



Knowledge grows

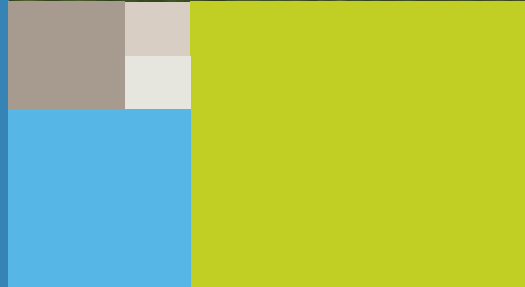
YaraMila™

The balanced solution
for improved pasture



“Do you grow grass or do you let your grass grow?”

All too often the answer is that grass is just left to grow, without using the fundamental principles that are adopted for other growing crops. Just as with those other crops, grass has a huge yield and quality potential that should be exploited by livestock producers.



Unique solutions for improved pastures

YaraMila™ 21-7-3(4) and YaraMila™ 17-5-10(4) contain a balance of the most essential nutrients to drive yield and quality of improved pastures. The ratio of nitrogen, phosphorus, potassium and sulphur varies between each product and this allows tailoring of nutritional programs to suit the particular enterprise – grazing or silage/ hay. YaraMila products are compound prills or granules, with each prill or granule containing the specified ratio of nutrients. This is unique as most pasture fertilisers are blends.

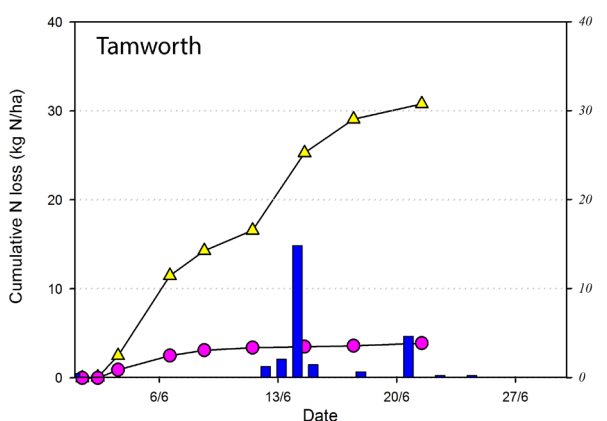
What are the key nutrients to manage?

Nitrogen

Nitrogen is the major nutrient required for growth by many crops including grass. It is the key to achieving high dry matter yields and improved feed quality. Nitrogen is a component of all proteins and chlorophyll, which drives photosynthesis, energy production and plant growth.

The key to achieving optimum returns is to apply adequate rates of nitrogen. The source of nitrogen applied, either as ammonium nitrate, urea or ammonium sulphate will influence the rate required to produce the desired response.

Nitrogen volatilisation losses from surface applied urea or urea based blends onto pastures can be significant. High surface trash levels containing urease enzyme and humid conditions drive nitrogen losses.

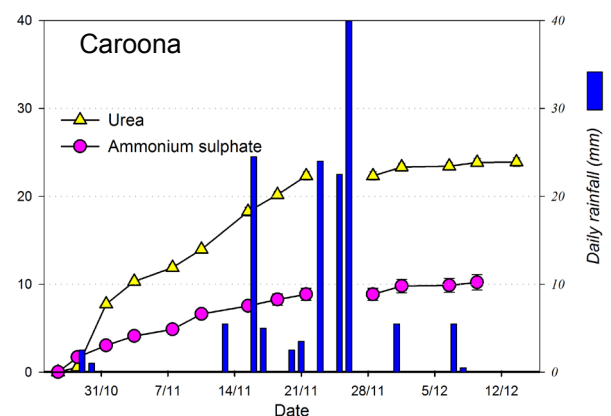
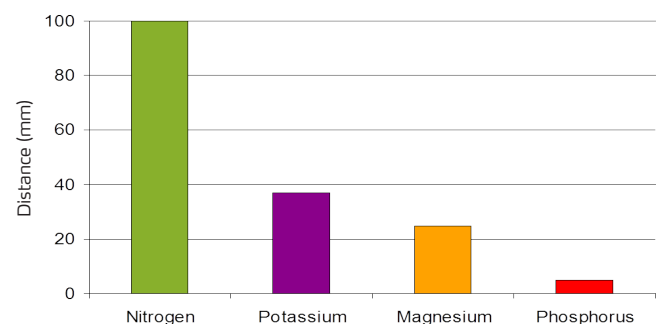


To quantify potential nitrogen volatilisation losses from surface applied urea and ammonium sulphate, G Schwenke (NSW DPI) conducted two trials, one at Tamworth during June and the second at Caroona during November-December. 100 Kg/ha of nitrogen was applied and 25-30% was lost in the urea plots. (Blue bars indicate rainfall and gap in Caroona data is due to storm damage).

Nitrogen applied with YaraMila fertilisers is based on ammonium nitrate and has a very low risk of loss from volatilisation. Ammonium nitrate is the preferred nitrogen source for many grass pasture species. It is taken up quickly by plants and gives a quick lift in production, especially during cooler months when dry matter production is slow.

Phosphorus

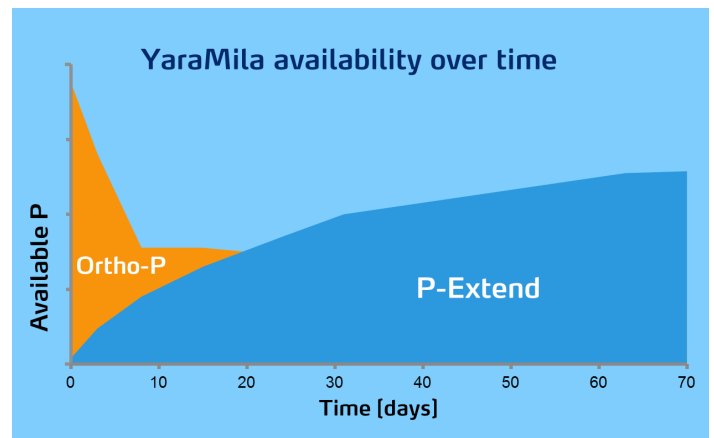
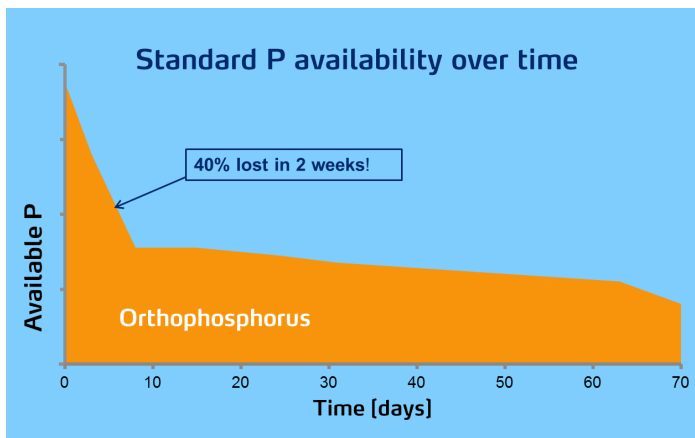
Phosphorus plays a major role in the energy supply for many plant metabolic processes and enzyme activity, forming the central part of the energy bonds in ATP. This energy is needed for the active uptake and internal redistribution of other nutrients, so even though phosphorus demand is small compared to that of nitrogen, its availability is essential. Phosphorus has limited movement in soils so applied phosphorus needs to be placed near plant roots for uptake, as shown in the graph below.



Phosphorus cont.

Phosphorus is very immobile in the soil and transient deficiencies can show up in early spring when soils are cold and wet. Trials have shown that spring applied phosphorus improves the response to applied nitrogen, even on soils with high P levels.

The results of recent Yara research into the value of the different forms of phosphorus contained in YaraMila compound fertilisers has shown that citrate soluble P is fully plant available. YaraMila compounds contain approximately 70% orthophosphorus and 30% citrate soluble phosphorus or P-Extend whilst most commonly available P fertilisers contain >85% orthophosphorus. P-Extend is released at a consistent rate and improves phosphorus availability for up to 70-80 days after application. It is a benefit in both alkaline and acidic soils and is not fixed by aluminum and iron. Other Granular NPK fertiliser do not have the same availability as this is a positive benefit of the high quality raw materials used to manufacture YaraMila products.



Potassium

Potassium is vital for regulating water supply and cell turgidity and like nitrogen, is taken up in large quantities during the rapid growth phases in the spring and early summer.

An adequate supply is essential for maximising yields from applied nitrogen, however there can be dangers to animal health if excess potassium is supplied with an increased risk of hypomagnesaemia. Grass management (i.e. grazing or cutting) will affect the rate required. Potassium excreted by livestock is mostly water-soluble and in the urine. Recycling of potassium must be taken into account and fertiliser recommendations will subsequently differ between cut and grazed swards.

Under intensive grazing, the N:K ratio required in fertiliser is typically around 6:1. Where grass is cut for silage or hay, removal of potassium in the crop can be large, as high as nitrogen and the rate of

following applications must be matched to the future management of the grass, i.e. whether it is to be grazed or subsequent cuts taken.

Sulphur

The importance of sulphur as a nutrient for crops has been well documented in the past. The effective use of sulphur has been linked to the following:

- The building block of protein helping to improve growth & development
- Improves nitrogen use efficiency
- Reduces nitrate leaching
- Essential for N fixation by legumes
- Essential for the synthesis of the essential amino acids, methionine and cysteine
- Essential for the synthesis of chlorophyll
- Increases sugar content
- Improves dry matter digestibility

With YaraMila™, you can spread with confidence...

Sulphur is similar to nitrogen, in that it is taken up by plants in the sulphate form, and as such in this form is highly leachable. Yara trial work looking at quality aspects from sulphur applications have also shown a 15% increase in crude protein, increased sugar content and increases in vitro dry matter digestibility, from 55.1% to 57.2%.

Heavy over application of sulphur may induce copper deficiency in cattle by forming compounds in the rumen which bind copper making it unavailable to the animal. This is due to the complex interactions between sulphur, copper and molybdenum.

Magnesium

The supply of magnesium is particularly important for cow health and the reduced risk of grass tetany (hypomagnesaemia). It also increases photosynthetic activity of grass and maintains good growth for high yields while improving palatability. Relatively little magnesium is removed by grazing or fodder conservation over the season. However, magnesium does need to be readily available for grass uptake.

The risk of grass tetany will be reduced by applying adequate amounts of magnesium and also by avoiding excessive use of potassium and nitrogen on grazing ground. Grass tetany is most commonly due to low plant magnesium concentration during periods of lower temperatures, higher soil moistures and lower oxygen levels.

Yara offers a range of YaraMila fertilisers to provide balanced nutritional solutions for profitable pasture production. For more information visit www.yara.com.au or contact your local sales agronomist

YaraMila™ Pasture Options	(N) Total Nitrogen	N Nitrate	N Ammonium	P Phosphorus	K Potassium	S Sulphur	Mg Magnesium	B Boron	Zn Zinc
YaraMila™ 21-7-3(4)	21%	7.5%	13.5%	7.4%	2.5%	4%	0.4%		0.15%
YaraMila™ 17-5-10(4)	17%	6.8%	10.2%	4.6%	10%	4%	1.2%	0.15%	
YaraMila™ 10-4-25	10%	4%	6%	4.4%	24.9%		0.9%	0.2%	



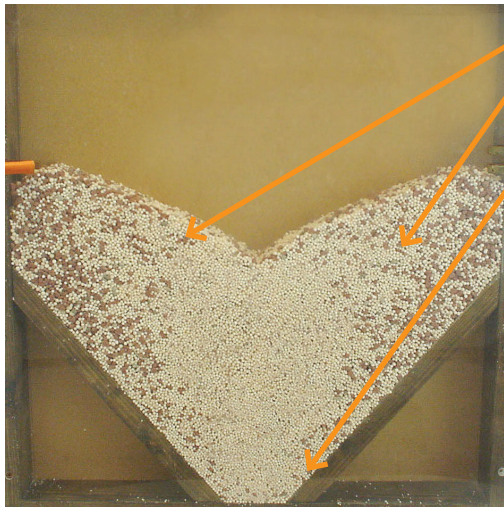
Segregation

Segregation of blended products can occur during transport, handling and application leading to large variations in the required application rate of each nutrient.

Blended fertilisers are mixtures of products which have different sized and density granules. During handling, different sized products separate causing segregation of the blend. With YaraMila true uniform compound products segregation of individual nutrients is not possible.

Which would you rather use?

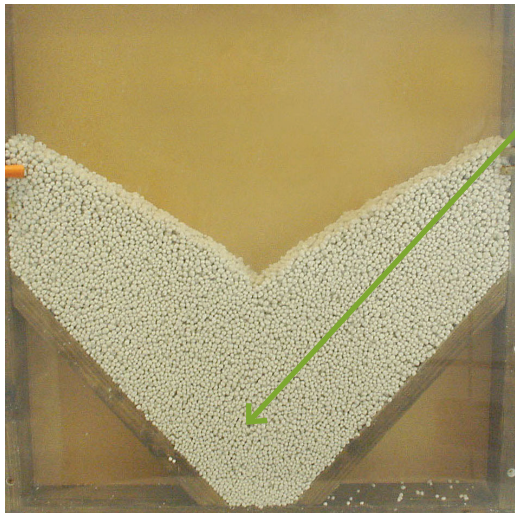
POOR BLEND



Larger particles bridging
Smaller particles (often the nitrogen source) rushing through



Yara TRUE COMPOUND



All nutrients in every particle



Landing sites and nutrient uptake

YaraMila



60 kg N/ ha, 23 prills on
100cm²

Bulk Blend

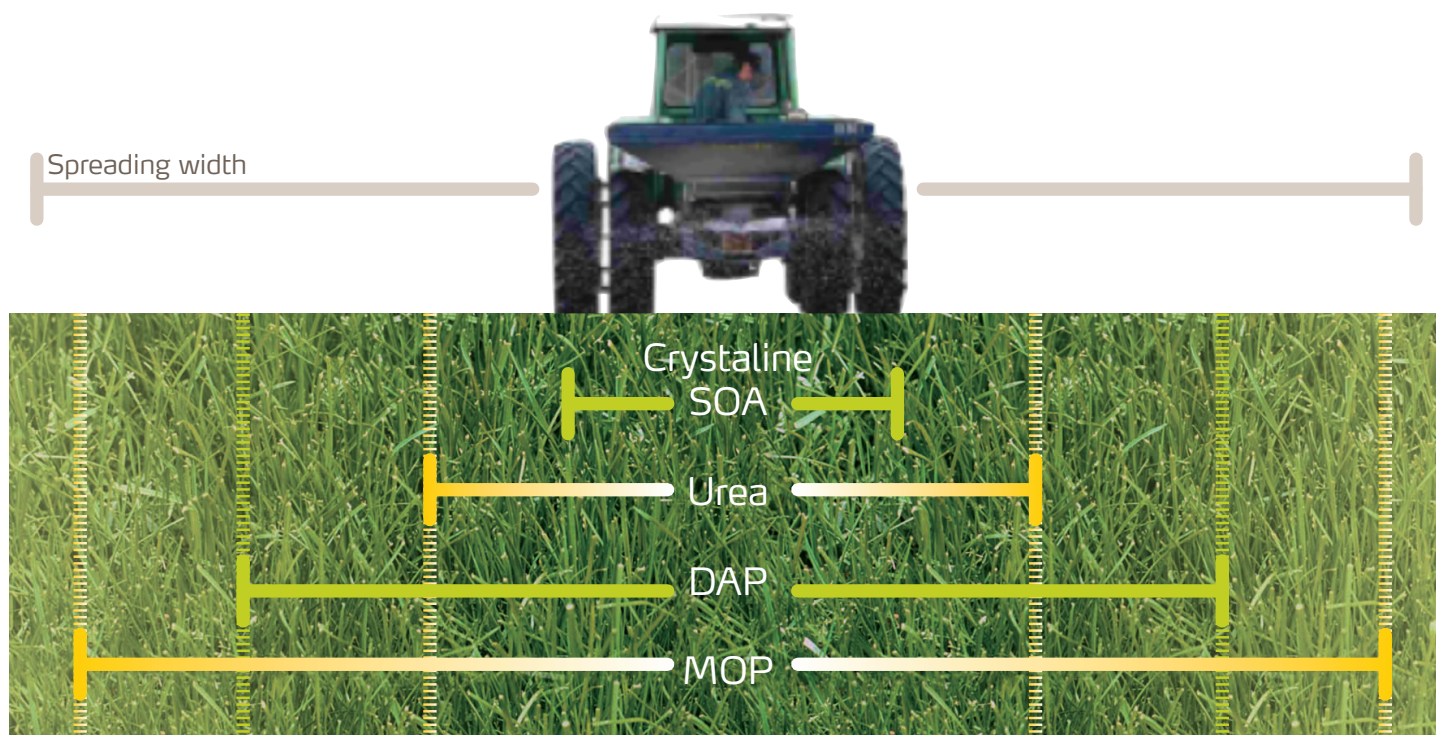


60 kg N/ ha, 13 prills on
100cm²

Uniform application and distribution of nutrients is one of the key benefits of using a true uniform compound fertiliser, as found in the YaraMila range. Every 2-4mm prill or granule contains all the stated nutrients, whereas blends are a mixture of fertiliser components, usually based on Urea, MAP or DAP, AS and MOP.



Spreading of poor quality blends compared to uniform compounds



Trials and Demonstrations

Grower Demonstration

Two fields based on perennial ryegrass near Warragul in Gippsland, Victoria were selected to compare the performance of YaraMila 17-5-10(4) against a standard NPKS fertiliser blend containing urea, MAP, MOP and ammonium sulphate. Both treatments were applied at 200 kg per hectare which applied the following nutrient (kg/ha).

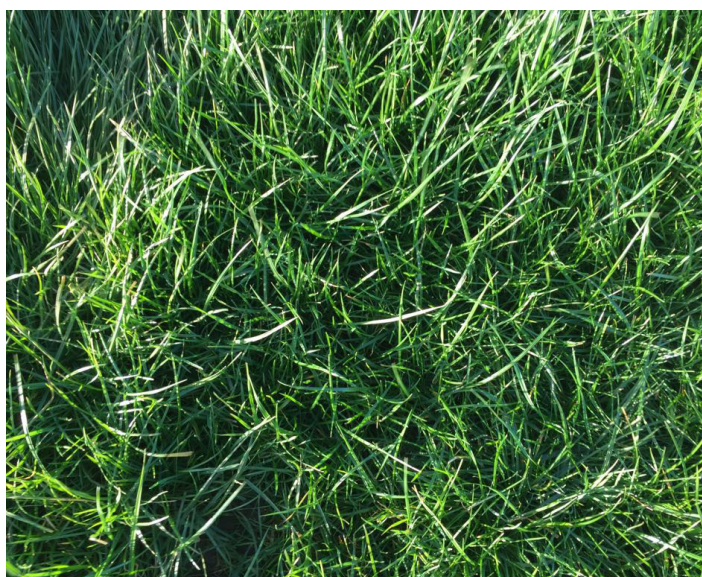
Nutrient Applied kg/ha	N Nitrogen	P Phosphorus	K Potassium	S Sulphur	Mg Magnesium	B Boron
YaraMila™ 17-5-10(4)	34	9.2	20	8	2.4	0.3
NPKS Blend	47.6	7.4	26	8.2		

The fertilisers were applied in early November which was a wet spring and there was approximately 1500 kg/ha of residual dry matter (DM) at the time of application. The site received 19 mm of rainfall 7 days prior to fertiliser application, 9 mm within 7 days of application and there was a further 30 mm of rain over the following 3 weeks. Pasture measurements were taken 4 weeks after application using a rising plate meter, calibrated by taking 10 pasture cuts from each treatment in one of the paddocks.

Results shown on the following page illustrate that YaraMila 17-5-10(4) produced more DM in the same period with similar P, K, S but 13 kg/ha less N. The value of the additional DM has been calculated for milk and beef.

Photos below show the improved density, greater plant anchorage and lower weed incursion of the YaraMila treated area after a number of applications.

YaraMila



Urea based NPKS Blend



Grower Demonstration results

	Roadside paddock		Back lower hill paddock	
	NPKS Blend	YaraMila 17-5-10(4)	NPKS Blend	YaraMila 17-5-10(4)
Dry Matter Yield (kg/ha)	3875	4345	3942	4317
Difference (kg/ha)		470		375
Dry Matter increase converted to Beef (kg) with 50% utilisation		34		27
Value of increased Production (Beef = \$3/kg)		\$101		\$80
Dry Matter increase converted to Milk Solids (kg) with 70% utilisation		48.7		38.9
Value of increased Production (Milk Solids = \$5/ kg)		\$243		\$194



Trial Plot Results

YaraMila 21-7-3(4) & YaraMila 17-5-10(4) were compared to various fertilisers in a replicated plot trial at Holbrook, NSW on newly planted perennial ryegrass pastures. Ryegrass was planted mid-May with 80 kg/ha DAP, fertilisers in Table 2 were applied mid-July and assessments with a Pasture Probe were taken in early September. As can be seen in Table 1, nitrogen alone as urea was not the key to promote DM production during this period. Balanced nutrition – N, P, K & S doubled the DM production compared to N alone.

YaraMila 17-5-10(4) performed better than the NPKS blend with 10kg/ha less N and similar P, K & S, highlighting the value of ammonium nitrate nitrogen during the winter growth period.

YaraMila 21-7-3(4) produced the highest DM production, nearly twice that of the untreated area and >1000 kg/ha DM more than the urea treatment. When the extra DM is converted into economic return from kilograms of beef or milk solids less the cost of the fertiliser, YaraMila 21-7-3(4) has increased returns by \$180/ha & \$526/ha for beef or milk production respectively. Increased DM production during feed gap periods can be highly valuable, especially during the cold winter months.

Table 1: Trial Plot Results

Treatment	Application Rate (kg/ha)	Pasture Yield (kg/ha)	Yield Increase over untreated (kg)	Increased Returns less fertiliser cost over untreated (Beef)	Increased Returns less fertiliser cost over untreated (Milk)
Untreated	0	1621	0	\$0	\$0
Urea	150	1989	315	\$5	\$85
P + K Blend	200	1642	21	-\$96	-\$90
Urea based NPKS Blend	150	2379	705	\$70	\$251
YaraMila 17-5-10(4)	150	2554	880	\$76	\$302
YaraMila 21-7-3(4)	150	3023	1349	\$180	\$526

YaraMila driving pasture production when you need it. High quality pasture - still the cheapest feed.

Table 2: Nutrient input of various fertiliser spread mid-July onto trial plot

		Nutrient Applied (kg/ha)						
Fertiliser	Application rate kg/ha	N	P	K	S	Mg	B	Zn
Untreated		0	0	0	0	0	0	0
Urea	150	69	0	0	0	0	0	0
P + K Blend	200	0	13.2	24	16.4	0	0	0
Urea based NPKS Blend	150	35.7	5.6	19.5	6.2	0	0	0
YaraMila 17-5-10(4)	150	25.5	6.9	15	6	1.8	0.23	0
YaraMila 21-7-3(4)	150	31.5	11.1	3.8	6	0.6	0	0.23





For further information please contact:
 Yara Australia Pty. Ltd.
 Level 1, 6 Holt Street
 McMahons Point NSW 2060
 www.yara.com.au
 1800 684 266
 Yara_Australia

Improved Pasture Program



February - April

May - July

August - October

November - January

Improved Temperate Pastures

YaraMila™
21-7-3(4)

Spread 150-200kg/ha

Spread 150-200kg/ha

YaraMila™
17-5-10(4)

Alternatively, spread
200-300kg/ha for hay/
silage pastures

Yara Liquids
SULSA
24-3-0+6S

Foliar apply 70-100L/ha
Repeat at 4-6 week
intervals as required.

Tropical Pastures

YaraMila™
21-7-3(4)

Spread 200-300kg/ha

YaraMila™
17-5-10(4)

Spread 250-350kg/ha