

Case Study: Irrigated Lucerne

'Santa Lea', Moree, NSW
Irrigation: Underground Drip

The Brief

BioNutrient Solutions was asked to improve the poorer Western half of the farm so that it yielded as well as the Eastern half within a 1-2 year time period.

Targeted program for Lucerne nutrition and soil improvement has delivered:

- ✓ Increased Yield by 48% over 2 years.
- ✓ Improved Gross Margin and rapid return on investment.
- ✓ Measurably improved Soil health, with lower Sodium salts and increased Organic Matter percentage.

The Issues

Yield	Western side yielded poorer (22%) with 2 cuts less per year average, i.e., 2.5t/ha compared to 3.2T/ha
Gross Margin	Western side 9.8% lower \$/ha return than eastern half
Soil Structure	Declining soil quality with increasing Sodium levels over time
Irrigation Water	Bore water with relatively high dissolved salts
Insect Pressure	Heavy aphid pressure throughout the season
Crop Resilience	Poor recovery from cutting in hot months, with yield dropping up to 50% in the 4th cut during January
Fertiliser History	Salt based fertiliser in fertigation & ground spread manure and gypsum
Nitrogen Rates	Poor root nodulation – associated high Nitrogen inputs

The Soils

- Generally good Phosphorus (30+ppm Colwell)
- Alkaline pH above 8.0
- High Magnesium (25-35% base saturation)
- Variable Sodium levels (4-10% ESP)
- Prone to hardsetting and waterlogging

The Plant Nutrition derived from SAP tests

- High Nitrate: Unconverted protein potential and aphid pressure
- Low Potash and Calcium: Compromised stem strength
- Low Boron: Enables Calcium uptake and sap pressure
- High Sodium: Reduces nutrient and soil water uptake

The Diagnosis

Salts	Salts in the irrigation water and fertiliser inputs were exacerbating the problem. Adding more salt to fix a salt doesn't work.
Water Quality	Needed improvement with soluble calcium & carbon to buffer sodium
Fertigation Inputs based on sap tests	Reduce Nitrate inputs Increase Calcium, Boron and Potassium.
Soil Chemistry	Base Calcium, Phosphorus & Potassium levels needed improvement

“We are very happy with the results we are achieving. Not only has the soil improved, but we’re making more money as well. The BioNutrients program has been a significant step forward in our enterprise.”

Angela Druery, 'Santa Lea', Moree



Solid lucerne stems from 'Santa Lea' after BioNutrients treatment.

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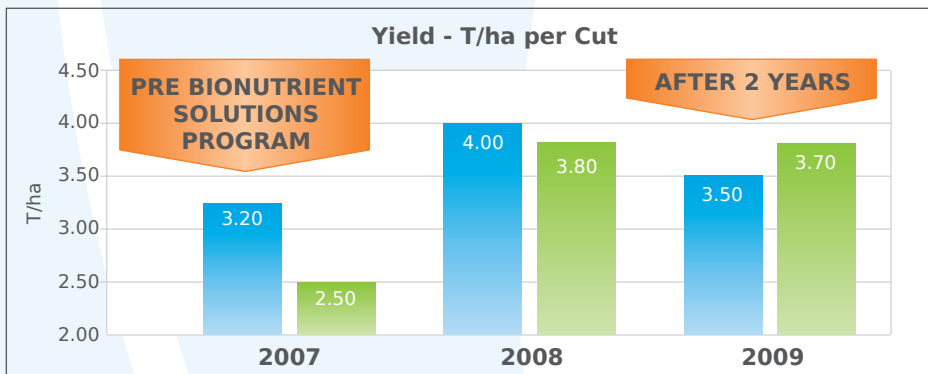


The Fertiliser Program

Nitrogen Fixation	Azotobactor application in irrigation	Eco-N at 1L/ha Molybdenum 40g/ha
Reduce Salts	Regular biology applications within irrigation to sequester Sodium	Compost extract at 20L/ha
Improve Base Soil	Compost blend with boosted Calcium & Potash	1-2T/ha of SolidStart
Fertigation Nutrition	Balance of P, K, Calcium and trace elements	CalPac – 7-15L/ha per water BioPK – 5L/ha per water

In a nutshell, the fertiliser program consisted of regular Carbon, Calcium and Biology in the irrigation to sequester salts and build stronger plants, whilst building soil fertility long term with compost.

The Results Since 2006-07 Season



■ Eastern side untreated ■ Western side untreated

The Products

CalPac:

Soluble Calcium (6.0%Ca) to meet high Lucerne requirement for Calcium, as well as soluble Carbon (25%) to buffer salts in soil and irrigation water.

SolidStart – Compost:

Mineral replacement to raise P, K and Calcium without the salts of gypsum and manure.

BioPK:

Soluble P (4.2%) and K (17.8%) to meet rapid growth demands whilst compost becomes available.

Trace elements:

As needed based on SAP test results.



Treated Western block - Lucerne

- ✓ Yield of the targeted area has increased by 48% to 3.75T/ha average.
- ✓ Return on \$ invested has been \$5.50 per \$1 spent and Gross Margin increased to exceed the rest of the farm, by \$990/ha in 2008-09 season.
- ✓ Soil chemistry improvement measured in Calcium (up), Sodium (down), OM% (up).
- ✓ A noticeable increase in the quality of the crop, with plant density up, solid stems being grown for the first time, and lower aphid control costs recorded.
- ✓ Increased ability of the crop to take in water and withstand January heat stress.

Soil Improvement over time recorded for one bay representative of full program

