STARTER

Rye grass treated with ECTOL STARTER and NitrotainTE27.

ECTOL STARTER Smart Technology:

Ideally, the germinating and emerging seedling needs an immediate source of nutrients, and any restriction at this stage in the plants life cycle significantly impacts yields. The application of **ECTOL STARTER** to the seed ensures the seed has a critical nutrient supply, and unlike dry fertiliser, will not damage the seed. Furthermore, the greater efficacy of **ECTOL STARTER** reduces the amount of crop nutrient that needs to be applied as a starter.

Storage and Handling:

Store under cover and out of direct sunlight. Contents may settle; mix before using. Best used within 12 months of purchase. Non-toxic and non-flammable. Avoid contact with skin and eyes. Avoid breathing spray and mist.

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Pack Sizes Available:
1000L, 200L, 20L.

1. GRDC project code: UA00139.

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ECTOL PLANT & CROP NUTRIENTS

STARTER

Protected Phosphorus, Nitrogen, Potassium & Trace Elements

ANALYSIS

14:12:2

Analysis	
Total Nitrogen	14%
Total Phosphorus	12%
Total Potassium	2%
OTHER MINERALS	
Molybdenum	500mg/L
Boron	2500mg/L
Humates	8%
Fulvates	7%
Lignosulphonates	

General Information:

ECTOL STARTER is a mixture of protected Phosphorus, Nitrogen and Potassium that is safely applied in-furrow. It will not burn sensitive seeds or seedlings.

The Phosphorus complex avoids immobilisation and lock-up of Phosphorus in acid soils and Calcareous soils (high buffering index) and reduces the loss from Phosphorus run-off in low buffering soils. The Nitrogen complex avoids the atmospheric and leaching loss of Nitrogen and the acidification of soils. **ECTOL STARTER** is an efficient alternative to DAP use in broad-acre crops.

Recommendations:

For application to the soil, providing immediate nutrients to germinating seeds and emerging seedlings and ongoing nutrients to crops.

Compatibility:

Can be mixed with crop protection and herbicide products subject to a jar test.

Seedling and Crop Phosphorus Requirements:

Phosphorus (P) plays a role in photosynthesis, respiration, energy systems, early root development and growth and is a component of phospholipids and nucleic acids. It is an important plant macronutrient and makes up about 0.2% (0.002ppm) of the plants dry weight.

Most of the P is needed in the first six to eight weeks after sowing. In the case of cereal crops it helps set-up yield potential by maximising tiller numbers and head size. In some soils up to 65% of total plant P comes from the early applications of applied fertiliser. It is important therefore that adequate P is available to the emerging seedling.

Phosphorus is particularly immobile in the soil and most crops only recover 20 to 30% of the applied P fertiliser in the year of application. This is partly due to the fact that the placement of the fertiliser is away from the seedling and by the time the roots reach the fertiliser it has been immobilised in the soil.

Immobilisation can be due to reactions with Aluminium, Iron and Manganese in acid soils, or Calcium in calcareous high pH soils. Complexes can also form with the organic matter and the P can be bound onto certain clay surfaces. Soil microbes are also responsible for the tying up and the releasing, or mineralisation, of organic P. Generally, between 20 to 80% of the total P in the soil is present in the organic fraction.

Total soil P may be up to 3000kg/ha, but the amount in solution and available to plants is typically less than 4kg/ha. The key to P fertility is to not only have the P in solution, but to have the necessary physical conditions and biological activity in the soil, to replenish it as it is taken up by the plants.

CROP	RATE/DILUTION	NOTES
Cereal Crops, Legumes, Pulses, Maize, Fodder Crops	10L/ha to 50L/ha	As determined by the crop requirements. Apply in furrow or post emergence.
Pasture	20L/ha	Spring and Autumn spray applications.
Potatoes	10L/ha to 50L/ha	Apply as crop planted.

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Total crop requirements vary, but the standard removal of P would be as follows:

- Cereals: 3-4 kgs/tonne
- Maize: 3 kgs/tonne
- Maize Silage (DM): 2 kgs/tonne
- Canola: 7 kgs/tonne
- Cereal hay: 2kgs/tonne

Soil Uptake of P:

The uptake of P by the plants usually occurs in the roots in the hydrogen phosphate form. Due to the low soil concentration of P and the relative high concentration in the plant, energy is required. There are a number of pathways into the plant, but once in the plant the P is moved up through the Xylem but is also translocated as an organic compound to all parts of the plant via the Phloem.

Foliar Uptake of P:

There is greater interest in the concept of applied liquid P as P fertilisers are becoming increasingly expensive and farmers are looking to reduce the up-front costs.

Leaves need to be healthy to uptake foliar applied phosphorus. Wheat leaves that are severely deficient in phosphorus (P) cannot take up foliar applied P as the leaf structure is compromised. An adjuvant is required in the formulation for the P applied to stick to the leaf and be taken up. However, the type of adjuvant does not appear to be important, as long as it contains a surfactant and is compatible with the fertiliser. Earlier applications of foliar P (tillering) results in a lower fertiliser recovery than at flag leaf emergence through to mid-booting. It is possible to increase wheat P uptake using foliar P application[1].

Mycorrhizae in P Uptake:

There is a general view that P uptake by plants occurs as a direct consequence of uptake in the soil by the roots. However, in 90% of land plants, symbiotic associations are formed with Mycorrhizae fungi.

These beneficial fungi exchange carbohydrates for P with the plant and affect a significant increase in the root's absorption area. Managing soil conditions conducive to Mycorrhizae, or even the addition of Mycorrhizae to the soil, is a sound management practice.

Nitrogen:

Nitrogen is the most important macro-nutrient and impacts the root uptake of Phosphorus. Nitrogen is an essential element for the production of amino acids, nucleic acids, proteins, vitamins for plant growth, energy reactions and the production of Carbohydrates.

Nitrogen Efficiency:

Nitrogen Fertilisers tend to be inefficient as they are highly soluble with Nitrate Nitrogen being leached from soils, especially under irrigation, or ammonium Nitrogen being lost to the air as ammonia. Both forms are also acidifying by carrying Calcium and Magnesium out of soils or by the build-up of H+ ions. Acidification deep in the soil is extremely difficult to rectify.

The Nitrogen in **ECTOL STARTER** is formulated to negate Nitrogen loss by chelating or complexing the Nitrogen, avoiding the atmospheric or leaching losses and soil acidification. These stable forms of organic nitrogen are rapidly transferred into the plant via leaves or roots and most importantly will not damage seeds or seedlings.

Potassium:

ECTOL STARTER contains Potassium, an essential element critical to the synthesis of proteins from applied Nitrogen. The Potassium in **ECTOL STARTER** further enhances the efficiency of Nitrogen utilisation. Potassium is not very mobile and is often not available to plants in sandy soils or dry conditions. Potassium does not form organic complexes in the plant but is essential to many enzymatic processes and regulatory roles within the plant.

Molybdenum (Mo):

The important micronutrient is held in **ECTOL STARTER** as an anionic chelate and is exceedingly important to the plant as the Mo containing enzymes reduce the Nitrate molecules in the plant to an organic form as the first step to protein production. If this process does not occur there is a build-up of nitrate in the plant which impacts cell well stability, leading to leaky cells, a loss of cell sap and cell death.

The nitrogen absorption is highest in the first 4 weeks of plant life and the nitrate levels are 10 to 100 times higher than at the later stages of plant life. Even if Mo is at normal or adequate levels, its concentration should be above normal levels to ensure the maximum conversion of nitrates in the early stage of growth.

Boron (B):

Boron deficiency has been shown to affect most of the nutrient concentrations, uptake and balance in the plant tissues. The most important role for B is possibly its relationship with Calcium where it forms Calcium-Boron-Sugar complexes and directly effects the integrity of cell membranes and membrane permeability.

Humates and Fulvates:

These naturally occurring substance, which are derived from the aging of organic matter, have been shown to increase the uptake of minerals by roots and appear to have a stimulating or hormonal function within the plant.

*Clover and rye treated with **ECTOL STARTER** and NitrotainTE27.*