



a division of  
Amgrow Australia Pty Ltd

# NOCULATE™ LIQUID

## LIQUID MICROBIAL INOCULANT



A proprietary microbial suspension containing beneficial micro-organisms, vitamins, humic acid, and kelp helping to:

- Enhance plant growth and decomposition of organic matter
- Increase resistance to environmental extremes
- Vitamins derived from yeast provide catalyst for enzymes
- Increase root growth and development

**BRANDT.**

## BRANDT NOCULATE LIQUID

Biochemical processes carried out by microorganisms

### NUTRIENT SOLUBILISATION

The soil matrix contains many naturally occurring insoluble complex minerals, such as calcium phosphate. Calcium phosphate is rich in both calcium and phosphate but these potential nutrients are not readily available to the plant. Many of the microbial strains found in **Brandt Noculate Liquid** produce organic acids such as citric acid, oxalic acid, malic acid and glycolic acid. Over time these organic acids solubilise a portion of the calcium phosphate dissociating them into calcium and phosphate ions. The end result is more calcium and phosphorous is made available to the plant essentially tapping a nutrient reserve not available under normal circumstances.

### NITROGEN FIXATION

Free living nitrogen-fixing bacteria are also incorporated into **Brandt Noculate Liquid**. These organisms have the capacity to convert dinitrogen (N<sub>2</sub>) from the atmosphere into ammonia (NH<sub>3</sub>) a plant available form of nitrogen. This molecular conversion is mediated by nitrogenase, an enzyme produced by the bacteria.

To put nitrogen fixation into perspective, roughly two-thirds of the global input of fixed nitrogen arises from biological processes. Independent studies have shown that soils rich in nitrogen fixing bacteria can sequester upwards of 110 kg/ha per year from this process. This data supports the importance and benefit of nitrogen-fixing bacteria in **Brandt Noculate Liquid**.

### ENHANCED NUTRIENT ABSORPTION

**Brandt Noculate Liquid** also enhances the plants ability to sequester and ultimately absorb vital nutrients. A complex series of biochemical reactions, mediated by microbial metabolites, increases the permeability of the plants cellular membrane, which in turn facilitates nutrient uptake. Tissue analysis performed at Auburn University has consistently shown that plants inoculated with the Brandt consortium contain more nitrogen, phosphorous and potassium than the control plants.

### PLANT GROWTH PROMOTION

Many of the beneficial strains contained in **Brandt Noculate Liquid** produce plant growth regulatory compounds, which have the capacity to positively impact plant growth. These microbial metabolites stimulate cell division in plants ultimately increasing growth and yield. This biologically induced process enhances plant growth thereby reducing the need for supplemental fertiliser applications.

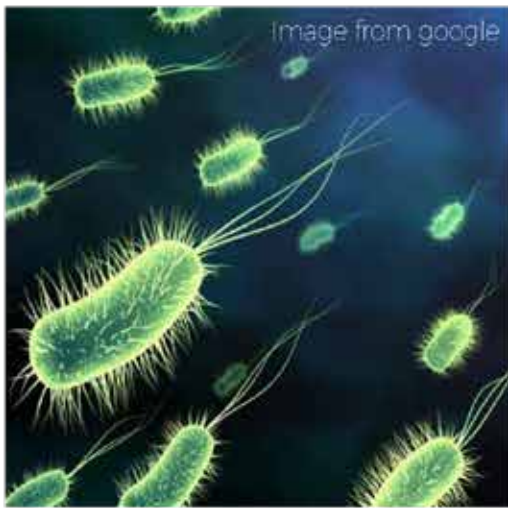
### NOCULATE FEATURES

- ✓ Enhances plant growth and decomposes organic matter
- ✓ Increases resistance to environmental extremes
- ✓ Vitamins derived from yeast provide catalysts for enzymes
- ✓ Increases root growth and development

**Brandt Noculate Liquid** is an all natural product specifically formulated to promote the establishment and enhance the viability of all plantings and transplants. A proprietary microbial system containing 54 strains of beneficial soil micro-organisms, humic acid, kelp, essential amino acids, vitamins, biotin, folic acid and natural sugars. The establishment of beneficial microbial populations is the key to creating the ideal soil environment for healthy plant growth. **Brandt Noculate Liquid** is an ideal general purpose microbial supplement (probiotic) to enhance soil health and accelerate microbe dependent soil processes.

Over the last 500 million years plants and beneficial soil micro-organisms have developed a symbiotic relationship. When a plant photosynthesises it releases a carbon exudate into the soil, which micro-organisms utilise as a food source. The microbes in the rhizosphere surround the root to get this food source. In return, the micro-organisms nourish the roots, recycle nutrients, improve the surrounding soil structure and solubilise minerals for plant availability. Many soils today are out of balance and are virtually devoid of beneficial microbial populations due primarily to a reliance on pesticides and inorganic fertilisers to treat the symptoms rather than the causes. **Brandt Noculate Liquid** is specifically formulated to re-establish these beneficial microbial populations and provide the soil with the necessary components to promote healthy growth and provide increased resistance to environmental extremes.

**Brandt Noculate Liquid** provides benefits to both the soil and the plant. Specifically, the microbes will provide plants with increased resistance to environmental extremes (heat, cold, drought), minimise nutrient leaching, aid in nutrient cycling, facilitate nutrient absorption, improve soil structure, solubilise minerals (including phosphorous) for plant availability, enhance seed germination, increase the photosynthetic capacity of the plant, enhance root architecture and stimulate plant growth. The other natural components contained in **Brandt Noculate Liquid** will stimulate root growth and root formation, improve nutrient absorption, enhance seed germination and viability, accelerate cell division, improve CEC and provide energy for plant and microbial metabolism.



## COMPONENTS AND BENEFITS

### **Bacillus and Paenibacillus (39 strains)**

Increases resistance to environmental extremes. Solubilises minerals (including phosphorous) for plant availability.

### **Pseudomonas (6 strains)**

Produces natural plant growth hormones and enhances seed germination and viability of emerging seedling.

### **Streptomyces (Actinomycetes) 5 strains**

### **Trichoderma (Fungi) 4 strains**

Decomposes organic matter and improves soil structure.

### **Vitamins Derived From Yeast**

Enhances plant growth metabolism and microbial growth.

### **Humic Acid**

Increases CEC and promotes microbial proliferation. Contains plant essential metabolites.

### **Kelp**

Increases mineral uptake. Facilitates translocation of water and solutes within leaf tissue.

## APPLICATION RATES

### **Foliar:**

For general use apply 250 mL per 100 L water using a sufficient volume of water to achieve desired coverage

### **Soil:**

Apply 2-4 L per hectare through irrigation or planting equipment directly into the root zone

### **Ornamental/Nursery:**

Mix through soil or growing media at 100 mL/m<sup>3</sup>

### **Hydroponic Systems:**

Add 100 mL per 100L of tank volume every 4 weeks.



# BRANDT®



## IMPROVED SOIL STRUCTURE

**Brandt Noculate Liquid** also enhances the structure of the soil matrix over time by way of its biological component (bacteria, actinomycetes & fungi). Soil bacteria have the capacity to produce a glue-like substance (polysaccharides), which creates micro-aggregates in the soil profile. These micro-aggregates are then wound together and stabilised by fungal and actinomycete hyphae to create macro-aggregates. This biologically induced process improves the soil structure over time increasing porosity and water infiltration as well as the water holding capacity of the soil matrix.

## REDUCED NUTRIENT LEACHING

**Brandt Noculate Liquid** also significantly reduces the incidence of nutrient leaching. Nitrogen is very mobile in the soil profile and it often leaches past the roots before they have a chance to absorb it. Soil bacteria will incorporate this free nitrogen into their bodies utilising it to satiate their metabolic functions. Much of this nitrogen would have been lost forever to the plant through the leaching process had the bacteria not incorporated it into their cell mass and temporarily stored it.

This storehouse of nitrogen is then given back to the plant through a complex process known as nutrient mineralisation. Nutrient mineralisation occurs when protozoa consume soil bacteria in order to satiate their nitrogen and carbon requirements. Soil bacteria contain more N than the protozoa require therefore the protozoa essentially "spit" this excess nitrogen back into the soil (in the form of protein) where it is then absorbed by the plant roots. In short, **Brandt Noculate Liquid** serves to satiate the short term and long term nutritional requirements of the plant. They have the capacity to increase nutrient availability, facilitate nutrient absorption and to continue providing these nutrients to the plant over an extended period of time.

## DISEASE SUPPRESSION

Brandt incorporates a variety of beneficial soil microbes that have the ability to suppress pathogenic micro-organisms through a process known as competitive exclusion. The beneficial species pre-emptively consume the food source for such pathogenic fungi as pythium, fusarium, rhizoctonia, sclerotinia, magna porthe and

phytophthora keeping them in check through the process of natural selection. Many strains also produce antibiotics, which inhibits the pathogens ability to carry out protein synthesis. When the pathogen loses the ability to synthesize proteins they expire.

Brandt also incorporates a number of species that synthesize the enzyme chitinase. Chitinase has the capacity to degrade chitin, the primary component found in the cell wall of pathogenic fungi. Once the pathogens cell wall has been damaged (cell lysis) by the enzyme they can no longer regulate metabolic functions and they expire.

**Brandt Noculate Liquid** also contains Trichoderma, this beneficial soil fungus is capable of parasitising (consuming) pathogenic micro-organisms and destroying them. Trichoderma are also proficient at producing anti-fungal metabolites such as chitinase and B-glucanase.

## AND MUCH MORE

Aside from their ability to suppress pathogens, positively affect plant nutrition, soil structure and plant growth the biologically diverse microbial system found in the Brandt formulas provide the plant and soil a number of other quantifiable benefits.

They serve to stabilise soil pH, increase humus levels, improve CEC of soil, increase the photosynthetic capacity of the plant, enhance root architecture and provide plants with increased resistance to environmental stress such as heat, cold, drought and foot traffic.

## NOCULATE LIQUID

### Active Ingredients:

Bacillus subtilis	10 000 000 CFU per ml
Bacillus licheniformis	10 000 000 CFU per ml
Bacillus azotoformans	10 000 000 CFU per ml
Bacillus megaterium	10 000 000 CFU per ml
Bacillus coagulans	10 000 000 CFU per ml
Bacillus pumilus	10 000 000 CFU per ml
Trichoderma viride	10 000 000 CFU per ml



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**For more information on these products, contact your local Barmac Territory Manager on 07 3802 5050.**

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