

## Summary of: Using Humic Compounds to Improve Efficiency of Fertiliser Nitrogen

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As the manufacturers of the Tow and Fert range of machines we are often asked “Where’s the Science.” This question is preloaded with the assumption that there is no science, when in fact, there is a lot of science out there that testifies to the effectiveness of foliar applied fertiliser.

This study, conducted in 2013 is a terrific example of how effective foliar applied fertiliser (in this case N) can be. In summarising this study, we will focus primarily on the comparison between foliar applied urea with humic compounds and solid (granular) applied urea with dissolvable humic compounds.

### The Trials

The three trials covered in the aforementioned paper were conducted at Cloverdale Holdings a 730 Ha, 2900 cow dairy farm near Ashburton from December 2009.

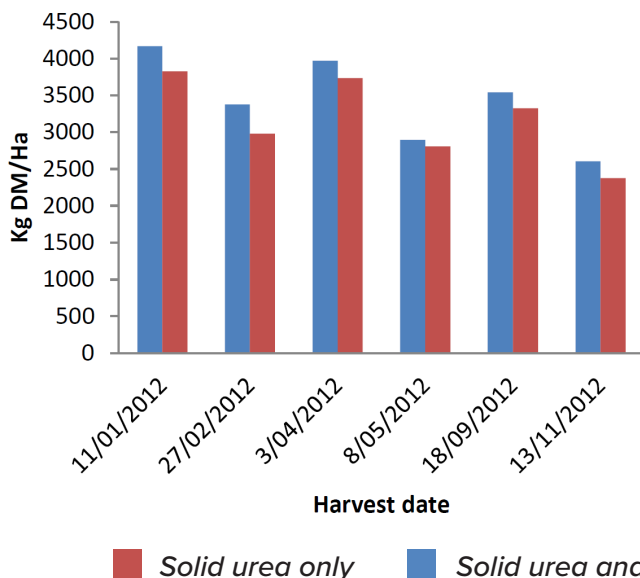
Three trials were carried out over 4 years with each of the trial’s treatments being applied to 6 Ha areas. Pasture production was measured by taking pasture cuts on four 0.5 square meter replicate plots for each treatment at each harvest date.

Humic acid treatments were applied as soluble humic acid granules mixed with solid urea fertiliser before it was spread onto the paddock or as humic acid solution that was mixed with dissolved urea in the case of liquid applications.

Liquid fertiliser applications were made to pastures with covers of 1800 to 2000kg of dry matter/Ha.

### Trial 1.

**Solid (Granular urea)** applied at 65Kg/Ha (30 kg N/Ha) with and without 3kg of soluble humic acid granules/Ha.



*Left: Trial 1. Using solid (Granular urea) with the addition of soluble humic acid resulted in more dry matter being grown at harvest on each occasion.*

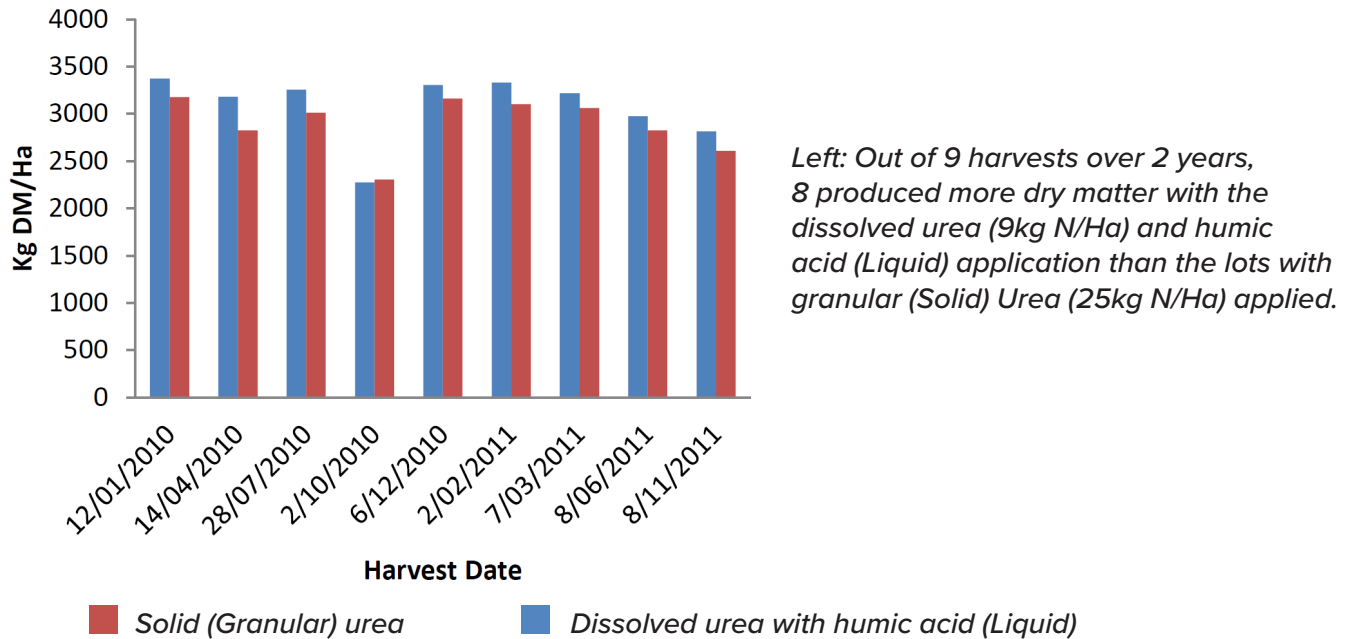
#### Results:

- An average 9% more dry matter was produced where humic acid granules were used.
- Total amount of extra dry matter produced where humic acid granules were used was **1,680 kg/ha**.

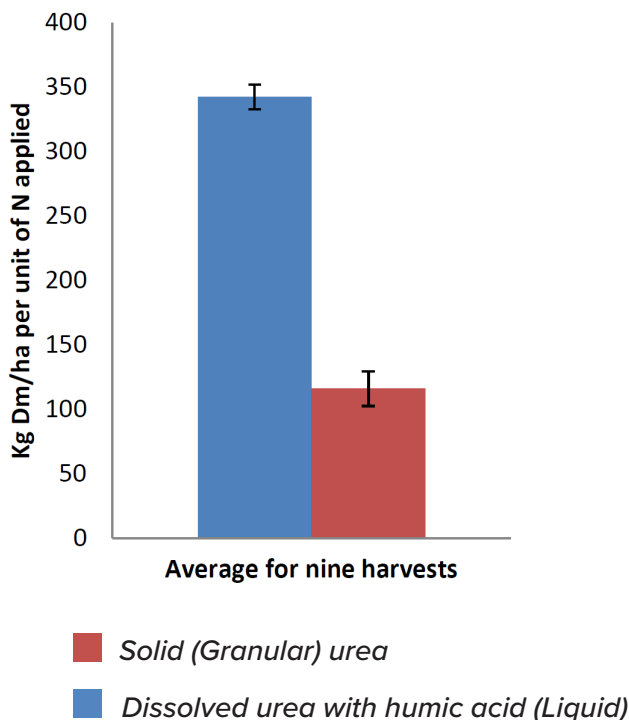
## Trial 2.

Solid (Granular urea) applied at 55Kg/Ha (25kg N/Ha) and liquid applications of dissolved urea at 20Kg/ha (9kg N/Ha).

The dissolved urea had 6 litres/Ha of humic acid added to the spray mix.



Per unit of applied nitrogen (N) it is clear that the foliar applied urea and humic acid mix produced three (3) times as much dry matter compared to applying granular urea on its own.



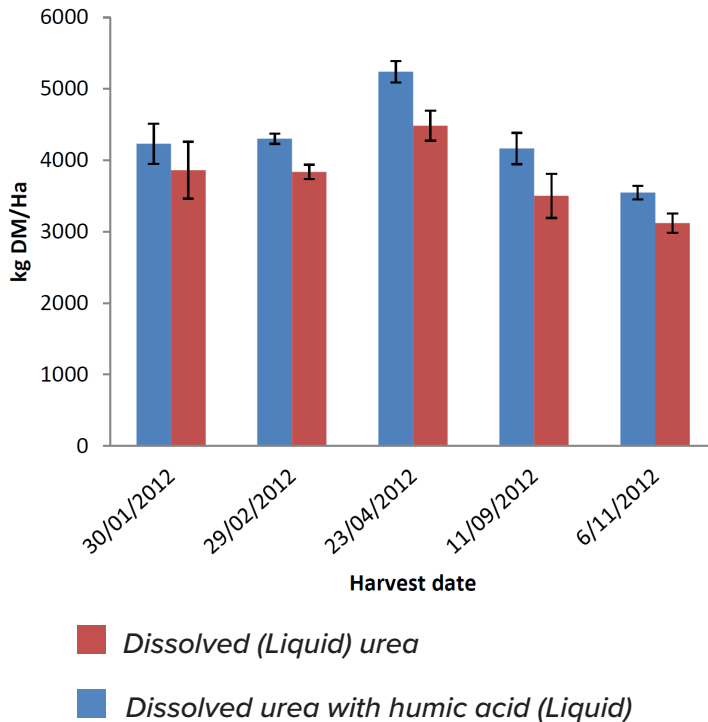
Left: Average pasture production per unit of N applied at 9 harvest dates from plots treated with dissolved urea and humic acid (Liquid) fertiliser compared to granular (Solid) urea.

### Results:

- Granular (Solid) application of urea compared to dissolved (Liquid) applied urea with humic acid added resulted in more dry matter growth at 8 of 9 harvests.
- Per unit of N applied, the plots with liquid application grew three (3) times more dry matter compared to those with only granular (solid) urea application.
- The additional growth achieved with the liquid application of urea and humic acid is described as HIGHLY SIGNIFICANT by the research team.

### Trial 3.

Dissolved (Liquid) urea applied at 20Kg/Ha (9kg N/Ha) as liquid applications with and without the addition of 6 L/Ha of humic acid.



*Left: Pasture production from 4 of the 5 harvests in trial 3 on plots treated with liquid urea compared to those treated with liquid urea and humic acid showed an increase in dry matter growth.*

The trial shows that there is a significant benefit to be derived from the addition of humic acid to liquid nitrogen of between 9% and 18% with an average of 14% more pasture dry matter grown across the trial. *This represented an additional 2,681 kg DM/Ha.*

**Results:**

- The addition of humic acid (a carbon source) to the mix resulted in an average increase in dry matter growth of 14%

### Summary

The above results from the 3 trials clearly illustrate the benefit of using a carbon source, humic acid, in combination with foliar applications. When it comes to comparing the difference between granular (Solid) and foliar (Liquid) applications the benefits are significant with 3 times more dry matter production per unit of applied N being the outcome. This means that farmers could reduce the amount of N applied by 65% and still grow the same amount or more grass. The addition of humic acid to the mix serves to grow even more.

For farmers and businesses this means the following:

*From the study “The use of humic compounds with dissolved urea applications will result in **14% greater pasture dry matter production** than the use of dissolved urea on its own. This work has also clearly demonstrated that the use of nitrogen fertiliser as a liquid or foliar application with humic compounds included in the spray solution **will result in a large increase in the amount of pasture produced per kg of nitrogen fertiliser added** when compared to the use of solid urea fertiliser.”*

1. Significantly reduce N use (65%) potentially saving 10’s of thousands of \$\$\$ in fertiliser cost.
2. High usage by the plant of the N applied as it is applied to the leaf of the plant and does not land on the soil.
3. Significantly reduce potential for leaching and run off.
4. Much better environmental outcomes, lower environmental impact.

***Additional Benefits observed in the study:***

1. It is likely that the chelation of urea with humic acid resulted in enhanced plant uptake and improved the ability of plants to use the N fertiliser.
2. Visual Soil Assessments show that where humic acid was applied the plants had deeper root systems and more dense roots.
3. There was a reduction in the nitrate levels in the pasture the animals ate. This benefitted animal health with reduced levels of lameness, lower empty rates and reduced somatic cell counts.

***Conclusions:***

Overall, the research team found that farmers can grow the same amount or more dry matter with 1/3rd the fertiliser input. The addition of humic compounds allowed for a highly efficient uptake by the plant with less leaching and run off.

View the original report here:

[https://www.towandfert.co.nz/wp-content/uploads/2022/08/Paper\\_Schofield\\_2013.pdf](https://www.towandfert.co.nz/wp-content/uploads/2022/08/Paper_Schofield_2013.pdf)

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