



AgSolutions

A U S T R A L I A



Common Sense Ideas to Manage Your Soil for Profit

There is more to soil health than N-P-K...

The fertilizer industry was founded on the early research of Justin Von Liebig. He initially believed that N-P-K were the only elements needed for plant growth. His later research which has not received the same publicity, established that plants need the broad spectrum of all minerals for healthy growth, resulting in his Law of the Minimum statement...

The YIELD of a PLANT is LIMITED by a DEFICIENCY of ANY ONE ESSENTIAL ELEMENT.

In the Past...

When N-P-K fertilizers first became available, relatively small amounts were required and the crop results obtained were great. Unfortunately, the application rates required to get these results... and the cost... have steadily increased.

Because these changes have happened over several decades, this increased fertilizer requirement has become accepted as normal.

To improve your crop and to reduce your costs, it is important to look at **why fertilizer requirements are increasing and what you can do to turn it around.**

It is not the fertilizer alone that gets the result...

Minerals and microbes play an important role in the effectiveness of applied fertilizers. When fertilizer is applied, **the increased plant growth is the result of the interaction of the applied fertilizer, soil microbes and stored mineral nutrients in your soil.**

For instance, when nitrogen fertilizer is applied, microbe activity in the soil is stimulated to bond the applied Nitrogen with Carbon in the soil at the ratio of 1 part Nitrogen to 10.4 of Carbon.

When excess nitrogen is added to the Soil (ie over and above plant and fundamental microbial requirements) the extra nitrogen will cause the microbes to have a "feeding frenzy" in an effort to bond the applied Nitrogen in a 1 : 10.4 ratio with carbon.

So, lets take a look at how the application of high levels of Nitrogen can affect the organic carbon and mineral levels in your soil ...

Buy now... Pay later

High crop yields obtained through the use of high levels of nitrogen fertilizer may come at the price of overtaxing and destroying the humus fraction and mining the mineral elements in your soil.

This occurs because large amounts of Carbon are required for soil microbes to bond applied Nitrogen in a 1 : 10.4 ratio with Carbon. To perform this function, Carbon is utilized from the humus fraction of the soil.

This results in the destruction of the humus molecule, thus releasing Nitrogen and Mineral elements in addition to the Carbon.

Research has shown through "tagged Nitrogen" techniques, that when high rates of N fertilizer are used, 50% of the N taken up by the plant is natural Nitrogen - that is, Nitrogen that has originated from the soil humus bank.

Repeated applications of high levels of Nitrogen fertilizer to your soil, will over a period of years, deplete both the mineral elements and organic carbon levels... resulting in compacted soil that is difficult and costly to plough. (In World War II, high levels of N were used to harden the soil to make aircraft landing strips.)

It's not WHAT is used, but HOW MUCH...

Nitrogen is vital for healthy plant growth, however for every 1kg of excess Nitrogen applied to soil, 100 kg of humus is destroyed. (Ref. The Carbon Connection by Leonard Ridzon)

The end result is soil that has low organic carbon levels, reduced moisture and nutrient holding capacity and poor structure and tilth.

Conversely, by introducing a program to restore the mineral nutrients and increase humus levels, less fertilizer is required.

Soil Microbes play an important role in the Soil Food Web... so how are they affected by the use of applied fertilizers?

While the increased crop growth and residue inputs resulting from fertilizer application is beneficial, trials have shown that where 80kg/ha of N fertilizer was applied, the microbial population fell by 25%. Anhydrous Ammonia and Muriate of Potash are also known for their detrimental effect on soil organisms.

In addition to the depletion of microbe numbers, the application of high levels of fertilizer can also reduce the effectiveness of soil organisms.

High P inputs reduce the beneficial effects of mycorrhizae fungi (VAM) and high N inputs reduce Nitrogen fixation by micro organisms. (CRC for Soil and Land Management)

Low Nutrient Availability...

As well as the depletion of numbers, the action of soil organisms that is necessary to release plant nutrients is actually inhibited by applied fertilizers.

It is thought that, at best, just 20% of Phosphorus applied by way of fertilizer is available for plant uptake in the year it is applied.

Successive generations of Australian farmers have applied huge quantities of Phosphate fertilizer to combat the problem of chronic Phosphorus deficiency. This has led to a "bank" of fixed Phosphorus that is estimated at close to \$10 billion at current Superphosphate prices. (CSIRO - Rural Research 1997)

This is just one example of how the application of high levels of one element can cause reduced microbe activity and nutrient tie up in your soil. **Nature does not require high levels of any one nutrient, but rather requires the broad spectrum of mineral elements.**

Soil Management Advice...

Fertile soil can **INCREASE** your production and **SAVE** you money.

Fax over your soil test or phone us for practical advice on how to restore balance to your soil.

PHONE 1800 81 57 57

FAX 07 5482 7219

**Ag Solutions Australia Pty Ltd
8 Wadell Road, Gympie 4570**

Turn the Page...

and find out HOW to release tied up nutrients and improve all aspects of your Soil Fertility

Feed your Soil... and your soil will Feed your Crop!!!

The broad spectrum of Mineral elements and living organisms in your soil are the two most important factors for fertile soil and healthy crop growth ...

As outlined on the previous page, the use of high levels of fertilizer can deplete mineral levels, microbe activity and organic carbon levels in your soil. When these levels become depleted, higher amounts of water soluble fertilizer are required.

To reduce crop dependency on water soluble fertilizer, the emphasis needs to be on feeding your soil... and the **3 M's** are the three essential ingredients that work synergistically to improve your soil fertility...

Minerals **Mulch** **Microbes**

Minerals...

Because soil mineral elements have been depleted over decades of intensive farming, it is essential to restore the **broad spectrum** of mineral elements to your soil. AgSolutions products Natra Min and HI-Phos not only provide the broad spectrum of mineral elements, but also stimulate the soil organisms to ensure the availability of nutrients to your plants.

Mulch...

Mulch provides a home for soil organisms. It is converted into the carbon fraction of humus by soil microbes. A green manure crop provides the best supply, however plant roots and stubble also provide a valuable source of mulch.

Microbes...

Regardless of whether plants are to utilize existing nutrients or nutrients from applied fertilizer, soil microbes play an essential role in making these nutrients available for plant use.

Natra Min and HI-Phos **stimulate soil microbes** which greatly improves conversion and release of nutrients from applied fertilizers or soil bound nutrients.

Minerals & Mulch are essential to increase Microbe activity in your soil... and these living organisms produce their own weight in humus every day, providing a storehouse for water, nitrogen and mineral nutrients. This results in an improvement of the three aspects of soil fertility... *Nutritional, Biological and Structural.*

Improved soil condition will result in healthier crops with less disease. When Natra Min or HI-Phos are applied 4 - 6 weeks prior to planting, improved seed germination is just one of the benefits. Plants develop stronger root systems and are less prone to stress during hot, dry weather. **This means less irrigation requirements and less cost for you.**

The myth of applying Carbon products to your soil...

Low organic carbon levels in your soil is like a warning light on your car... it tells you that you have a problem that needs fixing. Ignoring this warning sign is like disconnecting your car's warning light without doing anything about the underlying problem that makes it glow.

Using products to supply carbon is like topping up the radiator of your car and hoping that the engine problem will fix itself. At best, it is a band-aid treatment - an expensive exercise for little result. How much carbon can you afford to buy?

Plant roots and stubble provide a valuable source of carbon. It is far more economical to start a program that stimulates soil microbes to utilize this carbon.

Living Soil - the key to plant health

Soil organisms are the key to plant health. Plants thrive or suffer depending on the living organisms around their roots. If the activity of soil organisms is low, or the type of organisms are out of balance, fertilizers and pesticides can only provide temporary help to improve plant vigor.

Reaping the Benefits...

From Bananas to Barley, no matter what the crop, you will see the benefits when you improve your soil fertility. The Vidoni family have applied Natra Min yearly for 9 years to their 32 acres of bananas. Over that time, they have eliminated the use of all other fertilizer and have reduced pesticide & fungicide use by 60%. Their top quality fruit took out major prizes at the 1999 Royal Brisbane Show.

Following repeat applications of Natra Min to Lucerne, Murray Sippel found that improved soil structure led to increased yield and improved quality of Lucerne. Areas treated with Natra Min had no leaf roller problems for three years even when adjoining untreated area had to be sprayed. Despite the soil not being treated for 18 months, the **Barley grown in 1999 resulted in a 30% increase in yield over the untreated area.**

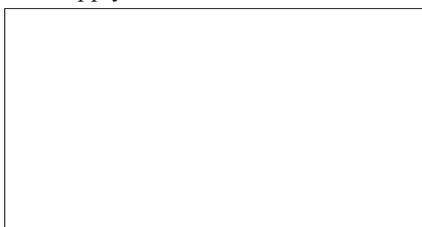
Use our FREE Soil Test Review service...

Fax me a copy of a recent soil test and I will take a look at it for you and let you know how to get started on a program to improve your soil - and your profits.

As well as re-mineralization with Natra Min, even greater benefits are obtained when a program of legume based crop rotation, mulching and soil aeration practices are coupled with a **gradual reduction** of water soluble fertilizer.

Give me a call now on 1800 81 57 57. I can give you practical advice for your crop and get you started on a program to restore fertility to your soil.

For supply of Natra Min contact:



BFA Certified
AI 437
for Organic Use

AgSolutions
A U S T R A L I A

8 Wadell Road, Gympie. 4570
PH. 07 5482 8044 1800 81 57 57
FAX 07 5482 7219

NEXT ISSUE...

Soil Testing ...

We'll look at the effect that high levels of some minerals have on nutrient availability...

And why a broad spectrum of mineral elements is vital for fertile soil.

MINERALS - the Building Blocks of Fertile Soil