



Dryland Cotton Fertiliser Guide

Contents



3

Cotton calendar



6

Soil testing



13

Pre-plant fertiliser applications



16

Choosing the right starter fertiliser



22

Leaf sampling in dryland cotton



24

Post-sowing nitrogen applications



26

Foliar fertiliser applications

Nutrition advice for dryland cotton

When deciding on a fertiliser program for dryland cotton, first consider the previous crop rotation. Keep in mind that cotton may be susceptible to 'long fallow disorder' on certain soils as it has mycorrhizal dependency.

Next, arrange soil testing to determine the availability of nutrients in the soil, both at the surface and at sub-surface depths. The full range of testing requirements can be obtained through Nutrient Advantage® Laboratory Services.

Soil fertility, particularly nitrogen levels, combined with starting soil moisture levels, will determine the initial target yield and plant configuration.

It is generally best to band nitrogen fertilisers pre-plant.

The variability of in-crop summer rainfall means it can't be relied on to move fertilisers into the soil when applied during the season. Nutrients such as phosphorus, potassium and zinc can become stranded at the soil surface in dry seasons.

If in-crop rains arrive late in the season, the high availability of mobile nutrients, such as nitrogen could also promote late growth flushes affecting lint qualities.

Phosphorus-based starter fertilisers should be banded with the seed, or below and to the side of the seed at higher application rates.

There are many advantages of a planned early fertiliser application, including:

- having the immobile nutrients (phosphorus and zinc) available for root interception;
- stimulation of soil microbial activity;
- promotion of root development;
- promotion of vigorous vegetative development for cotton seedlings.

Even though total nutrient levels available in the soil may be adequate, demand from plants can exceed the amount they can take up from the soil during periods of peak growth.

Foliar applications using Incitec Pivot Fertilisers' EASY Liquids® range of fertilisers can supplement crop requirements in these circumstances through the growing season.

Depending on seasonal conditions and yield estimates, nitrogen can also be applied during the growing season.



Planning your dryland cotton crop

Fertiliser choices should be considered as part of a total crop management program, along with issues like insect and weed control, irrigation and cultivation strategies.

Soil testing is a good way to accurately assess soil fertility and nutrient availability and helps to create a clear picture of the nutrients needed to meet your production goals.

Soil tests are undertaken for three main reasons:

Predictive – to check the soil's fertility or nutrient status.

Monitoring – to assess the suitability of current management practices over time.

Diagnostic – for trouble-shooting or to check on the accumulation of mineral elements toxic to plants.

It is particularly important to quantify available nutrients with soil testing prior to planting when planning to grow Bollgard II® cotton crops. They have higher peak nutrient requirements and may need careful management under stressful conditions.

The prime objective of soil testing is to arrive at a fertiliser recommendation tailored to the requirements of individual production systems.

In conjunction with the Nutrient Advantage® Laboratory Services, Incitec Pivot Fertilisers' Distributor Agronomists are well placed to develop specific fertiliser management plans for your dryland cotton crops.

With both NATA accreditation and ASPAC certification, Nutrient Advantage Laboratory Services deliver quality and accurate results with fast sample turnaround times.

Soil testing

Surface testing

Paddocks in a crop rotation will need surface testing every four to five years.

The recommended depth for surface soil sampling in dryland cotton is 0-10 cm.

Surface testing is primarily used to assess the probability of response to additional phosphorus fertiliser.

It is also important to have recent organic carbon levels from 0-10 cm tests and up to 120 cm tests if suitable testing equipment is available. Organic carbon is the engine driving mineralisation for additional nitrogen from sampling to sowing and through the growing season.

Sub-surface testing

Segmented sub-surface sampling is recommended to assess soil salinity, chlorides and exchangeable sodium levels through the profile.

The recommended sub-surface sampling depths for dryland cotton are 10-30 cm, 30-60 cm and 60-90 cm.

Segmented sampling is recommended if the paddock has not been sampled in the past three to four years to identify where any hostile elements, e.g. sodicity or chlorides, or potentially beneficial nutrients, e.g. nitrogen, are located through the root zone.

Include the BSES phosphorus test in the 10-30 cm profile too. This will assist with phosphorus recommendations in future rotations.

See your local Nutrient Advantage® accredited agronomist to arrange soil testing before growing dryland cotton.



The amount of each nutrient removed at various yield levels

Yield b/ha	N	P	K	S	Ca	Mg	B	Cu	Zn	Fe	Mn
	kg/ha						g/ha				
4	35	10	15	4	2	5	13	12	53	85	6
5	50	12	18	5	3	7	20	14	63	98	8
6	65	14	22	6	3	8	28	16	72	112	9
7	80	17	26	7	4	10	35	18	82	125	11
8	95	19	29	8	4	11	42	20	91	138	12
9	110	21	33	9	5	13	49	22	100	151	14
10	125	24	37	10	6	14	56	24	110	164	15

Source: Rochester, I & Constable, G. "Nutrients removed in high yielding cotton crops"
Australian Cotton Grower, June-July 2006

Key facts on nitrogen

Cotton uses nitrogen more than any other nutrient in the soil.

A 4 bale/ha cotton crop requires about 110 kg/ha of nitrogen. About 35 kg/ha of this nitrogen will be removed at harvest.*



Ensure adequate nitrogen is available at planting to assist in achieving a target yield. Additional nitrogen can be applied through the growing season, depending on conditions.

One of the best ways to assess soil nitrogen status is through pre-plant soil tests for residual mineral nitrogen. Combined with a knowledge of current soil organic carbon levels, an estimate of the plant supply of nitrogen throughout the season can be made.

Nitrogen deficiency symptoms include stunted growth and pale green or yellow coloured leaves. Older leaves are generally affected first, as the plant will usually take nitrogen from the lower leaves due to the mobility of nitrogen.

Most of the nitrogen used by cotton plants is in the nitrate form. All fertiliser nitrogen forms convert to nitrate in the soil.

Nitrogen can be lost from the soil through runoff, volatilisation, leaching below the root zone following heavy rain and, in some circumstances, denitrification.

Although nitrogen is one of the key nutrients for optimising cotton yield and quality, excess nitrogen or a poorly designed nitrogen application program can also make a cotton crop difficult to manage.

* Source: Rochester, I & Constable, G. "Nutrients removed in high yielding cotton crops" Australian Cotton Grower, June-July 2006

Key facts on phosphorus

Phosphorus is one of the primary nutrients in cotton production and is generally required throughout the life of the crop.

Conventional cotton generally only uses 11 per cent of its total phosphorus from germination through to early squaring.

A further 38 per cent of phosphorus is used from early squaring to early boll fill, while the remaining 51 per cent is used from early boll fill to maturity.

Cotton crops need about 16 kg/ha of phosphorus to produce a 4 bale/ha yield. About 10 kg/ha of this phosphorus will generally be removed at harvest.*

When a crop is deficient in phosphorus, symptoms may include slow emergence and growth, with plants appearing stunted and spindly, and displaying off-green foliage with purplish veins and petioles.

To help achieve better responses, phosphorus should be banded with or near the seed at or close to planting, as it is immobile in the soil.

Unlike most annual crops, phosphorus may be applied effectively in cotton as a sidedress or foliar application as late as early squaring, where there has not been the opportunity to apply adequate phosphorus prior to or at sowing. EASY PK® fertiliser has been specially formulated for foliar application.

* Source: Rochester, I & Constable, G. "Nutrients removed in high yielding cotton crops" Australian Cotton Grower, June-July 2006



Key facts on potassium

Potassium is an essential nutrient for cotton production.

Cotton crops need about 100 kg/ha of potassium to produce 4 bales/ha of cotton with 15 kg/ha of this removed in crop.*

Potassium can help with many important growth functions including photosynthesis, protein and carbohydrate synthesis, water regulation in plant cells and fruit formation.

Adequate potassium can also help improve crop yield and quality. It can help improve cold tolerance and assist crops with resisting disease.

Mature and older leaves are generally the first to show symptoms in situations of full season deficiency.

Late season onset of potassium deficiency generally occurs at the top of plants with symptoms including reddening and defoliation at the top of the bush.

The balance of potassium with other nutrients is important. High levels of calcium, magnesium or sodium in the soil may also induce potassium deficiency in crops, despite an adequate supply in the soil.

Where high rates of potassium are needed, it may be beneficial to split applications, i.e. apply some at planting and some later in the season.

The peak requirement for potassium in cotton generally coincides with the peak flowering period. In marginal situations, plant tissue testing at peak squaring can indicate if more potassium is needed.



* Source: Rochester, I & Constable, G. "Nutrients removed in high yielding cotton crops" Australian Cotton Grower, June-July 2006

Key facts on sulphur



Where soil testing reveals less than 10 mg/kg of sulphate sulphur from 0 to 10 cm, dryland cotton could be at risk of sulphur deficiency unless sulphate levels increase between 10 and 60 cm.

Soils containing natural gypsum generally have enough available sulphur to meet crop needs.

Crops take up sulphur in the sulphate form, so fertilisers containing this form offer immediate availability.

Applying elemental sulphur is unlikely to be effective where sulphur deficiency is acute in this season's crop.

Where soils have been treated with gypsum as a soil ameliorant, this may supply enough sulphur for a couple of crops, depending on application rates.

Sulphur is often supplied in fertilisers containing other nutrients, such as potassium sulphate.

Key facts on zinc

Most growers are aware of the need to supply adequate zinc to their crops and dryland cotton is no exception.

Zinc is essential for enzyme reactions, the formation of auxin, a plant hormone, and necessary for the production of chlorophyll and carbohydrates. Symptoms of zinc deficiency, such as yellowing, appear first on younger leaves.

Zinc is one of the most common nutrients to be foliar sprayed early in a cotton crop's development, as it can be good insurance against zinc deficiency, particularly if no zinc was applied with the starter fertiliser at sowing.

As cotton requires zinc early in its growth cycle, it is best applied every year with starter fertilisers to improve its early availability.



Zinc deficiency in cotton.*

* Source: Nehl, D. Allen, S. 2002 "Symptoms of diseases and disorders of cotton in Australia", Australian Cotton Cooperative Research Centre.

Pre-plant fertiliser applications

Pre-plant applications can begin up to 10 weeks prior to planting.

Not only is this a good time to get one of the biggest fertiliser application jobs done, but it gives the nitrogen a better chance of moving below the top layer of soil, where it can be used by the crop at later stages of growth.

Most of the nitrogen is in the top 30 cm of soil. However, crops source moisture and nutrients throughout the whole root zone. Getting nitrogen into the root zone is difficult post-planting, especially in dryland systems.

By applying pre-plant nitrogen, you are giving your cotton crop every opportunity to take advantage of any seasonal upside that may occur.

There are a range of pre-plant nitrogen fertilisers to choose from, including BIG N[®] and EASY N[®] fertilisers and urea.

The high concentration of nitrogen in BIG N and the convenience of on-farm delivery means you can spend more time applying nitrogen and less time re-filling when using BIG N.

EASY N can be injected using most types of discs and points, so systems can be set up to use existing tillage equipment.

The basic requirements of an EASY N soil injection system include an application tank, filter, pump, metering system, distribution system and tubes to the ground.

Urea is the most widely used nitrogen fertiliser in the world due to its high analysis, relatively low cost and easy handling characteristics.

Muriate of Potash or Granulock Cotton Sustain blend can be mixed with urea for pre-plant applications where potassium is needed.

Cotton takes up more potassium than any other nutrient except nitrogen. Like nitrogen, it is not easily lost from the soil, so it can be applied well before the season gets underway.

Visit www.easyn.com.au for more information on EASY N. For information on BIG N, visit www.bign.com.au.



Pre-plant fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
BIG N®	82% nitrogen	Colourless gas which is a liquid under pressure	BIG N is an efficient fertiliser for applying nitrogen, particularly where high rates are needed. BIG N is ideal for variable rate application and can be applied as a liquid using Cold-Flo® technology.
EASY N®	42.5% nitrogen (w/v) - 21.5% as urea, 10.5% as ammonium, 10.5 as nitrate	Liquid	EASY N can be injected using tines or discs or sprayed on to the soil surface, preferably including incorporation.
Urea	46% nitrogen	Granular	Urea is a commonly used nitrogen fertiliser.
Urea with ENTEC®	46% nitrogen	Granular	Urea with ENTEC delays the conversion of ammonium to nitrate nitrogen to reduce the potential for leaching and denitrification losses depending on seasonal conditions.

Pre-plant fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
Granulock® Cotton Sustain® blend	6.1% nitrogen, 12% phosphorus, 22.5% potassium and 0.55% zinc	Granular	Granulock Cotton Sustain fertiliser blend is an ideal pre-plant fertiliser where high rates of potassium are required. The potassium is in the Muriate of Potash form.
Muriate of Potash	50% potassium	Granular	Muriate of Potash is an economical and widely used potassium fertiliser.
Sulphate of Potash	41% potassium, 18% sulphur	Granular	Sulphate of Potash has a lower salt index than Muriate of Potash. This limits chloride application and reduces the chance of fertiliser burn.
Granubor®	15% boron	Granular	Where boron is needed, Granubor can be broadcast pre-plant. CAUTION: Boron fertilisers should be used with caution as boron toxicity can be easily induced.

Choosing the right starter fertiliser

Plant uptake of phosphorus and zinc can also be enhanced where vesicular arbuscular mycorrhiza (VAM) is highly active in the soil. Where VAM levels are low, it is particularly important to ensure phosphorus and zinc are applied at planting.

Consider Granulock® SuPreme Z® or SuPreme Z Extra fertilisers at sowing in dryland cotton crops. These fertilisers offer a good balance of nutrients for the crop in an easy handling granular form.

Where sulphur is needed, Gran-Am® fertiliser can be used to supply plant available sulphate sulphur at sowing. It can be

blended with other starter fertilisers or urea to create the right nutrient mix and applied banded away from the plant line.

Water injecting additional phosphorus at sowing can also assist with early seedling vigour. It is particularly beneficial to help cotton seedlings through periods of low soil temperatures.

Fertiliser options for water injection include EASY NP + Zn™, EASY NPK 27™ and water soluble products, Liquifert® P and Liquifert Emerald.



Setting up for sowing

A wide variety of starter fertilisers and blends are available for cotton, each offering different levels of phosphorus, zinc and other starter nutrients.

As cotton requires zinc early in its growth cycle, it is best applied every year with starter fertilisers to ensure its early availability to developing root systems.

For best results, phosphorus-based starter fertilisers should be banded with the seed, or below and to the side of the seed at higher application rates.

Both phosphorus and zinc are immobile in the soil, so it is important to apply them where the crop can have easy access to the nutrients.

Suggested maximum rates (kg/ha by row spacing) of Granulock SuPreme Z or MAP with the seed when sowing cotton

	Disc/Knife			Narrow Point			Sweep		
Row spacing	53cm	71cm	100cm	53cm	71cm	100cm	53cm	71cm	100cm
Soil moisture at planting									
Good	75	56	40	113	85	60	150	112	80
Average	38	28	20	75	56	40	113	85	60
Poor	19	14	10	38	28	20	75	56	40

The suggested maximum rates apply for all row configurations. Source: Incitec Pivot Fertilisers

Phosphorus placement at sowing



The amount of starter fertiliser that can be placed with the seed at sowing is influenced by a number of factors. These include physical and chemical product characteristics, soil texture, soil moisture, application method and the amount of water that is in, or placed with, the product. The following should be used as a guide only for medium to heavy textured soils. Refer to your local Incitec Pivot Fertilisers' Distributor for maximum rates on lighter textured soils.

The rates suggested are in grams (g) or millilitres (mL) per metre of sown row. To convert to kg/ha or L /ha multiply grams /ha by 1,000 divided by row spacing (in cm).

Where Liquifert® P, Liquifert Emerald, EASY NP™, EASY NPK 27™ or EASY NP + Zn™ fertilisers are used as a 'pop up' fertiliser the aim should be to apply 1 to 2 kg/ha of phosphorus and 50 to 100gms/ha of zinc.

Higher rates are required when conditions have the potential to limit early seedling growth. These conditions include low soil temperature (early in the season) or waterlogged and/or sodic soil situations.

Before applying these products please seek advice from your agronomist as to the appropriateness and applicable rate to apply the product to your crop.

A guide to phosphorus placement

Suggested phosphorus and zinc 'pop up' rates

Suggested maximum rates when planting with MAP and Granulock SuPrime Z

Product rate g/m sown row

Soil moisture status at planting	Soil opener type		
	Disc/knife	Narrow point	Sweep
Good	4	6	8
Average	2	4	6
Poor	1	2	4

The suggested maximum rates apply for all row configurations.
Source: Incitec Pivot Fertilisers

Suggested maximum rates when planting with EASY NP, EASY NPK 27 and EASY NP + Zn

Product rate g/m sown row

Soil moisture status at planting	Soil opener type		
	Disc/knife	Narrow point	Sweep
Good	5	8	10
Average	3	4	8
Poor	1.5	2.5	5.5

Note: EASY NP, EASY NPK 27 and EASY NP + Zn can be diluted in water.
The suggested maximum rates apply for all row configurations.
Source: Incitec Pivot Fertilisers

Suggested maximum rates for water injection of Liquifert P and Liquifert Emerald

Product rate g/m sown row

Soil moisture status at planting	Water rate L/ha	Soil opener type		
		Disc/knife	Narrow point	Sweep
Good	100 – 200	6	8	8
Average	400	4	6	8
Poor	400 - 800	2	4	6

Note: Where Liquifert Emerald and Liquifert P are used in water injection at rates of less than 10 kg/ha, water rates of 40-50 L/ha are acceptable but the dissolution rate will decrease with more product and/or less water.
The suggested maximum rates apply for all row configurations. Source: Incitec Pivot Fertilisers

Sowing fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
Granulock® SuPreme Z®	11% nitrogen, 21.8% phosphorus, 4% sulphur, 1% zinc	Granular	Granulock SuPreme Z fertiliser is a compound starter fertiliser with a good balance of nutrients for cotton.
SuPreme Z Extra	10.9% nitrogen, 21.2% phosphorus, 3.9% sulphur and 2% zinc	Granular	SuPreme Z Extra fertiliser provides high concentrations of zinc.
MAP	10% nitrogen, 21.9% phosphorus, 1.5% sulphur	Granular	MAP is popular for supplying the crop's phosphorus needs. It has good handling characteristics.
DAP	18% nitrogen, 20% phosphorus, 1.6% sulphur	Granular	DAP can be used to supply the crop's phosphorus needs. As DAP is high in nitrogen, it should not be applied in the sowing furrow due to the risk of seed burn.
Zinc sulphate monohydrate	35% zinc	Granular	Zinc sulphate monohydrate can be blended with starter fertilisers to increase the amount of zinc supplied.
Gran-Am®	20.2% nitrogen, 24% sulphur	Granular	Gran-Am fertiliser contains high sulphur rates in the plant available sulphate form. It can be blended with other starters or urea.

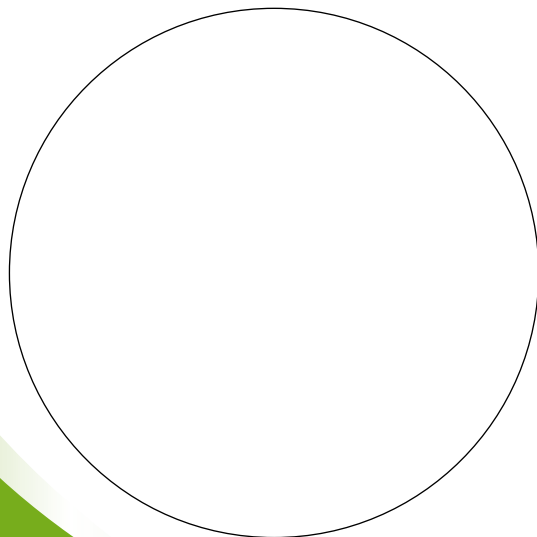
Sowing fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
CK 1	14.7% phosphorus, 14.5% potassium, 0.7% sulphur, 10.7% calcium	Granular	CK 1 fertiliser is a phosphorus and potassium fertiliser mainly used at planting.
EASY NP™	11% nitrogen, 16% phosphorus (w/v)	Liquid	EASY NP fertiliser is a nitrogen and phosphorus 'pop-up' starter.
EASY NP + Zn™	10% nitrogen, 15% phosphorus, 0.7% zinc (w/v)	Liquid	EASY NP + Zn fertiliser is a 'pop-up' starter. The zinc is in EDTA chelate form.
EASY NPK 27	8% nitrogen, 14% phosphorus, 5% potassium, 0.7% zinc (w/v)	Liquid	EASY NPK 27 fertiliser is primarily used as a 'pop-up' starter applied through water injection.
Liquifert® Zinc	22% zinc	Soluble solid	Liquifert Zinc fertiliser can be dribbled along the seed row or applied as a foliar spray.
Liquifert® P	12% nitrogen, 26.6% phosphorus	Soluble solid	Liquifert P fertiliser can be used as a 'pop-up' at planting, dissolved in a ratio of 15 kg product to 100 L of water.
Liquifert Emerald	9.5% nitrogen, 19.3% phosphorus, 12% potassium, 0.25% zinc	Soluble solid	Liquifert Emerald fertiliser provides a blend of nutrients ideal for planting, particularly in cool conditions.

Leaf sampling in dryland cotton

Consistency of sample collection is the key to getting the best out of cotton tissue sampling.

Leaf testing is a more accurate guide to pinpoint any nutrient deficiencies and is generally used from first squares to first bloom.



Leaf testing acts as an early warning system to highlight any nutrients that may be lower than optimum without any apparent visual symptoms (hidden hunger) that may be affecting crop yield potential and/or quality.

Being consistent in sampling location, location on the plant, soil moisture, time of day and other key variables need to be considered. Refer to the Nutrient Advantage® Laboratory Services' Tissue Sampling Guide for more detailed information.

Collecting leaves of about the same size and location on the plant is critical. Collect leaves from the third or fourth leaf down the plant from the terminal. The circles (left) can be used as a guide for consistent leaf size.

Leaf samples should be taken from a number of plants in an area which is representative of the whole paddock. This can be a defined area or a transect across the paddock.

Sampling sites should be clearly defined and the positions of the sites GPS referenced so that they can be accurately revisited.

Where possible, samples should be collected at about the same soil moisture availability. Samples should be collected between dawn and 10am (EST).

Micronutrient fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
Zincsol®	8.4% sulphur, 16% zinc (w/v)	Liquid	Zincsol fertiliser is a liquid zinc fertiliser used to help correct and prevent deficiencies in crops.
Coppersol®	3.4% sulphur, 6.7% copper (w/v)	Liquid	Coppersol fertiliser is best applied as a high volume spray early in the growing season or coinciding with a new flush of growth.
Mangasol®	10.1% sulphur, 17.3% manganese (w/v)	Liquid	Mangasol fertiliser is a manganese sulphate solution ideal for helping correct and prevent manganese deficiency in crops.
Topfoliar®	9.1% nitrogen, 4% phosphorus, 6.2% potassium, 0.005% boron, 0.01% copper, 0.03% manganese, 0.03% zinc, 0.002% molybdenum (w/v)	Liquid	Topfoliar fertiliser gives a balanced range of nutrients and is ideal for supplementing solid fertiliser programs and boosting plant growth in times of crop stress.
Liquifert® Zinc	22% zinc	Soluble solid	Liquifert Zinc fertiliser can be dribbled along the seed row or applied as a foliar spray.
Liquifert® Mag	9.6% magnesium	Soluble solid	Liquifert Mag fertiliser is a convenient option where magnesium is needed.
Solubor	20.5% boron	Soluble solid	Solubor fertiliser can be used in foliar sprays to treat deficiency. CAUTION: Boron fertilisers should be used with caution as boron toxicity can be easily induced.

Post-sowing nitrogen applications

Post-sowing applications of nitrogen are a good way to supply additional nitrogen to the crop as it comes up to its highest nitrogen use period.

The main sidedressing window for dryland cotton is from first squares to peak squaring.

Nitrogen can be sidedressed between the rows, provided the row spacing is wide enough to ensure that the crop is not damaged by application machinery.

Growers must take care with placement when sidedressing, as placing nitrogen too close to plant roots may result in root pruning and crop damage.

Consider BIG N[®], EASY N[®], EASY U-Sol[®] fertilisers or urea for nitrogen applications in-crop.

Whichever fertiliser is chosen, the nitrogen should be applied into the soil, with adequate coverage to prevent volatilisation losses, unless rainfall immediately follows application.

With EASY N and EASY U-Sol, this means using StreamJet[™] nozzles or dribble bars to direct the spray to the soil.

It is also wise to take care with BIG N when applying more than 80 kg/ha of nitrogen to ensure that ammonia vapour, which may occur in cloddy soils, does not damage plant tissue.

Cotton growers who are concerned about crop damage from ammonia vapour when using BIG N should consider using Cold-Flo[®] technology, which involves applying most of the ammonia in a super cooled liquid form.

Green Urea[™] fertiliser is also available for dryland cotton growers to surface apply nitrogen.

Although growers can expect significant volatilisation losses due to urea being left on the soil surface during warm summer temperatures, Green Urea retains nitrogen in the urea form for an extended period, allowing extra time for significant rainfall to move the fertiliser into the soil.

Post-sowing nitrogen fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
BIG N[®]	82% nitrogen	Colourless gas which is a liquid under pressure	BIG N is an efficient fertiliser for applying nitrogen, particularly where high rates are needed. BIG N is ideal for variable rate application and can be applied as a liquid using Cold-Flo [®] technology.
EASY N[®]	42.5% nitrogen (w/v) - 21.5% as urea, 10.5% as ammonium, 10.5% as nitrate	Liquid	EASY N can be injected using tines or discs or applied as a stream on to the soil surface, preferably with incorporation by rainfall to move it into the root zone.
EASY U-Sol[®]	26% nitrogen (w/v)	Liquid	EASY U-Sol fertiliser is a liquid solution of urea.
Urea	46% nitrogen	Granular	Urea is a commonly used nitrogen fertiliser.
Green Urea[™]	46% nitrogen	Granular	Green Urea fertiliser uses a urease inhibitor to minimise volatilisation losses from surface applied urea. It suits situations where surface applied urea is not rapidly incorporated by cultivation or adequate rainfall.

Foliar applications in dryland cotton

As the crop nears the time of peak demand for potassium, foliar applications can be used with good effect.

Foliar applications are ideal before and during the peak requirement for potassium (around 1300 day degrees), as the root system is starting to close down. Additional potassium applications can be used as a preventative measure against premature senescence.

Consider fertilisers such as Liquifert® K Nitrate and EASY PK®.

Nitrogen can also be foliar sprayed at this time, if additional nitrogen is still needed. Cotton crops reach their peak

requirement for nitrogen at the same time as their peak requirement for potassium.

Cotton growers can use EASY N® and EASY U-Sol® fertilisers in foliar applications in situations where lower rates are appropriate. Up to 10 kg/ha of nitrogen can be applied as a foliar application from first flower to first open boll.

This is a period of maximum leaf area and maximum root mass, and represents the last opportunity to feed your crop.

Nitrogen foliar applications can also be useful to aid recovery in cotton crops suffering physical damage such as hail or insect attack.



Foliar fertilisers for dryland cotton

Fertiliser	Analysis	Form	Comments
EASY N®	42.5% nitrogen (w/v) - 21.5% as urea, 10.5% as ammonium, 10.5% as nitrate	Liquid	Foliar applications of EASY N are ideal for peaks in demand, treating deficiency symptoms or helping crops overcome stress.
EASY U-Sol®	26% nitrogen (w/v)	Liquid	EASY U-Sol fertiliser is a liquid solution of urea and can be foliar applied.
Liquifert® N	46% nitrogen	Soluble solid	Liquifert N fertiliser is a fine granular form of urea, so it dissolves faster in water. This makes it ideal for foliar sprays.
Liquifert MKP	22.5% phosphorus, 28% potassium	Soluble solid	Liquifert MKP fertiliser can be dissolved in a ratio of 15 kg product to 100 L of water. It is ideal to supplement phosphorus and potassium supply during peaks in demand.
EASY PK®	1% nitrogen, 12% phosphorus, 24% potassium (w/v)	Liquid	EASY PK fertiliser can be applied in fortnightly sprays to reduce the effects of premature senescence.
Liquifert K Spray	42% potassium, 18.5% sulphur	Soluble solid	Liquifert K Spray fertiliser applies potassium and sulphur.
Liquifert K Nitrate	13% nitrogen, 38.3% potassium	Soluble solid	Liquifert K Nitrate fertiliser may help reduce the effects of premature senescence.

Compatibility guide to mixing EASY Liquids

	EASY N [®]	EASY U Sol	EASY NP	EASY NP + Zn	EASY PK	EASY NPK 27	Topfoliar	EASY NS	EASY ATS	EASY KS	EASY Cal	Coppersol	Zincsol
EASY U Sol [®]													
EASY NP [™]													
EASY NP + Zn [™]													
EASY PK [®]	(1:1)												
EASY NPK 27 [™]	(1:1)												
Topfoliar [®]			X	X		X							
EASY NS [™]					(1:1)								
EASY ATS [®]													
EASY KS [®]	(1:1)						X	(1:1)					
EASY Cal [®]			X	X	X	X	X	X	X	X	X	X	
Coppersol [®]	(1:100)	(1:100)	X	X	X	X	X	(1:100)		X	X		
Zincsol [®]	(1:100)	(1:100)	X	X	X	X	X	(1:100)		X	X		
Mangasol [®]	(1:25)	(1:25)	X	X	X	X		(1:25)		X	X		

- Compatible when neat EASY Liquids fertilisers are mixed.
- Dilute the fertilisers listed vertically with the specified ratio of water before mixing with the other EASY Liquids fertiliser.
For example, dilute one part Coppersol with 100 parts water, then mix with EASY N.
- Not compatible. Do not mix. Insoluble precipitates will form.

Mixing EASY Liquids with pre-dissolved Liquifert fertilisers

Liquifert soluble solid fertilisers must be pre-dissolved in water before the addition of neat EASY Liquids. The practical solubility of Liquifert fertilisers at 10°C is listed with the product in the left column of the table.

Pre-dissolved soluble solids	Neat EASY Liquids													
	EASY N	EASY U Sol	EASY NP	EASY NP + Zn	EASY PK	EASY NPK 27	Topfoliar	EASY NS	EASY ATS	EASY KS	EASY Cal	Coppersol	Zincsol	Mangasol
Liquifert® N (30 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert Lo-Bi (30 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert P (15 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert MKP (8 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert K Nitrate (10 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert K (20 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert K Spray (5 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hydro Calcinit (60 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert Mag (30 kg/100 water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Liquifert Zinc (25 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Solubor (10 kg/100 L water)	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ Compatible when fully dissolved Liquifert is mixed with neat EASY Liquids.

■ Further dilution with water may be required.

■ Not compatible. Do not mix. Insoluble precipitates will form.

For feedback or further information, contact
Incitec Pivot Fertilisers on 1800 009 832.

www.incitecpivot.com.au



This guide covers many of the fertilisers suitable for cotton, but is not a complete list of Incitec Pivot Fertilisers' product range.

Incitec Pivot Fertilisers also offers a comprehensive custom blending service for Liquifert Products, EASY Liquids® products and dry granular fertilisers, allowing growers

to tailor their purchase to suit their specific soil and crop requirements.

For more information on fertiliser rates and application strategies, contact your local Incitec Pivot Fertilisers' Distributor.

This is a guide only, which we hope you find helpful as a general tool. While Incitec Pivot Limited has taken all reasonable care in the preparation of this guide, it should not be relied on as a substitute for tailored professional advice and Incitec Pivot accepts no liability in connection with this guide. Talk to your local Incitec Pivot Fertilisers' Distributor Agronomist about soil testing and arranging a specific fertiliser recommendation that best suits your needs.

© BIG N, Granulock, Cotton Sustain, Liquifert, EASY LIQUIDS, EASY N, EASY PK, EASY U-Sol, EASY KS, EASY ATS, Zincsol, Coppersol, Mangasol, Gran-Am and Topfoliar are registered trademarks of Incitec Pivot Limited. ™ SuPrime Z, EASY NP, EASY NP+Zn, EASY NPK 27 and Green Urea are trademarks of Incitec Pivot Limited. © ENTEC is a registered trademark of K & S Aktiengesellschaft. © Cold-Flo is a registered trademark of USS Agri-Chemicals, a division of US Steel & Co. © Streamjet is a registered trademark of Spraying Systems Company. © Bollgard and Bollgard II are registered trademarks of Monsanto Technology LLC. © Granubor is a registered trademark of US Borax Inc.



Incitec Pivot Fertilisers is a business of Incitec Pivot Limited, ABN 42 004 080 264.