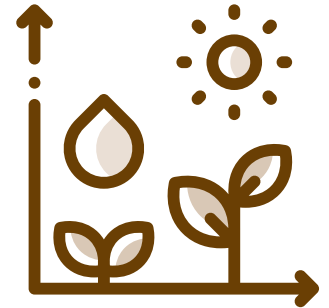


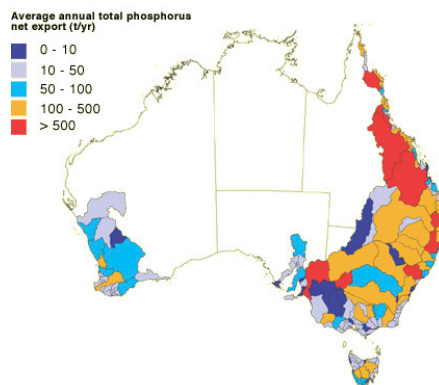
The benefits of using Rock or Silicate Minerals as Fertilisers



Rock mineral Phosphates such as Apatite, form the basis for the manufacture of many everyday fertilisers including Super Phosphate and Monoammonium Phosphate. Used excessively, these form insoluble compounds usually derived from Calcium, Phosphorus, Iron, Aluminium etc. in the soil.

This is both wasteful and problematic as soil structure becomes tighter with these concretions effectively reducing plant available soil fertility. It is worth emphasising the point, that the inappropriate or over application of fertilisers, results in a de-fertilisation of the soil owing to resulting nutrient antagonisms (Nutrient Fixing) and excess leaching into the environment.

The environmental impact of excessive Phosphorus use has not gone unnoticed by the Australian government.



In Western Australia, the state government proposed a “Fertiliser Action Plan” in 2007 where phosphorus fertilisers with greater than 40% water solubility including those in table 2.1 would be banned in favour of low water solubility fertilisers such as Reactive Rock Phosphate (i.e. Eco Prime Soft Rock Phosphate), Table 2.2.

Table 2.1 - Typical analysis of a range of highly water soluble P fertilisers

Product	Total P (%)	Water Solubility (%)
Single Super ('Super Phosphate')	8.8	77
Double Super	17.1	80
Triple Super	20.7	78
MAP	21.9	83
DAP	20.0	89
'Turf Special'	1.8	83
'Potato E'	7.0	83

Table 2.2 - Typical analysis of a range of low water soluble P fertilisers

Product	Total P (%)	Water Solubility (%)
Lime Reverted Super	7.0	39
CSBP 'coastal super' (Mk I)	7.2	6
CSBP 'coastal super' (Mk II)	9.0	27
Agmin	4.5	17
'Red mud' coated Superphosphate	7.1	39
Reactive Phosphate Rock	10-18	0

The benefits of using Rock or Silicate Minerals as Fertilisers

A reason for focusing on the water solubility of Phosphorus is it can leach into inland water ways. These freshwater courses are naturally low in Phosphorus, and its addition can result in massive algal blooms as a result of eutrophication. The worse impacts of this are often seen due to the subsequent deoxygenation of water as algae dies resulting in extensive fish deaths. These blooms can often be toxic as well, for other water users including contamination of town water supplies etc.

Organisations such as the Food and Agricultural Organization of the United Nations (FAO), CSIRO and others have for some years pursued alternatives to synthetic fertilisers. One of these has been what they refer to as Rock Phosphates (RP).

Rock Phosphates have been found to work well under certain conditions as outlined by Australia's National Reactive Phosphate Rock Project, for instance under high rainfall conditions (>850mm), high Phosphorus leaching conditions, and high Phosphorus fixing conditions. Being generally suited to lower pH conditions, it has been noted that RP products also performed well when allowed up to 4 years to release, ultimately exceeding the economic value of super phosphate over that period. Evans⁶ took another step-in research by incorporating sulphur with RP to speed reactivity and increase pH tolerance, as supported by further CSIRO research in combining bacillus with Sulphur and RP to create Bio-superphosphate.

Eco Growth has utilised much of this research commencing in the 1992 benefaction of Australian Reactive Rock Phosphate by Superior Fertilisers, to enhance Phosphorus availability. This micronized phosphorus and the addition of organic binding substances increased citrate solubility resulting in faster release of phosphorus. This base compound was then fortified for non-organic production with water soluble Phosphorus to enhance the speed of release.

In the early 2000s EcoGrowth incorporated specialised microbes (Eco-Advance) to further enhance this process resulting in exceptional speed of release and longevity, allowing for EcoGrowth Products such as Eco-Prime Red / SF14 and Purple / SF35 to out compete many name brands resulting in exceptional market uptake, achieving name brand status in many markets including in Macadamias, Avocados, Viticulture, Turf (and more) across the country.

Results: Fertilisers that perform differently

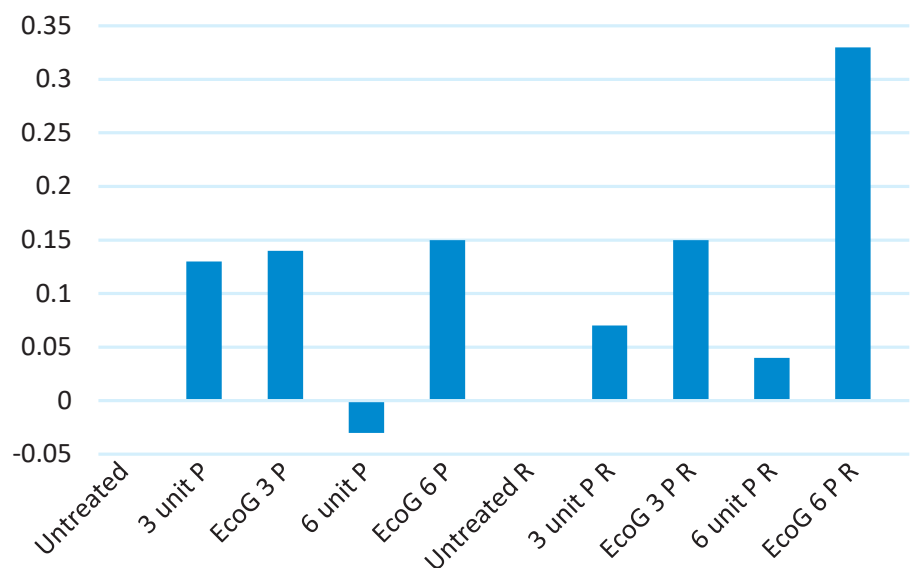


Chart 1, Dowerin 2017, replicated yield performance trial of phosphorus inputs, of EcoGrowth 3 and 6 unit/ha fertiliser Ripped R and Non-ripped vs. TSP 3 and 6 unit/ha Ripped R and Non-ripped, plus and minus yield result in tonnes against control.

The benefits of using Rock or Silicate Minerals as Fertilisers

The true advantage of these unique fertilisers is that they perform differently from synthetics and can be tailored in many situations to take full advantage of their unique characteristics. For instance, they can be used effectively in high Phosphorus Buffering Index (PBI) soils such as found in Low pH, High Aluminium, High Iron and Acid Sulphate situations. Owing to low salt index, they are also appropriate for saline soils.

An extreme example is to be found near Albany in the South West of Western Australia, where saline peat swamps used for growing seed potatoes sometimes vary in pH from 3.5pH water, through to 9.0pH in as little as 100meters distance over a single paddock. Owing to their unique chemistry, Eco Growth's fertilisers are able to ensure constancy across the paddock in delivery of Phosphorus (and all elements), except for in the most extremities of the paddocks.



Picture: Potato farm in Albany, WA



Picture: Excellent consistency



pH 3.5



pH 9.0

The benefits of using Rock or Silicate Minerals as Fertilisers

These Eco-Prime Fertilisers increase soil fertility, not just by increasing Phosphorus, but owing to their natural origins, re-mineralising the soil with a complex analysis of macro and micronutrients (Rock Minerals), which can be specifically matched to various soil types from highly saline high magnesium soils, though to leaching calcareous sands.

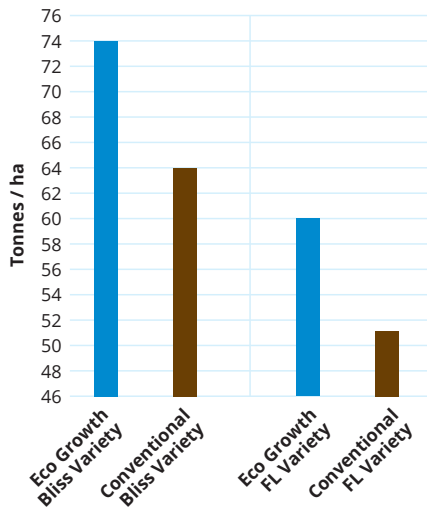


Chart 2, Yield comparison.

A significant increase in skin peel analysis against conventional control was observed.

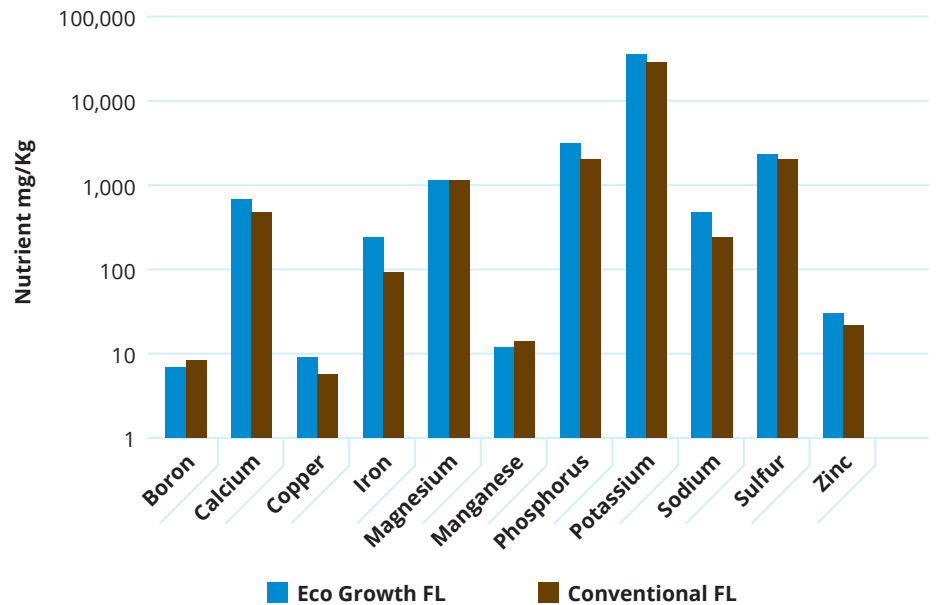


Chart 3, Skin peel analysis comparison: Eco Growth vs. Conventional on FL variety

How to get the most out of Silicate Rock Minerals

EcoGrowth is able to formulate silicate rock mineral blends that combine minerals in both water soluble and colloidal slow release form to match your soil and crop. These come not just containing Eco-Advance beneficial microbes, but as importantly they contain the materials for indigenous microbes to be stimulated and sustained as plants grow.

Eco Growth can formulate for use in many environments from high Salt, excess Aluminium, through to calcareous sands. Our fertilisers can be selected designed for use in air seeders through to three-point linkage spreaders.

Today's range has been developed with a combination of volcanic silicate rock minerals sources rich in macro and micronutrients. The result, being a natural balance of phosphorus, Calcium, Carbon, Magnesium, Iron, Manganese with extensive trace elements including nickel and selenium. These are arranged in each fertiliser granule looking rather similar to a colloid of healthy soil, with a pudding like mixture of carbon, microbial food, air and mineral, perfect for soil health.

For more information, contact your local distributor, or browse further at ecogrowth.com.au

The benefits of using Rock or Silicate Minerals as Fertilisers

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