively controls a wide variety of insects and powdery mildew on contact

- Super Insecticidal Soap

Soybean oil emulsifier/adjuvant that works as a spreader, sticker and drift retardant. Also encapsulates pesticides to minimize odor and volatilization

- SprayTech Oil

Hydrophilic based polymer that reduces evapo-transpiration helping to minimize transplant stress, sunscald, frost damage and winter kill.

- Hytech Polymer

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