HOME GROWN FEED

Unlocking your pastures potential

DONAGHYS N-Boost®

Some things never change.

PASTURE IS THE CHEAPEST FORM OF FEED.

Some things do change, **N-*Boost*® AN EVOLUTION IN FARMING.**

contents

the N-*Boost*® System on pasture

1. Dissolve urea

At a rate of 40kg/ha in 200L of water using a Donaghys supplied mixing station

2. Add N-*Boost*®

At 3L/ha

3. Spray on pasture

200L/ha of the total spray mix, either self applied or using a contractor

Grow the same amount of dry matter with half the usual amount of nitrogen.*

The N-*Boost*® and dissolved urea solution is then sprayed onto pasture with a conventional boom sprayer.

* Based on trials comparing the N-*Boost*® System to use of 80kg of urea

how does **N-*Boost*® work?**

The foliar application of dissolved urea results in the nitrogen being in a plant available form (ammonium), dramatically improving the time and energy efficiency of nitrogen uptake. Studies show that most of the nitrogen can be taken up into the leaf within the first 12 hours after application. This avoids the lag in N uptake and utilization before pasture is grazed in a short rotation. But applying foliar urea alone is not enough to gain the benefits seen with the N-*Boost*® system partly because of the osmotic stress from the urea and partly because recently grazed pasture has low energy status for processing nitrogen.

Scientific studies at Lincoln University found that N-*Boost*® stimulates plant cell organelles, particularly chloroplasts. These are the key cell components of the plant responsible for energy production, storage, and release. The studies also demonstrated that N-*Boost*® allows plants to better cope with osmotic stress.

The combination of plentiful nitrogen (from foliar urea), plentiful energy release (from chloroplast stimulation) and osmotic stress reduction uniquely maximizes the nitrogen response of pastures.

- **N-Boost® increases chlorophyll concentration in the plant**
- **N-Boost® stimulates plant energy**
- **N-Boost® increases plant nutrient uptake**
  - ***Allowing the plant to produce more carbohydrates***
  - ***Allowing more amino acids to convert into protein***
  - ***Increased protein production = Increased growth***

The microorganisms utilised in the production of N-*Boost*® are commonly found in soils and are all on the GRAS (Generally Recognised As Safe) list of ACVM.

After production has been completed, the final packaged N-*Boost*® product contains no live microorganisms and is a non-DG product.

N-*Boost*® contains a complex of bioactives derived from a fermentation of selected microorganisms. Several of these such as adenine compounds stimulate the activity of chloroplasts. Others such as non-protein amino acids also improve the ability to cope with osmotic stresses.

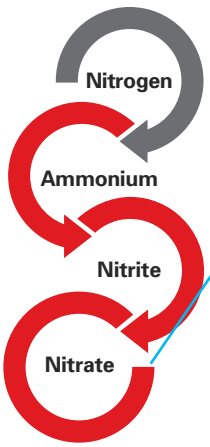
DONAGHYS N-Boost

pasture application comparison

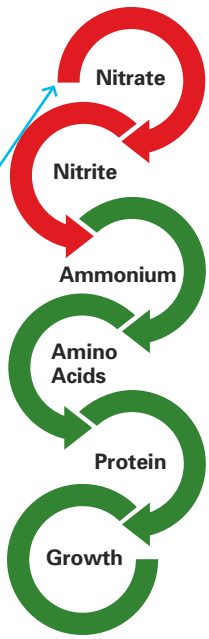
spreading urea

When urea is spread onto pasture it can go through several chemical transformation before it can be used by the plant

On the Soil



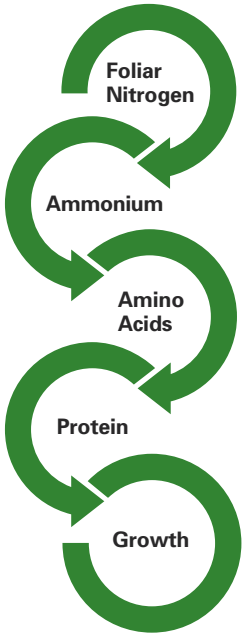
In the Plant



spraying urea

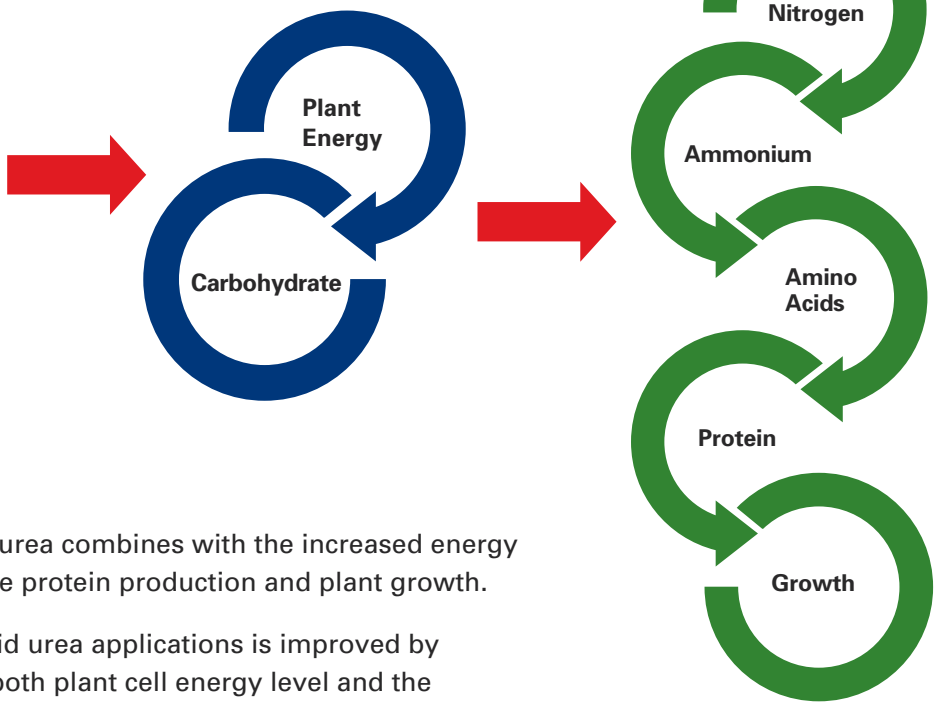
Spraying urea onto pasture improves the speed uptake of Nitrogen and reduces the energy requirements of the plants.

On the Plant



Skipping the large plant energy requirement, reducing volatisation, skipping nitrates, reducing leeching and allowing more rapid growth.

working on pasture



The foliar application of urea combines with the increased energy from N-*Boost*® to increase protein production and plant growth.

Pasture response to liquid urea applications is improved by N-*Boost*® assisting with both plant cell energy level and the absorption of nitrogen.

DONAGHYS N-Boost®

benefits

MAINTAIN COST EFFICIENCY

MAINTAIN COW NUMBERS AND PRODUCTION

DECREASE ENVIRONMENTAL IMPACT

SCAN TO VISIT OUR ONLINE CALCULATOR

maintain cost efficiency

Modelling partial use of the N-*Boost*® system (refer scenario 1 in the website calculator) allows farmers to maintain profitability when compared to using a solid urea application system. Full use of the N-Boost® system can potentially allow farmers to increase their profitability (refer scenario 2)

maximise pasture response to nitrogen

Trials show that the N-*Boost*® System doubles the nitrogen response of pasture compared to 40kg/ha of urea alone therefore giving potential for increased dry matter production with capped inputs of Nitrogen.

Metabolisable energy (ME) and other feed quality indicators of pasture grown are maintained using the N-*Boost*® System. By using less nitrogen, clover levels in pasture can be increased leading to subsequent increased potential in atmospheric nitrogen fixation.

decrease environmental impact

Using the N-*Boost*® system allows you to reduce your nitrogen application, which is shown to reduce nitrogen leaching by up to 15%*. A reduction in nitrogen can result in a decrease in nitrous oxide emissions.

* Modelling of a typical 160ha Canterbury dairy farm, using the Overseer® nutrient budget software, indicated up to a 15% reduction in nitrogen leaching from using the N-*Boost*® System at 40kg/ha of urea compared to 80kg/ha of urea only, without compromising pasture production.

application of N-*Boost*®

To apply the N-*Boost*® System onto pasture, 40kg/ha of urea is dissolved in water with 3L/ha of N-*Boost*® and typically sprayed at a total spray mix volume of 200L/ha.

DISSOLVED UREA

Urea is easily dissolved in water in an N-*Boost*® Mixing Station (which can be supplied by Donaghys) or by agitating in a spray tank.

APPLICATION

The N-*Boost*® and dissolved urea solution is then foliar sprayed onto pasture with a conventional boom sprayer.
This can be self applied or using a contractor. Refer to label for usage instructions.

5,000, 15,000 & 25,000 Litre mixing stations available (tank, pipes, pump and fittings).

For details and conditions, please contact Donaghys.

versatility of application

N-*BOOST*® AS PART OF A SPRAYING SYSTEM

The N-*Boost*® System can be incorporated with existing spray applications allowing the farmer to apply multiple products at once, saving time and money.

broadleaf pasture herbicides

N-*Boost*® has also been tank mixed and found to be compatible with commonly used broadleaf pasture (phenoxy) herbicides e.g. Donaghys 2-4D Amine and Donaghys Flumetsulam.

gibberellic acid

Donaghys GibbSTART MAX can be mixed with N-*Boost*® and applied strategically during shoulder periods to stimulate extra pasture production.

facial eczema

Donaghys Liquid Mycotak can be added to the spray mix to provide control of the causal organism of facial eczema. Liquid Mycotak offers up to six weeks protection against facial eczema.

DONAGHYS N-Boost®

proven

PROVEN IN NEW ZEALAND AND INTERNATIONALLY

PATENTED IN 5 COUNTRIES

1 INTERNATIONAL PUBLICATION

N-*Boost*® has been peer reviewed and published in the Journal of Plant Nutrition.

OVER 15 YEARS ON NZ FARMS

5 PEER REVIEWS

The pasture trial data reports of N-*Boost*® have been peer reviewed by five independent parties.

53 EXTERNAL ORGANISATIONS

370 TRIALS

Since 2008, there have been over 370 pasture and crop trials conducted by 53 independent universities and organisations.

publications

The scientific N-*Boost*® pasture trials have been peer reviewed both in New Zealand and internationally including trial design, statistical analysis, product performance and an overall meta-analysis of the data.

AsureQuality Peer Review
This report by AsureQuality reviews the New Zealand field trials on pasture conducted by Donaghys to evaluate pasture responses to the application of N-Boost® in association with urea. It considers the design and execution of the field trials as well as the analysis and reporting of results. *"Overall, the adopted trial design and statistical analyses are scientifically robust."*

ASUREQUALITY REVIEW; AUG 2009

Fertiliser Quality Council Peer Review Report
This Fertiliser Quality Council peer review is a report of the Expert Panel on the pasture trial programme conducted by Donaghys to support their claims regarding the agronomic performance of N-Boost®. *"This current review concludes that the overall trial program has been designed and conducted in a scientifically credible manner."*

FERTILISER QUALITY COUNCIL REPORT; SEP 2012

Fertiliser and Lime Research Centre
A paper entitled *"Nitrogen Response Effect of LessN®: A Meta-Analysis"* was presented at the Fertiliser and Lime Research Centre (FLRC) Conference at Massey University on 12-14 February 2013.

JENKINS, T.A. AND RANDHAWA, P.S. (2013). NITROGEN RESPONSE OF LESSN: A META-ANALYSIS. IN: ACCURATE AND EFFICIENT USE OF NUTRIENTS ON FARMS. (EDS L.D. CURRIE AND C L. CHRISTENSEN).

Journal of Plant Nutrition, USA: How well do fertilizer enhancers work?
N-Boost® biostimulant sprayed with dissolved urea increased pasture nitrogen response by an equivalent of 18.0 kg N/ha compared to urea alone in nitrogen-responsive and label-conditions trials. This was similar to a manufacturer claim that the product increases nitrogen response by an equivalent of 18.4 kg N/ha.

VSN New Zealand Ltd
"I would conclude that on average there was less than a 3% difference between the two treatments [LessN® System vs. 80kg urea per hectare]."

DR DAVID BAIRD; OCT 2012.

"The average addition[al] kg of N over 40 kg required to give the same response as LessN is 39 kg with a 95% interval of (35-44) kg."

DR DAVID BAIRD; OCT 2012

Saville Statistical Consulting Ltd
"In general terms, the LessN40 treatment yielded twice the DM response per kg of applied nitrogen as did the two treatments with the same rate of applied nitrogen (40 kg urea/ha), and was equivalent to the two treatments with twice the rate applied urea (80 kg/ha)."

DAVE SAVILLE; OCT 2012

Donaghys N-*Boost*® is the original scientifically proven and trusted Donaghys LessN® with the same ingredients and method of application.

DONAGHYS N-Boost

pasture trials

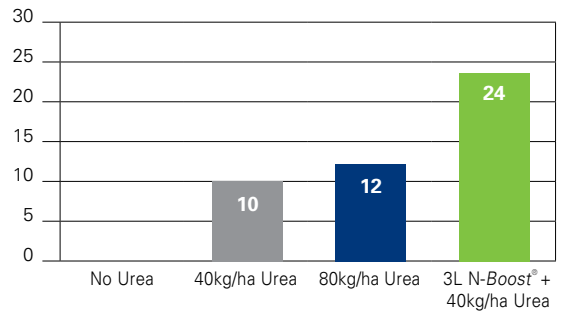
pasture trials

67 trials nationwide have been conducted on a mixture of dryland and irrigated clover based pasture, making it the largest nitrogen response study on pasture in New Zealand since 1981.

The trial periods ranged from 15 to 187 days with the average length of most trials being 25 days.

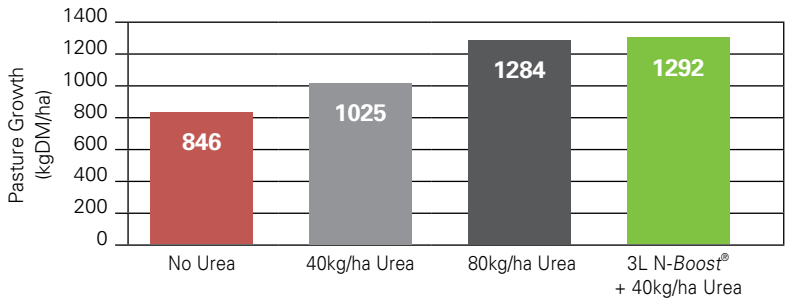
Over 100,000 individual pasture measurements were taken.
Of the trials conducted, seven trials did not show a nitrogen response to urea application, seven were not conducted in accordance with Donaghys recommendations (i.e. off-label) and another seven did not include a treatment with 40kg/ha of urea.

Nitrogen Response (kg DM / kg N applied)*



* Average nitrogen response over 46 trials, average length 25 days.

Average Pasture Growth Over 46 Trials
Average Length of 25 Days

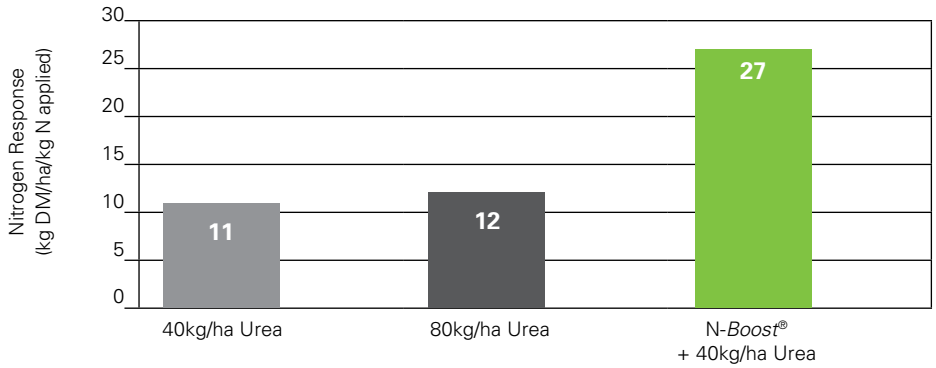


DONAGHYS N-Boost®

extended pasture trials

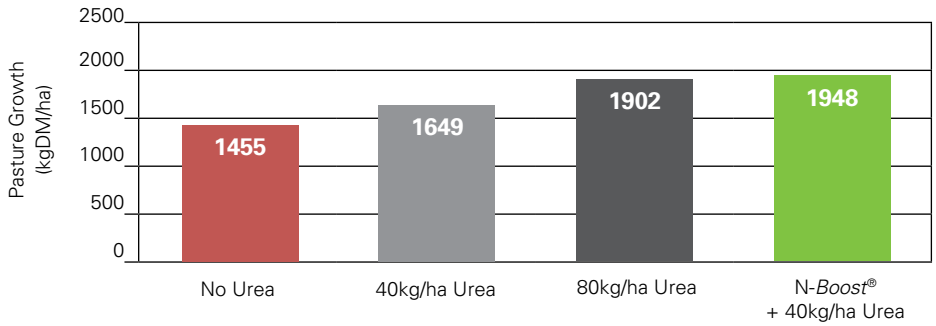
Nine extended trials were conducted past one grazing round (average of 49 days) to assess the residual effect of N-*Boost*®. **Five of these trials** were independent and four were in-house.

Average Nitrogen Response Over 9 Trials
Average Length of 49 Days



Over the average of these trials, 27kg/DM per kg of Nitrogen was grown with the N-Boost® system, compared with 12kg/DM with 80kg/ha of urea and 11kg/DM with 40kg/ha urea applied.

Average Pasture Growth Over 9 Trials
Average Length of 49 Days

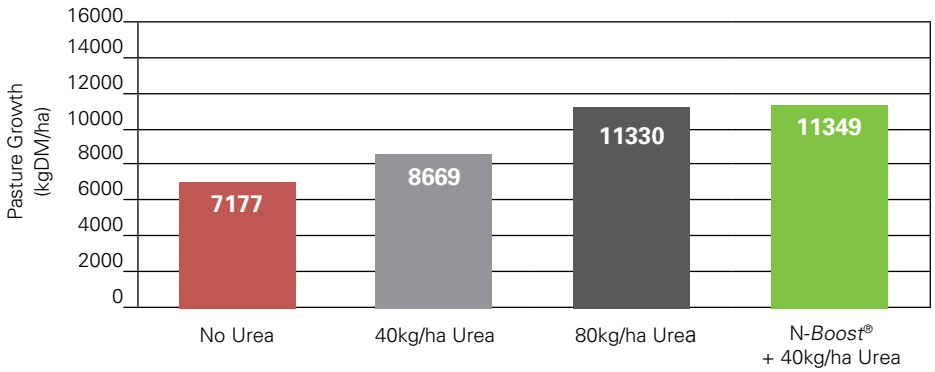


Extended trials proved that the residual effect of the N-Boost® System is similar to an application of solid urea at 80kg/ha as an average of 1948kg of DM was grown with the N-Boost® system compared to 1902kg of DM with 80kg/ha urea.

ONE TRIAL WAS ALSO CONDUCTED THROUGHOUT AN ENTIRE MILKING SEASON (SEVEN GRAZING ROTATIONS)

Treatments were reapplied before grazing three and grazing six. Using 120kgs less urea, the N-*Boost*® treatment grew similar amounts of pasture to the 80kg spread urea treatment.

Total Pasture Growth Over One Trial
Total Length Of 187 Days



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variability of nitrogen fertiliser response

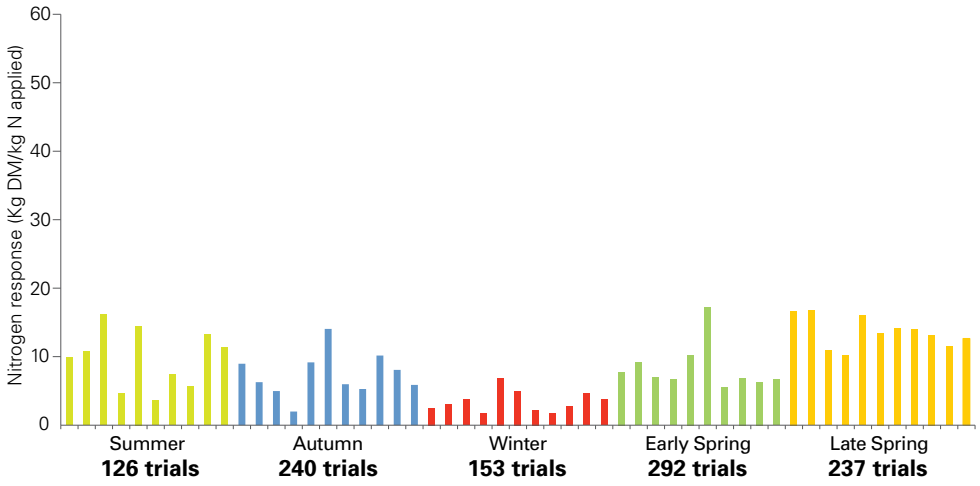
Applying urea alone will have variable results on pasture response due to external factors such as soil temperature, moisture and existing soil nitrogen.

Using the N-*Boost*® System will also have variable results on pasture response but trial results show that the N-Boost® System will still double the pasture response to 40kg of urea per hectare.

* Nitrogen Fertiliser Trial Database: A Valuable Resource. Climatic Factors and First Cut Response to Nitrogen Application. In: Nutrient management in a rapidly changing world. (Eds L.D. Currie & C.L. Lindsay), pp. 191-204. Fertiliser and Lime Research Centre, Massey University, Palmerston North, NZ.

The Regional Variability Of Nitrogen Response On Pasture Using Urea Alone

DATA OBTAINED FROM RAJENDRAM ET AL. 2009*.

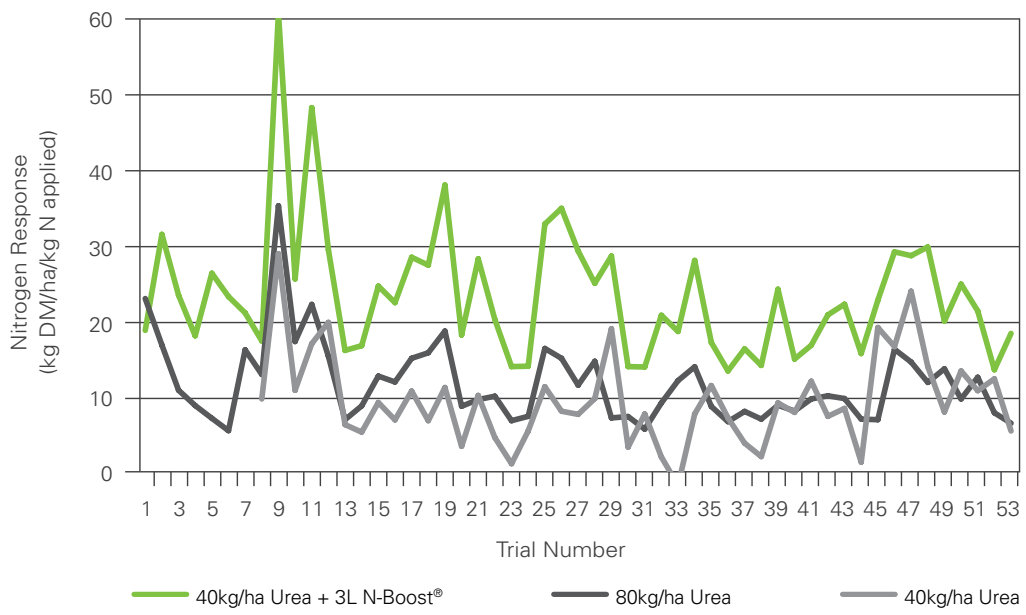


Each bar represents from left: Northland/Auckland, Waikato, Bay of Plenty, Taranaki, Lower North Island, East Coast North Island, Northern South Island, Canterbury, West Coast South Island, Lower South Island and Central Otago.

NITROGEN RESPONSE

Pasture response to nitrogen is variable depending on climate, seasonality, soil, and temperatures. The use of the N-Boost® system has similar variability, but trial results show that the N-Boost system will still double the pasture response to 40kg of urea per hectare. This can be seen in the chart below."

Nitrogen Response Of 3L N-Boost® + 40Kg/Ha Urea
COMPARED TO 40KG/HA UREA ALONE AND 80KG/HA UREA ALONE



N-*Boost*® should only be used when a nitrogen response can be expected. Soil temperatures must be 10°C or above. Ensure sufficient pasture cover for optimum foliar uptake (1400-1600kg DM/ha). For best results apply the N-*Boost*® System 3-5 days after grazing. Sufficient soil moisture content is required for pasture to respond. Avoid application in very hot or windy conditions or within 6 hours of impending heavy rain.

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Spread Urea application V Spray Urea application

Independent replicated pasture trials confirmed the response to spreading urea granules is the same as spraying liquid urea.

ADDING N-*Boost*® TO LIQUID UREA MAKES THE DIFFERENCE.

Table 2. Pasture dry matter (kg/ha) in different treatments measured within one grazing cycle in six dairy farms in Canterbury during the summer of 2010-11. Values estimated by pasture probe reading.

FARM	1	2	3	4	5	6	MEAN	%
Control	950.3	1201.0	738.3	1454.0	1242.9	1159.8	1124.4	0.0
LessN40	1517.8	1746.6	1294.4	1833.6	1649.1	1634.3	1612.6	43.4
Liq U40	1214.9	1657.0	1053.8	1604.4	1446.5	1414.0	1398.4	24.4
Solid U40	1127.4	1595.4	1103.8	1752.0	1290.8	1430.0	1383.2	23.0
Solid U80	1400.3	1753.5	1355.9	1972.8	1718.6	1526.0	1621.2	44.2

- The average of all 6 trials showed that there was no difference in dry matter between the spread 40kg and spray 40kg urea treatments, as highlighted by the red squares.
- And the average of all 6 trials showed that the **N-*Boost*®** system (LessN40) doubled the nitrogen response to 40kg urea, resulting in the same amount of DM grown as with 80kg urea, as highlighted by the blue squares.
- The independent trial report concluded from these measurements, the increase in pasture productivity obtained with the LessN (**N-*Boost*®**) treatment was similar to that of urea application at 80kg/ha.

This will result in maximising the return of urea applications.

DONAGHYS N-Boost

farmer testimonials

MITCHELL COOMBE

LOCATION Morrinsville

SIZE 197ha effective Area

COWS 650

“ We have had good results from N-*Boost*® this season. I was looking for an option that could lower our nitrogen use while looking at ways to maintain our production.

We are trying this on one of our farms and it has been very successful. We’ve had feed available during a tough January.

Going into rounds with strong covers with good clover content where we’ve used N-*Boost*® has been excellent. ”

farmer testimonials

SIMON AND BEC RIORDAN

LOCATION Dromore, Ashburton

SIZE 540ha effective area

COWS 2,088 cows

“**Traditionally the farm here has been an intensive operation and a high nitrogen user over the years. We’ve always thought we’ve used it efficiently – but we were still a high user. When 190kg/ha cap came in we had to reduce our usage by more than 100kg a hectare.**

We’ve just been following the programme, following the cows with 40kg Urea foliar sprayed with N-*Boost*® applied. Plus, we’ve had two applications of maintenance fertiliser. We’re waiting 5 days post grazing so there is more leaf on the grass for a good response.

We’ve had even pastures with good clover this season. The cows are eating it out nice and evenly as there are fewer urine patches. It’s been noticeable on the dry days.

In the N-*Boost*® trial it’s ticked a lot of boxes, the results speak for themselves. We have dropped our usage by over 100kgs of N. We don’t want our legacy to be polluters, we pride ourselves on looking after the environment.”

cropping with N-Boost®

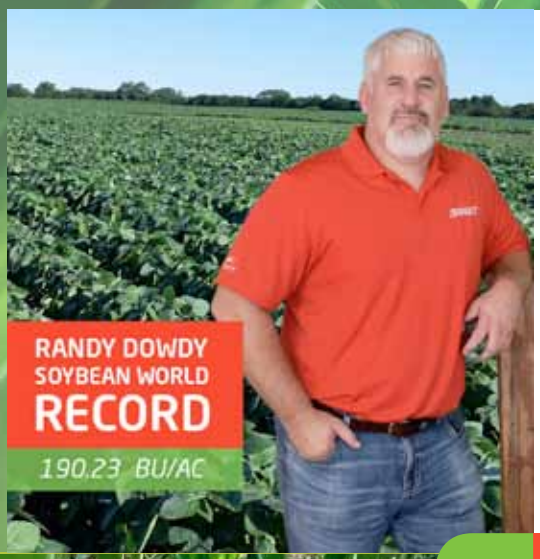
application on crops

In cropping situations, 3-6L/ha of N-Boost® is applied as a foliar application with water, sprayed at an appropriate water volume (50-200L/ha). The N-Boost® solution is then applied to the target crop at specific growth stages in addition to standard fertiliser applications.

To save costs, N-Boost® is recommended to be used at the same time as a sprayed on herbicide, fungicide or insecticide application (with or without the addition of foliar nitrogen).

Conditions and timing for spraying N-Boost® on to crops vary depending on individual crop types.

Contact your local Donaghys Territory Manager for further information.



Georgia USA grower Mr R Dowdy broke the world record for soybean yield with 190.23 bushels per acre (12.8 tonnes/ha) of soybeans.

This surpasses his previous record of 171 bushels per acre (11.5 tonnes/ha) in 2016.

N-Boost® was among the key crop inputs credited with helping this renowned USA grower set a new world record for soybean yield in the 2019 Georgia Soybean Production Contest, and was part of a core soybean nutrition programme designed to help soybeans reach their full genetic potential.

N-*BOOST*® HELPED GROWER SET A WORLD RECORD FOR SOYBEAN YIELD

10.1%
CROP YIELD INCREASE

In trials, the overall average yield increase was 10.1% for N-Boost® treated crops, compared to untreated crops.

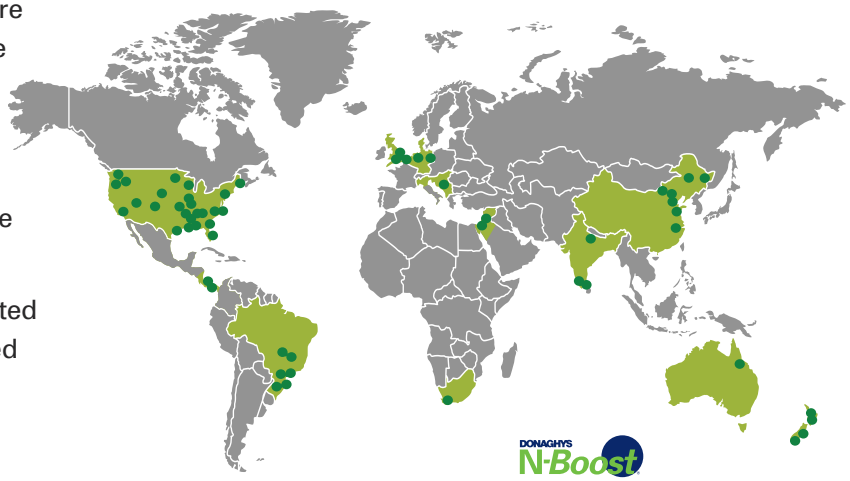
increase crop yields

Crop Trials

N-Boost® is recognised internationally where it is largely used in broadacre and intensive cropping situations.

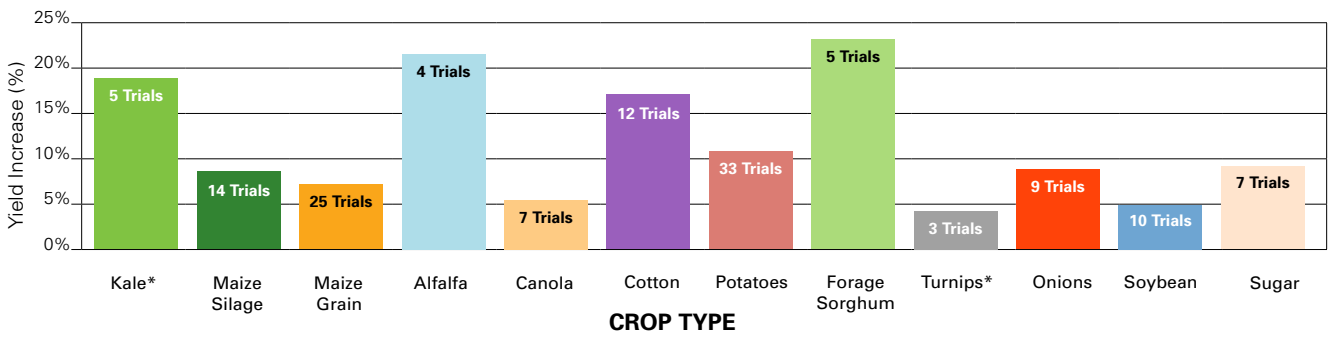
N-Boost® has been proven to provide commercially viable yield increases on a range of significant broadacre and intensive vegetable crops.

Over 250 replicated trials have been conducted on 25 different crop types. In trials designed to quantify yield improvement, the overall average yield increase for the N-Boost® treated crops was 10.1% compared to the untreated crops.



N-BOOST® AROUND THE WORLD

The Effect Of N-Boost® On Selected Crops Trialled In New Zealand And Overseas



During many of these trials, N-Boost® has been tank mixed with many common agrichemicals without any incompatibility issues. It is recommended that a small area be trialled for compatibility if unsure.

Donaghys N-Boost® is the original scientifically proven and trusted Donaghys LessN® with the same ingredients and method of application.

about us

Established in 1876, proudly NZ owned and still manufacturing in Dunedin, Donaghys has been supplying the rural sector for over 140 years. Just as farming practices have changed over the years so has Donaghys.

Donaghys has a comprehensive range of quality and innovative products across animal health, dairy shed supplies and crop protection.

With knowledgeable and experienced territory managers, backed by our technical veterinarians and scientific team, Donaghys takes pride in what we offer, and stand behind the products we supply.

FOR MORE INFORMATION ABOUT N-BOOST® VISIT
www.donaghys.com/n-boost
or call **0800 942 006**
to be directed to your local territory manager.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