

# NitrotainTE22 / Urea Trial NZ

by

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# Introduction

Urea as a common fertiliser poses challenges like nitrogen loss and environmental impact. Alternatives from ECTOL Pty Ltd offer eco-friendly solutions, reducing nitrogen loss and environmental harm, making them crucial for sustainable agriculture.

This trial evaluates yield as Dry Matter (DM) and nutrient response from two foliar fertilisers, NitrotainTE22 (22%N) and ECTOL Crop and Pasture, when compared to Urea granular fertiliser on a dairying environment in Canterbury, NZ. Of note, NitrotainTE22 is now available as NitrotainTE27 with 27% elemental Nitrogen.

## Materials and Methods

### Experimental Design

The research began with an initial application in September 2019, followed by measurements taken at 4-week, 8-week, and 12-week intervals thereafter. The primary aim was to evaluate crop yield (Dry Matter - DM) of two distinct treatments, specifically NitrotainTE22 (NTE22) and ECTOL Crop and Pasture (ECP), in contrast to Urea, alongside an untreated pasture control group.

### Trial Plots

Four distinct treatment groups were established in the trial, each replicated four times in a Latin square format. The trial plots included:

1. Untreated: No fertiliser applied
2. Urea: 75kg/ha
3. NTE22: 10 Lts/ha
4. NTE22: 7Lts/ha + ECP 2Lts/ha

### Trial Setup

- The test area was enclosed with electric fencing
- Each treatment area covered 12 square meters
- Measurements were taken at 0 (TDM only), 4, 8 and 12 weeks
- To assess Dry Matter (DM), plate readings were conducted to determine Total Dry Matter (TDM)
- Grazable Dry Matter (GDM) is a more reliable measure of pasture consumed by grazing animals, and was obtained by employing a rotary mower set to a height of 11-12 cm
- Dairy Business Centre (DBC) analysis was employed to calculate DM/ha
- Soil test analysis was conducted by Hill Laboratories

## Summary of findings

- Urea, applied at an amount of 75 kgs/ha on pasture, exhibited a substantial increase in TDM response during the initial 4 weeks after application. However, no significant difference in TDM was observed during the subsequent 4 to 12 weeks.

- NitrotainTE22, applied at 10 Lts/ha, outperformed Urea in terms of TDM production over the 8 weeks following application.

- **The production of GDM displayed significant distinctions from TDM. NitrotainTE22 surpassed Urea in GDM response during the 8 weeks following application (154% vs. 101%) and maintained this advantage up to 12 weeks after application.**

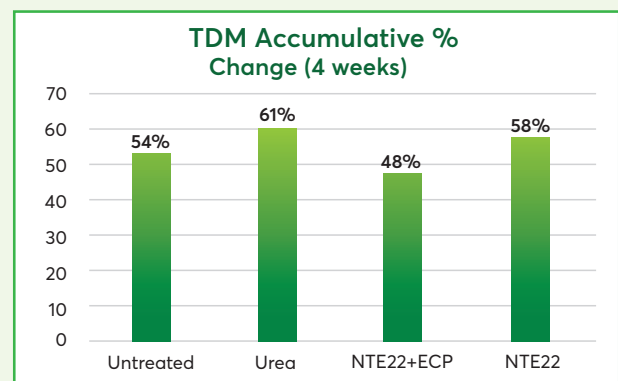
- Urea had no lasting effect on GDM after the initial 4 weeks following application, when compared to the untreated control.

- The combination of NTE22 and ECP had a substantial impact on GDM, with the most significant response occurring in the 8 to 12 week period following application.

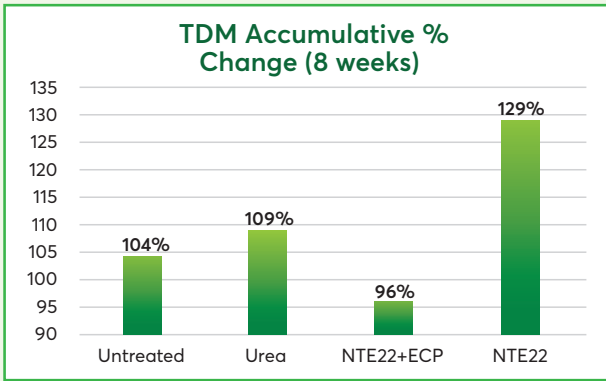
## Key Results and Conclusions

See Appendix 1 and 2 for raw measurements and data.

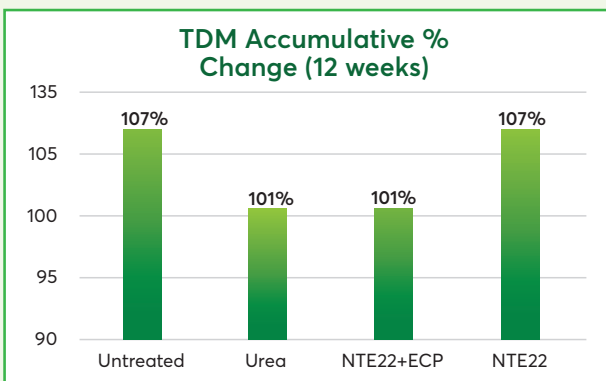
### Total Dry Matter (TDM) using Plate Metre



TDM at first cut +4 weeks after treatments, the Urea treatment had a 61% increase in TDM, NTE22, 58%. Untreated 54%



At the second cut +8 weeks NTE22, had a 129% increase in TDM since treatments, Urea a 109% increase and untreated 104%.



There were no significant differences at +12 weeks on any treatment.

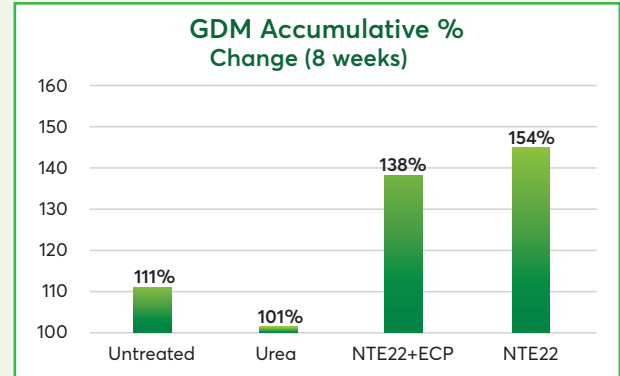
## Conclusions on Total Dry Matter

- The application of Urea had an immediate effect on TDM production in the 4 weeks after application but exhibited minimal impact on accumulative TDM over 8 weeks compared to the untreated control.
- NTE22 initially exhibited a smaller effect on TDM during the first 4 weeks following application in comparison to Urea. However, it demonstrated a more pronounced impact during the subsequent 4 weeks, culminating in a notably significant response over the 8 week post application period.
- The lesser rate of NTE22 with ECP did not show an impact on TDM.
- In the third month after application no treatment showed any accumulated impact on TDM. Each treatment had a reading over 3,500KgDM/ha and the pasture was naturally peaking.

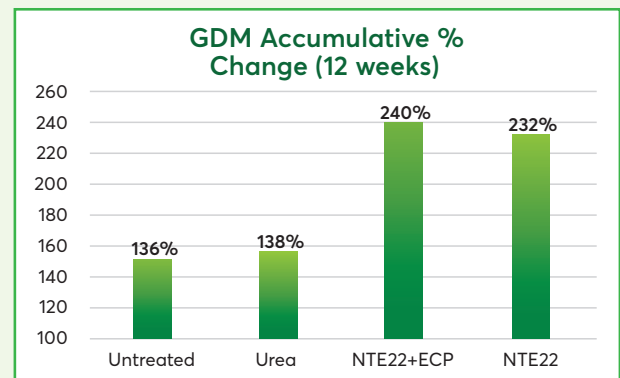
## Grazable Dry Matter (GDM) Mown

By harvesting the treatment plots at a height of 11-12 cm and subsequently drying the samples, a more precise assessment of Grazable DM (GDM) is obtained. This method is superior in accuracy compared to measuring Total DM (TDM).

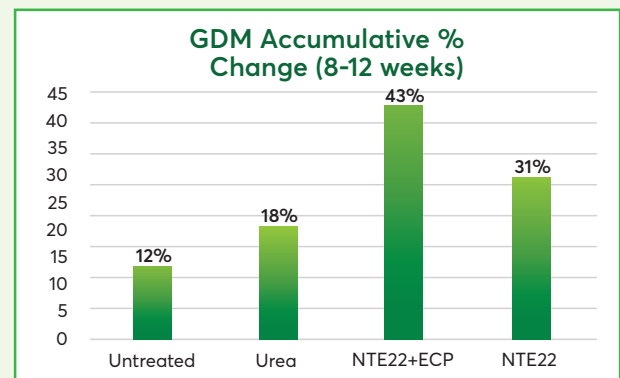
*Note: No pre-application samples were taken, so responses to the first application could not be measured. % Changes could only be measured from the first cut onwards.*



At the second cut +8 weeks after application, Urea GDM increased by 101% and NTE22 GDM increased by 154%.



At the third cut +12 weeks after application, NTE22+ECP had increased GDM by 240%, NTE22 by 232% and Urea by 138%.



The increase in GDM over the four-week period between +8 weeks and +12 weeks was 43% for NTE22+ECP, 31% for NTE22, 18% for Urea and 12% for untreated pasture.

## Conclusions on Grazable Dry Matter

- The Urea response in terms of GDM was only significant in the first four weeks following application.
- NTE22 on the other hand displayed its most significant response during the 4 to 8 weekly period following application and the accumulated GDM response from NTE22 exceeded that of Urea over this same period.
- During the period from 8 to 12 weeks there was a significant increase in GDM from NTE22 and NTE22+ECP, while the response from Urea in the period 8 to 12 weeks after application was not significantly better than the untreated control.
- NTE22 is shown to increase GDM for at least 12 weeks after application.
- NTE22+ECP produced the highest measure of GDM in the final 8 to 12 weeks confirming the growth promotant plant response to ECP.
- While there was no observable rise in TDM (Total Dry Matter) from the 8th to the 12th week following application of any treatment, a noticeable increase in GDM was evident during this period with NTE22 and NTE22+ECP.

# Appendix

## Appendix 1. Total Dry Matter measurements

All measurements are in kgs/ha	WEEK 0	WEEK 4			WEEK 8			WEEK 12		
	Measured TDM	Measured TDM	Increase in TDM	% Increase	Measured TDM	Increase in TDM	% Increase	Measured TDM	Increase in TDM	% Increase
Untreated	1785	2757	972	54	3639	1854	104	3689	1904	107
Urea	1810	2914	1104	61	3782	1972	109	3640	1830	101
NitrotainTE22 + ECTOL Crop and Pasture	1781	2635	854	48	3497	1716	96	3586	1805	101
NitrotainTE22	1781	2819	1038	58	4070	2289	129	3681	1900	107

Table 1 - TDM measurements at Week 0, 4, 8, 12

## Appendix 2. Grazed Dry Matter measurements

All measurements are in kgs/ha	WEEK 0	WEEK 4	WEEK 8			WEEK 12		
	Measured GDM	Measured GDM	Measured GDM	Increase in GDM	% Increase	Measured GDM	Increase in GDM	% Increase
Untreated	n/a	529	1115	586	111	1248	719	136
Urea	n/a	648	1304	656	101	1539	891	138
NitrotainTE22 + ECTOL Crop and Pasture	n/a	447	1065	618	138	1521	1074	240
NitrotainTE22	n/a	504	1280	776	154	1675	1171	232

Table 2 - GDM measurements at Week 0, 4, 8, 12