



FERTILIZERS

*Quality Ingredients
Australian Made
Family Owned*

Nutrient Solutions

Dairy & Pasture Nutritional Guide



***Increase the value of your pasture with
SLTEC's range of quality fluid fertilizers***

***SLTEC can assist you in managing your nutrient budget, improving
dry matter production and reducing environmental impacts***

www.sltec.com.au

Why Choose SLTEC® Fertilizers?

SLTEC® Fertilizers is a leading manufacturer of fluid Fertilizers, based in Northern Victoria.

Our Promise

Quality

SLTEC® Fertilizers is committed to supplying consistently high quality products.

Investment

SLTEC® Fertilizers will ensure that your fertilizer inputs maximise the return on your investment.

Service

SLTEC® Fertilizers will provide professional, logistical and agronomic support to ensure a sustainable relationship.

Read our quality assurance policy online at sltec.com.au/quality

Why use Fluid Fertilizer?

- Efficient and highly plant available
- Can deliver many nutrients with a single application
- Small and frequent applications reduce leaching and runoff
- Foliar and Fertigation options allow flexible application timing unlike relying on broadcast application
- Consistency of product and uniform application across the soil
- Nutrients infiltrate to the root zone where maximum uptake is achieved
- Foliar application particularly of trace elements avoids tie up in the soil
- Can be mixed with a range of farm chemicals
- Labour savings and improved workplace safety



Product Options

Nitrogen Products

Foliar top dressing with nitrogen can significantly boost your pasture production, especially in colder months when nitrogen fixation and mineralisation slows. The added cost of applying nitrogen can be profitable in situations where higher cost conserved feed is being used.

Nitro QUAD 3™ & Nitro QUAD 20™

High nitrogen with the benefits of the four organic stimulants found in QuadSHOT® (3% or 20 % QuadSHOT®) three forms of nitrogen to ensure an optimal proportion of immediately available and slower release nitrogen. The addition of QuadSHOT® not only softens but enhances the product for foliar uptake by stimulating plant response.



NitrologiCAL PLUS TE™ Trial

Timely foliar applications of products such as NitrologiCAL PLUS TE™ have been demonstrated to maintain pasture growth, promote significant extra dry-matter production and an improvement in plant Calcium and trace element levels important for animal health (Tasmania trials 2011 - 2013).

Foliar rates from 35 to 70 L/ha of NitrologiCAL PLUS TE™ applied midway through the pasture recovery cycle resulted in improvements in dry matter production ranging between 230 kg/ha to 450 kg/ha* greater than untreated pasture at the time of grazing. Cost of the extra feed relative to the treatment ranged from 9 to 32 cents per kg DM. (*measured with a rising plate meter)

NitrologiCAL PLUS TE™

34.2% (w/v) nitrogen. A perfect alternative to straight nitrogen fertilizers, NitrologiCAL PLUS TE™ enhances total pasture quality by maintaining levels of important trace elements and calcium.

Nitrogen Fixation

Having a legume in your pasture not only provides a high protein forage for milk production but also provides a cheap nitrogen source to the soil through nitrogen fixation. A general ratio of pasture plant composition to optimise milk production is around 60% clover and 40% grass.

MoBo Complex™

Supplies Molybdenum and Boron together in appropriate ratios for legume based pastures and lucerne. Boron is associated with Molybdenum in the synthesis and movement of sugars, the production of carbohydrates and nitrate reduction.

Foliar Nutrition

Baseline PLUS™

Containing 11 plant available nutrients including chelated trace elements and organic stimulants. This product is perfect for a general foliar boost for pasture where a balanced NPK option is required.

Crop Booster PLUS™

15% phosphorus, 4% calcium with trace elements ideal for general foliar use on pasture and in particular pasture establishment when high phosphorus and calcium is required for good root development.

TE 8 PLUS™

Provides a compliment of key trace elements for pasture growth activated with fulvic acid for increased foliar uptake.

Plant and Soil Health

Plants need a soil with good structure and fertility to achieve high production rates. These products are designed to enhance these properties both directly and by stimulating beneficial soil microbial populations.

BiologiCAL® PLUS

BiologiCAL® PLUS has been specifically formulated to provide a highly available and activated calcium source that is complimented with potassium and QuadSHOT® biological stimulant. Plants require calcium in relatively large amounts for many functions including cell division & strength, root system and leaf development.

QuadSHOT® - Now Organically Certified

Contains a carefully selected range of organic additives and biological stimulants. These ingredients stimulate soil microbial activity, thereby improving the cycling and availability of plant nutrients and subsequent soil fertility and health. When combined with management practices that enhance organic matter and soil structure development, this product can assist in mobilizing available nutrients and improving plant uptake efficiencies.

For more information about BiologiCAL PLUS® and QuadSHOT® see page 11 and 12.

Mineral Nutrients: Cost of Production

Grazing for milk production removes a unique combination of nutrients and exports them off the farm as listed below in Table 1. There is a proportion of the total nutrients removed in the milk that comes from dairy pasture dry matter produced on farm and a proportion that is derived from imported feed supplements such as hay, silage, grain, pellets etc. The proportion removed from the grazing component of the diet is often around 60+% of the total nutrient requirement.

If nutrients taken out of the soil by grazed pasture are not continually replaced then you put your pasture at risk of becoming sub-optimal and less productive or profitable.

Below are 12 nutrient elements (excluding Carbon, Hydrogen and Oxygen) that are essential for healthy plant growth. However not all of these elements are commonly applied as fertilizer due to the minute amounts that are required and their natural concentrations in soil.

Establishing optimal soil nutrient levels and then maintaining those levels will ensure you get the most out of your pastures.

- Nitrogen
- Calcium
- Iron
- Phosphorus
- Magnesium
- Boron
- Potassium
- Manganese
- Molybdenum
- Sulphur
- Copper
- Zinc

Soil and tissue testing are great tools to ensure that these nutrients are adequately maintained in your soil and are being taken up by the pasture in adequate amounts. Monitoring in this way allows the farm manager to identify and amend nutrient limitations early.

Maintaining nutrient budgets is another important tool to assist in making sure your soils and pastures stay at their optimal fertility. There are a range of excellent dairy pasture nutrient budgeting tools available. For further information see www.dairyaustralia.com.au



When creating a nutrient budget, consider every component of nutrient inputs and outputs. For example, Nitrogen loss or export from a farm can be as a result of leaching, denitrification, volatilisation and consumption by cattle and utilization in milk production as well as fodder removal (hay, silage, grain etc). Gains to the system are through fertilizers, Nitrogen fixation, importing fodder, grain and other feed supplements from other farms and animal manure and urine deposition in paddocks.

Maintaining productive pastures with balanced nutrition helps farmers increase the proportion of total metabolisable energy for lactation from pasture systems, thereby reducing the demand for imported energy sources via grain and other supplements.

Table 1.

Mineral element removal in milk
(based on an average 6,000 litre lactation per year)

Nutrient Element	Amount Removed	
	Per cow (kg)	By a 300 cow herd (kg)
Nitrogen (N)	31.8	9,540
Phosphorus (P)	5.6	1,680
Potassium (K)	9.6	2,880
Sulphur (S)	1.8	540
Calcium (Ca)	7.2	2,160
Magnesium (Mg)	0.6	180

Data sourced from: (Reuter & Judson, 2003)



Mineral Nutrients: Roles for Pasture & Dairy

After carbon, nitrogen and potassium are the most abundant elements in plant material. It is vital that these elements are monitored and not left to decline over time. Potassium in particular is the most likely element to be concentrated around stock camps and dairy pads, thus effluent returns are an important consideration in nutrient budgeting as much of the potassium consumed in pasture is returned to the soil in faeces.

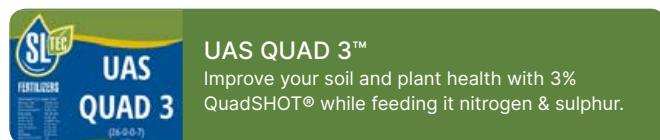
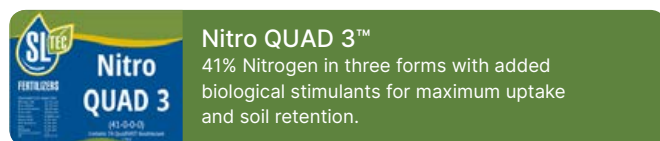
Nitrogen

Pasture

Of all the soil obtained elements required by pastures, nitrogen is utilised in the greatest amount. It is an essential component of amino acids and is therefore directly involved in increasing plant protein levels as well as yield. The largest reservoir of nitrogen in the soil is held as organic matter which can undergo mineralisation to release available forms of nitrogen for plant uptake. The amount of soil organic matter and the rate of its mineralisation will vary with soil conditions but are both generally greater under perennial pasture than cropping systems. Soil organic matter is also important for improving soil structure and feeding microbial populations. For this reason, farm managers should aim to maintain organic matter at as high a level as possible in order to sustain the productivity and health of the soil.

Dairy Cow Health

Since most dairy cows meet their requirement for protein and carbohydrates from pasture, it is vital to ensure your pasture has optimal levels of soil Nitrogen. Low Nitrogen in the diet will cause cattle to have low feed intake and growth rates.



Phosphorus

Pasture

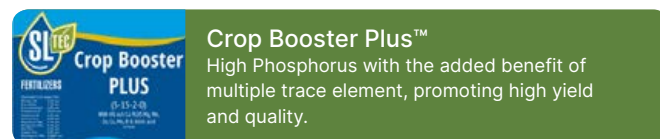
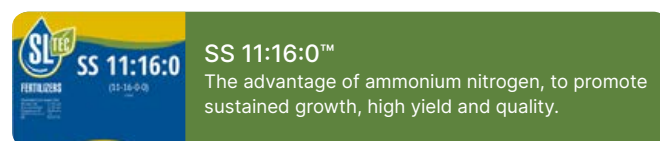
Phosphorus is a component of many essential compounds that make up plant cells. It is highly involved in photosynthesis, respiration and the formation of cell membranes. Signs of phosphorus deficiency include stunted growth, dark green coloration of the leaves often with red margins and leaf tip browning. If levels are inadequate, pasture growth can be substantially reduced, seed yields are low and nitrogen fixation is impaired.

Nitrogen and sulphur deficiencies are frequently associated

with phosphorus deficiency and since Australian soils are prone to be low in phosphorus, it is important to measure and monitor this element. Legumes and temperate species like ryegrass are responsive to phosphorus application where levels are low.

Dairy Cow Health

Symptoms of phosphorus deficiency in cows are poor appetite and reproduction as well as joint stiffness and a dull coat.



Potassium

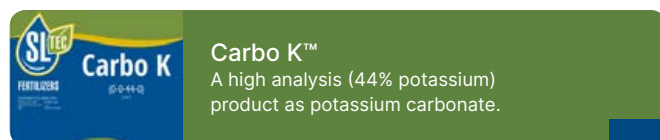
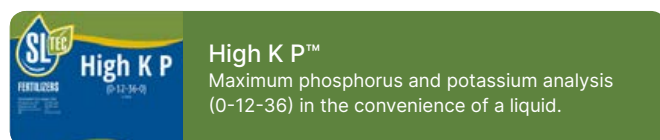
Pasture

Potassium plays an important role in the regulation of osmotic potential across plant cells, it also has important roles in activating many enzymes involved in respiration and photosynthesis.

Potassium is not lost through volatilisation to the atmosphere like nitrogen but can be leached under high rainfall or excessive irrigation especially in soils with a low cation exchange capacity and/or high permeability. Productive pastures require good levels of potassium to maximise dry matter production and to maintain the legume component of mixed swards. Where potassium levels are low in mixed swards, the grass portion can out-compete the legume portion and make the pasture grass dominant. Much of the increased pasture production from potassium fertilization results from greater growth from the legume component.

Dairy Cow Health

Potassium fertilizer application can temporarily enhance the risk of grass tetany, which is where the cow is not absorbing enough magnesium from the diet. To reduce the risk of this problem potassium should not be applied just prior to or immediately after calving. Symptoms of potassium deficiency are low milk yields and poor appetite.



Mineral Nutrients: Roles for Pasture & Dairy

Sulphur


Pasture

Sulphur is found in two amino acids as well as some coenzymes and vitamins essential for plant metabolism. It is an essential element for protein formation and chlorophyll production. Inorganic sulphur is taken up by plants in the form of sulphate (SO_4^-), this form is soluble and is therefore prone to leaching in high rainfall and irrigation areas.


Like nitrogen, sulphur is released through mineralisation of organic matter. Therefore it is beneficial to apply sulphur in cold months when mineralisation slows.

Dairy Cow Health

Sulphur deficiency in dairy cows causes reduced milk production and appetite.



High AS™
A high concentration sulphur product also containing nitrogen.



UAS™
A blend of high nitrogen and sulphur ideal for winter applications when sulphur mineralisation can slow.

Calcium

Pasture

Once taken up by the plant calcium plays a role in several major plant functions. Among other roles, calcium stimulates root and shoot development, increases the strength of cell walls, activates many plant enzymes, maintains the integrity and selectivity of cell membranes, neutralises organic acids and along with molybdenum and cobalt, calcium is required in relatively high concentrations for rhizobia to carry out nitrogen fixation.

Soil

Calcium contributes to soil fertility by flocculating clay and is therefore the most important element in respect to improving soil physical health. By creating favourable soil structure, calcium allows roots to penetrate deeper down the soil profile and spread out to contact more soil which increases nutrient uptake, this is important to allow plants to obtain water and nutrients and at the same time increases the concentration of oxygen in the soil so roots can undergo respiration without limitation.


Dairy Cow Health

Calcium has a major effect on rumen metabolism, skeletal growth, reproduction as well as muscle function and has a close relationship with phosphorus in many body functions.


Milk Fever

When dietary calcium is not high enough to meet the animal's demand, it will be withdrawn from the animal's bones where around 98% of the animal's calcium is located. The onset of lactation places such a large demand for calcium on the cow that a situation can develop where blood calcium levels are not being replenished fast enough from reserves to compensate for loss. The symptoms are impaired muscle and nerve function to such a degree that the cow is unable to rise. Intravenous calcium treatments are used to restore muscle function and keep the cow alive long enough for its body to adapt and increase calcium mobilisation from its body stores. Although not many cows get milk fever, almost all cows will experience a decrease in blood calcium levels whilst their intestines and bones adapt to the demands of lactation.

Using a transition diet leading up to calving can avoid the development of milk fever of which blood acidity is an important determinant. Acidity will change depending on the ratio of cations and anions in the cow's diet, therefore the DCAD (dietary cation-anion difference) can alter the acidity of the blood. Feeding a diet three weeks before calving that has a low or negative DCAD will promote the blood to become more acidic and improves the cow's ability to release calcium from the bones to cope with high calcium demand. To lower the DCAD of the diet nutritionists add sources of Cl^- or SO_4^- (anionic salts) to pre-calving rations of dairy cows.



Cal Mag & Boron™
Maintains plant calcium : magnesium ratios with boron to assist calcium mobility.



BiologiCAL® PLUS
Plant available calcium with a balanced mix of biostimulants.

Magnesium

Pasture

Magnesium is a component of chlorophyll and is very important for photosynthesis to occur. It is also involved in protein synthesis and the activation of many plant enzymes. Although absorbed on exchange sites in the soil like calcium, magnesium is not held as strongly. This and the fact that most parent materials are lower in magnesium explain why magnesium is generally found in lower proportions than calcium. Magnesium deficiency is more likely on coarse textured and acid soils.

Dairy Cow Health

Magnesium is an important cofactor for major metabolic activities, it is vital for efficient nerve conduction, muscle function and bone formation. Unlike calcium, maintenance of magnesium levels is dependent on dietary sources and cannot be readily withdrawn from other parts of the

Mineral Nutrients: Roles for Pasture & Dairy

body. This makes magnesium an important nutrient to be monitored.

Grass tetany is most common in cows during early lactation and the disorder is often caused by grazing pastures high in potassium because potassium interferes with magnesium absorption in the rumen.



Mag Complex™
An economical sulphur based product that supplies 6.3% magnesium



Nitro Mag™
9.0% magnesium in a highly compatible form for applying with nitrogen products such as UAN and Nitro QUAD 3.

Manganese

Pasture

Manganese is a critical component of the enzyme system in plants and aids in chlorophyll production.

Dairy Cow Health

Manganese deficiency in cattle can cause growth impairment, bone deformities and reduced reproductive performance including calf abnormalities. The highest concentration of manganese is found in the liver, bones and hair. Re-mobilisation of manganese from these sites appear limited but may be able to help with manganese deficiency to some degree. Manganese can be both soil and foliar applied in SLTEC's range of fluid fertilizers.



Manganese Complex™
An economical sulphur based product that supplies 17.0% manganese.



Nitro Mang™
24.0% manganese in a highly compatible form for application with nitrogen products such as UAN and Nitro QUAD 3.

Copper

Pasture

Copper is an important cofactor for many chemical reactions and is necessary for chlorophyll formation as well as aiding in the production of strong cell walls. Copper is most likely to be deficient on sandy soils and soils low in organic matter.

Dairy Cow Health

Copper is important for many biological processes such as electron transport for aerobic respiration and absorption and transport of Iron needed to produce hemoglobin. Copper deficiency signs include anaemia, a rough speckled coat and loss of hair pigmentation commonly around the

eyes. It can also cause reduced immune function, fragile bones, poor growth and cardiac failure.

Iron

Pasture

Iron is a catalyst for chlorophyll formation and aids in transporting oxygen. Iron deficiency may be caused by excessive soil phosphorus, an alkaline soil and low organic matter levels.

Dairy Cow Health

Iron is a component of hemoglobin and myoglobin, it is also a cofactor for many enzymes. Iron deficiency in adult cattle is rare but when it does result it causes anaemia. Iron deficiency is most likely to be found on soils that are calcareous or have been heavily limed.



Fe PLUS™
8.1% iron plus fulvic acid for maximum uptake.

Boron

Pasture

Plant requirements of boron can vary widely between plants with lucerne being a species that seems to be more sensitive to low boron levels. Boron is easily leached in both acid and alkaline soils, especially where the soils are sandy or under high rainfall or irrigation.

Boron has some association with auxins, synthesis and movement of sugars, is involved in the production of carbohydrates and nitrate reduction. It is also extremely necessary for the germination and viability of pollen, seed quality and yield. Without boron the plant struggles to utilise essential nutrients like calcium, nitrogen, and phosphorus resulting in a reduction in new tissue development.

Dairy Cow Health

The role of boron in animal and human health is not well understood however there is an important relationship between boron and vitamin D3 in influencing cartilage and bone mineralisation including calcium, magnesium and phosphorus metabolism and subsequent animal growth. Boron also appears to be linked to anti-inflammatory processes and production of antibodies.



Boron Complex™
Boron Complex is effective at increasing boron levels uniformly over the soil. Contains 15.0% boron.

Mineral Nutrients: Roles for Pasture & Dairy

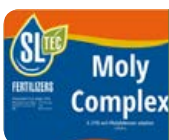
Molybdenum

Pasture

Molybdenum is required by plants for protein synthesis and is especially important for legumes as it is needed for nitrogen fixation by rhizobia.

Dairy Cow Health

Molybdenum is a component of several enzymes in animals, in particular xanthine oxidase which catalyses the breakdown of purines to uric acid. Molybdenum application can cause a copper deficiency by reducing the uptake of copper in the animal, this condition is called molybdenosis. It is recommended to always apply copper when applying Molybdenum to pasture, unless soil copper levels are excessive.



Moly Complex™

An easy and even application of molybdenum, important for optimizing performance of legume based pastures. 24.0% molybdenum.

Zinc

Pasture

Zinc is important for the production of chlorophyll and carbohydrates and is involved in numerous enzyme systems (many enzymes require zinc ions for their activity). Zinc deficiency is not uncommon in pastures and is most likely to occur on sandy and acidic soils as well as calcareous soils high in calcium carbonate. As well as this, having high levels of either zinc or phosphorus may reduce plant uptake of the other.

Dairy Cow Health

Zinc is a component of many enzymes and hormones that are essential for healthy growth and reproduction, and of all the metals, zinc is a component of the most proteins.



Z PLUS™

15.9% zinc plus fulvic acid for maximum uptake.



Nitro Z™

8.0% zinc in a highly compatible form for application with nitrogen products such as UAN and Nitro QUAD 3™

Product Technical Information

Product Code	Name	N% (w/v)	P% (w/v)	K% (w/v)	S% (w/v)	Ca% (w/v)	Specific Gravity (kg/L)	pH Range	Typical Application Rates		
									Fertigation	Foliar Use 200 - 2,000 L/ha water	
High Nitrogen (N) Blends											
GG0064	Nitro QUAD 3™ N as NO ₃ 10.3%, N as NH ₄ 10.3%, N as Urea 20.6%, P as PO ₄ 0.1%, Fe 0.001%, Si 0.003%, Fulvic Acid 0.01%, Fish Hydrolysate 0.2%, Humic Acid 0.2%, Kelp 0.2%, Molasses 0.2%	41.1	0.1	0.1	-	0.003	1.30 - 1.32	6.0 - 7.0	10 - 80 L/ha	10 - 60 L/ha	
GG0097	Nitro QUAD 20™ N as NO ₃ 8.6%, N as NH ₄ 8.5%, N as Urea 17.0%, P as PO ₄ 0.3%, Fe 0.006%, Fulvic Acid 0.05%, Fish Hydrolysate 1.5%, Humic Acid 1.3%, Kelp 1.5%, Molasses 1.5%	34.1	0.3	0.5	-	-	1.28 - 1.29	4.0 - 6.0	10 - 80 L/ha	10 - 60 L/ha	
GG0062	NitrologiCAL PLUS TE™ N as NO ₃ 8.7%, N as NH ₄ 8.5%, N as Urea 16.9%, Ca 0.8%, Zn 0.4%, Cu 0.25%, B 0.05%, Fulvic Acid 0.001%, Fish Hydrolysate 0.04%, Humic Acid 0.03%, Kelp 0.04%, Molasses 5.4%	34.2	-	0.3	0.2	0.8	1.30 - 1.31	5.0 - 6.0	10 - 100 L/ha	10 - 60 L/ha	
GG0026	High AS™ Ammonium Thio Sulphate (ATS) N as NH ₄ 16.0%	16.0	-	-	33.9	-	1.33 - 1.34	8.5 - 9.5	10 - 40 L/ha	5 - 20 L/ha	
GG0066	UAS™ N as NH ₄ 5.7%, N as Urea 20.9%	26.7	-	-	6.7	-	1.23 - 1.25	3.0 - 7.0	10 - 80 L/ha	5 - 40 L/ha	
NPK Blends											
GG0009	Baseline Plus™ N as NO ₃ 0.02%, N as Urea 11.7%, P as PO ₄ 4.9%, Mg 0.2%, Mn 0.01%, Zn 0.01%, Cu 0.005%, B 0.02%, Fe 0.01%, Fulvic Acid 0.01%, Fish Hydrolysate 0.4%, Humic Acid 0.3%, Kelp 0.4%, Molasses 0.4%	11.7	4.9	13.6	2.0	0.01	1.29 - 1.32	7.5 - 8.5	10 - 80 L/ha	2 - 15 L/ha	
SNPK0040	Crop Booster PLUS™ N as NO ₃ 2.1%, N as NH ₄ 2.9%, P as PO ₄ 15.2%, Mg 0.2%, Mn 0.4%, Zn 0.4%, Cu 0.5%, Mo 0.01%, B 0.05%, Fulvic Acid 0.5%	5.0	15.2	2.1	-	4.0	1.30 - 1.32	< 2.0	10 - 80 L/ha	2 - 20 L/ha	
SS9001	SS 11:16:0™ N as NH ₄ 11.3%, P as PO ₄ 16.0%	11.3	16.0	-	-	-	1.29 - 1.30	6.0 - 7.0	20 - 100 L/ha	2 - 20 L/ha	
High Potassium (K) Blends											
GG0068	High K P™ P as PO ₄ 12%	-	12.0	36.5	-	-	1.55 - 1.57	12.0 - 13.0	10 - 80 L/ha	1 - 5 L/ha	
GG0072	Carbo K™	-	-	43.9	-	-	1.54 - 1.55	13.0 - 14.0	10 - 80 L/ha	1 - 5 L/ha	
Trace Element Blends											
GG0024	Cal Mag & Boron™ N as NO ₃ 12.4%, Mg 3.4%, B 0.2%	12.4	-	-	-	12.1	1.47 - 1.50	2.0 - 3.0	10 - 100 L/ha	5 - 10 L/ha	
SNPK0046	TE 8 PLUS™ Mg 2.4%, Mn 3.2%, Zn 3.2%, Cu 0.5%, Mo 0.02%, B 0.2%, Fe 0.7%, Fulvic Acid 0.5%	-	-	0.1	7.2	-	1.28 - 1.29	1.0 - 2.0	10 - 25 L/ha	2 - 10 L/ha	

Product Technical Information

Product Code	Name	N% (w/v)	P% (w/v)	K% (w/v)	S% (w/v)	Ca% (w/v)	Specific Gravity (kg/L)	pH Range	Typical Application Rates	
									Fertigation	Foliar Use 200 - 2,000 L/ha water
Trace Element Blends										
SNPK0053	MoBo Complex™ N as amine 6.0%, Mo 0.30% , B 15.0%	6.0	-	-	-	-	1.34 - 1.39	7.0 - 8.0	5 - 10 L/ha	1 - 3 L/ha
SNPK0031	Fe PLUS™ Fe 8.1% , Fulvic Acid 0.5%	-	-	0.1	4.7	-	1.22 - 1.23	2.0 - 3.0	5 - 10 L/ha	1 - 3 L/ha
SNPK0026	Z PLUS™ Zn 15.9% , Fulvic Acid 0.5%	-	-	0.1	7.8	-	1.36 - 1.38	2.0 - 3.0	5 - 10 L/ha	1 - 3 L/ha
Sustainable & Renewable Blends										
SG0017	BiologiCAL® PLUS N as NO ₃ 0.3%, P as PO ₄ 0.1%, B 0.1%, C 6.1%, Fulvic Acid 0.3%, Fish Hydrolysate 0.3%, Kelp 1.0%, Molasses 20.0%	0.3	0.1	2.0	1.8	6.5	1.17 - 1.20	6.0 - 8.0	20 - 60 L/ha	4 - 20 L/ha
SG0039	QuadSHOT® C 5.2%, Fe 0.006%, Fulvic Acid 0.3%, Fish Hydrolysate 8.0%, Humic Acid 6.6%, Kelp 8.0%, Molasses 8.0%	0.3	0.1	3.4	0.2	0.2	1.10 - 1.20	2.5 - 3.5	20 - 60 L/ha	1 - 5 L/ha
SG0003	Bio Kelp™ Kelp 22%	0.1	1.1	4.2	-	-	1.09 - 1.11	10.0 - 11.0	5 - 20 L/ha	5 - 7 L/ha
SG0012	Fish Hydrolysate™ Fish Hydrolysate 100%	2.5	0.3	0.3	-	-	1.04 - 1.06	3.0 - 5.0	5 - 20 L/ha	2 - 5 L/ha
SG0016	Humic K 26™ Mg 0.03%, Mn 0.001%, Zn 0.001%, Cu 0.001%, Fe 0.01%, Si 0.1%, Fulvic Acid 1%, Humic Acid 25%	0.1	-	6.0	0.1	0.03	1.10 - 1.12	10.0 - 11.0	2 - 20 L/ha	N/A
SG0013	Molasses™ P as PO ₄ 0.1%, Molasses 100%	1.0	0.1	-	0.7	1.09	1.27 - 1.28	5.0 - 6.0	2 - 10 L/ha	N/A

Pasture Soil and Tissue Analysis

	Perennial Ryegrass	White Clover	Lucerne
Plant Tissue Optimum Range (Nutrient %)			
Nitrogen (N)	4.5 – 5.0	4.8 – 5.5	4.5 – 5.0
Phosphorus (P)	0.35 – 0.4	0.35 – 0.40	0.26 – 0.7
Potassium (K)	2.0 – 2.5	2.0 – 2.4	2.5 – 3.8
Sulphur (S)	0.27 – 0.32	0.27 – 0.32	0.26 – 0.5
Calcium (Ca)	0.25 – 0.3	0.4 – 0.5	0.51 – 3.0
Magnesium (Mg)	0.16 – 0.2	0.18 – 0.22	0.31 – 1.0
Plant Tissue Optimum Range (Nutrient ppm)			
Sodium (Na)	< 0.2	< 0.3	< 0.12
Iron (Fe)	50 – 60	50 – 65	45 – 60
Manganese (Mn)	50 – 300	25 – 30	25 – 30
Zinc (Zn)	14 – 20	16 – 19	15 – 40
Copper (Cu)	6 – 7	6 – 7	5 – 15
Boron (B)	5 – 15	25 – 30	25 – 35
Molybdenum (Mo)	0.3 – 0.4	0.15 – 0.2	0.15 – 3.0

Sourced: (Reuter & Robinson, 1997)

Why Soil Test?

- Soil testing is a minor cost in comparison to total fertilizer budget
- Only spend money on nutrients that are limiting growth and quality
- Stop paying for nutrients your pasture already has available
- Maintaining optimal pH will improve nutrient availability and encourage soil biology
- Improving soil structure makes it easier for plants to grow and thrive
- Soils vary and require individual management for optimal production

Why Tissue Test?

Plant tissue analysis acts as an early warning system to highlight any nutrient deficiencies before they display any visible symptoms, which may affect pasture yield and quality.

Visual Symptoms of Nutritional Disorders

Element	Possible Symptoms
Nitrogen	<ul style="list-style-type: none"> • Stunted growth • Pasture yellow or light green in colour • Low protein content in grasses • Urine patches become obvious • A lack of nodules or small whitish nodules on clovers
Phosphorus	<ul style="list-style-type: none"> • Stunted growth, weak roots and shoots • Decreased tillering and yields • Dark green leaves • Brown leaf tips
Potassium	<ul style="list-style-type: none"> • Poor growth • Whitish spots along the outer margin of clover leaves • Outer leaf margin death • In grasses, older leaves are first to turn pale green and leaf tips become scorched
Sulphur	<ul style="list-style-type: none"> • Plants may be stunted with thin stems • Young leaves show yellowing • Poor nodulation on clover roots • Symptoms more obvious in legumes
Calcium	<ul style="list-style-type: none"> • Poor root growth, may become stunted, turn a dark colour and rot • Die-back and browning of growing tips on roots and leaves • Leaf curling • Poorly developed seed
Magnesium	<ul style="list-style-type: none"> • Pale areas between green leaf veins • Thin leaves • Yellow or reddish leaf margins or brown spotting on grass • Older leaves show first symptoms
Iron	<ul style="list-style-type: none"> • Yellowing between leaf veins on younger leaves, veins dark green • Tips and margins of leaves remain green for the longest time • Deficient leaves curl upwards • Stunting and abnormal growth
Manganese	<ul style="list-style-type: none"> • Yellowing between leaf veins on younger leaves, veins pale green • Stunted growth
Zinc	<ul style="list-style-type: none"> • Pale areas between leaf veins • Clover leaves have bronze spots and develop a mottled appearance • Branching of small, dark green abnormal shaped leaves in the centre of the plant
Copper	<ul style="list-style-type: none"> • Stunted growth • Pale areas and/or brown discolouration • Leaves die back and tips curl • Signs are first shown on the younger leaves
Boron	<ul style="list-style-type: none"> • Poor growth • Distorted and chlorotic leaves • Yellow tints in Lucerne, reddish colourations in clover • Poor seed set
Molybdenum	<ul style="list-style-type: none"> • Symptoms may be similar to Nitrogen deficiency • Legumes will have green, grey or white nodules instead of a displaying a pinkish appearance, cupping of leaves and distorted stems may also be seen

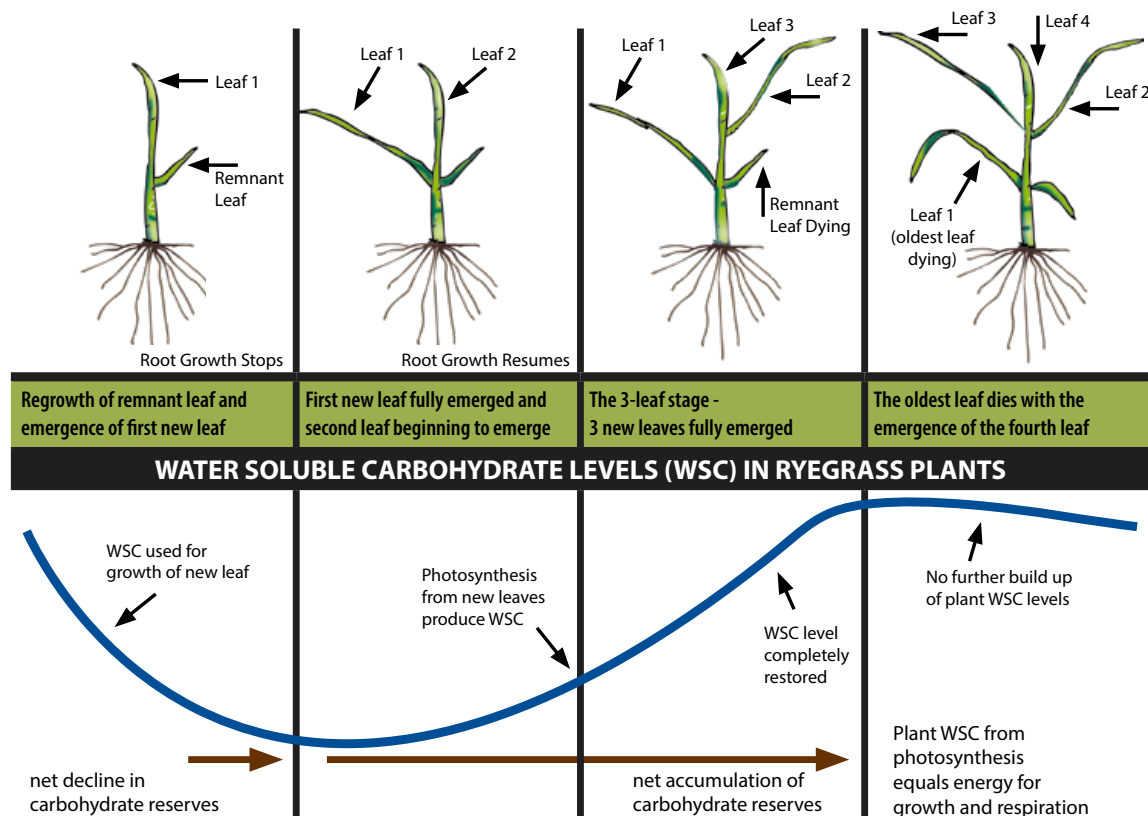
Grazing Perennial Ryegrass

Perennial ryegrass tillers normally maintain three live leaves, once the fourth leaf begins to emerge, the oldest leaf will begin to die. After being grazed, the plant will stop root growth and begin to use stored carbohydrates to regrow its shoot system. Once the first leaf has been restored, the second leaf will start to emerge and the plant will begin to replace the carbohydrates that were consumed during the regrowth (see diagram below). However, it is not until the third leaf has almost fully emerged that the stored carbohydrate level returns to where it was pre-grazing.

To promote and sustain a healthy and robust root system, grazing should begin after the carbohydrates have been fully restored and before leaf senescence begins. If grazing is premature, the root system will not yet have the carbohydrates fully restored and this will result in poorer regrowth ability and persistence. If grazing is late then pasture will be wasted and the nutritional value will have declined.

Grazing at the right time can have a positive effect on tiller density. The general target is to graze within the second and third leaf stage. In Spring the target stage can be closer to the second leaf stage and in Winter it is likely to be closer to the third leaf stage. This is due to leaves being larger in spring, the size difference between the second and third leaf is decreased in spring and nutritional value declines faster in Spring.

Ryegrass should be grazed to a height of around 4 to 6cm, this level has been found to optimise pasture productivity, nutritive value and persistency while not compromising the intake of milking cows. Grazing at this level should leave a residual DM of around 1500 kg/ha.



Product Compatibility

SLTEC®'s range of fluid fertilizers are compatible with a wide range of agricultural chemicals. We are continually testing physical compatibilities with common herbicides, fungicides and insecticides and Growth Regulators.

Dow Agrosiences has recently released the Nitrogenase inhibitor eNtrench™ for addition to common Nitrogen fertilizers to enable farmers improved Nitrogen management. SLTEC®'s products such as **Nitro QUAD 3®** and **NitrologiCAL PLUS TE™** have excellent compatibility with eNtrench™. *Please consult an SLTEC® agronomist for further information.*

Gibberellic acid

Gibberellic acid is applied at low rates to stimulate pasture growth throughout cold winter months when plant growth slows. Most commonly available Gibberellic acid formulations are highly compatible with SLTEC® products including **Nitro QUAD 3™** and **NitrologiCAL PLUS TE™**. *Contact an SLTEC agronomist for more information on Gibberellic acid and compatibility.*



A Multitrace Solution to Maximize Crop Potential

TE 8 PLUS™

Product Code: SNPK0046

A foliar multi-trace element blend activated with fulvic acid (0.5%) to maximise uptake at lower rates than standard trace blends across a wide range of crops.

Benefits of TE 8 PLUS™

- A focus on magnesium, manganese, zinc and copper – the key drivers of photosynthesis and healthy leaves and plants; resulting in reduced disease pressure.
- Molybdenum and boron to enhance assimilation and transport in the plant.
- Fully soluble nutrients in plant available forms.
- Fulvic acid provides an efficient chelating agent with only small amounts required to benefit plant permeability to a range of nutrients.
- TE 8 PLUS™ is physically compatible with a wide range of herbicides, insecticides and fungicides. Please contact SLTEC® for more information.
- TE 8 PLUS™ will help ensure you utilise all your fertilizer inputs as the trace elements work in synergy with your macro applications.

TE 8 PLUS™ is versatile across a range of crops from broadacre cereals and vegetables to pre-bloom and post harvest application in vineyards and orchards where it is often combined with SLTEC® Nitro QUAD 3™ or Lo Biuret Urea to improve bud nutrient levels to drive early spring growth.

Guaranteed Analysis (w/v)

Potassium (K)	0.1%
Sulphur (S)	7.2%
Magnesium (Mg)	2.4%
Manganese (Mn)	3.2%
Zinc (Zn)	3.2%
Copper (Cu)	0.5%
Molybdenum (Mo)	0.02%
Boron (B)	0.2%
Iron (Fe)	0.7%
Fulvic Acid	0.5%
Specific Gravity	1.284 kg/L
pH Range	1.0 - 2.0

Typical Application Rates

Foliar

2 - 10 L/ha

Horticulture use 200 to 2,000 L/ha water

Broadacre use at least 100 L/ha water

Fertigation

10 - 25 L/ha



Highly Available, Activated Calcium + Organic Boost



BiologiCAL® PLUS

Product Code: SG0017

Plants require calcium in relatively large amounts for many functions, including cell division & strength, root system and leaf development. Calcium is also an essential element required for healthy soils, influencing both the physical, chemical and biological aspects.

Benefits of BiologiCAL® PLUS

- Aids in maintaining a high pH to control clubroot
- Improves nitrogen efficiency; compatible with a wide range of nitrogen-based products.
- Helps to displace sodium and magnesium in difficult soils
- Improves soil structure and friability
- Improving moisture penetration/infiltration
- A unique form of activated calcium that stimulates plant uptake
- Built-in soil and plant stimulants to enhance soil fertility and plant health
- Assists in the reduction of soil nematodes that inhibit root growth and plant productivity
- Provides plant available calcium without extra nitrogen
- Improves plant resistance to disease and overall resilience
- Improves cell wall strength, plant durability and stress tolerance

Guaranteed Analysis (w/v)

Nitrogen (N)	0.3%
N as nitrate	0.3%
Phosphorus (P)	0.1%
Potassium (K)	2.0%
Sulphur (S)	1.8%
Calcium (Ca)	6.5%
Boron (B)	0.1%
Fulvic Acid	0.3%
Fish Hydrolysate	0.3%
Kelp	1.0%
Molasses	20.0%
Carbon (C)	6.1%
Specific Gravity	1.177 kg/L
pH Range	6.0 - 8.0

Typical Application Rates

Foliar:

Broadacre: 1 to 40 L/ha
with at least 100 L/ha
Horticulture: 1 to 20 L/ha
with 200 - 2,000 L/ha

Fertigation:

20 to 60 L/ha

Pop-Up, At Planting, Directed Soil Spray

Banded with Seed: 4 to 7 L/ha
Banded to the Side: 5 to 15 L/ha
- with 10 to 100 L/ha of water

20 to 60 L/ha as a directed soil spray,
prior to planting with 50 to 100 L/ha water



Four Key Plant & Soil Microbial Stimulants Now Organically Certified

QuadSHOT®

Product Code: SG0039

QuadSHOT® contains a carefully selected range of organic additives and biological stimulants. These ingredients stimulate soil biological activity, thereby improving the cycling and availability of plant nutrients and soil fertility and health. Together with management practices that enhance organic matter and soil structure development, this product assists in mobilising available nutrients and improving plant uptake efficiencies.

Humic acid – increases the nutrient holding capacity of the soil

Kelp – enhances plant and root growth development

Fish Hydrolysate – stimulates nitrogen cycling

Molasses – promotes beneficial soil biology

Each of these stimulants are also available as individual products

Benefits of QuadSHOT®

- Improves saline and sodic soils
- Improves the moisture-holding capacity of soils
- Enhances nutrient cycling and availability
- QuadSHOT® can be used to soften a range of foliar fertilizers, allowing higher use rates without the potential for phytotoxic burn – e.g. Nitro QUAD 3™ and UAS QUAD 3™
- QuadSHOT® is designed to aid in the soils mineralisation and nutrient availability. It also increases the plant's uptake efficiency of essential minerals.
- Improves overall soil health and vitality.

Guaranteed Analysis (w/v)

Fish Hydrolysate	8.0%
Kelp	8.0%
Molasses	8.0%
Humic Acid	6.6%
Fulvic Acid	0.3%
Nitrogen (N)	0.3%
Phosphorus (P)	0.1%
Potassium (K)	3.4%
Sulphur (S)	0.2%
Carbon (C)	5.2%
Calcium (Ca)	0.2%
Iron (Fe)	0.006%
Specific Gravity	1.154 kg/L
pH	10.0 - 11.0

Typical Application Rates

Foliar

1 to 5 L/ha
Broadacre use at least 100 L/ha water
Horticulture use 200 to 2,000 L/ha water

Fertigation

20 to 60 L/ha through sprinkler, traveller or drip systems

Pop-Up, At Planting, Directed Soil Spray

Banded with Seed: 4 to 7 L/ha
Banded to the Side: 5 to 15 L/ha
with 10 to 100 L/ha of water

20 - 60 L/ha as a directed soil spray, prior to planting or banded under canopy, with 200 - 800 L/ha water

Dipping Rates

Tree Age	Young	Established
Fertigation	40 L/ha	80 L/ha
Pre-Plant Dip	10 - 30 L/ha (per 100 L Water)	





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Organisation

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