SUSTAINABLE REGENERATIVE AND CARBON

FARMING

FERTILIZER IN THE WORLD

By the year 2050, we'll need twice the amount of food from the same acreage we use now to feed the world. That's going to take some serious innovation. Agriculture Remains Central to the World Economy. 60% of the Population Depends on Agriculture for Survival.

THE DANGER AND DISADVANTAGE OF USING CHEMICAL FERTILIZER

Agriculture remains central to the world economy.

Over 4.2 billion people use conventional Agriculture practices by relying heavily on Chemical Fertilizer and pesticides.

The Disadvantage

- High cost
- High weight
- Storage
- Inferior crops
- Low yields
- Lower selling price
- Costly logistic

The Harm

- Health
- Environment
- Soil quality

HARMFUL EFFECTS OF USING CHEMICAL FERTILIZERS

The use of Chemical Fertilizers is a dated agricultural method we have seen implemented since the 1930s. Chemical Fertilizers or Inorganic Fertilizers are created to provide a number of nutrients that are found in natural soil, that are essential to plant growth. These synthetically manufactured materials aid in the growth of plants, but only for short periods of time, making Chemical Fertilizers a poor agricultural choice for long-term sustainable farming practices. We are beginning to see detrimental effects on the Environment, Human Health, along with Plant and Animal life, all caused by the use of these Chemical and Inorganic Fertilizers.

NATURE & THE ENVIRONMENT

- Chemical fertilizers are packed full of inorganic and synthesized elements, such as Nitrogen, Phosphorus, and Potassium (NPK) along with many other nutrients and components.

- While these minerals can aid in plant growth, they neglect the health of the soil completely, and the buildup in these chemicals and nutrients is a result of the severe environmental effects that we are seeing today.

BODIES OF WATER

- Chemical Fertilizers are full of inorganic and synthetic minerals and materials that are extremely detrimental to the environment through excessive use over time.

- Toxic buildup of these inorganic components are being leaked into bodies of water through rainfall and sewage, disrupting and destroying aquatic life.

HUMAN HEALTH

- A serious issue we are seeing from these synthetic materials being leaked into our water systems is that our groundwater and drinking waters are being affected.

- High levels of these chemicals are in our drinking water, and it is causing serious health issues such as; Blue Baby Syndrome, Cancers, Asthma, Autism and other learning disabilities, birth defects, reproduction dysfunction, diabetes, and both Alzheimer's and Parkinson's Disease.

CLIMATE CHANGES

- High levels of Methane, Carbon Dioxide, Ammonia and Nitrogen are produced from the use of Chemical Fertilizers. These components have greatly contributed to the Global Warming that we see the effects of today.

- The third leading cause of greenhouse gas is Nitrous Oxide, which is the byproduct of Nitrogen, followed by Carbon Dioxide and Methane.

SOIL HEALTH & QUALITY

- Soil Tests being done once every three years is recommended to ensure that you are using the correct amounts of fertilizers, preventing overuse.

- This is because when using these chemical fertilizers, it increases the acid levels of the soil, altering its long-term productivity.

- Creating desertification of the world where soil is not able to sustain life.

OUR SOLUTION

SUSTAINABLE REGENERATIVE AND CARBON FARMING

WHAT IS THE DIFFERENCE?

Lightweight, Simplistic, Sustainable & cost efficient.

OMRI

Listed formulations for use in the production of organic foods and fibers.

RESULTS YOU CAN SEE

In under 30 days.

LIGHTWEIGHT

Only one 1kg unit required per Hectare, per Crop compared to 500kg of Chemical Fertilizer

BENEFIT

- **AFFORDABLE**

A huge saving of $200-$300 USD per Hectare, per Crop. Up to 50% saving on input cost.

- **UP TO 50% YIELD INCREASING**

Providing the farmer with a much higher income on their crops.

- **HIGHER NUTRITION VALUE**

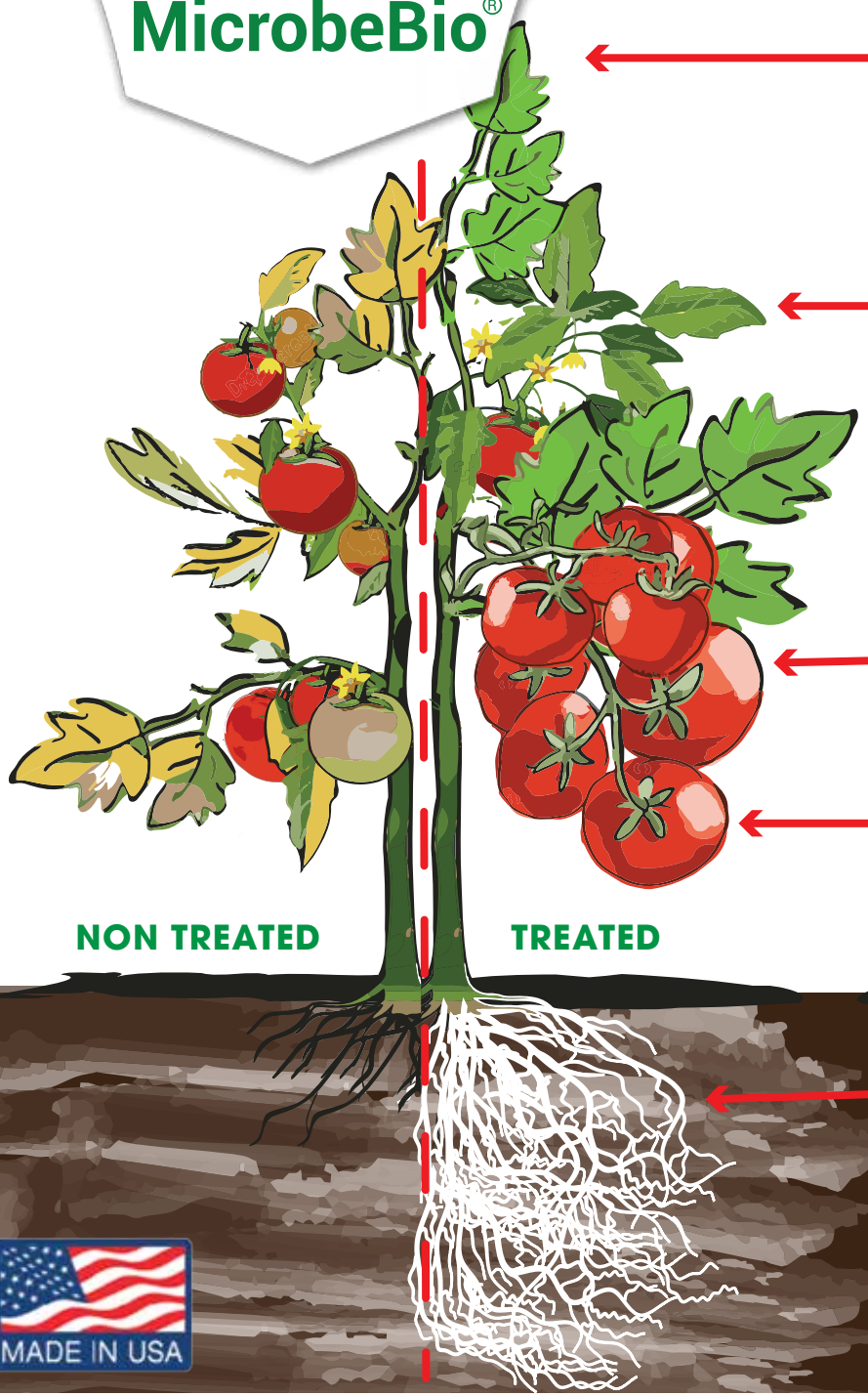
And higher Brix level for better tasting fruits, and command a higher price for being organic. Improve human and animal health.

- **MINIMAL TRANPORT COST**
- **UP TO 50% WATER SAVING**
- **HUMAN AND PET SAFE**
- **ENVIRONMENT-FRIENDLY**

Improve air, water and soil quality.

- **REGENERATE AND PROTECT SOIL FOR FUTURE GENERATION**
- **MAXIMIRE PROFIT FOR FARMER**

MicrobeBio®



Environmental Friendly - MicrobeBio® microbes aerate and regenerate soil health, resulting in better absorption, less run-off and a significant increase in water efficiency. Microbes do not cause run-off, leach through the soil, or cause any damages to aquifers, rivers or lakes, as Synthetic Fertilizers do. Microbes contain no harsh chemicals or heavy metals, making them completely safe to use around both humans and animals. Because microbes are organic and regenerative, they tend to remain in the soil much longer than traditional fertilizers. MicrobeBio Bioremediation helps reduce and remove the pollution produced, providing clean water, air, and healthy soils for the future generations. This results in a Win-Win for farmers, consumers, and most importantly – the environment.

The Microbebio Symbiotic Cycle - Microbebio products help increase photosynthesizes, giving more sunlight energy in the form of carbon compounds to increase the transfer of proteins, carbohydrates and nutrients into the root area. In return, this feeds the army of Microbebio beneficial bacteria in such a way that they will protect and stimulate crop growth and production. Microbebio products replenish and exponentially increase the beneficial bacteria that have coexisted in the soil for millions of years, enhancing the symbiotic cycle for the plants. For example, microbes make essential elements such as nitrogen and phosphorus available in exchange for the carbon provided by plants. MicrobeBio® microbes act as a nutrient agent, allowing the plant to utilize more of the bio-available essential nutrients within the soil. Rather than being washed through the soil or locked in a form that plants cannot use, the plants can absorb these nutrients through the stem, leaves and root arbuscules. MicrobeBio® products help in the assimilation of micro and macro nutrients supplied to the plants, promoting growth and crop development, enhancing flowering fruit set, increasing quality and production, as well as improving the color, size and consistency of the crop.

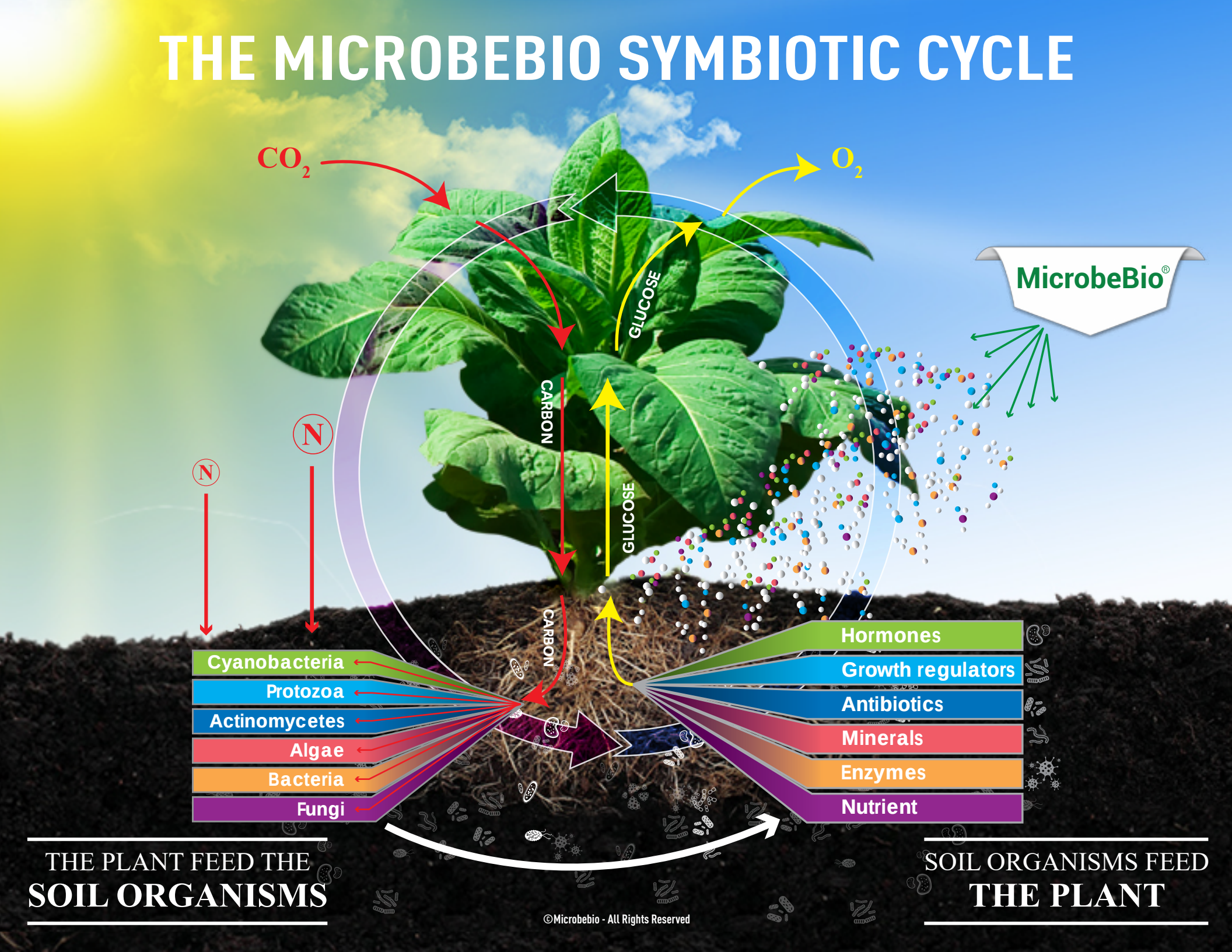
Increase Yield – MicrobeBio® microbes free the carbon and other essential nutrients by effectively breaking down and increasing the organic matter found in the soil. This balances soil pH and reduces soil salinity, returning them to biological circulation. Microbes also provide amino acids, which are the basic building blocks of proteins, in which other fertilizers don't include. These amino acids are fundamental to maximize growth and correct any nutrient deficiencies in the pant.

Bigger Healthier Faster - MicrobeBio® reintroduces billions of beneficial worker microbes, in which their sole purpose is to better the surrounding environment and rebalance the soil, allowing the plants to grow bigger, healthier, and stronger. These beneficial microbes are converted into nitrogen, various nutrients and organic phosphates in the soil, that the plants then use to become healthier and more resistant to disease and pests. This allows the plant to bloom more, producing bigger, healthier and better tasting fruit, with less maintenance

Increase Root Mass – MicrobeBio® microbes colonize the root zone with a number of diverse beneficial microorganisms, which essentially increases the root mass. This allows the plant to access additional nutrients deeper within the soil and supports greater water absorption, leading to less watering and an increased drought resistance. The plant roots and the microbes work together in a symbiotic relationship to benefit each other. The plant releases sugar and carbon from photosynthesis to attract and feed the microbes to further satisfy their nutritional needs. In return, the microbes form a structure known as arbuscules, allowing the plant to receive phosphorus, sulfur, nitrogen, along with many other micronutrients within the soil, air and water to help the plant reach its optimum potential.

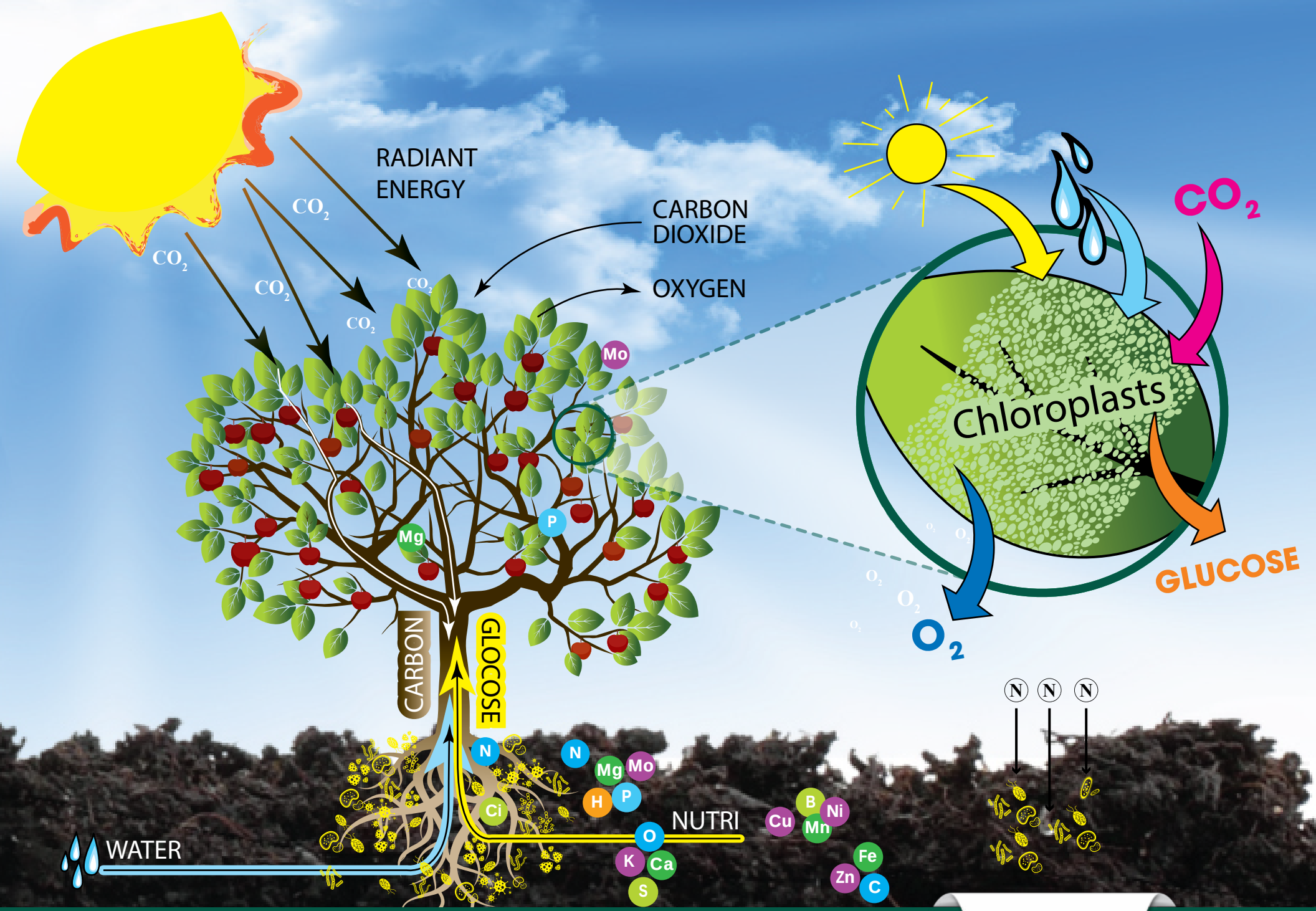
MICROBEBIO® SUSTAINABLE REGENERATIVE AND CARBON FARMING FOR MAXIMUM PROFIT

THE MICROBEBIO SYMBIOTIC CYCLE



THE PLANT FEED THE
SOIL ORGANISMS

SOIL ORGANISMS FEED
THE PLANT

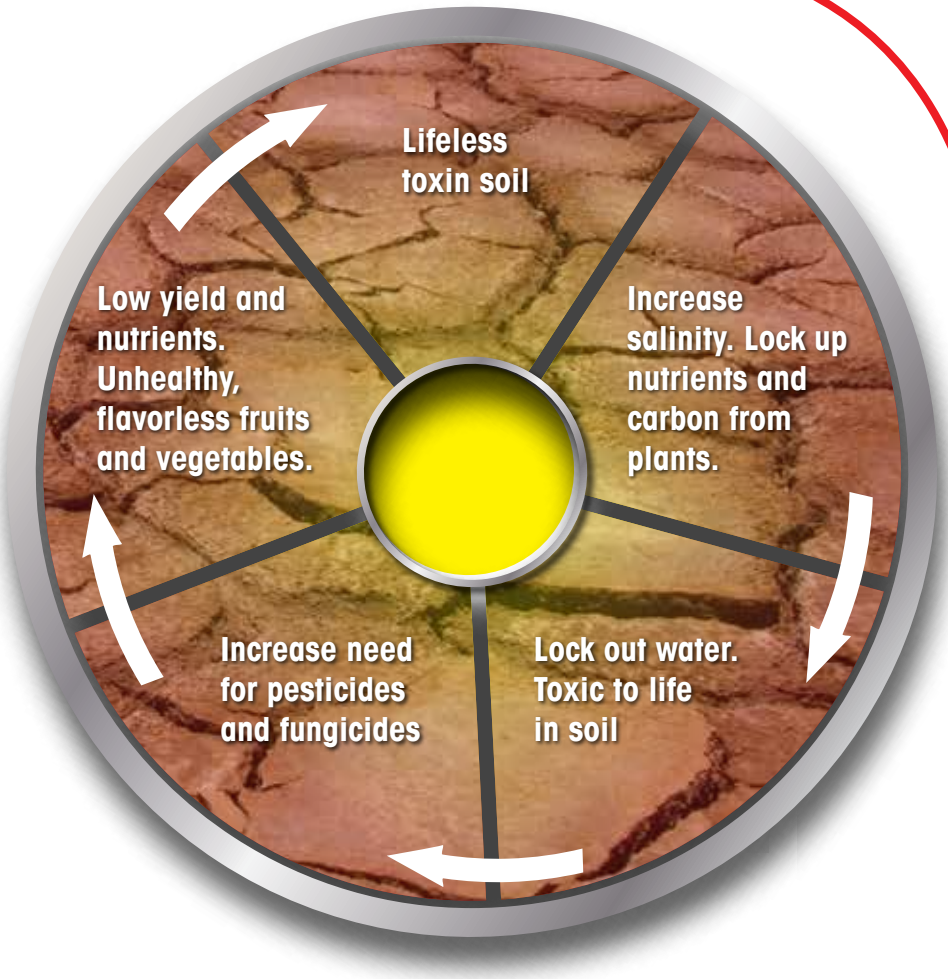


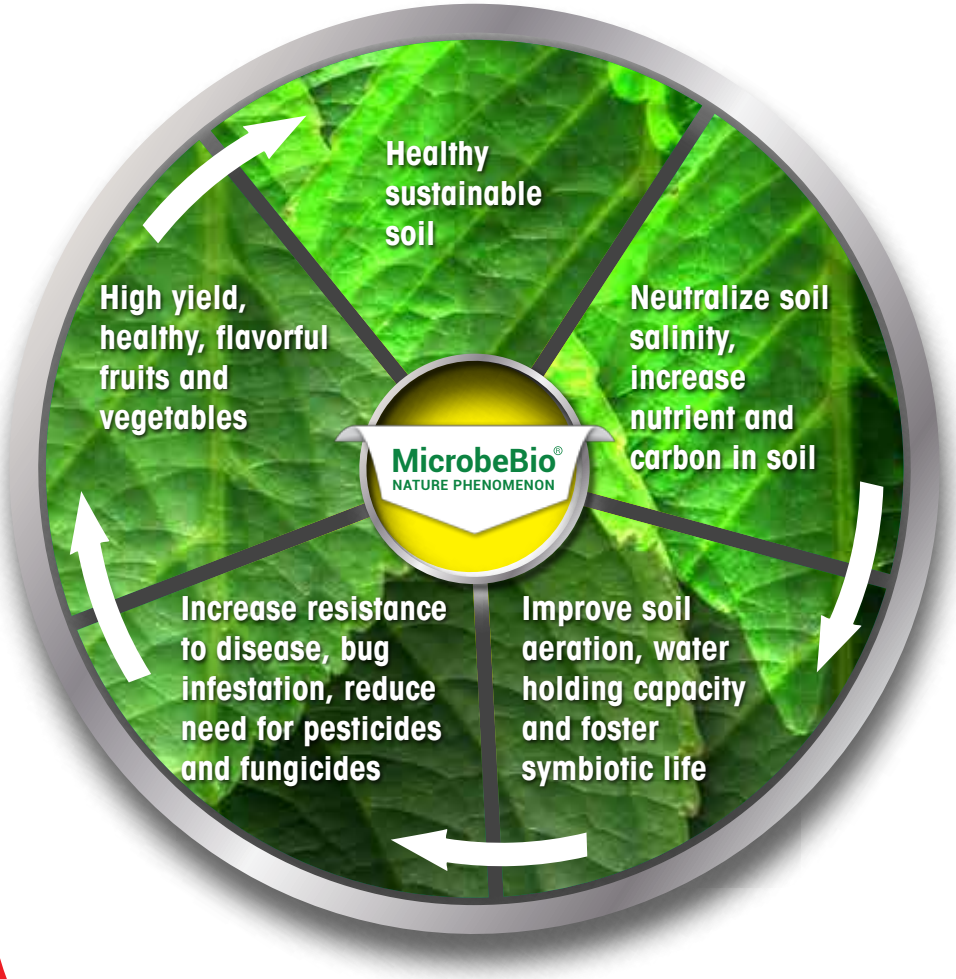
water + carbon dioxide + sunlight →→→ glucose + oxygen

$6\,H_2O + 6\,CO_2 +$ radiant energy →→→ $C_6H_{12}O_6 + 6\,O_2$

MicrobeBio®

USING CONVENTIONAL FERTILIZER





USING MICROBEBIO

LIGHTWEIGHT, SIMPLISTIC, SUSTAINABLE & COST EFFICIENT

- INCREASE QUALITY AND YIELD
- ENHANCED RESISTANCE TO DISEASE, PEST AND STRESS
- MAXIMIZE PROFITS FOR THE FARMER
- REVITALIZE AIR, WATER AND SOIL
- ENVIRONMENTALLY FRIENDLY
- MINIMAL LOGISTIC COST
- DECREASED IRRIGATION
- EXTENDED SHELF LIFE
- HUMAN AND PET SAFE

100% ORGANIC

MicrobeBio.com info@microbebio.com

MicrobeBio®

INCREASE ORGANIC MATTER

ENHANCES WATER HOLDING CAPACITY

IMPROVED ROOT DEPTH AND DENSITY

STIMULATES MICROBIAL ACTIVITY

INCREASE CARBON

DECREASE IRRIGATION

REDUCE FERTILIZER

INCREASE YIELD

INTRODUCE MICROBEBIO SOLUTION

MicrobeBio® is an OMRI listed formulation for use in the production of organic foods and fibers a "bio-cocktail" of 50+ beneficial soil microbes which enhance soil life. Our proprietary combination of microbial strains works in sequence to boost nutrient-uptake in plants, improve plant vigor, and stimulate microbial and bio-diversity activity in the soil which contributes to drought tolerance and increase plant performance.

MicrobeBio® works synergistically with organic nutrients to help improve soil sustainability. Each microbe strain in the chain is critical as it plays an important role in regenerating, decomposing (composting), and protecting against pathogens to improve plant vigor, soil quality, and crop yields

OUR SOLUTION

To understand the nutrient-uptake process in plants, consider the way probiotics strengthen our health as humans. Similarly, endophytes (microbes) strengthen the health of plants, allowing them to adjust to environmental changes faster than genetic adaptation will permit. Thus, endophytes can help plants survive extreme conditions such as drought, high temperatures, insufficient nutrients, and even environmental toxins. Ultimately, adding the right microbes to your soil not only increases your plant's nitrogen absorption but also allows plants to thrive within natural or man-made growing environments such as hydroponics (growing plants without soil).

MicrobeBio® produces outstanding plant growth as a catalyst for continual nourishment for each host plant by growing a life-giving, synergistic microbial colony. This scientific formula is unique in that it not only stimulates an immediate source of nutrients but in addition, its living microorganisms are slowly-released throughout the crop cycle to provide nourishment for the entire season.

OMRI®
LISTED
For Organic Use

MADE IN USA

NON GMO

PRODUCER
Certified Organic
Washington State Dept. of Agriculture

ISO

HUMAN AND PET SAFE

NATURAL

Chemical and GMO-FREE
100% Organic

COMPLIES WITH NATIONAL ORGANIC PROGRAM FOR USE IN ORGANIC PRODUCTION

approved by

MINISTRY OF AGRICUTURE

ZAMBIA TEST

Test and endorsed by ministry of agriculture.

MicrobeBio®

YIELD INCREASING
Our products can increase crop yields by up to 50%

CHEMICAL FREE
Our products are chemical and GMO free

SUSTAINABLE
Improve soil fertilily help build sustainable soil for future generation

LIGHTWEIGHT
1kg Box serves 1 Hectare of Land

AFFORDABLE
Flexible payment options and a viable price point

HIGHER PROFIT FOR FARMER

THE SCIENCES

MICROBEBIO® THE SCIENCE
NITROGEN FIXATION AT A BIOLOGICAL LEVEL

Nitrogen Fixation at a Biological Level – Microorganisms assimilate nitrogen in the atmosphere into an organic compound

SOLUBILIZATION OF PHOSPHATES

Solubilization of Phosphates – Phosphates bound in the soil are solubilized, allowing plants to more easily uptake them.

MOBILIZATION AND MINERALIZATION

Mineralization and Immobilization – Healthy plant hormones are increased, as well as the storage of soil carbon, greatly increasing nitrate nitrogen availability to plants. This creates a nutrient reservoir plants can access, comprised of organic bio-stimulants in the soil.

PRODUCTION OF PHYTOHORMONES

Production of Phytohormones – Using bacteria, MicrobeBio® products significantly reduces the salinity of your soil, enhancing it greatly.

BALANCING THE pH OF YOUR SOIL

Balancing the pH of your Soil – The organic bio-stimulants found in MicrobeBio® products make your soil more porous, even under extreme environmental conditions, allowing for better aeration, infiltration, and drainage of the soil. Leaching is also greatly reduced due to buffering of the pH, as well as improving aggregation of soil particles.

INCREASED SAPROPHYTIC COMPETENCE

Increased Saprophytic Competence – The microbes in MicrobeBio® products are helped by saprophytes, which consume dead and decomposing matter. This allows MicrobeBio®products to perform better as it allows our microbes to better compete with both native soil microbes and other organic bio-stimulants.

MICROBEBIO® ECOSYSTEM & SOCIAL HEALTH

Farmers normally look for soil with high organic matter levels. Soil organic matter and the organisms that live in it are critical to many soil processes. It helps provide high crop yields and reduces input costs. The combination of our products introduce micro-organisms that play vital roles in the decomposition of organic matter to make retained nutrients available to the plant. Soil life plays a major role in many processes that increase nutrition and water availability for agriculture productivity.

The main activity of beneficial organisms is growing and reproducing. By-products from stable humus, roots and plant residue feed soil organisms. In turn, soil organisms support plant health as they decompose plant residues, organic matter, cycle nutrients, enhance soil structure and control the populations of soil organisms, both beneficial and harmful (pests and pathogens) in terms of crop productivity. (cited from www.fao.org)

WHAT ARE ESSENTIAL NUTRIENT FOR PLANT GROWTH?

Plants are complex organisms that require many different forms of nutrients. There are 17 nutrients that are essential for plant health. The primary macronutrients (Nitrogen, Phosphorus, Potassium,) secondary macronutrients (Magnesium, Sulfur, Calcium,) micronutrients (Boron, Chlorine, Manganese, Iron, Nickel, Copper, Zinc, Molybdenum) and Non-mineral elements (Hydrogen, Carbon, Oxygen) are all nutrients needed for optimal growth and a healthy plant. It's all about the biology of the soil and here is why it is so important.

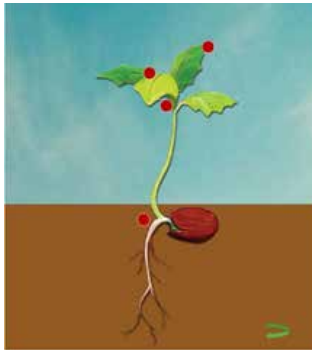
OUR MICROBES CYCLING, ASSIMILATING, SOLULIZING AND RELEASING THE 17 KEY NUTRIENTS REQUIRED FOR OPTIMUM GROWTH AND VIGOR

N Nitrogen	**P** Phosphorus	**K** Potassium					
Primary Macronutrients							
Mg Magnesium	**S** Suifur	**Ca** Calcium	**H** Hydrogen	**C** Carbon	**O** Oxygen		
Secondary Macronutrients			Non-Mineral Elements				
B Boron	**Cl** Chlorine	**Mn** manganese	**Fe** Iron	**Ni** Nickel	**Cu** Copper	**Zn** Zinc	**Mo** Molybdenum
Micronutrients							
Semimetal	Halogen	Transition Meteal	Alkaline Earth	Nonmetal			

N	P	K
Nitrogen	Phosphorus	Potassium

PRIMARY MACRONUTRIENTS

N (NITROGEN)



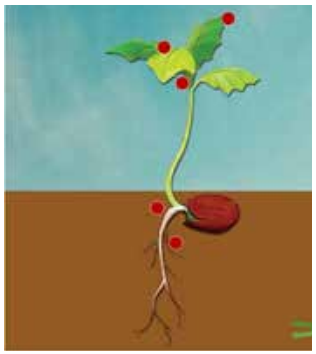
Nitrogen (N) is important for plants and other living things. It plays a crucial role in plants and is responsible for chlorophyll synthesis and in the process needed to make protein. Most nitrogen is unavailable to plants because it is in a gas state in the atmosphere.

MicrobeBio® helps provide more nitrogen for plants through Nitrogen Fixation. This is the process of taking the unusable nitrogen from the air and converting it into organic compounds that plants and organisms can use.

P (PHOSPHORUS)

Phosphorus is one of the main nutrients plants need to grow healthy. Plants get the phosphorus from the soil by absorbing P from the soil as primary and secondary orthophosphates. It is essential plants get enough phosphorus because it is important for many of its production cycles including root growth, converting the sun's energy into usable energy and make other key functions. A lack of phosphorus is detrimental to the plant and will cause it to not absorb nutrients.

Microbes help plants receive the amount of phosphorus they need to thrive. Our product accomplishes this through phosphate solubilization which is the process of solubilizing bound phosphate in the soil and making it available for uptake by plants.



K (POTASSIUM)

Potassium is another essential nutrient that plants need in order to be healthy. It is vital to photosynthesis, protein synthesis, and many other plant functions. Potassium builds cellulose and helps translocate sugars and starches. It also has a major impact on the plant's size, shape, color, taste, and other quality related measurements. Having enough potassium can also increase root growth and increase drought resistance.

MicrobeBio helps plants receive as much potassium as they need. The microorganisms in MicrobeBio solubilize potassium, which is the process of breaking down potassium making is available to plants, and make it easier for plants to absorb it.

Mg	S	Ca
Magnesium	Suifur	Calcium

SECONDARY MACRONUTRIENTS

MG (MAGNESIUM)

Magnesium is important to a plants health. Magnesium is in every molecule of chlorophyll which means it is actively involved in photosynthesis. It also aids in phosphate metabolism, plant respiration and the activation of many enzyme systems. Magnesium is needed to capture the sun's energy for growth and production through photosynthesis.

Like many other nutrients, most magnesium is not available for plants. Microbes take this unusable magnesium and convert it into a compound that plants can absorb. MicrobeBio microbes will ensure plants get the right amount of magnesium that they need.

S (SULFUR)

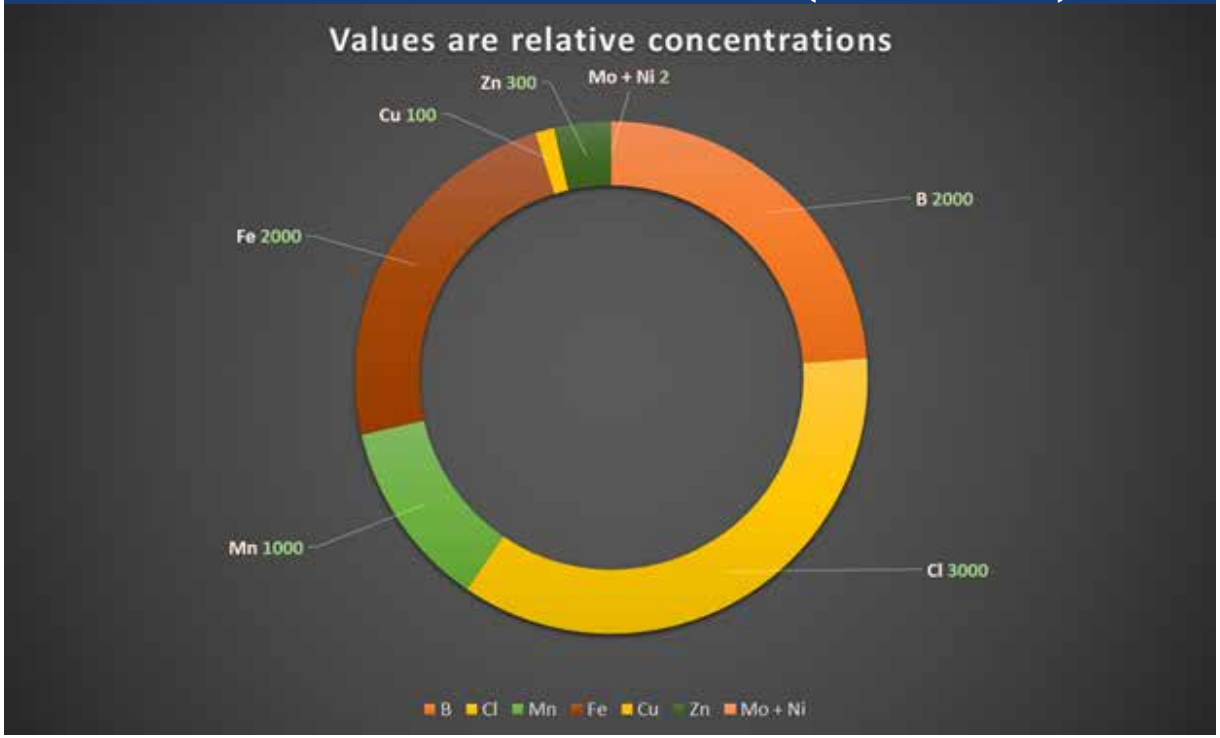
Sulfur is an important nutrient that plants receive through the soil, but can also enter plant leaves as dioxide. Sulfur is needed for synthesis of certain amino acids and proteins, photosynthesis, seed production, nitrogen fixation and is also useful for winter crop hardiness. However, most sulfur in the soil is tied up in organic matter and cannot be absorbed by plants. This leads to the problem of plants not having enough sulfur. MicrobeBio's microbes help break up this matter and convert the sulfur in the organic matter into a compound that is easy for plants to absorb and use.

CA (CALCIUM)

Calcium is an important nutrient for plants because it is essential for their structure. Much like we need calcium for strong bones, plants need calcium to develop strong cell walls. This enables plants to stand upright and be better protected. Calcium also helps with cellular signaling which is a biological process critical to a plant's healthy development. Deficiency in calcium can have negative effects on plant growth. Most calcium compounds found in the soil are insoluble and plants can't use them. MicrobeBio's microbes help by taking the insoluble calcium and turning it into a soluble compound that plants can use.

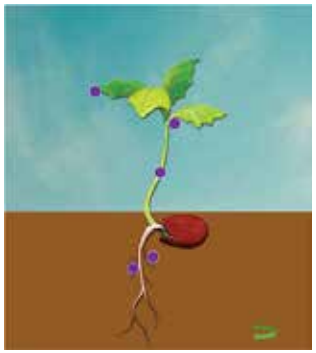
B	Cl	Mn	Fe	Ni	Cu	Zn	Mo
Boron	Chlorine	manganese	Iron	Nickel	Copper	Zinc	Molybdenum

MICRONUTRIENTS
ACHIEVE FULL BALANCED NUTRITION (SOURCE: IPNI)



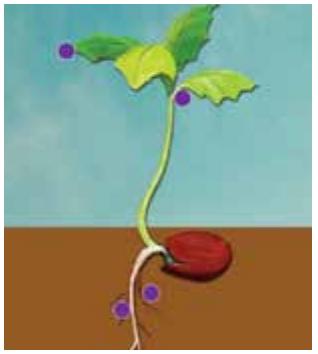
B (BORON)

Boron is vital to plant health because it plays a key role in forming and strengthening cell walls. Boron also has an impact on the uptake of potassium and phosphorus. Boron is also one of the nutrients that usually has the biggest deficiency in plants.



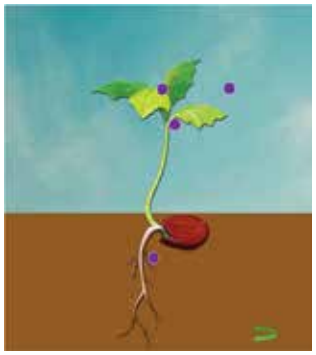
Deficiency in Boron affects the cell walls and reproductive organs of plants. Severe deficiency can lead to stunted growth and death of growth tissue. MicrobeBio's microbes go into the soil and any insoluble Boron is broken down and made into a soluble matter that plants can absorb.

CL (CHLORINE)



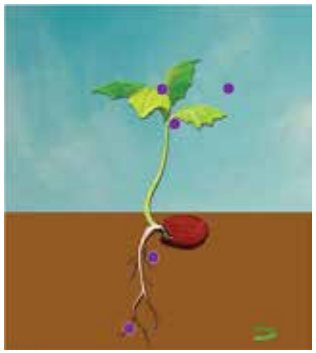
Chlorine has a number of benefits for plant growth and is an essential nutrient for plants despite the fact it is classified as a micronutrient. It plays a key role along with potassium in the proper function of the plant's stomatal openings. This allows plants to control their internal water balance. Chloride (Chloride element that plants absorb) also helps with the hydrolysis process in photosynthesis. Most chlorides found in soil is soluble, but MicrobeBio can be used in the soil where the chloride is not soluble and help make it

accessible to plants.



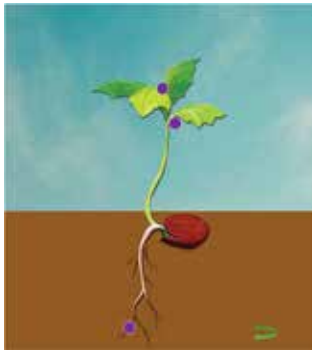
MN (MANGANESE)

Manganese is used in plants as a major factor to various systems including photosynthesis, respiration and nitrogen assimilation. It is also involved in the process for pollen tube growth, pollen germination and resistance to root pathogens. Deficiency in Manganese can stunt growth, cause yellow leaves and cause sunken spots to appear. MicrobeBio helps break down Manganese in the soil, making it available for plants to take in.



FE (IRON)

Iron is essential for plant growth and food production and is a key nutrient needed for energy transfer, nitrogen reduction, and fixation and lignin formation. Plants also need iron in order to move oxygen through their system and keep their leaves green. Deficiency in iron can cause yellow leaves with green veins also known as chlorosis. MicrobeBio's microbes help plants receive the nutrients needed by getting iron from the soil (sourced from water or fertilizer) and making is accessible to plants.



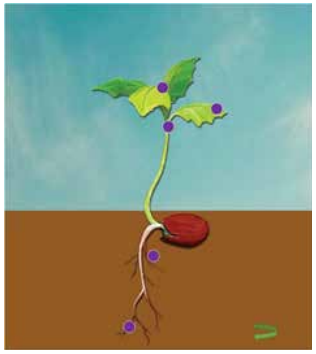
NI (NICKEL)

Nickel (Ni) was added to the list of essential plant nutrients late in the 20th century. Plants absorb Ni as the divalent cation Ni^{2+}. It is required in very small amounts, with the critical level appearing to be about 0.1 parts per million. Furthermore, Nickel is necessary for the biosynthesis of the hydrogenase, carbon monoxide dehydrogenase, and of factor F430, found in a number of genera of bacteria.

No Ni deficiencies have been observed under crop-growing conditions, but in crop research settings, agriculture scientists have reproduced deficiency symptoms such as chlorosis of young leaves and dead meristematic tissue.

Nickel is a component of the urease enzyme and is, therefore, necessary for the conversion of urea to ammonia (NH_3) in plant tissue, making it important in plant nitrogen (N) metabolism.

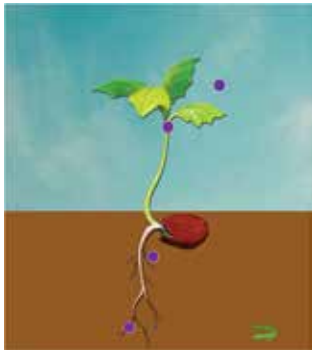
MicrobeBio® contains pieces of Four microbial enzymes are known to require nickel: hydrogenase, methyl coenzyme M reductase, carbon monoxide dehydrogenase, and urease. Recent biochemical and molecular biological experiments have provided clear evidence for the existence of multiple auxiliary genes that facilitate nickel incorporation into urease and hydrogenase.



CU (COPPER)

Copper is used to activate enzymes in plants that are involved in lignin synthesis and it is also essential for many other enzyme systems. Copper is used in photosynthesis and also serves to intensify flavor and color

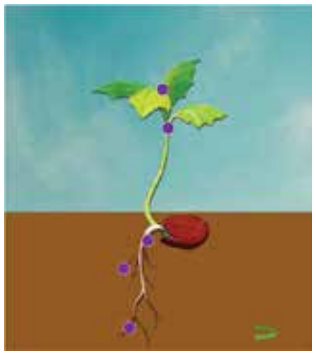
in vegetables and color in flowers. Deficiency in Copper can cause new leaves to grow smaller, lose their sheen and eventually wilt. MicrobeBio's microbes help provide copper to plants by finding and creating copper compounds that are usable by plants.



ZN (ZINC)

Zinc is used to activate enzymes that are responsible for the synthesis of certain proteins. It is also used in the conversion of starches to sugars, the formation of chlorophyll and some carbohydrates, to help withstand cold temperatures and helps in the formation of auxins which help with growth regulation and stem elongation. Deficiency in Zinc leads to chlorosis and new leaves are often cupped upward or distorted. MicrobeBio helps plants get the amount of Zinc they need by breaking down organic matter that contains Zinc and making it available for plants to use.

MO (MOLYBDENUM)



Molybdenum is an important nutrient that is used in two enzymes that convert nitrate into nitrite and then into ammonia before it is used to synthesize amino acids throughout the plant. Plants also use Molybdenum to convert inorganic phosphorus into organic forms and by symbiotic nitrogen fixing bacteria in legumes to fix atmospheric nitrogen. MicrobeBio helps by turning Molybdenum into a soluble form that plants can use.

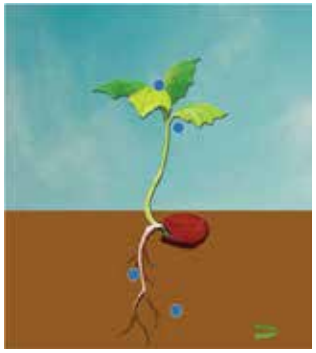
H	C	O
Hydrogen	Carbon	Oxygen

NON – MINERAL ELEMENTS

H (HYDROGEN)

Hydrogen is an important compound for plants and it one of three that make up a majority of the plant. Hydrogen is needed in order to complete biochemical reactions. Hydrogen is

mostly derived from water which means most hydrogen that a plant comes into contact with should be soluble so the plant can use it right away.

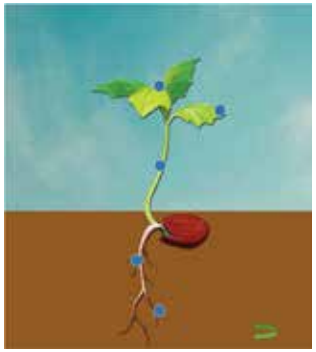


C (CARBON)

Carbon is a crucial compound needed for plant growth and is one of three compounds that make up the majority of plant mass. Carbon is needed in every living and plants are no exception. Plants take CO2 from the air and use the carbon from it for energy. This energy is then used to build essential biological compounds such as carbohydrates and proteins.

MicrobeBio's microbes help build carbon in the soil through carbon sequestration, which is the process of taking CO2 from the air and converting it into a solid state for long term storage. This creates more

organic matter and carbon in the soil which causes microbes to begin a mineralization process and transition all carbon sources into plant available fertilization such as nitrate nitrogen.

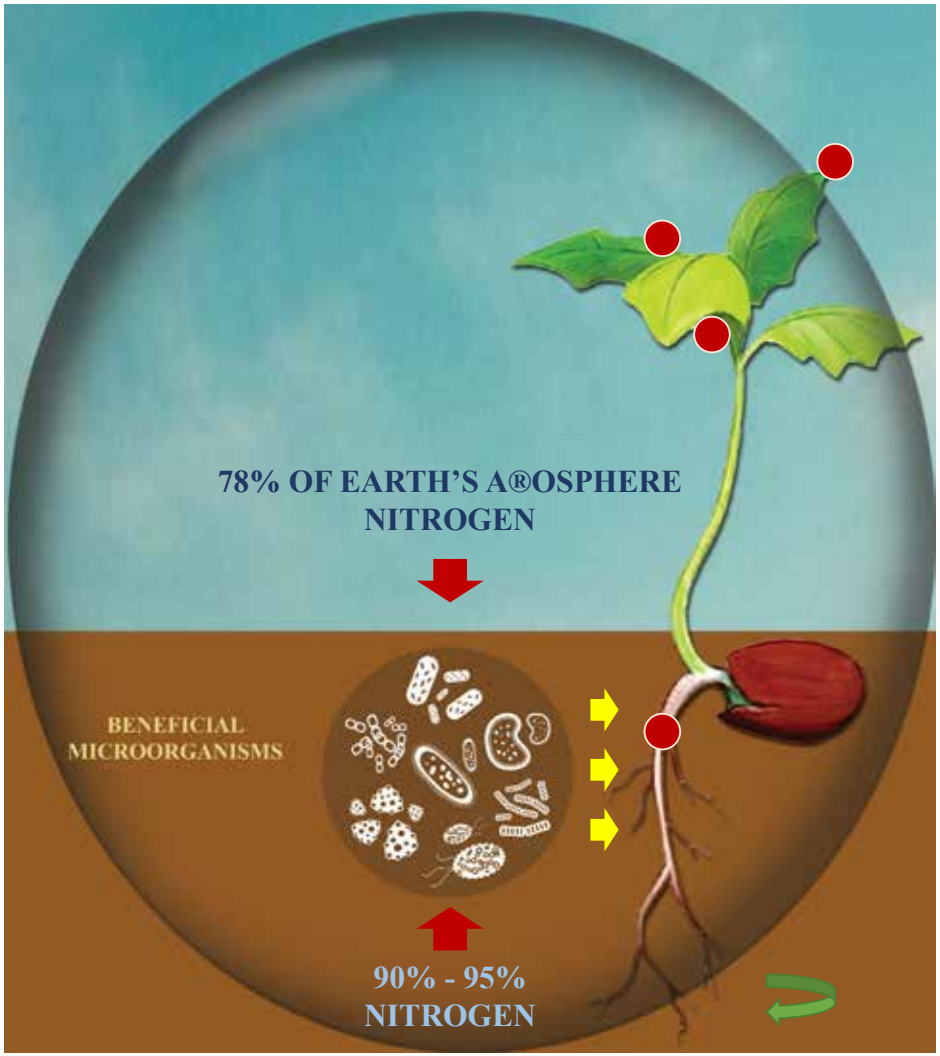


O (OXYGEN)

Oxygen is an important compound needed in plants and is one of three compounds that make up the majority of plant mass. Oxygen is responsible for cellular respiration in plants. Plants get oxygen by breaking down CO2 during photosynthesis and releasing the majority of it as a byproduct while keeping a small portion for future energy. MicrobeBio® helps increase the amount of oxygen available to plants through carbon sequestration, which stores CO2 in the soil until it is needed.

ELEMENT GROUPS

Semimetal	**B** An element whose properties are intermediate between those of metals and solid non-metals or semiconductors.
Halogen	**Cl** An element occupies group VIIA (17) of the periodic table. They react ono-metallic elements which form strongly acidic compounds with hydrogen from which simple salts can be made.
Transition Metal	**MN, FE, NI, CU, ZN, CU** Any of the set of metallic elements occupying a central block (Groups IVB-VIII, IB, and IIB, or 4-12) in the periodic table. Chemically they show variable valency and a strong tendency to form coordination compounds, and many of their compounds are colored.
Alkaline Earth	**MG, CA** Occupies group occupying Group IIA (2) of the periodic table. They are reactive, electropositive, divalent metals, and form basic oxides which react with water to form comparatively insoluble hydroxides.
Nonmetal	**N, P, S, H, C, O** An element or substance that is not a metal.

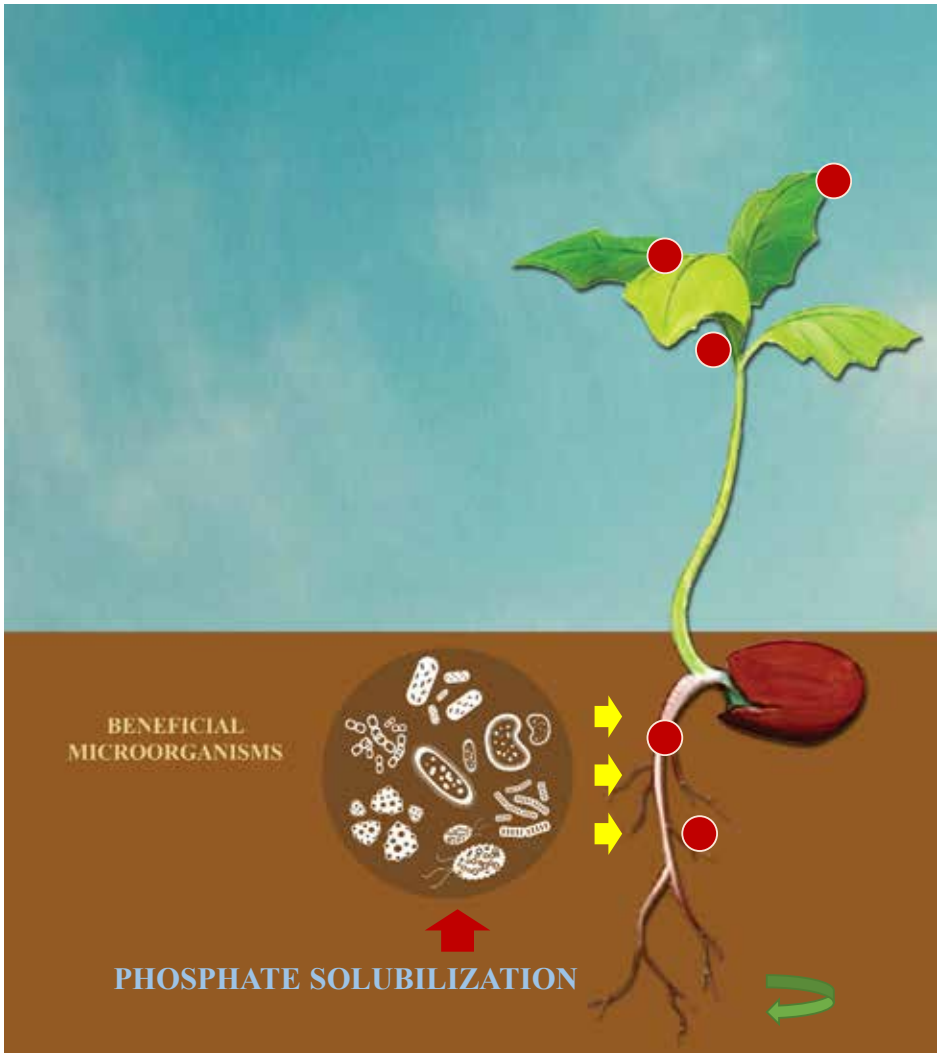


BIOLOGICAL NITROGEN FIXATION

90 – 95% of Nitrogen in the soil is in an organic form that is not available to uptake by plants. Furthermore, 78% of the earth's atmosphere is nitrogen which is not available for plant use.

MicrobeBio® Nature Vigor provides beneficial microbes that play a vital and necessary role in the Nitrogen cycle.

This is the process of taking the unusable nitrogen from the air and converting it into organic compounds that plants and organisms can use.

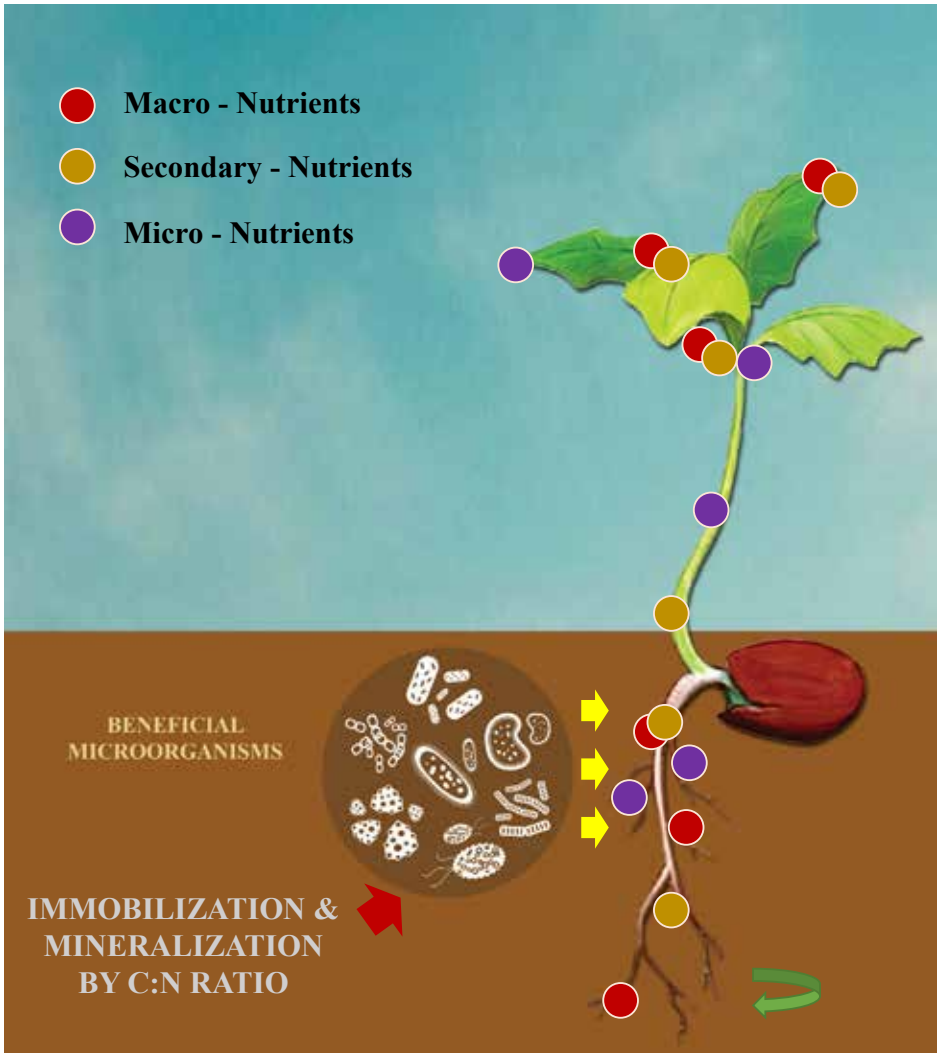


PHOSPATE SOLUBILIZATION

Phosphorus is one of the main nutrients plants need to grow healthy. Plants get the phosphorus from the soil by absorbing P from the soil as primary and secondary orthophosphates. It is essential plants get enough phosphorus because it is important for many of its production cycles including root growth, converting the sun's energy into usable energy and many other key functions. A lack of phosphorus is detrimental to the plant and will cause it to not absorb nutrients.

MicrobeBio® Nature Vigor helps plants receive the amount of phosphorus they need to thrive. Our product accomplishes this through phosphate solubilization which is the process of solubilizing bound phosphate in the soil and making it available for uptake by plants.

IMMOBILIZATION & MINERALIZATION



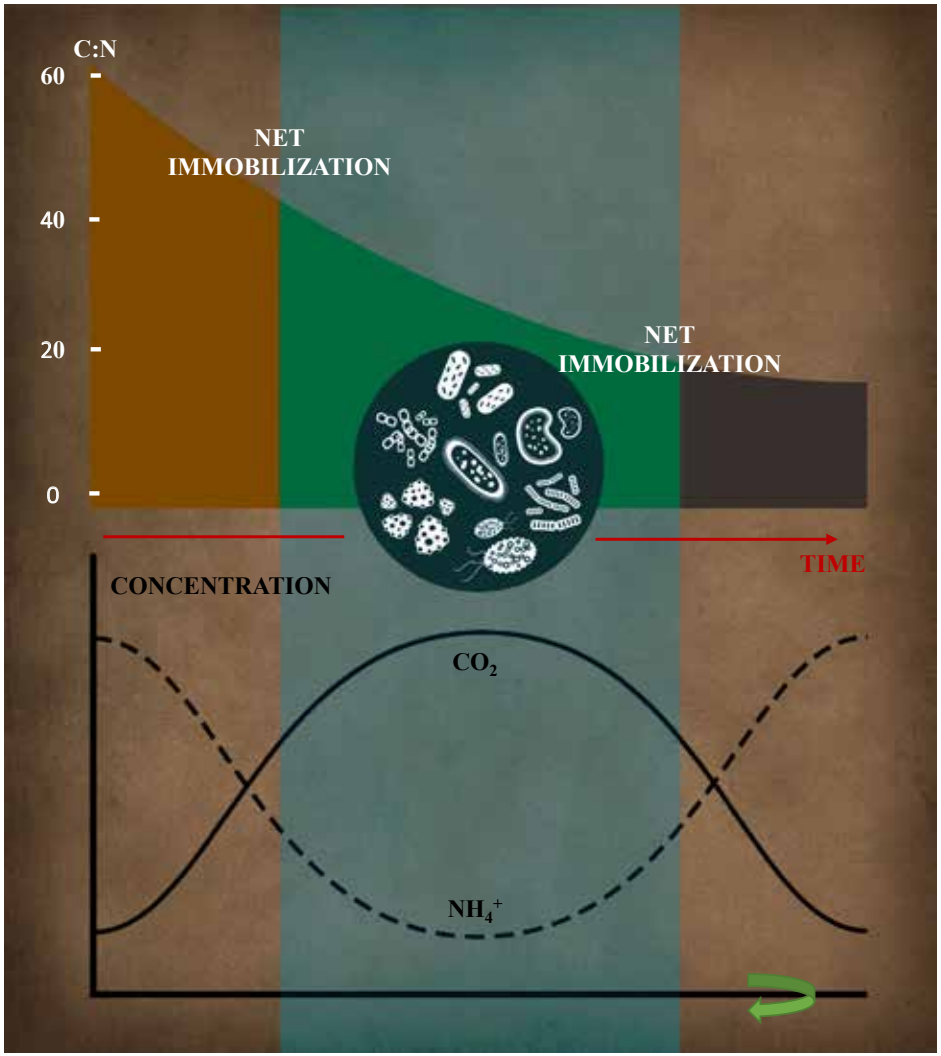
Plants have different parts containing various amount of nitrogen. Our Nature Vigor provides the beneficial microorganisms expressing an amount of nitrogen in plants or inorganic matters is the carbon to nitrogen ratio (C:N ratio).

Immobilization: When the C:N ratio of added organic matter is high (greater than 30:1 ratio), microorganisms will require more nitrogen from the soil (the form of nitrate or ammonium) or in the air (the form of ammonia) to decompose the carbon in the organic matter. This nitrogen will be immobilized (unavailable for plants) until these microorganisms die when the nitrogen is released.

Mineralization: When the C:N ratio of reduced organic matter is low (less than 30:1 ratio), the abundant nitrogen is supplied through the decomposition of the organic matter to obtain the nitrogen levels of the decomposing organism. As a result, there will be a net release and build-up of inorganic nitrogen in soil (mineralization).

The more we can balance the IMMOBILIZATION & MINERALIZATION, the more plants can update nutrients and increase yield.

IMMOBILIZATION & MINERALIZATION



The graph shows what happens when organic material with high C:N ratio is added in the soil. There is 3 times period.

1ST PHASE: NET IMMOBILIZATION (C:N RATIO IS DECREASING)

- The number of our microorganisms are increasing.
- Microorganisms consume N (NH4+) causing it to decrease.
- Microorganisms consume C compounds and release CO_2

2ND PHASE: BALANCE IMMOBILIZATION & MINERALIZATION

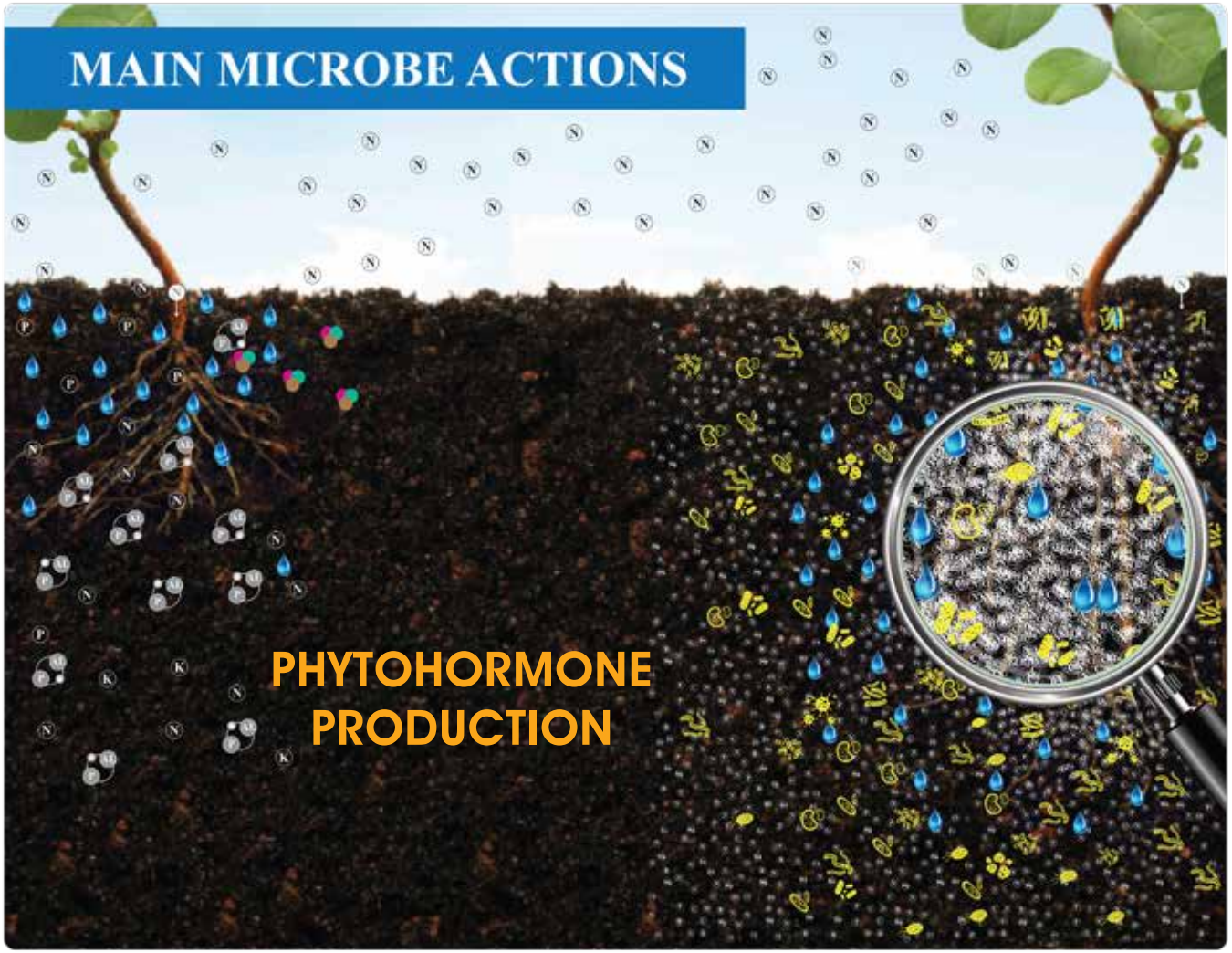
- Microorganisms have consumed most of the available N.
- Maximum consumption of C products and production of CO2.

3RD PHASE: NET MINERALIZATION (C:N RATIO IS LOW)

- Microorganisms are dying.
- NH4+ level is increasing – the NH4+ that was part of the microorganisms is now available in soil.
- C compounds are decomposed – CO2 production is low.

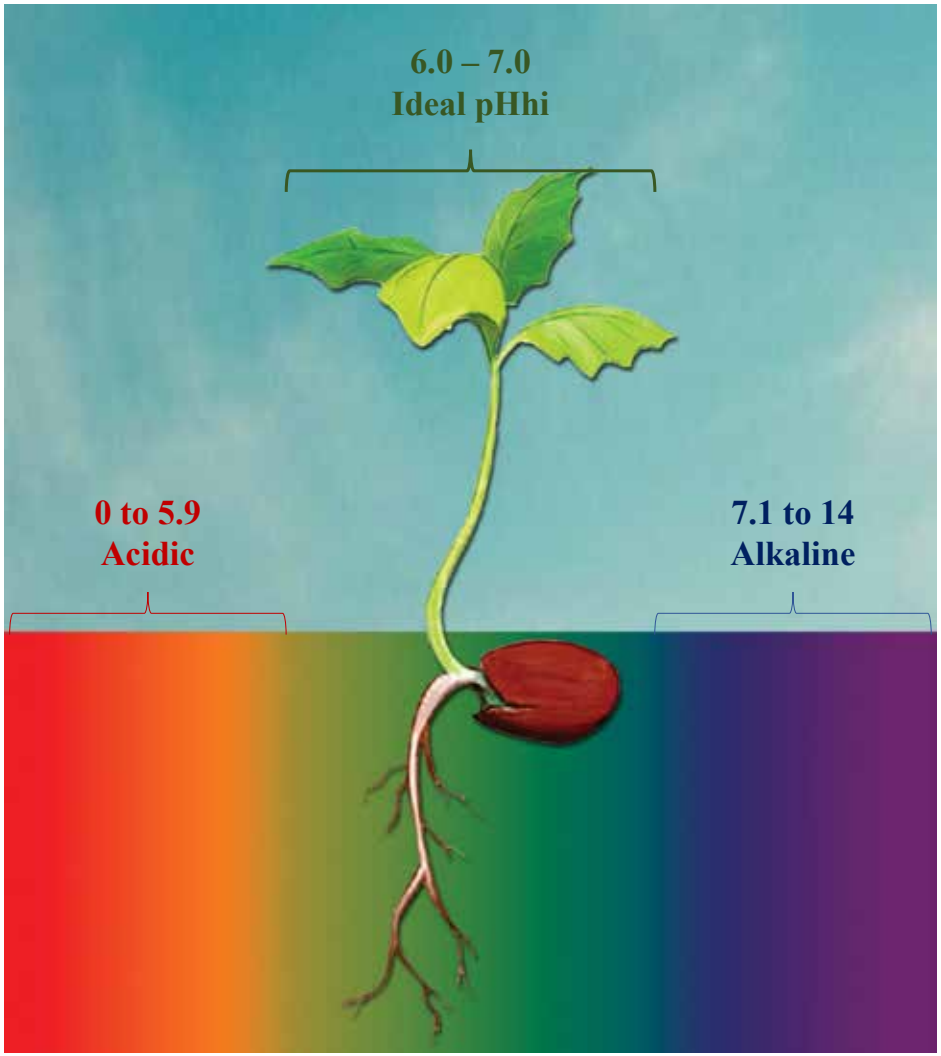
PHYTOHORMONE PRODUCTION

Plant growth promoting microorganisms in MicrobeBio® Nature Vigor contain organic stimulants and beneficial microorganisms that colonize the plants onto seeds and enhance plant growth. They produce phytohormones through phytohormone production.



Phytohormone production is an organic substance synthesized organ of the plant that can be translocated to other stages where it triggers unique biochemical, physiological, and morphological responses.

This process gives crops a chance to reach optimal growth and yield at the shortest times.

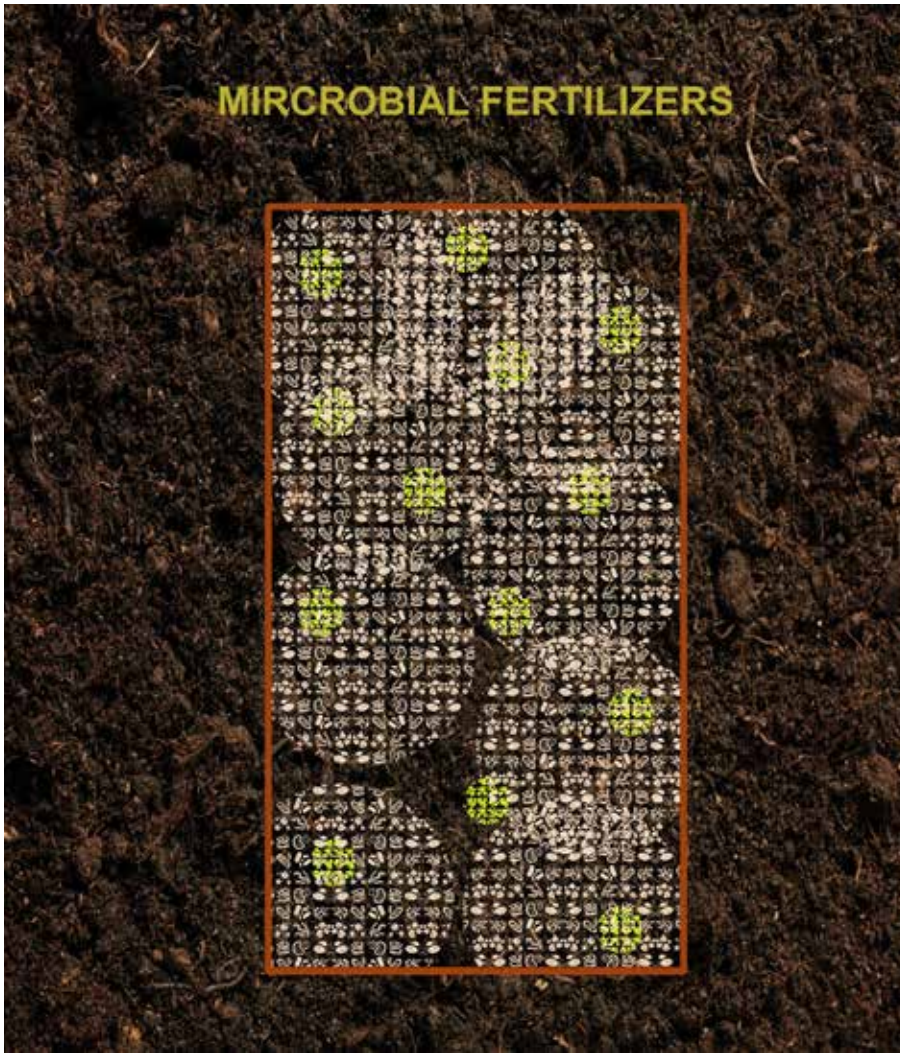


BALANCE SOIL pH

Soil pH has the most effect on the availability of most nutrients to plants in both either chemical forms and solubility of nutrients in the soil.

MicrobeBio® Nature Vigor promotes optimal soil pH under extreme environmental conditions by balancing. Organic bio-stimulants make the soil more porous, thus improving soil aeration, infiltration and drainage. It buffers the soil's pH and prevents loss of plant nutrients through leaching. Organic bio-stimulants make soils more granular, improving the aggregation of soil particles.

SAPROPHYTIC COMPETENCE

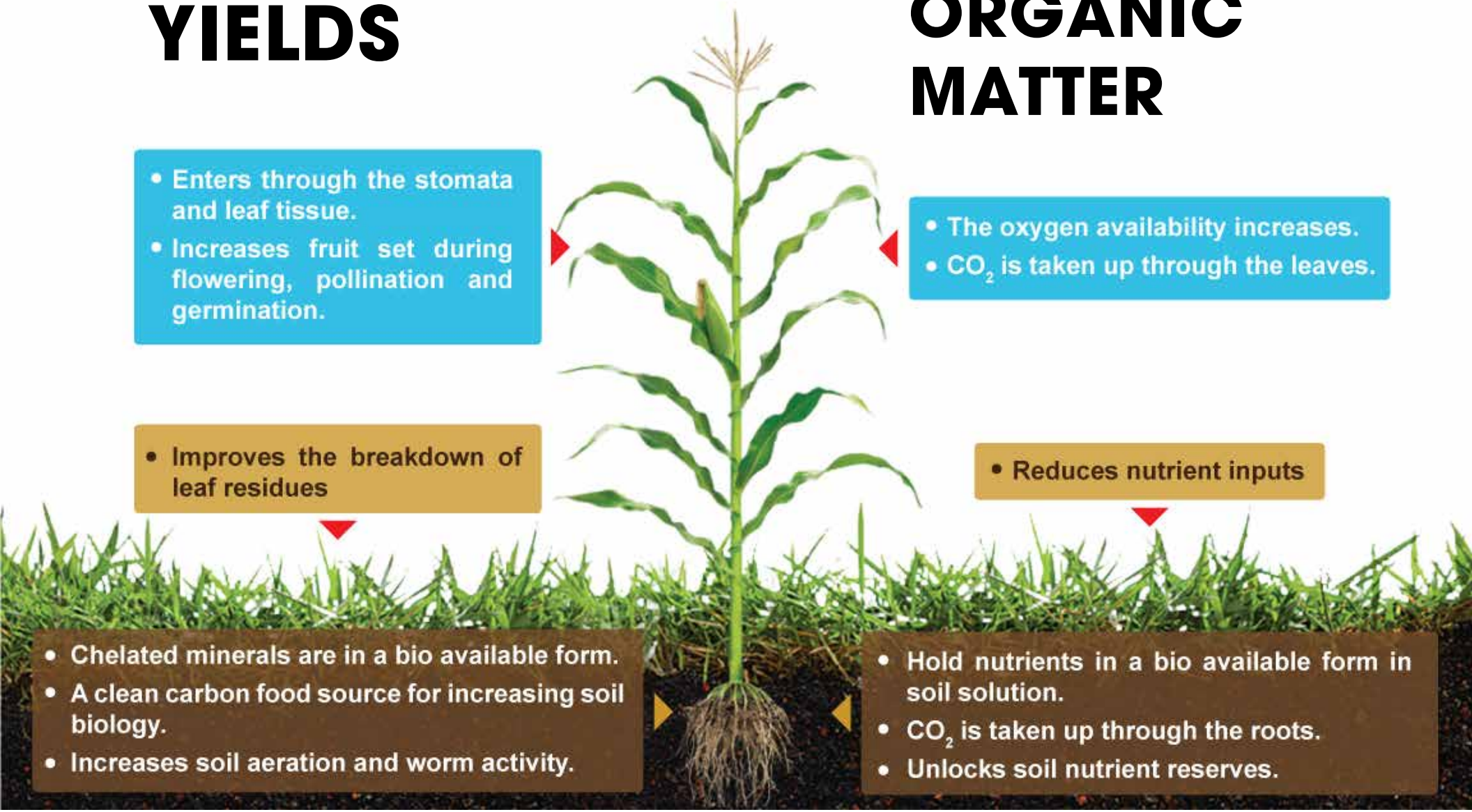


Saprophytic competence describes the ability of rhizobia inoculants to establish themselves in the soil, at least for the interval between a growing season. Species and strain differences in this ability are well documented.

Sentence would read better as: "Saprophytic competence of MicrobeBio® Nature Vigor has a unique role in improved commercial inoculants aggressiveness and perseverance in soil, versus less efficient native strains. In additional, MicrobeBio® Nature Vigor obtain available nutrients and additional water from the environment and soil for the plant to uptake.

FOR HIGHER YIELDS

WITH ORGANIC MATTER



- Enters through the stomata and leaf tissue.
- Increases fruit set during flowering, pollination and germination.

- The oxygen availability increases.
- CO_2 is taken up through the leaves.

- Improves the breakdown of leaf residues

- Reduces nutrient inputs

- Chelated minerals are in a bio available form.
- A clean carbon food source for increasing soil biology.
- Increases soil aeration and worm activity.

- Hold nutrients in a bio available form in soil solution.
- CO_2 is taken up through the roots.
- Unlocks soil nutrient reserves.

BENEFITS

There is a balance in this life. Our part of that balance is to care for our Earth in a conscious, considerate and nurturing way. That's the very reason we created our microbial regenerative technology. Its sole purpose is to serve the stewards of our lands and plants. Using microbials is a tool which helps growers cultivate within the art of sustainability. By simply adding this comprehensive community of life to the soil and roots of plants, growing becomes more proactive and less reactive.

THE BENEFITS

- Significantly improves soil structure and help plants to absorb and utilize applied nutrients as well as to increase the availability of the vast pool of nutrients currently in the soils.
- Nutrient contamination of surface and ground water is a serious environmental issue in many areas. Soil microbes can help reduce nutrient losses by trapping the excess nutrients and preventing them from leaching through the soil or running off the soil. The nutrients are then slowly released and are available for plants to take them up.
- Increase efficiency in crop production – considerably increases crop yield and quality increase profitability for farmers
- Stimulates effective breakdown of organic matter – greatly increases carbon and nutrient levels in the soil
- Controls/reduces salinity and heavy metals in soil
- Increases drought resistance and decreases irrigation by improving moisture retention capacity in the soil
- Increases root vitality

Creates healthy white, larger, deeper, and denser root systems better seed germination

- Significant reduction in cost and dependency on nitrogen-based fertilizers and transportation
- Greater resistance to pest and diseases increase plant vigor
- Increases formation of micronutrients, especially iron, which can be readily absorbed by plants
- Significantly increases Brix levels – better tasting produce
- Reduces adverse environmental impact on production and plant health and can remediate many soil contaminants
- Easy to apply, non-toxic, non – GMO 100% organic
- Regulate pH in acid and alkaline conditions:
  + Helps build sustainable soil for future crops

KEY FEATURE

Protecting soil and improving crops from the ground up.
Microbebio works with plants and soil for more productive agriculture.

ABOUT US

MicrobeBio is a microbial technology company that specializes in identifying, selecting and producing specialty microbials for the agriculture and environmental industries through its novel biochemical screening platform.

WHAT ARE BACTERIA?

Bacteria are single celled microorganisms that lack a nucleus (prokaryotes). They may be shaped like spheres, rods or spirals

Bacteria are diverse in nature and are capable of metabolizing and living off of a variety of food sources.

INTRODUCING
MICROBEBIO MICROBIALS

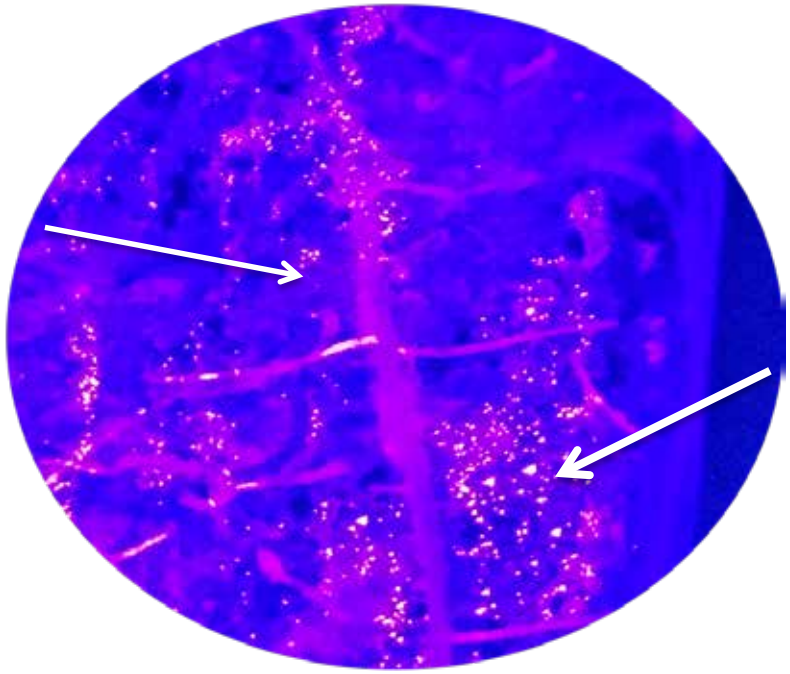
MicrobeBio's microbials are a select combination of highly tested, functional, organic microbial enhancements containing soil and plant health promoting bacteria.

Further

- Acts upon the plant rhizosphere to promote a healthy environment for meristem root growth.
- The increased biodiversity allows for accelerated organic mineralization, improved plant nutrient uptake, enhanced photosynthesis and an overall healthier plant.

CENTRAL DOGMA
AGRONOMY AND MICROBIOLOGY
OF UTMOST IMPORTANCE

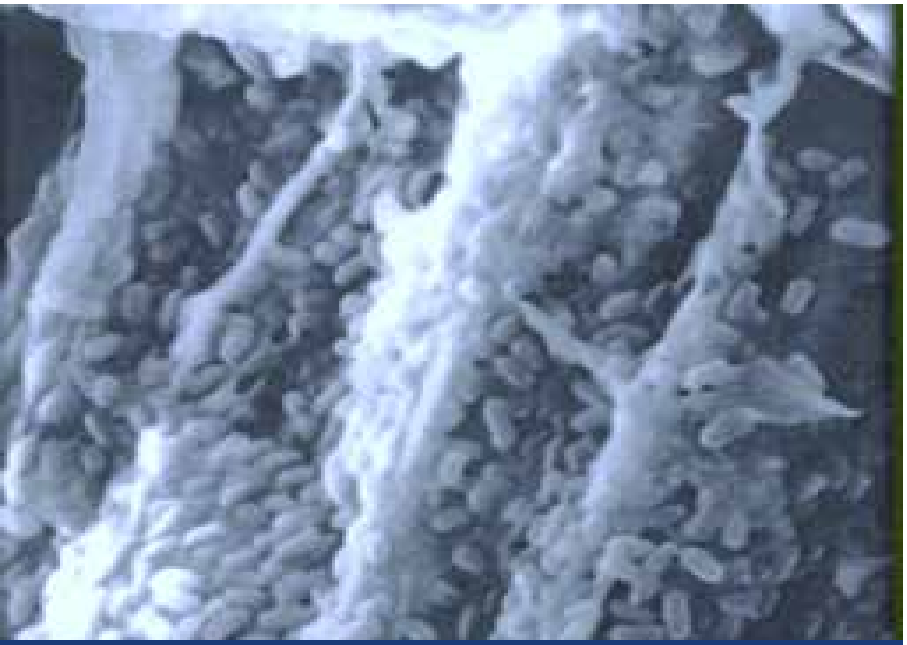
Bacteria MUST colonize the root zone to stimulate Plant Growth Promotion and **mineralization.**



MicrobeBio Bacterial colonization at the root zone
Bioilluminated Image

Beneficial Bacillus Spores

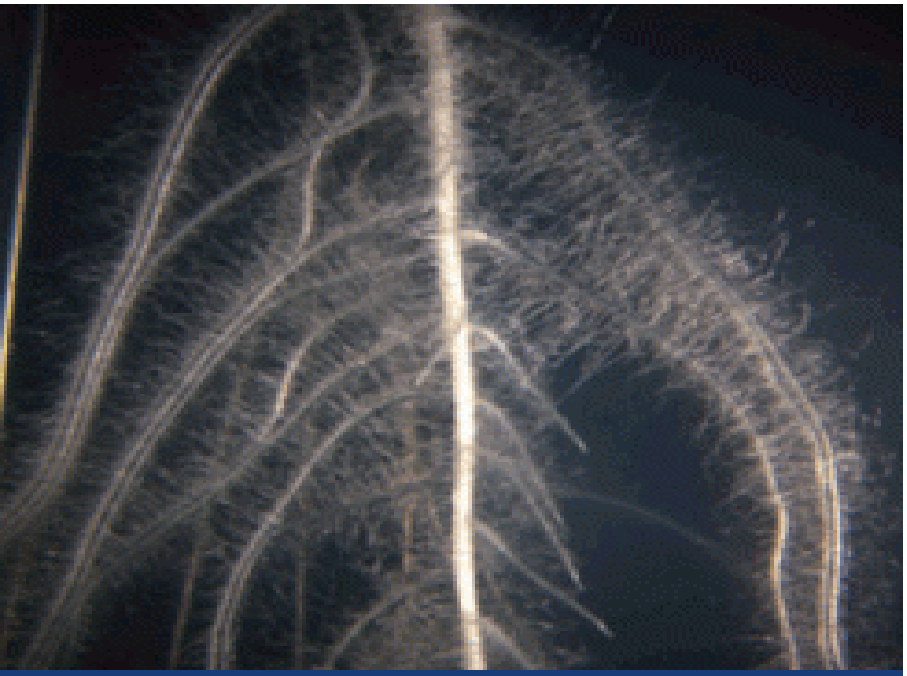
Strains in MicrobeBio's Products



Bacilli root associations protect the rhizosphere by the production of antibiotics and polysaccharides

All beneficial bacterial strains are **naturally derived** from agriculture sources worldwide

Microbebio's
Specialty Agriculture Microbials

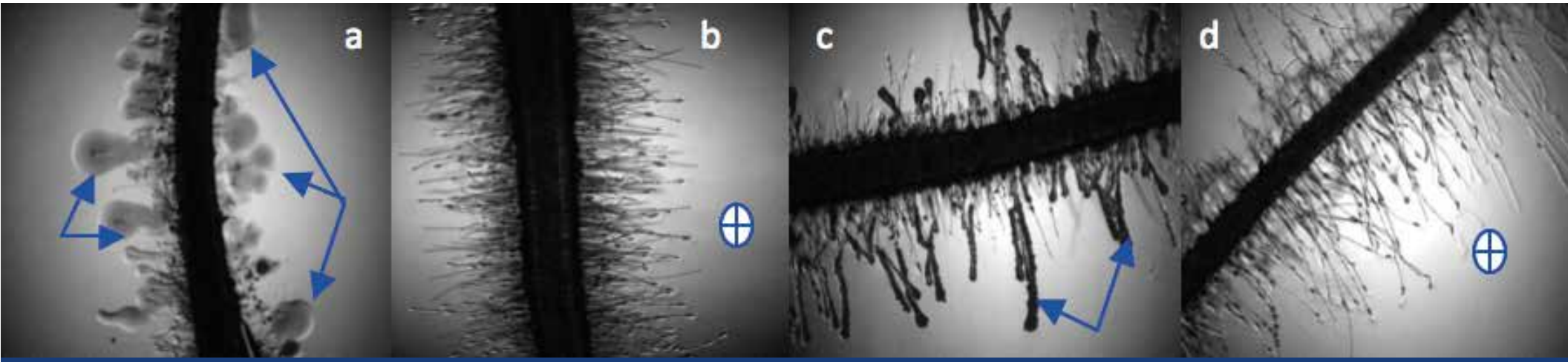


Root-associated Bacilli aids rapid nutrient uptake through root cells

Nature Vigor:

- >400 Billion CFU/Gram
- Ultra concentrate of Ag Bacillus spores
- High-throughput testing
- And validation
- Synergistic and effective
- Motile and chemotactic

Root Colonization by MicrobeBio Bacteria



Bacillus subtilis colonization and polyaccharide production

Mineral depletion from **1940** to **1991**

Substantial loss of nutrients in vegetables and fruits over time!

Vegetables

Lost **76%** of their copper content

Lost **49 %** of their sodium content

Lost **46%** of their calcium content

Lost **27%** of their iron content

Lost **24%** of their magnesium

Lost **16%** of their potassium

Fruit

Lost **19%** of their copper content

Lost **29%** of their sodium content

Lost **16%** of their calcium content

Lost **24%** of their iron content

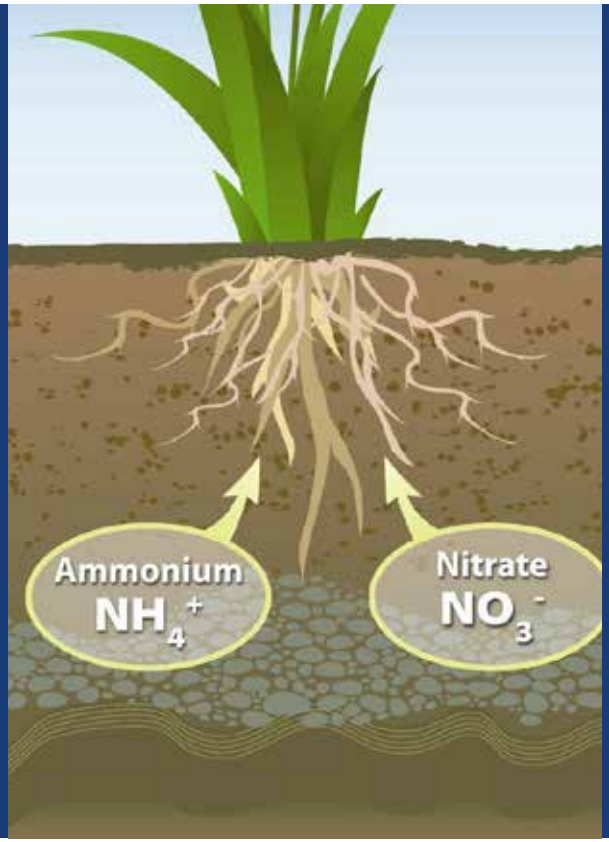
Lost **15%** of their magnesium content

Lost **22%** of their potassium content

Source: USDA Soils

Mineralization and Nitrogen

Beneficial bacteria impacts



Beneficial bacteria fix nitrogen and rapidly mineralize nutrients into plant useable forms

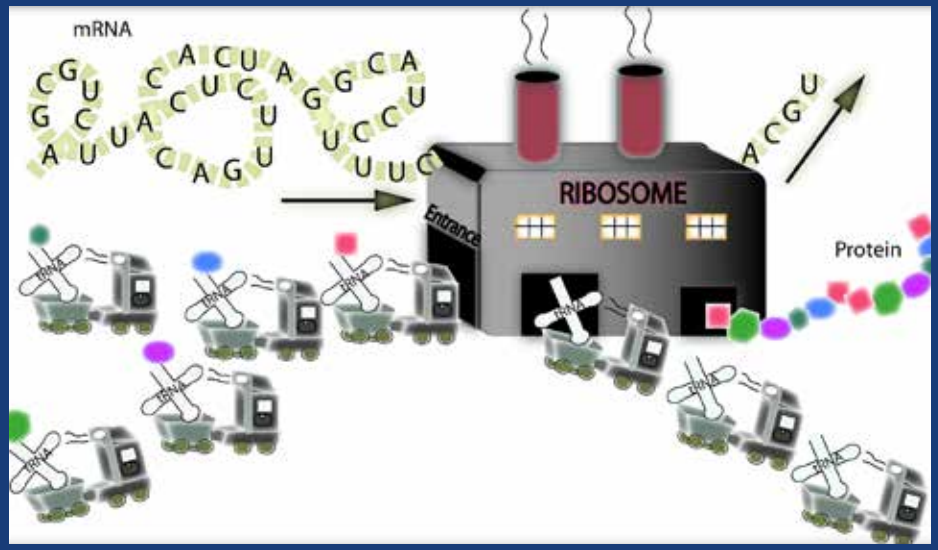
Beneficial bacteria

The key to soil health

Converting unusable nutrients into usable nutrients 24/7

Bacteria are Microscopic Jackhammers

Continually breaking down insoluble nutrients and ions into their free forms for plant use

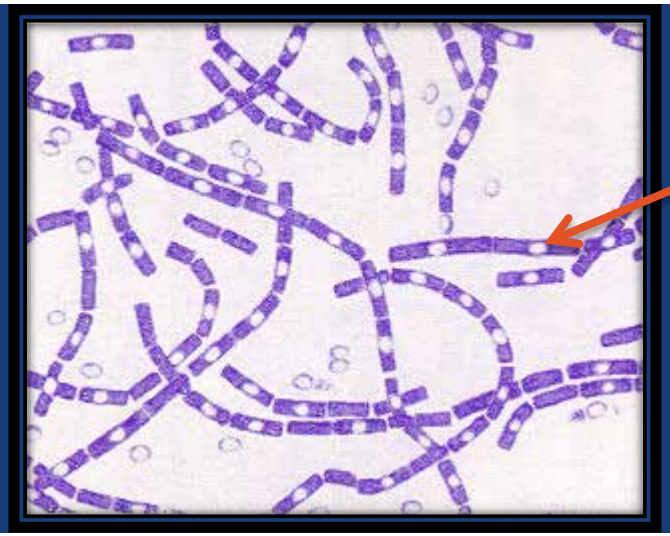


Bacteria are Microscopic Factories

Continually producing by products and Surfactants for greater nutrient uptake

Bacteria Survival, Shelf Life and Integrity

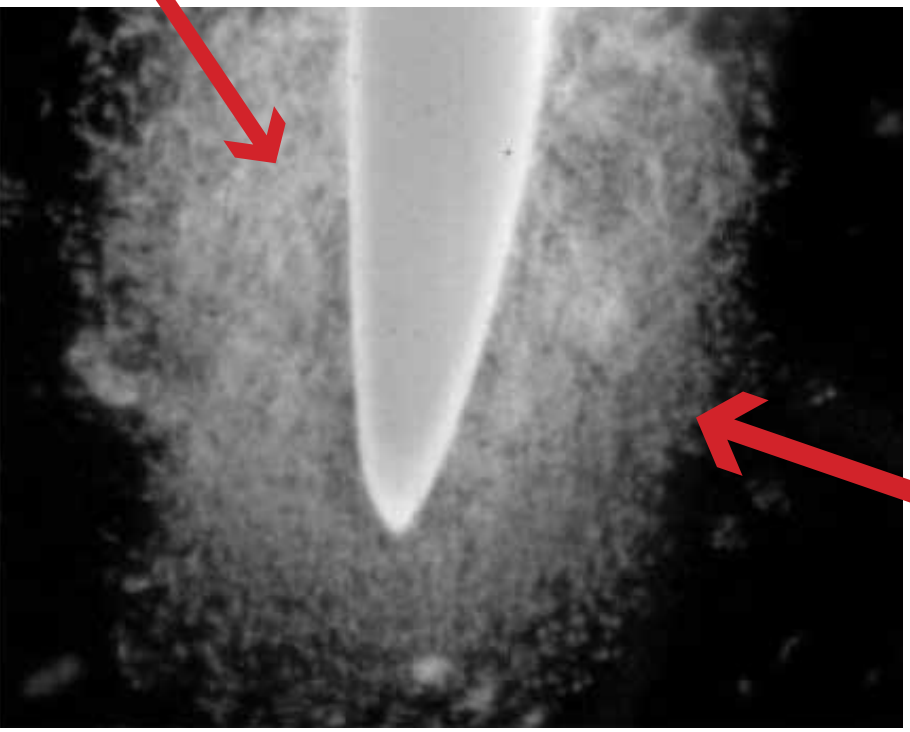
Bacillus bacteria form **endospores** to survive and cope with undesirable environment conditions such as temperature, salinity, pH, drought, abiotic and biotic factors.



MicrobeBio bacteria form endospores and are able to overcome temperature and environment extremes.

SHELF LIFE IS A MINIMUM OF 2 YEARS (LIQUID) AND 5 YEARS (POWDER)

Root Hair Extension and Microbial Chemotaxis



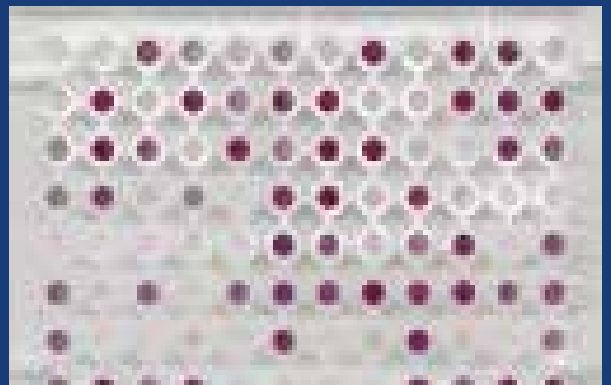
Microbes swiftly move towards root sugars and chemicals

CHEMOTAXIS IS THE MOVEMENT OF MICROORGANISMS TOWARDS ROOT EXUDATE CHEMICALS AND STIMULI

The MicrobeBio Difference

1000+ biochemical assays, all microbial strains extensively lab and field tested

- Over 1000+ metabolic challenge assays
- Proven metabolic diversity of complex polymers and sugars in the soil (lignin, chitin, cellulose, pectin, keratin, starch, dextrose, xylose, etc)
- Proven metabolic activity in divergent soil pH, osmotic salinities, phosphorus, sulfur and nitrogen
- Proven nitrogen fixation and assimilation
- Synergistic blend of Bacillus strains



What are beneficial soil bacteria… and why they are important

Beneficial Soil Bacteria

Microscopic Farmers

Bacteria break-up rock minerals tightly bound in soil

Minerals and nutrients are **abundantly present** as ion complexes in the soil…

- Yet, these elemental ions form rock complexes that are insoluble to water and unavailable to plants.
- Microorganisms function to continually release **unavailable** plant nutrients bound in soil, metabolically transforming them into plant **available** nutrients (P, K, Ca…)

BACTERIA PRODUCE LARGE VOLUMES OF ENZYMES AND BIO-SURFACTANTS THAT BREAK ION COMPLEXES IN SOIL TO RELEASE NUTRIENTS FOR PLANT UPTAKE.

Beneficial bacteria

The key to soil health

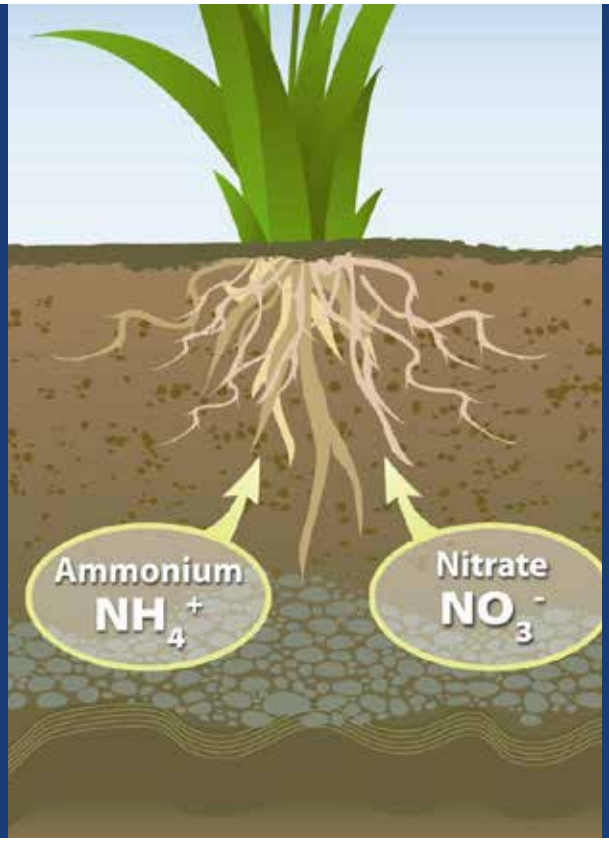
Converting unusable nutrients into usable nutrients

Beneficial bacteria continually produce essential enzymes, surfactants, polysaccharides and antibiotics essential for soil, root and plant growth

AG MICROBIALS WORK SYNERGISTICALLY WITH PLANT ROOTS TO PROMOTE SOIL HEALTH, PHOTOSYNTHESIS, PLANT VIGOR AND IMPROVE NUTRIENT UPTAKE

Mineralization and Nitrogen

Beneficial bacteria impacts



Bacillus bacteria fix nitrogen and rapidly mineralize nutrients into plant useable forms

BIOCHEMICAL SEQUENCE OF NUTRITION ON PLANTS

N Nitrogen

Mg Magnesium

To form amino acids, DNA and cell division. Amino Acids form proteins such as Chlorophyli and tag trace elements.

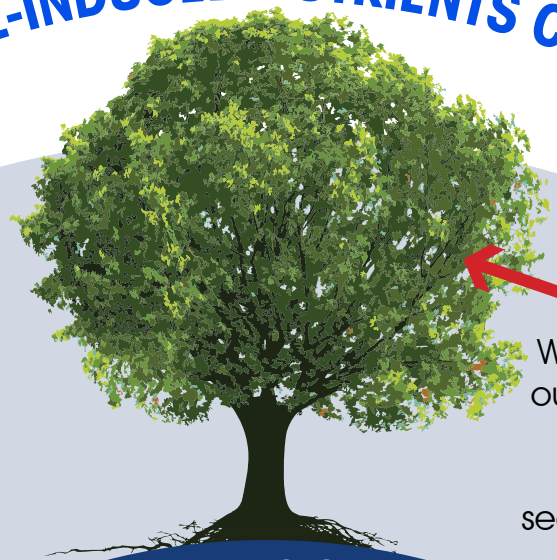
Ca Calcium

P Phosphorus

MICROBIAL-INDUCED NUTRIENTS CASCADING

Si Silicon

C Carbon



When soils are out of balance of nutrients, the above sequence is less efficient.

B Boron

K Potassium

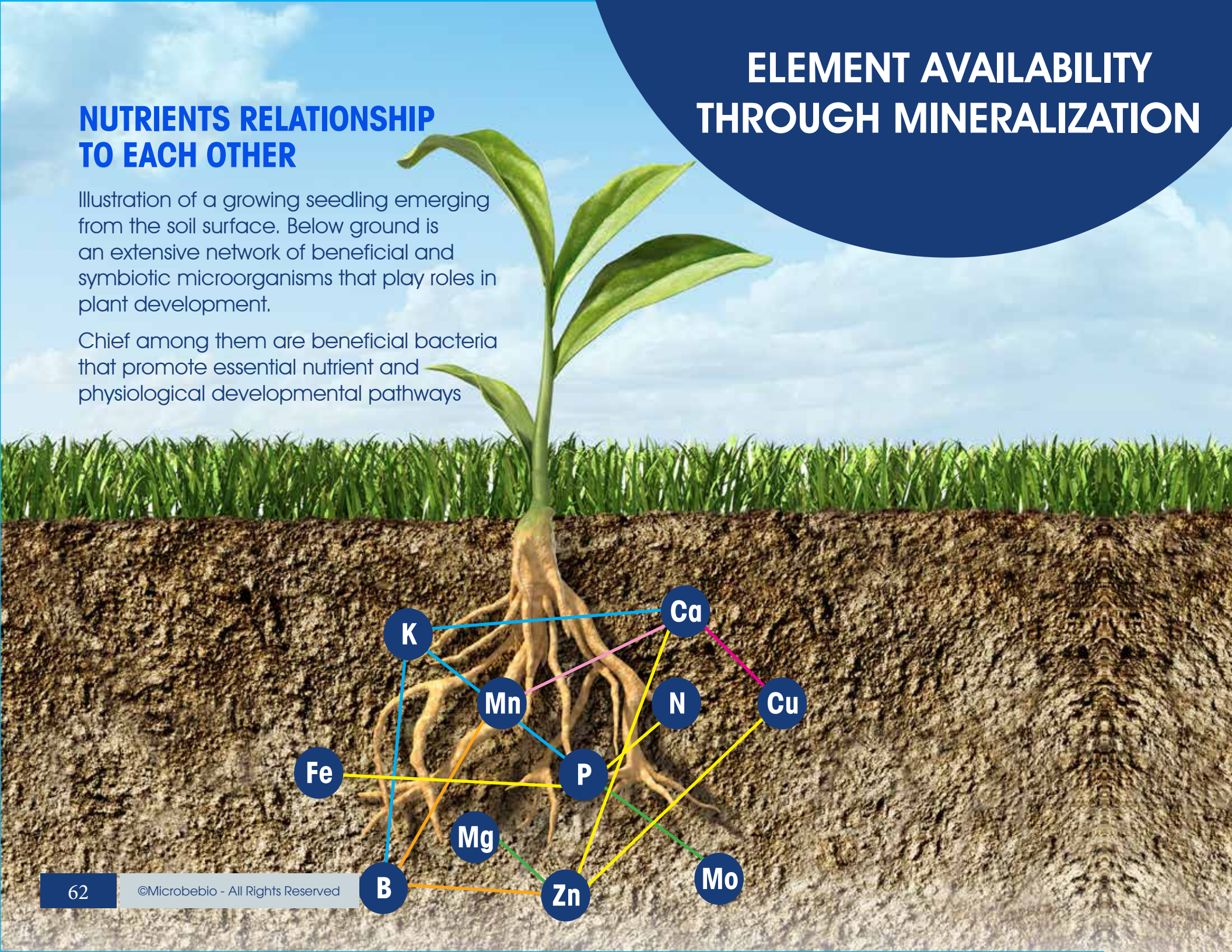
BASIS OF PLANT GROWTH

ELEMENT AVAILABILITY THROUGH MINERALIZATION

NUTRIENTS RELATIONSHIP TO EACH OTHER

Illustration of a growing seedling emerging from the soil surface. Below ground is an extensive network of beneficial and symbiotic microorganisms that play roles in plant development.

Chief among them are beneficial bacteria that promote essential nutrient and physiological developmental pathways



What's the Problem?

Is Feeding the Existing Microbials in Soil Enough?

The Challenge…

Nutrient and microbial imbalance will not self-correct

Phytophthora capsici infecting pepper

The **micro and macro biome** in soil work cohesively with one another…
Yet, over time and due to conventional farming and tilling practices, soils begin to **suffer from a nutrient and microbial imbalance** that cannot be self remedied without intervention.

Feeding Existing Microbials is Not Enough

Feeding existing microbial communities will not improve soil and plant health

Microbial communities in the soil that have been stressed through **abiotic (drought, pH, high salinity) and biotic (pests, disease)** challenges become stripped of their essential life-giving components.

Through the natural law of competition, the stressed areas of soil are occupied, often by pathogenic fungi, in space left open by beneficial microbes.

SIMPLY FEEDING THE SOIL WITHOUT ADDED BENEFICIAL BACTERIA FEEDS THE PATHOGENS, ALLOWING THEM TO FURTHER FLOURISH WITH LITTLE COMPETITION.

So, what's the bottom line?

The impact of imbalance and loss of soil health

What's the Bottom Line?

The indigenous soil bacteria are simply not enough to promote optimal plant health, solve crop nutrient deficiencies and soil pathogenesis… if it were, there would be no soil health problem.

Since an imbalance in soil bacteria exists, then a boost of the correct microbials is required to fundamentally alter the soil microbiome. NLBS introduces microorganisms capable of correcting deficiencies in the soil.

Nematode BioControl Tests

NEMATODE	Disease Reduction vs. Control (In-Furrow Treatment)	Disease Reduction vs. Control (Seed Treatment)	Average Microbiology Change vs. Control
Root Knot Nematode	↓86%	↓91%	↑1,330,000 CFU/Gm
Soybean Cyst Nematode	↓84%	↓88%	
Sting Nematode	↓93%	↓96%	↑950,000 CFU/Gm
Lance Nematode	↓81%	↓94%	↑950,000 CFU/Gm

The Solution…

Improving crop nutrients, crop health, and much more

So, what is the solution?

Treating soils with **beneficial Ag bacteria** allows microbials to physically occupy space that is critical to out-compete and **eliminate pathogenic microorganisms.**

Promoting critical microbial populations enables **healthy mineralization, metabolic cycling, nitrification and nutrient uptake.**

Bacillus and Beneficial Soil Bacteria

Direct and Indirect Benefits on Plant Growth Promotion

Direct Mechanism	Effects on Plant Growth
Nitrogen fixation on or in root or shoot tissue	Increased plant biomass or nitrogen content
Production of plant growth regulators (i.e., auxin, cytokinins, giberellins)	Increased root or shoot biomass or root branching; induction of reproduction cycles
Inhibition of ethylene oxide synthesis in inoculated plants	Increased root length
Phosphorus solubilization content	Increased plant biomass or phosphorus
Sulfur oxidation	Increased plant biomass or foliar sulfur content
Increased root permeability	Increased plant biomass & nutrient uptake
Increased nitrate reductase activity and assimilation	Increased plant biomass or nitrogen content

Table 1: Direct mechanisms involved in plant growth promotion by Bacillus and soil bacteria.

Bacillus and Beneficial Soil Bacteria

Direct and Indirect Benefits on Plant Growth Promotion

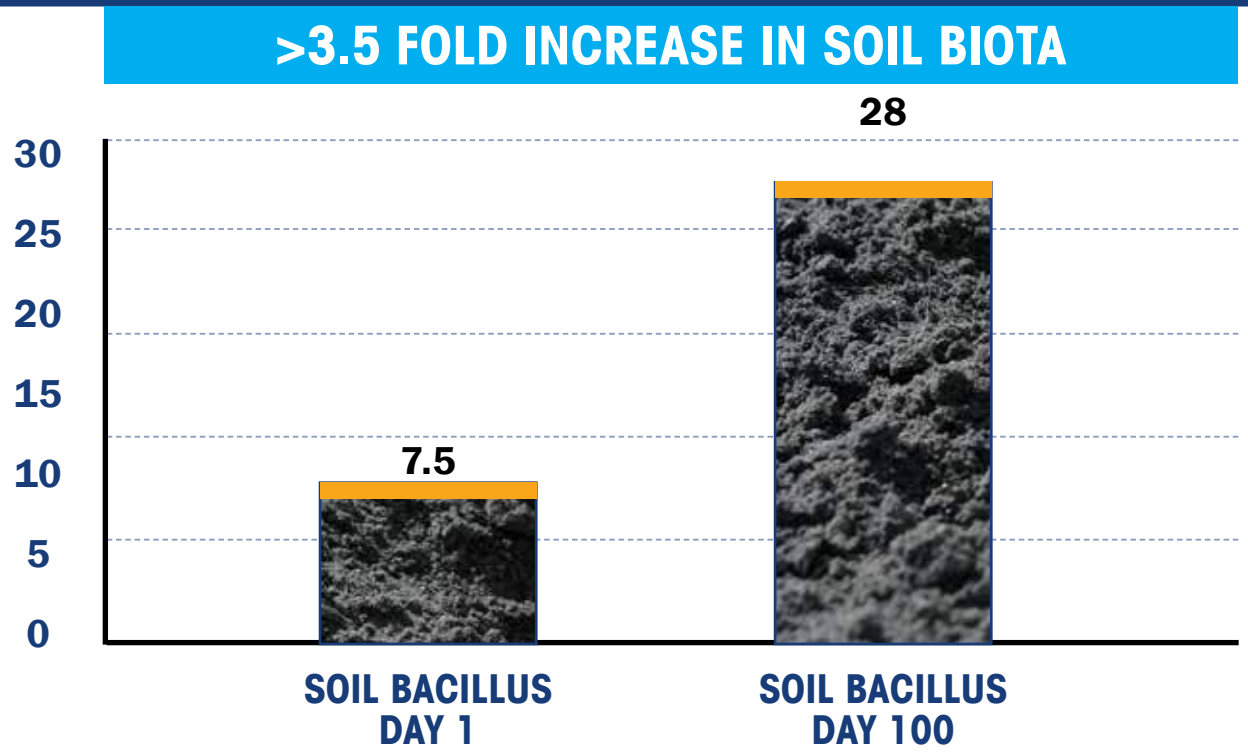
Indirect Mechanism	Effects on Plant Growth
Increased root nodule number or size on legumes or actinorhizal plants	Increased plant biomass, nitrogen content or yield
Increased infection frequency or efficacy by mycorrhizal fungi	Increased plant biomass
Suppression of disease pathogens	Increased plant biomass and reduced incidence of disease and plant mortality
Induction of plant systemic resistance to pathogens	Increased plant biomass and reduced incidence of disease and plant mortality

Table 2: Indirect mechanisms involved in plant growth promotion by Bacillus and soil bacteria.

Bacillus Content in Soil

(Consistent Improvements)

Soybean and Corn Soil Tests



Beneficial Bacteria

Enhances Plant Growth, Soil Health and Mitigates Environmental Stress

- Improves nutrient uptake
- Improves water uptake
- Improves root growth
- Improves plant growth yield
- Induces phytohormones

Note greater decomposition of pith of treated residue treated late fall 2015, pic 8/10/16

BENEFICIAL MICROBES IN MICROBEBIO®

Our microbial products contain an unparalleled proprietary formula of 50+ strains of microorganisms. The most notable difference between our line of microbial products and that of other manufacturers is encompassed in the following three words: Bio-diversity, Endospores, and Equilibrium.

We have conducted rigorous lab and field compatibility studies around the world, Southeast Asia, and the U.S. to ensure the synergy and efficacy of this formula:

BIO-DIVERSITY

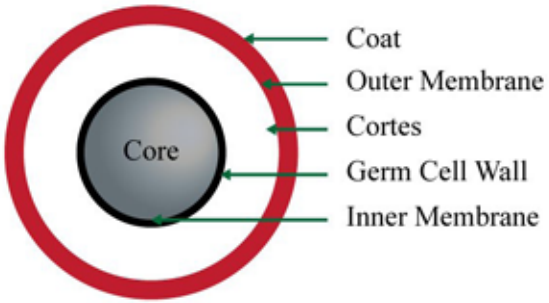
This chain of 50+ strains of bio-diverse microorganisms is critical for promoting nutrient cycling in the soil when applied to the root zone or as a foliar treatment.

- By contrast, mono-cultural strains (without diversity) are susceptible to environmental pathogens and more easily succumb to lysing, denaturation of their DNA, and death.
- The bio-active potential of these microbial spores (vs. "live" microbes which live and die), ensure a longer duration of nutrient uptake by plants throughout all phases of the growth cycle.

ENDOSPORES

Our products contain viable bacteria, sporulated via fermentation.

- Rationale: Spores (vs. active cells) limit metabolism and catabolism, thereby increasing shelf life and minimizing excessive genetic mutation of bacterial cells, which can lead to mutant cells that do not perform the way they were intended.
- Converting our products into endospores ensures fidelity (long-term activity), significantly reduces genetic mutations and stabilizes the quality of the product.
- By contrast, the quality of viable ("live"/active) cells in a container risk jug expansion or compression due to excess metabolism or CO_2 production in the container.
- Endospores are absolutely the preferred form due to their preservation, fidelity, quality assurance of performance in the field, and high shelf life.



EQUILIBRIUM

After many QA trials, we believe that heterogeneity of microbes promotes a prolonged duration of soil balance, resulting in season-long composting by the bacteria.
Biodiversity and redundancy allows for

- Accelerated organic mineralization in the soil
- Nutrient release
- Perimeter protection against pathogens
- Improved soil tilth leading to better air and water channeling

Here is a partial list of our proprietary formula of microbial spores and their functions

BENEFICIAL MICROBES

GENUS AZOTOBACTER

- Aids nitrogen fixation in association with non-leguminous plant roots in the presence of oxygen (which usually inhibits the nitrogen-fixing enzymes). By contrast, others do so by consuming all oxygen sources within their immediate surroundings.
- Increases uptake of N3- (atmospheric nitrogen). Historically, microbes were discovered as the original mediator for N3- Produces three enzymes, catalase, peroxidase and superoxide dismutases to neutralize reactive oxygen species.

GENUS BACILLUS

Nutrient Decomposition: Assists resistance to environmental factors such as heat, desiccation, radiation and chemical attacks which can persist in the environment for long periods of time. The endospore is activated at times of nutritional stress, allowing the organism to persist in the environment until conditions become favorable.
The Enzyme, Plant-Growth Hormones, Soil Structure: Produces enzymes, antibiotics, and small metabolites. It produces a variety of extracellular enzymes that are associated with the cycling of nutrients in nature.

C:N Ratio (Carbon & Nitrogen): Isolates the nitrate reductase enzyme to increase beneficial anaerobic respiration on nitrate. Additionally, oxidizes carbon monoxide aerobically.

Phosphate Solubilization: These microorganisms join together by polysaccharides on the cell wall to extract inorganic phosphorus from insoluble compounds. Used as a preventative measure to inoculate plants against pathogens. Also used in the making of penicillin and enzymes.

Lactic Acid Formation: Amends soil with organic materials for rapid microbial growth to significantly increase nutrient uptake.

Prophylactic: Boosts bacterium growth which prevents Rhizoctonia and fusarium spores from germinating. Builds high resistance to environmental stresses including UV light exposure, desiccation and the presence of oxidizers.

Bio-pesticide: Functions as a natural insecticide and endotoxin in many insecticides and pesticides.

GENUS PAENIBACILLUS

Nitrogen Fixation (conversion), nutrient cycling, soil structure: Capable of fixing (converting) nitrogen into a compound that is readily accessible by plants. The sources of less-accessible nitrogen (N2) are found in soil, plant roots, marine sediments, and the atmosphere.

Prevents Pathogen Encroachment: Similar to other strains, these bacteria form biofilms on plant roots to produce exopolysaccharides (probiotics) which suppress pathogen proliferation (fights plant diseases) and induce systemic plant resistance.

GENUS PSEUDOMONAS

Pathogen Reduction: Produces antimicrobial compound PCA-phenazine-1-carboxylic acid (C13H8N2O2) which prevents Rhizoctonia and Fusarium spores from germinating when applied to seedlings.

Auto-Immune Disease Reduction: Via Aerobic Denitrification and Nitric oxide dis-mutation

GENUS STREPTOMYCES

Significant Anti-biotic: Commonly found in soil and deep sea sediments. Demonstrates significant activity against organisms that cause plagues and diseases by producing antibiotics.

Anti-fungal: Strong in-vitro antagonism against various fungal plant pathogens in plate assays by producing extracellular anti-fungal metabolites
Genus Trichoderma.

Strong preventative nematicidal (anti-worm) measure: Applied to root zone as an anti-fungal Penicillium which treats Botrylis and Fusarium.

MYCORRHIZAE

GENUS GLOMUS

Supports root extensions.

GENUS SACCHAROMYCES

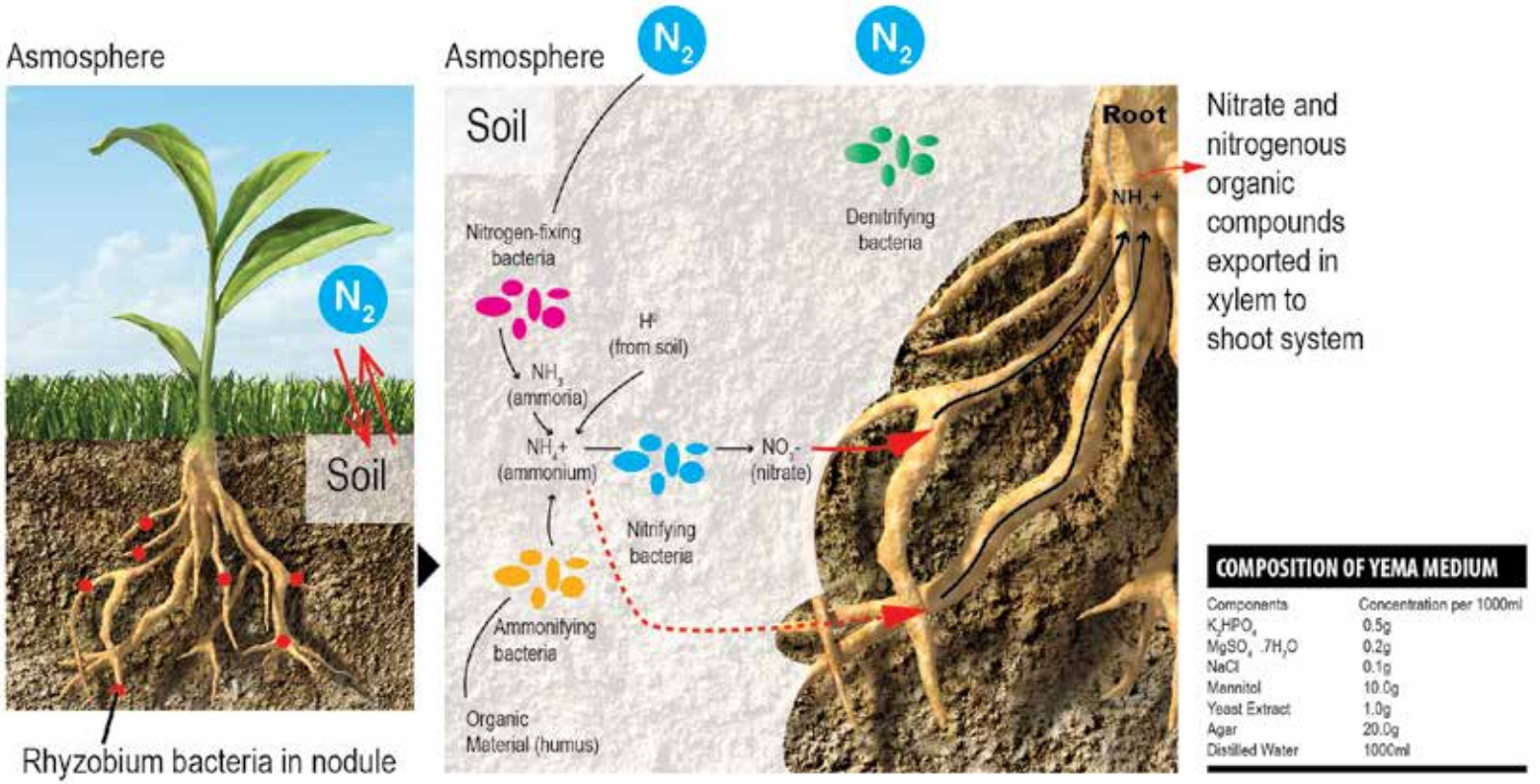
A species of yeast involved in secretory pathways of antibodies against diseases.

IMPACT

SYMBIOTIC NITROGEN FIXER

Symbiotic nitrogen fixation occurs between leguminous plants and Rhizobium

Association between **leguminous plants** and **Rhizobium**



COMPOSITION OF YEMA MEDIUM

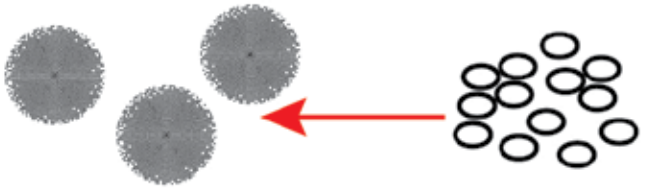
Components	Concentration per 1000ml
K_2HPO_4	0.5g
$MgSO_4 .7H_2O$	0.2g
NaCl	0.1g
Mannitol	10.0g
Yeast Extract	1.0g
Agar	20.0g
Distilled Water	1000ml

IMPACT

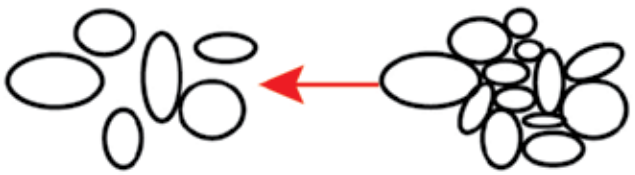
MICROBEBIO

1. Effect on soil physicochemical and biochemical properties
2. Effect on microbial community

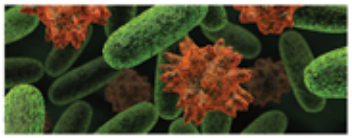
- Increased soil aggregation



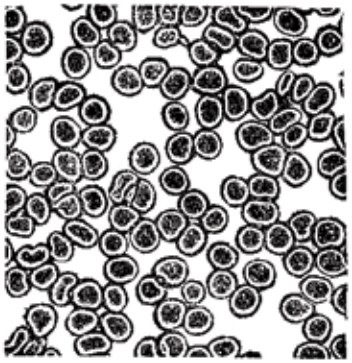
- Increased in soil porosity



- Increase in nitrifiers



- Increase in fungal community

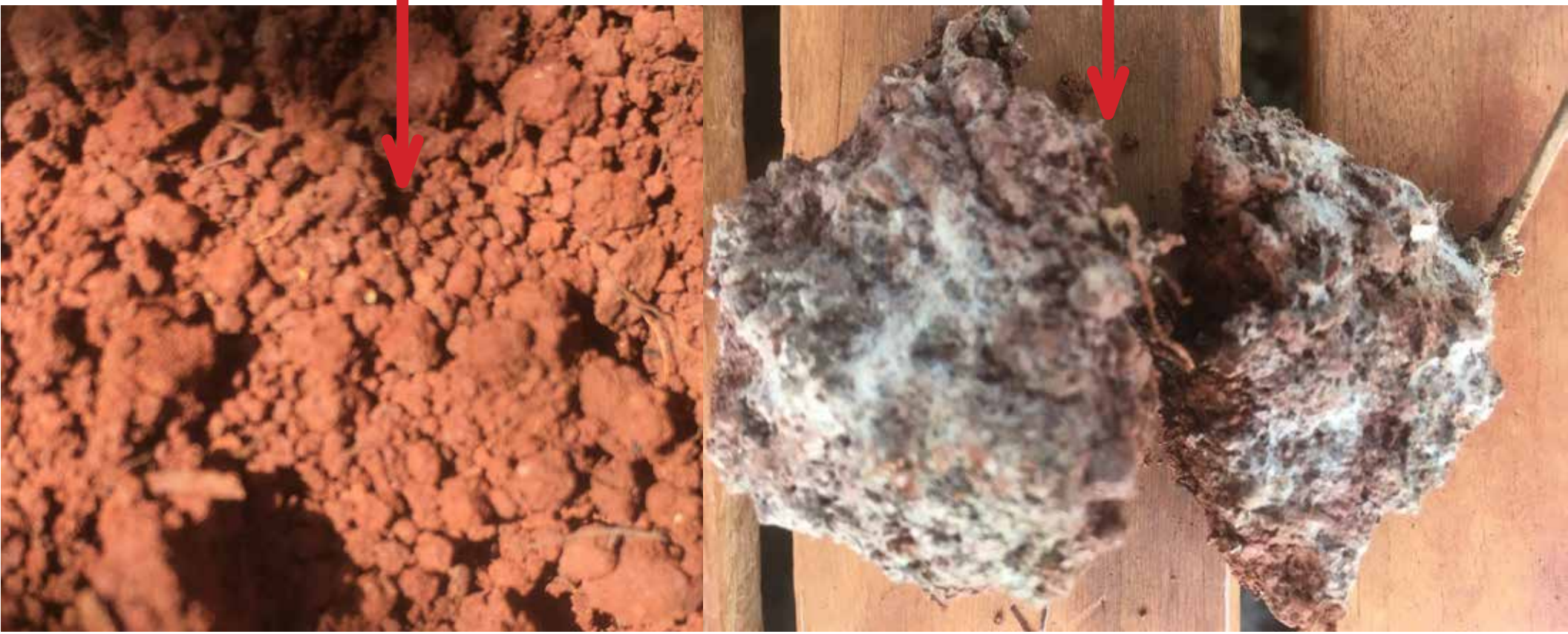


IMPACT

SOIL COMPARISON

TREATED

NON TREATED



IMPACT

PEPPER COMPARISON

TREATED

NON TREATED

IMPACT

PEPPER COMPARISON

TREATED

NON TREATED

IMPACT

TOMATO COMPARISON

TREATED

NON TREATED

IMPACT

DRAGON COMPARISON

TREATED

NON TREATED

IMPACT

WHEAT COMPARISON

TREATED

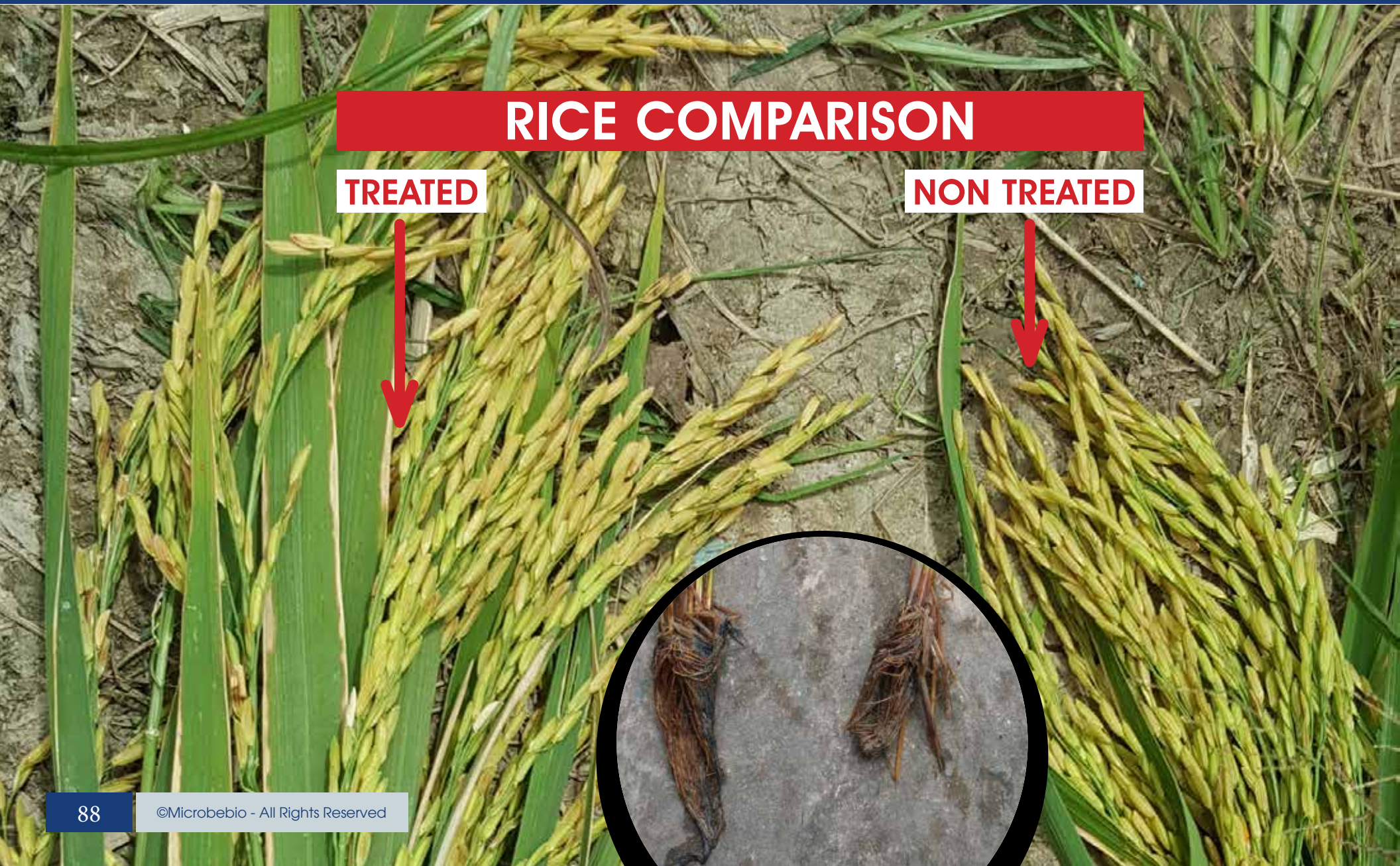
NON TREATED

IMPACT

WHITE RADISH COMPARISON

IMPACT

IMPACT



IMPACT

CORN COMPARISON

IMPACT

CABBAGE COMPARISON

IMPACT

SWEET PEPPER COMPARISON

IMPACT

PINEAPPLE TREE COMPARISON

TREATED NON TREATED

TRIAL TEST BY MICROBEBIO®

on Eggplant (3000m^2)
at An Giang, Vietnam

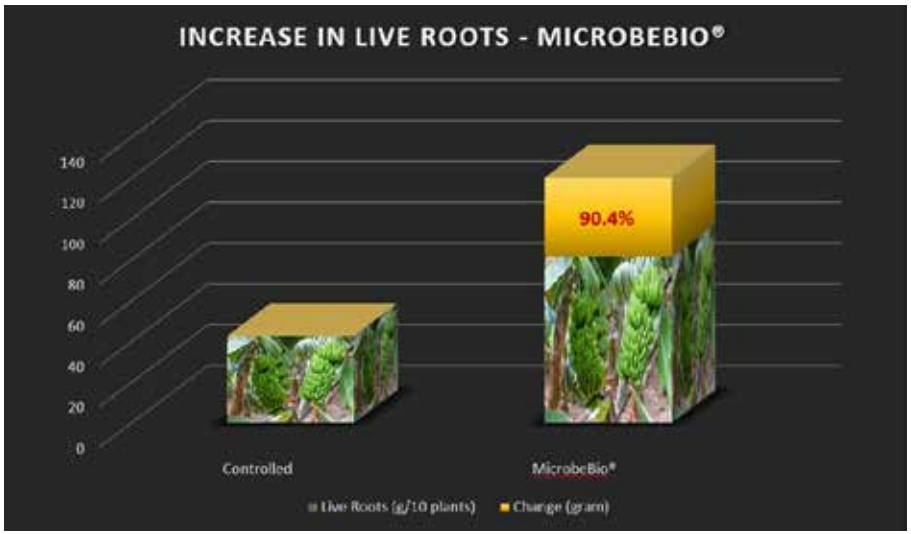
TRIAL TEST BY MICROBEBIO®

ORGANIC BANANA, DOMINICAN REPUBLIC

Place : Dominican Republic
Time : April – July 2018
Products : MicrobeBio® products
Experimental Design : The chosen banana field was split into three sections, one an untreated control and one treated with MicrobeBio® products. The purpose is to examine the effect of MicrobeBio® products on increasing in live roots of banana field.

Live roots:

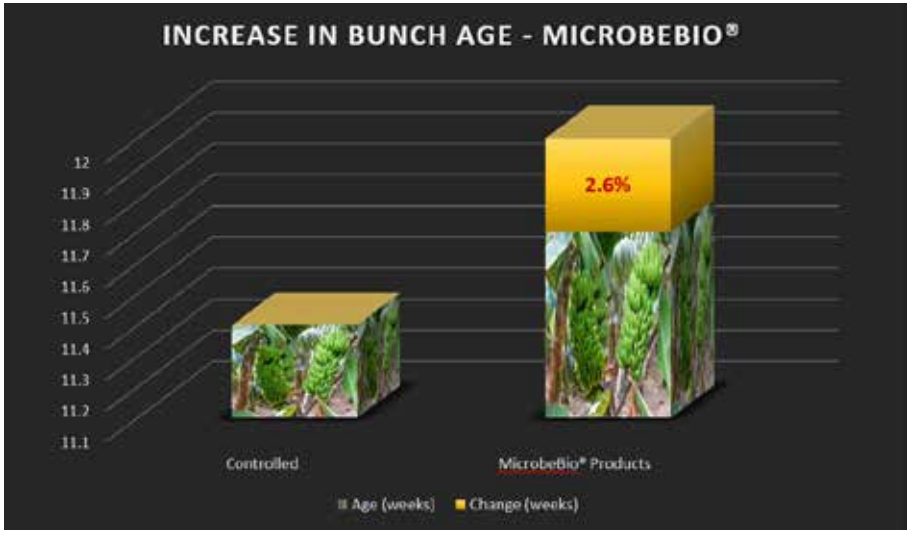
Treatment	Live Roots g/10 plants	Change gram
Controlled	42.8	-
MicrobeBio®	81.5	38.7 (+90.4%)

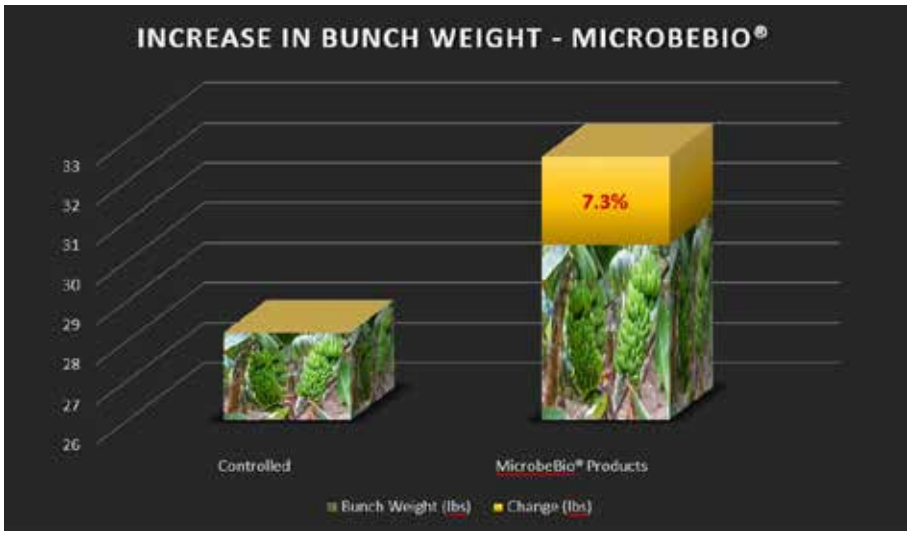


> The change of the banana live roots with MicrobeBio®: 90.4%

TRIAL TEST BY MICROBEBIO®

ORGANIC BANANA, DOMINICAN REPUBLIC





Conclusions : The results from this trial revealed that by using MicrobeBio® products, banana farmers can see considerably great improvement up to 90.4% (~ 38.7 gram per 10 plants) in the Live Roots of the banana field.

Bunch Age – Comparison monthly:

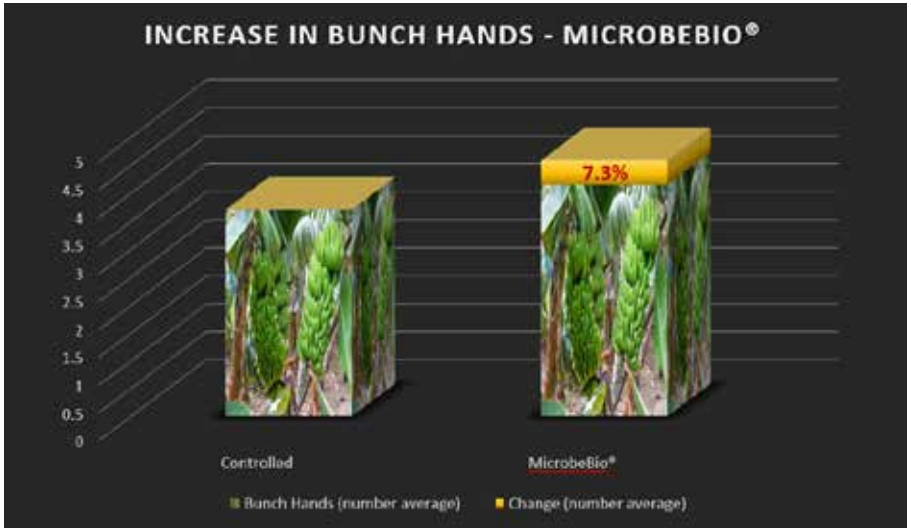
Treatment	Bunch Age weeks	Change gram
Controlled	11.4	-
MicrobeBio®	11.7	0.3 (+2.6%)

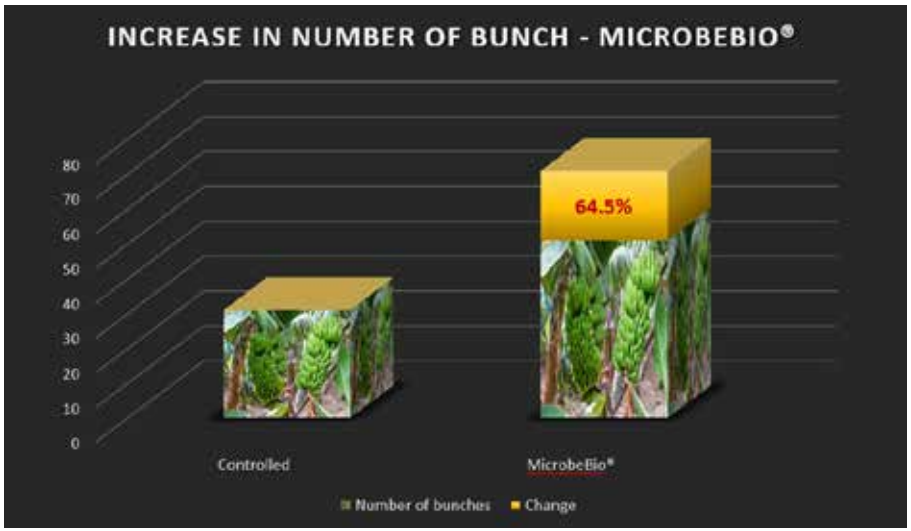
Bunch Weight – Comparison monthly:

Treatment	Bunch Weight lbs	Change gram
Controlled	28.2	-
MicrobeBio®	30.4	4.2 (+7.3%)

TRIAL TEST BY MICROBEBIO®

ORGANIC BANANA, DOMINICAN REPUBLIC





Bunch Hands – Comparison monthly:

Treatment	Bunch Hands Average number	Change Average number
Controlled	3.71	-
MicrobeBio®	4.15	0.44 (+11.8%)

Number of Bunch – Comparison monthly:

Treatment	Number of bunch monthly	Change monthly
Controlled	31	-
MicrobeBio®	51	20 (+64.5%)

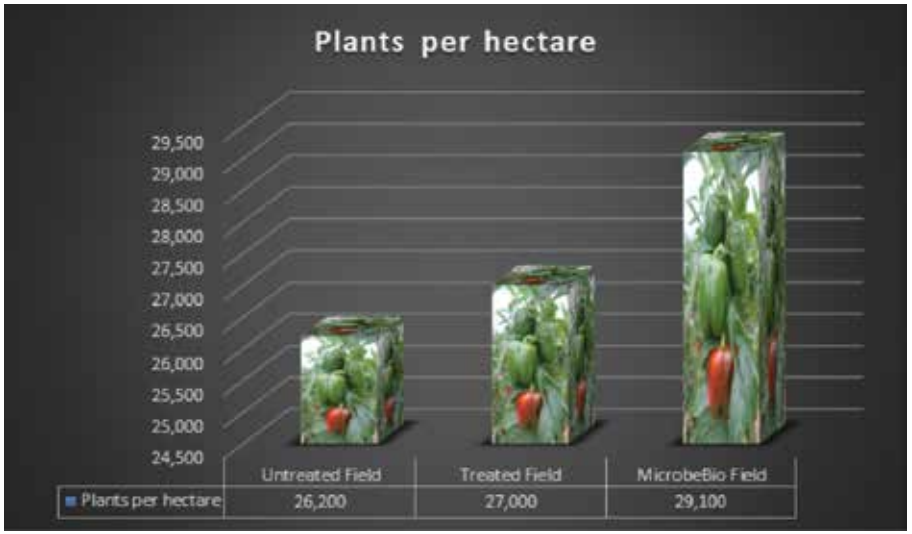
Conclusions: The results from this trial revealed that by using MicrobeBio® products, banana farmers can see considerably great improvement of increasing in total bunch number monthly 64.5% and total bunch weight monthly 7.3%.

TRIAL TEST BY MICROBEBIO®

DOMINICAN REPUBLICS BELL PEPPERS GROWTH

Area: Private Experiment of the Bell Pepper
Years: 2017
Experiments: MicrobeBio® products improved a higher yield to compare with the other controlled field at the same time as the test.

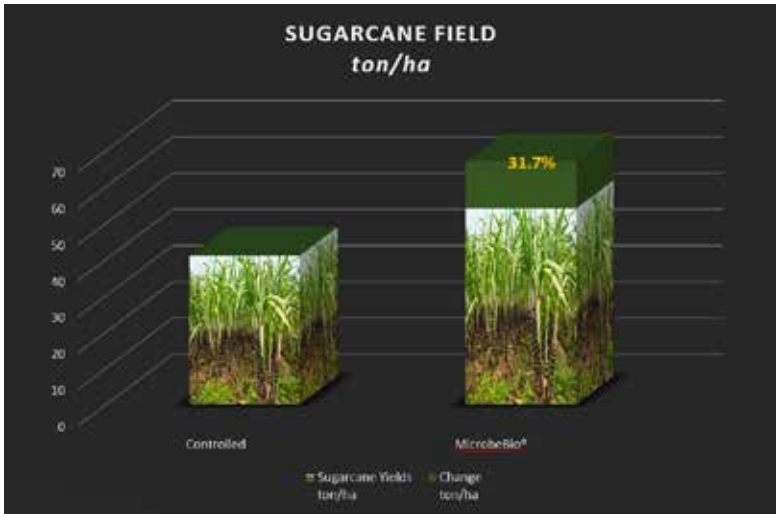
Results:



Conclusions: According to the results, the plants per hectare were treated by MicrobeBio® products presenting a higher number of fruits harvested per tree than the untreated field (11%) and treated field (7%).

TRIAL TEST BY MICROBEBIO®

SUGARCANE - BRAZIL



Place : Brazil

Planting Date : Annual

Products : MicrobeBio® Poducts

Experimental Design: There are three sections of the Sugarcane field used for the trial test one an untreated control and one with our MicrobeBio® products. The purpose is to examine the effect of MicrobeBio® products on Sugarcane yield.

Treatment	Sugarcane Yield Ton/ha	Change Ton/ha
Controlled	41	-
MicrobeBio®	54	13 (+31.7%)

Conclusions : This sugarcane in Brazil revealed that the sugarcane field was treated by MicroberBio® presenting 31.7% yield increase over the controlled yield.

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

Season: Winter-Spring (2018 – 2019)

Location: An Giang, Viet Nam

Area: 20 hectares

Variety: Dai Thom 8 (VNR20) was selected from a crossbreed combination between BVN and OM4900 varieties.

Products: Products were provided by MicrobeBio®
Experiment design: A 10-hectare area of a rice field was used as a trial area for Microbebio® products and control treatments of the field. This private test determines the effect of MicrobeBio® products on the field and the advantage of rice.

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

SOIL TEST

COLLECTING SOIL BEFORE A TREATMENT WITH MICROBEBIO® PRODUCTS

Organism Biomass Data														
Sample	**Unique ID**	**Dry weight**	**Active Bacterial Biomass (µg/g)**	**Total Bacterial Biomass (µg/g)**	**Active Fungal Biomass (µg/g)**	**Total Fungal Biomass (µg/g)**	**Hyphal Dia (µm)**	**Flagellates**	**Protozoa Numbers/g Amoebae**	**Ciliates**	**Total Nematode Number #/g**	**Percent Mycorrhizal Colonization of Root**	**Plant Available N Supply from Predators (lbs/acre)**	**Root-feeding Nematode Presence**
5234	#7 Soil	0.79	28.3	**96**	56.4	**159**	2.5	**2,412**	**3,123**	**0**	**1.7**	**6%**	**20-50**	**Multiple species**
Bold and highlight (means Low)														
Desired Range		**0.45 – 0.85**	**15 - 25**	**175 – 300**	**15 – 25**	**175 – 300**	**2.5 +**	**5,000 +**	**5,000 +**	**50 – 100**	**10 – 20**	**40% - 80%**	**75 lbs/ac+**	**None**

COLLECTING SOIL AFTER A TREATMENT WITH MICROBEBIO® PRODUCTS

Organism Biomass Data														
Sample	**Unique ID**	**Dry weight**	**Active Bacterial Biomass (µg/g)**	**Total Bacterial Biomass (µg/g)**	**Active Fungal Biomass (µg/g)**	**Total Fungal Biomass (µg/g)**	**Hyphal Dia (µm)**	**Flagellates**	**Protozoa Numbers/g Amoebae**	**Ciliates**	**Total Nematode Number #/g**	**Percent Mycorrhizal Colonization of Root**	**Plant Available N Supply from Predators (lbs/acre)**	**Root-feeding Nematode Presence**
5468	#8 Soil	0.85	33.6	204	66.4	194	2.5	5,848	5,847	62	16	61%	75 – 100	Multiple species
Bold and highlight (means Low)														
Desired Range		**0.45 – 0.85**	**15 - 25**	**175 – 300**	**15 – 25**	**175 – 300**	**2.5 +**	**5,000 +**	**5,000 +**	**50 – 100**	**10 – 20**	**40% - 80%**	**75 lbs/ac+**	**None**

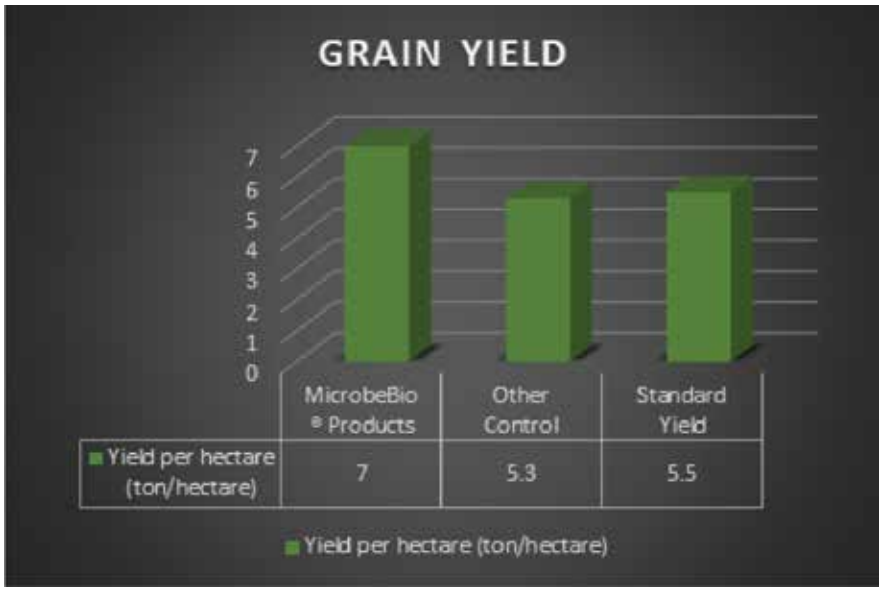
Conclusions: According to the test result, the soil test presents that the bacterial biomass and fungal biomass are an increase in triple. Protozoa numbers reach the optimal levels. Nematodes increase significantly. Plant available nitrogen supply from predators are doubled up.

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

RESULT ON YIELD

According to the local reports of growing rice in An Giang, the standard yield of Winter-Spring each year is 5.5 tons per hectare since rice season is a short period (90 – 95 days).



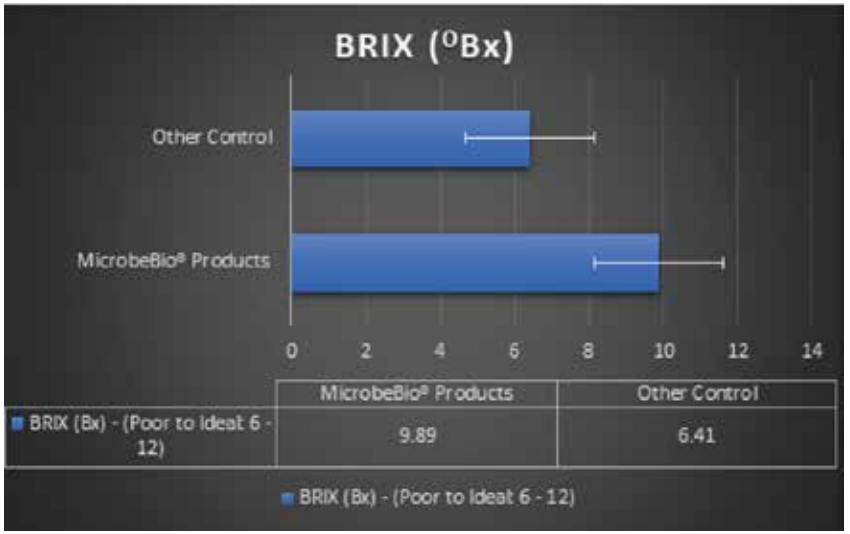
Conclusions: The grain yield by using MicrobeBio® products is 7 tons/ha that is more than the standard yield of approximately 20%. On the other hand, the other control is only at 5.3 ton/ha that is less than the standard yield of approximately 0.03%.

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

RESULT ON BRIX LEVEL

BRIX is the refractometer presenting indicating the percentage of dissolved solids (sugar and carbohydrates) contained in the juice being measured. The higher the Brix reading, the better the health and expression of the rice plant's genetic potential.



Conclusions:
According to the private experiment, the result has shown that low Brix crop attracted pests, insects, and diseases. The high Brix levels go up, the rice plants seem to improve the disease and pest resistance, mineral content, and taste. MicrobeBio® rice plants have the Brix level at 9.89 compare to the index table of Brix for rice (6 to 12) so that the rice plants grow healthily and prevent pests and disease. On the other hand, the control rice plants face to pests and diseases such as Fusarium, insects, and nematodes

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

Increased silt content showed in soil treated using MicrobeBio® Products

PRIVATE TEST CONCLUSION

According to the test result of yield and Brix report, the rice plants are treated by MicrobeBio® products present a significant increase yield of 20% and a high Brix level at 9.89 that is high-performance to compare to other control tests (increase the yield of 0.03% and Brix level at 6.41).

TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

THE BENEFITS OF RICE

- The rice (treated by MicrobeBio® products) reaches the standard export due to the elongated, limpid grain, sticky cooked, gentle scent, and amylose content of 16% delicious.
- Short growing period: 90 – 95 days
- Great resistance to pests and diseases, salinization, and alkalinization.
- Strong tillering, the density of aristae (392 aristae/m^2), steady body, height (35 – 40 inches)
- Productivity: 7 tons/ha (Winter-Spring 2018 – 2019)

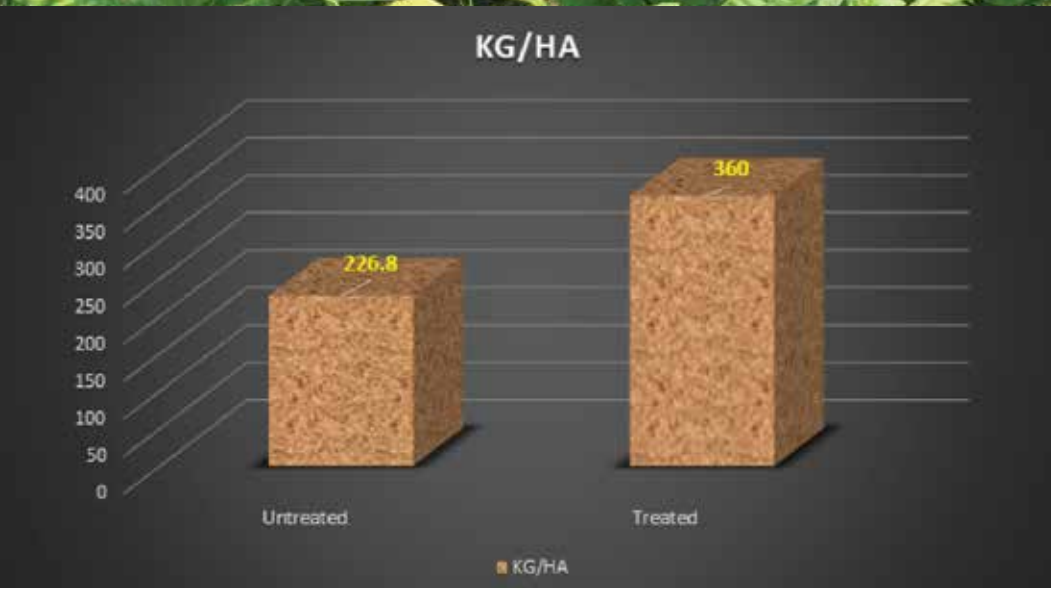
TRIAL TEST BY MICROBEBIO®

TRIAL TEST ON RICE – VIET NAM

Join us in creating a lifestyle of both health and sustainability, a billion microbes at a time

TRIAL TEST BY MICROBEBIO®

TOBACCO TRIAL TEST – VIET NAM



RESULT ON YIELD

1. **Products:**
- MicrobeBio® Vigor Boost
- MicrobeBio® Hydro Activator
- MicrobeBio® Nature Foliar

2. **Area:**
- Country: Vietnam
- Province: Cao Bang, Lang Son

3. **Trial Test Results:**

UNTREATED	TREATED
There are Tobacco Mosaic Virus and Rastonia Solanacearum	Present Tobacco Mosaic Virus and Rastonia Solanacearum
Leaves per plant maximum is 19.	Lease per plant is 24
Yield: 226.8kg per hectare	Yield: 360 kg per hectare. The yield significant increased marketable over the untreated (approx: > 30%).
Leaf quality: in average	Leaf quality: at rate of 1 + 2 grade leaves over 50% in the plating area such as: • Nicotine content • Inverted sugar solution meets the cigarette factories' requirement. • The sensory score is always evaluated at the level of attractiveness from good to excellent.

TRIAL TEST BY MICROBEBIO®

TOMATO – VIET NAM

Products: MicrobeBio® Vigor Boost, MicrobeBio® Nature Foliar, and MicrobeBio® Nature Activator.

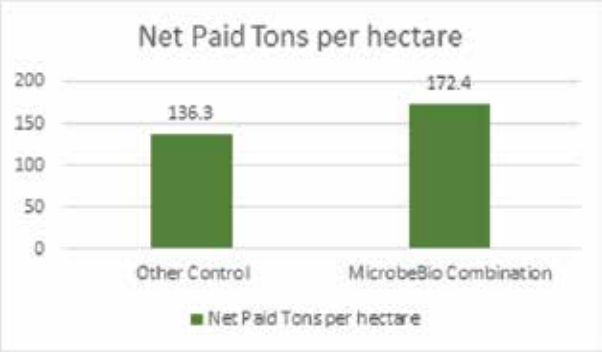
Country: Vietnam

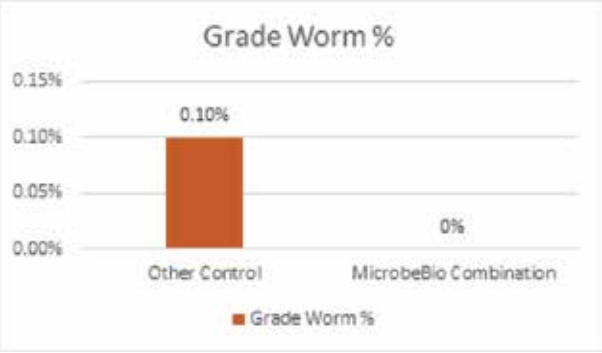
Province: Lam Dong

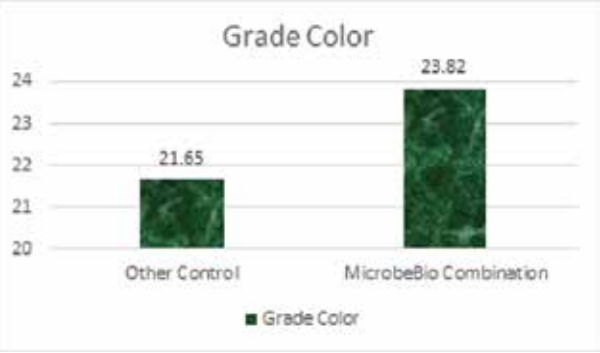
Yield increase: 22.6%

The test result:

Densities	Net tons per hectare	Net Paid tons per hectare	Grade Worm %	Grade Green %	Grade Color	Grade Brix	Grade pH
Other Control	143.6	136.3	0.01%	0.69%	21.65	4.85	4.02
MicrobeBio® Combination	186.8	172.4	0%	2.15%	23.82	4.85	5

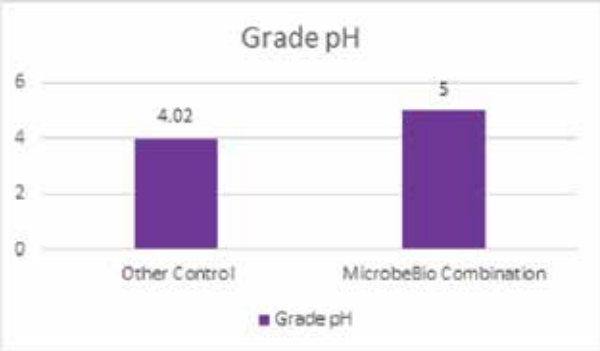


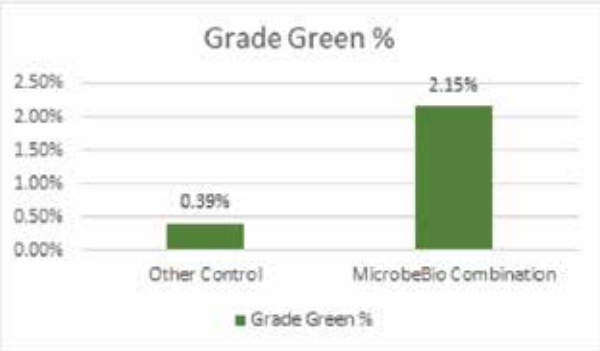


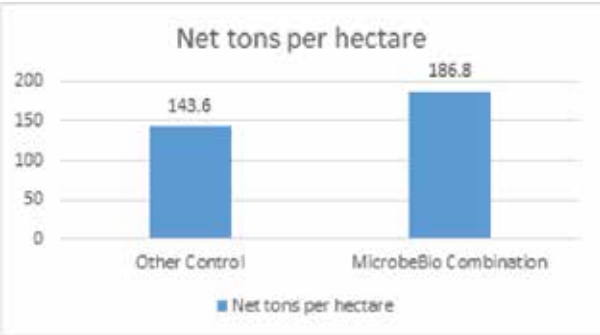


TRIAL TEST BY MICROBEBIO®

TOMATO – VIET NAM







TRIAL TEST BY MICROBEBIO®

COTTON – VIET NAM

In 2016, MicrobeBio had done a privacy Cotton trial test result in Gia Lai, Vietnam. Production Strategy was to apply MicrobeBio® Vigor Boost, MicrobeBio® Hydro Activator, and MicrobeBio® Nature Foliar. The trial produced 23.5% Yield Increase.

1. Products:

Our field:

- MICROBEBIO® VIGOR BOOST
- MICROBEBIO® HYDRO ACTIVATOR
- MICORBEBIO® NATURE FOLIAR

Other field

- NITROGEN BASED FERTILIZER

2. Area:

Country: Vietnam
Province: Gia Lai

3. Trial Test Result:

Average total bolls per plant by position and the average percentage of the treated plants when compared to the untreated plants by position:

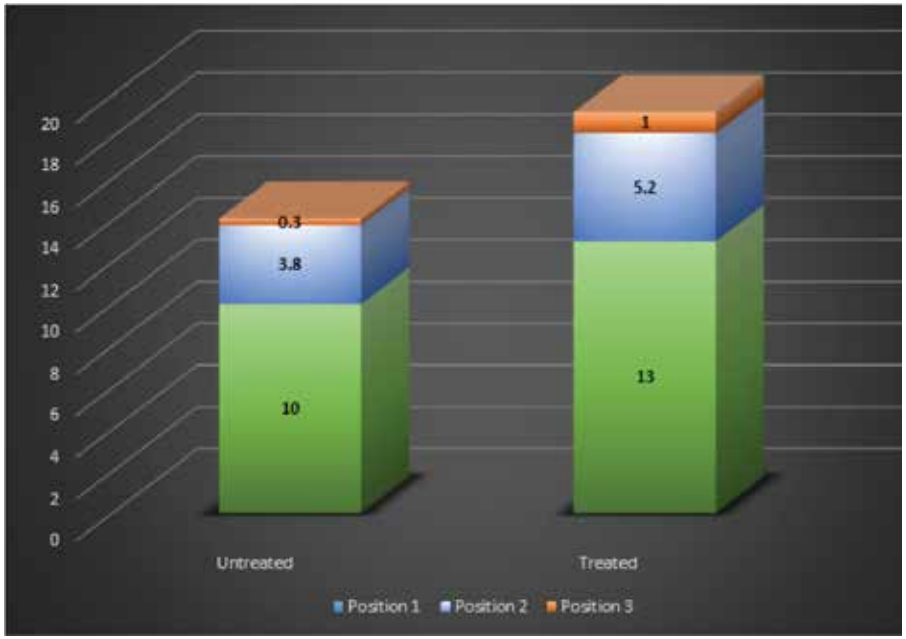
TRIAL TEST BY MICROBEBIO®

COTTON – VIET NAM



- Position 1: Bolls make up the highest percentage of the total yield. This position cracked boll on the plant, count the main-stem nodes above it to the uppermost harvestable 1 position boll. In the mature 1st position boll, it takes about 60 additional HU to mature a 1st position boll one main-stem node up the plant.
- Position 2: Bolls rank second in contributing to the total yield. In any given mature, boll on a fruiting branch, it takes about 120 HU to mature an additional position when moving out on a fruiting branch.

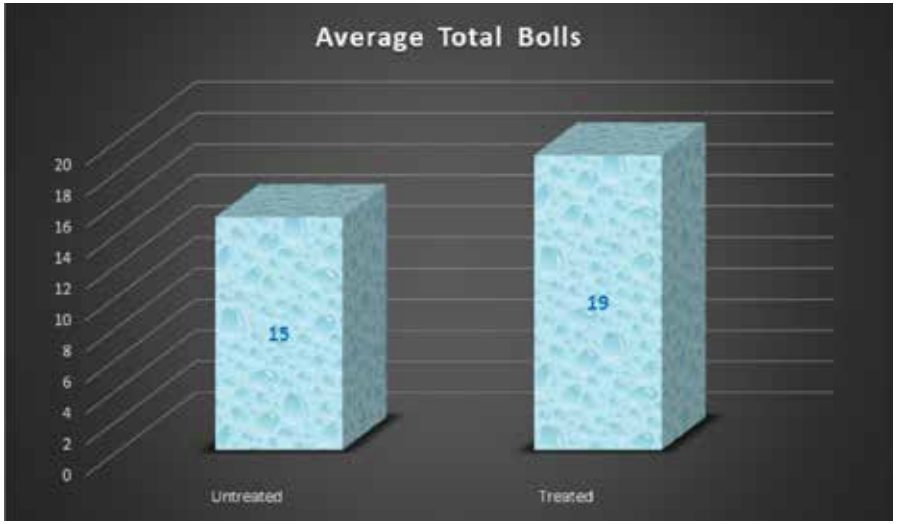
The first four positions contribute most to total yield. These are considered the most important positions.



TRIAL TEST BY MICROBEBIO®

COTTON – VIET NAM

Average total bolls per plant by treatment and the average percentage of the treated plants when compared to the untreated plants.

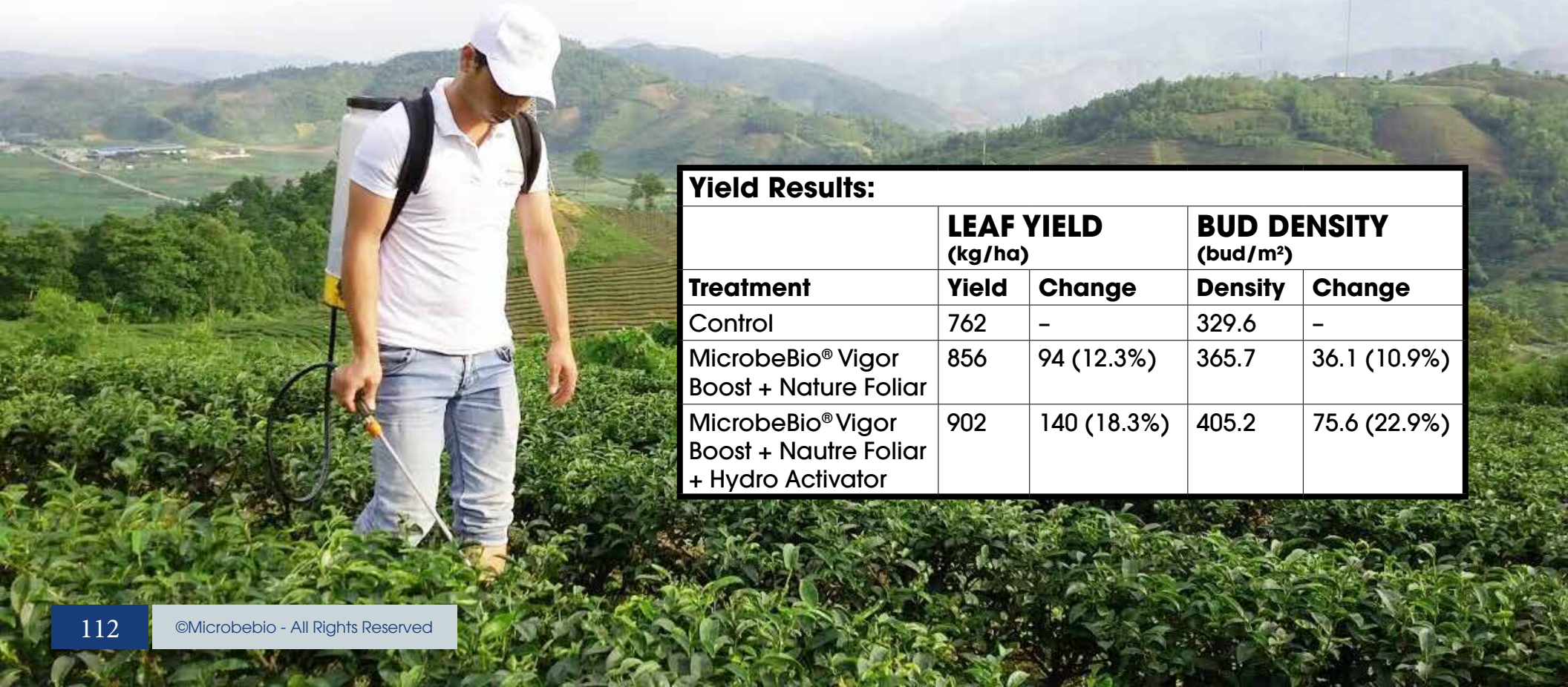


The untreated Field produced an average weight of 1936 kg/hectare. On the other hand, the treated Field with 3 times' application produced 5.9% more kg/hectare.

TRIAL TEST BY MICROBEBIO®

TEA – VIET NAM

Tea: The Effect of MicrobeBio® on Tea
Variety: Green Tea
Planting Date: Dec 05, 2017
Experimental Design: There were 3 sections of the Tea field used for this trial test, one an untreated control, one treated with MicrobeBio® Vigor Boost + Nature Foliar; and another one treated with MicrobeBio® Vigor Boost + Nature Foliar + Hydro Activator. This trial test aimed to examine the effect of MicrobeBio® products on tea trees regarding to three aspects including bud density, bud weight, and leaf yield.

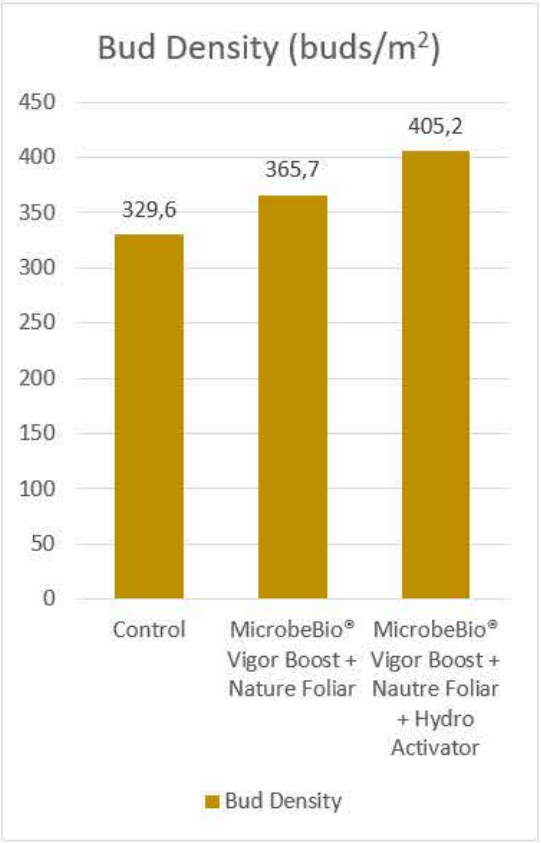


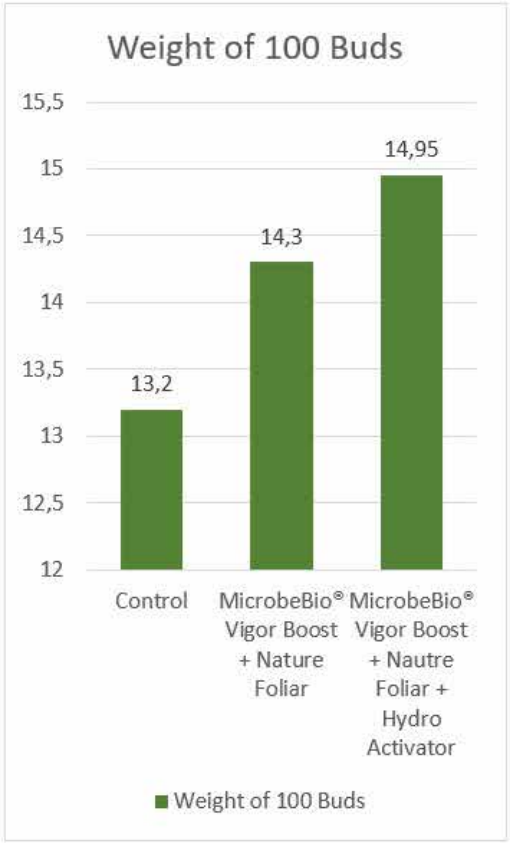
Yield Results:

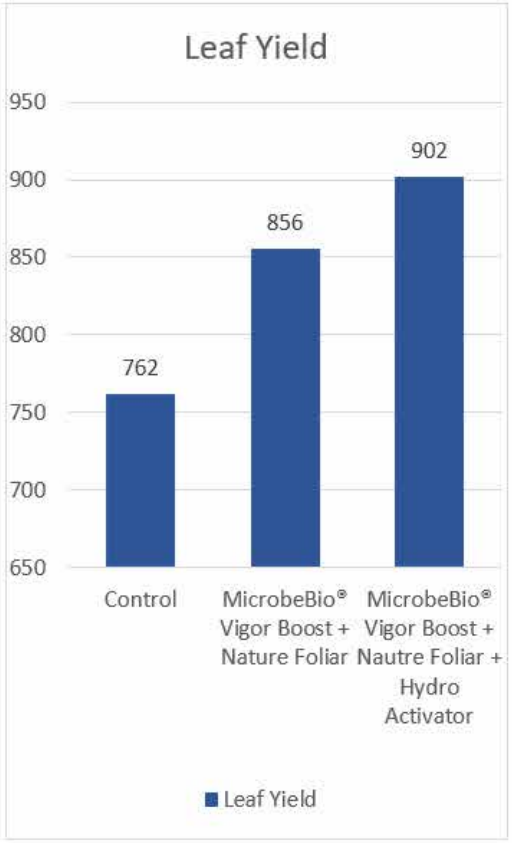
	LEAF YIELD (kg/ha)		BUD DENSITY (bud/m²)	
Treatment	**Yield**	**Change**	**Density**	**Change**
Control	762	–	329.6	–
MicrobeBio® Vigor Boost + Nature Foliar	856	94 (12.3%)	365.7	36.1 (10.9%)
MicrobeBio® Vigor Boost + Nautre Foliar + Hydro Activator	902	140 (18.3%)	405.2	75.6 (22.9%)

TRIAL TEST BY MICROBEBIO®

TEA – VIET NAM







Conclusions:

The study revealed that MicrobeBio® products delivered a great improvement in the bud density (18.3%), leaf yield (22.9%), and also bud weight. Therefore, MicrobeBio® products are highly viable plant amendment for tea growers.

IMPACT

OUR PRODUCT

AT MICROBEBIO, WE HAVE AN EXCEPTIONALLY UNIQUE LINE OF PRODUCTS THAT FUNCTION SYNERGISTICALLY TO COMPLETELY RESTORE THE SOIL, PROTECT CROPS FROM DISEASE AND PESTS, AND GREATLY INCREASE YIELD. OUR PATENT PENDING ORGANIC GROWING PROGRAM WILL MAXIMIZE YOUR SUCCESS

MicrobeBio products effectively outperform many of the other leading brands in this industry. How? Rather than focusing on singular aspects in the technology, chemistry, and condition of or stage of the plant development, MicrobeBio has developed an advanced multi-usage product platform. Our products are specifically designed to provide the fundamental nutrients and microbes throughout the entire duration of the crop cycle. MicrobeBio products are created to closely mimic Nature's processes which leads to better crop development and creates a natural defense against plant disease and pests. Our products work harmoniously with one another to support plant health by stimulating the natural processes which increase nutrient uptake and efficiency, remediate soil condition and provides a boost to growth and vigor. Our products are designed to deliver the exact nutrients and microbial amounts needed throughout the different stages of plant development, practically taking all of the guesswork out.

MicrobeBio's line of products are concentrated with the necessary beneficial "free-living" microorganisms and fungi and are equally created to ensure the healthy development of a healthy root system. These microorganisms form a symbiotic relationship with the plant's root system in order to better provide readily available nutrients. Each of our products contains a uniquely individualized combination of microbial inoculant in which enhances the atmospheric nitrogen absorption and solubilizes naturally occurring phosphorus that binds to soil particles. We provide products that enhance sustainable soil by including the fundamental components of bacteria, fungi, organic matter, microbe-biological elements and organic enzymes that increase soil minerals. When the soil has all of these natural components working together simultaneously, the water retention quality, air quality, and the plant biodiversity is considerably enhanced and improved. Healthy soils cultivate and ensure the production of beautiful and nutrient-dense plants.

Each and every one of MicrobeBio products is uniquely designed with progressive microbial technology to establish the most superb plant and crop yields. These microorganisms break down the organic matter within the soil, which frees additional nutrients that were previously unavailable to the plant. Because they are packed full of these beneficial microorganisms and bacteria, our products increase and raise the plant's natural ability to fight off harmful pathogens and/or bacteria that invade and disrupt the rhizosphere. By using our microbial technological products, you will see a major increase in the plant's tolerance to any physical and biological strain.

MicrobeBio understands that microbial technology can drastically alleviate global issues that are caused by the unsustainable agricultural practices we see today. By utilizing the power of naturally occurring microorganisms and bacteria, we can essentially revitalize the soil to greatly increase yields, all the while reducing the negative environmental impacts seen from unsustainable practices.

MicrobeBio focuses on an ecosystem-based strategy that targets long-term prevention of the damages to the environment caused by many pesticides. Our products consist of biopesticides, which are naturally occurring substances (such as microbes, bacteria, or plant extracts), that are produced with the goal of removing only the target organism. Biopesticides parasitize and kill the pests in the larval/pupal stage of development, effectively preventing further egg laying and limiting the damages of the crops. These biopesticides are considered to have a low impact on the environment and are seen to have an increase in the quality of yield being produced.

MicrobeBio products contain all of the fundamental organic matters that are essential to transforming any nutrient deficient soil into a strong foundation of fruitful and vigor filled soil. Our products are always 100% natural and are free of any chemicals, non-synthetic materials.

VISION STATEMENT

At MicrobeBio, our top priority and number one goal as a company is to cultivate and establish products that collectively harmonize and provide balance to each and every individual grow cycle. Over the past two decades, we have derived the absolute best of both Mother Nature and Science to bring forth 100% all organic and ecofriendly products. Through extensive research, MicrobeBio has taken the very foundation of Soil Ecology and applied it throughout all practices of agriculture, horticulture and viticulture, along with every other growing operation. We have formulated the precise biology within our products, giving growers the power to enhance their own soil ecology and support their plants with the ideal environment for overall plant productivity.

MicrobeBio wholeheartedly advocates for sustainable farming, and we have created exclusive products that stand behind this idea. We are certain that sustainable farming solely begins with products that are thoroughly considered to be economically viable – if it's not profitable, it it's not sustainable. MicrobeBio has created products that are ecologically sound and are specifically designed to preserve the resource base that sustains us all. We passionately cultivate easy to use products that are socially supportive, because the quality of life for farmers, their families and farm communities as a whole are meaningful to us.

OUR MISSION

Empowered communities tend to ignite their own self-reliance. Thus, we strive to develop vibrant agricultural communities by helping them to establish and evolve a series of habitual best practices in soil cultivation and preservation.

OUR MISSION

MicrobeBio's ultimate goal is to bring the technology into the country to manufacture, thus reducing logistics costs, creating jobs for the local people, and providing support teams to educate the local farmers, transforming Agriculture as a driver of economic transformation for the world, increasing food sources and nutrients, fighting malnutrition, moving towards sustainability to improve the lives of people around the world.

OUR MISSION

Empowering the World with Self-Reliance

- Builds self-sustaining solutions from the ground up, literally. Accordingly, we support communities whose livelihood depends on successful agronomic practices and the integrity of the soil.

LOCAL COMMUNITY

- Training on Microbial Technology
- Education regarding best agronomic practices
- Provisions of High-Tech Soil Remedies

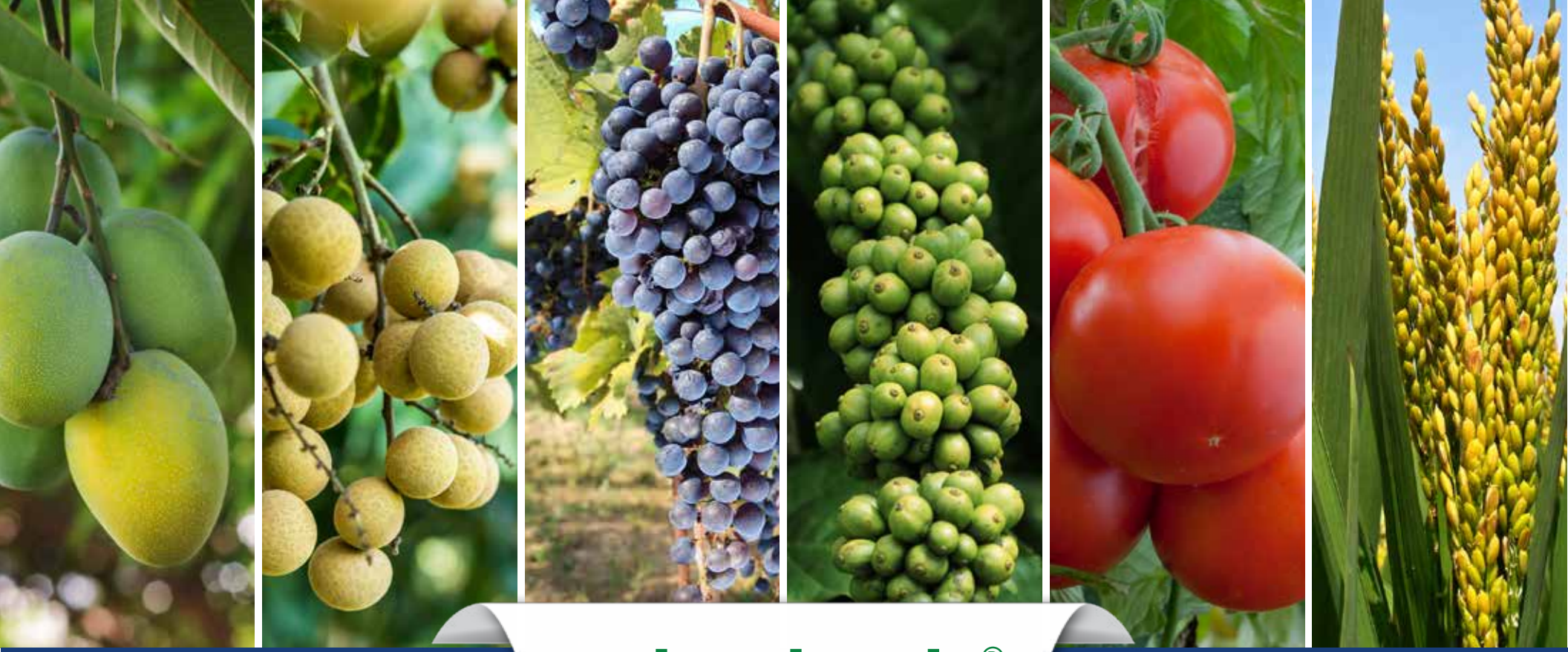
ANTICIPATED MERITS

- Improved soil for sustained farming
- Scale up advantages
- More work and commerce for the community
- Sphere of influence for surrounding cooperatives
- Community Empowerment

Think of MicrobeBio products like this – We're the health food of plant food, and were here to put an end to all of the horticultural junk-food that has been shoved down Mother Nature's gullet for far too long.

You might say that MicrobeBio has taken the very best of Mother Nature and put it into a concentrated form, and like all-natural products should be, we never use growth hormones or GMOs, never irradiate, and we never use any chemicals that are harmful to humans, livestock or the planet.

WE HOPE THAT YOU WILL JOIN US IN CREATING A LIFESTYLE OF BOTH HEALTH AND SUSTAINABILITY, A BILLION MICROBES AT A TIME.



MicrobeBio®

NATURE PHENOMENON

MICROBEBIO MICROBIAL TECHNOLOGY

Beneficial. Microbial. Soil. Enhancements