HALOGEN GREENS



RESEARCH REPORT 2026

Magtasium™ Preliminary Trial Results: Lucerne

Reviewed by

Prof. Wayne F. Truter | AgriVitality CC
PhD, MSc.Agric, BSc.Agric
MGSSA, IAEA, LRS, Pri. Sci. Nat
Agricultural and Environmental Science Specialist
SACNASP registration: 000148
wayne.truter@fplri.org | +27 83 470 3964

Research Support:

Life AgriScience
APPLIED RESEARCH SERVICES

FPLRI
RESEARCH, TECHNOLOGY & INNOVATION INSTITUTE

REPORT 07 | REVISION 08

HALOGEN GREENS
ELEVATING CROP PROTECTION, NATURALLY

1 Cor 3:6-7 (KJV)

GAUTENG:
Lawrence Road, Poortview AH, Roodepoort
WESTERN CAPE:
Unit 1, 7 Firgrove Way, Firgrove Industrial Estate, Somerset West
CANADA:
Serenity Lane, Fredericton, New Brunswick
Contact Number: +27 (0)87 474 6149
E-Mail address: info@halogengreens.com

Magtasium™ lucerne pot trial

Magtasium™ is a liquid, Group-3, Bio-Stimulant. Across four cuts, lucerne given Magtasium™ without added NPK plus trace fertiliser produced about 95-97% of the cut mass of plants given fertiliser alone. Separate trials also showed improvements in leaf readings, roots and shoots.

1. What was tested

The aim was to test Magtasium™ as a Bio-Stimulant by measuring leaf greenness, root and shoot growth, and regrowth after cutting. The 2025 greenhouse pot trials used sandy-loam and clay soils. The 2026 trial compared Magtasium™ without added NPK plus trace fertiliser against fertiliser alone. Fertilised treatments had a feeding-water EC of 0.87. EC describes dissolved salts in the feeding water.

2. What the trials showed

What was measured	Magtasium™ programme	Comparison	Result in %
Final leaf reading in sandy loam	48.42-48.62 SPAD with fertiliser	37.90 with fertiliser alone	Increase: 27.8% to 28.3%
Root wet mass without added fertiliser	136.6 g under dose B	118.2 g in the untreated control	Increase: 15.6%
Shoot wet mass with fertiliser	168.2 g under dose A	154.2 g with fertiliser alone	Increase: 9.1%
Combined mass from four cuts in 2026	366 g with leaf spray; 360 g with drench. No added NPK plus trace fertiliser.	378 g with fertiliser alone	Mass retained: Spray: 96.8% Drench: 95.2%

SPAD is a meter reading linked to chlorophyll, the green material leaves use to capture sunlight. In the last row, 96.8% and 95.2% show how much of the fertiliser-only cut mass was retained. The other percentages show increases over the comparison plants.

3. What this means for your farm

Magtasium™ kept cut mass close to the fertiliser-only result without added NPK plus trace fertiliser in that trial. Together with the separate leaf, root and shoot results, this gives growers a clear reason to test it in their lucerne feeding programme.

Start by adding Magtasium™ to your usual feeding programme. Keep a matching group without Magtasium™ and weigh each cut on the same dates. This shows whether it helps your lucerne produce more cut material. Test any fertiliser reduction separately: the pot plants could still use nutrients in the growing medium, so these results do not show how much fertiliser can be replaced.

Trial context and 2025 treatments

The greenhouse pre-feasibility programme began in 2025, with some observations continuing into 2026. The recorded design was randomised blocks with five replicates. Soil 1 was sandy loam and Soil 2 was clay; moisture was non-limiting.

Code	Nutrition and product programme	
T1	No Magtasium™; no designated fertilisation	
T2	Fertilisation; no Magtasium™	
T3	Fertilisation plus Magtasium™ dose A	
T4	Magtasium™ dose A without designated fertilisation	
T5	Fertilisation plus Magtasium™ dose B	
T6	Magtasium™ dose B without designated fertilisation	
Dose A	Weekly foliar 20 mL/L plus weekly drench 5 mL/L	
Dose B	Weekly foliar 40 mL/L plus weekly drench 10 mL/L	

Matching comparisons are T3 and T5 against T2, and T4 and T6 against T1. Dose A and B describe application rates, not different formulations.

2026 Lucerne treatment programme

Code	Magtasium™ application	NPK plus trace
T1	Weekly foliar 20 mL/L	No
T2	Weekly drench 7 mL/L	No
T3	No Magtasium™	Yes

Measurements and interpretation

SPAD is a non-destructive index of relative leaf greenness. It is not a direct measurement of photosynthetic rate, nutrient uptake or biological nitrogen fixation. Wet mass is not dry matter. Successive cut masses are reported as recorded sums per pot.

Only designated fertilised treatments received NPK plus trace fertigation, reported at EC 0.87. Product-only plants could access nutrients already present in the medium. The 2026 comparison does not establish a fertiliser-replacement rate.

The source contains invalid #REF! legend entries in the 2026 charts. These are excluded from interpretation. Results are descriptive; statistical significance cannot be independently assessed from the available material. Application rates are product volumes per litre of water, not hectare rates.

2025 pre feasibility results

3.8.1.1 Year 2025

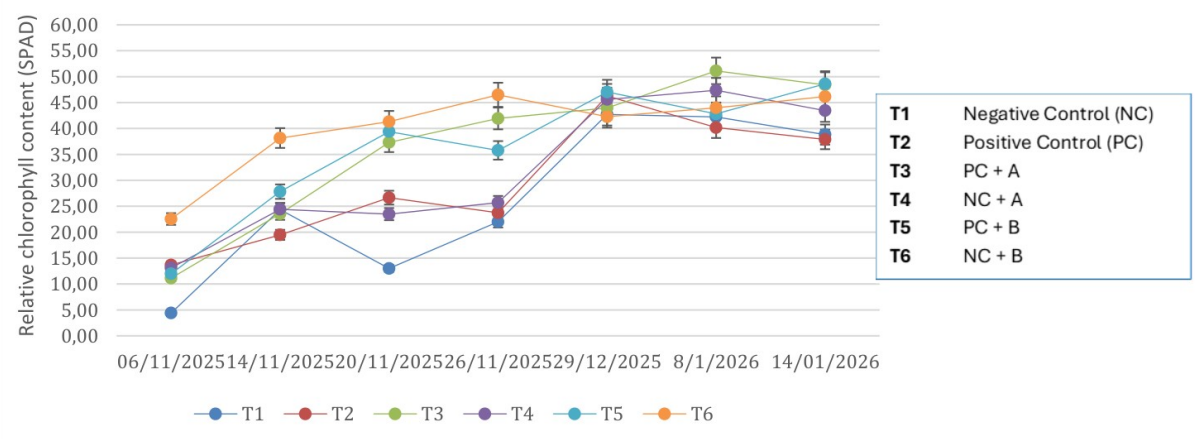

Figure 3.8.1: Relative chlorophyll content (SPAD) of lucerne in soil 1 in a pre-feasibility trial

Final Soil 1 SPAD was 48.42 in T3 and 48.62 in T5, compared with 37.90 in T2. T4 and T6 reached 43.46 and 46.16, compared with 38.82 in T1. All product treatments showed favourable final greenness relative to their nutrition controls. This is consistent with stimulation of chlorophyll-associated plant performance in lucerne.

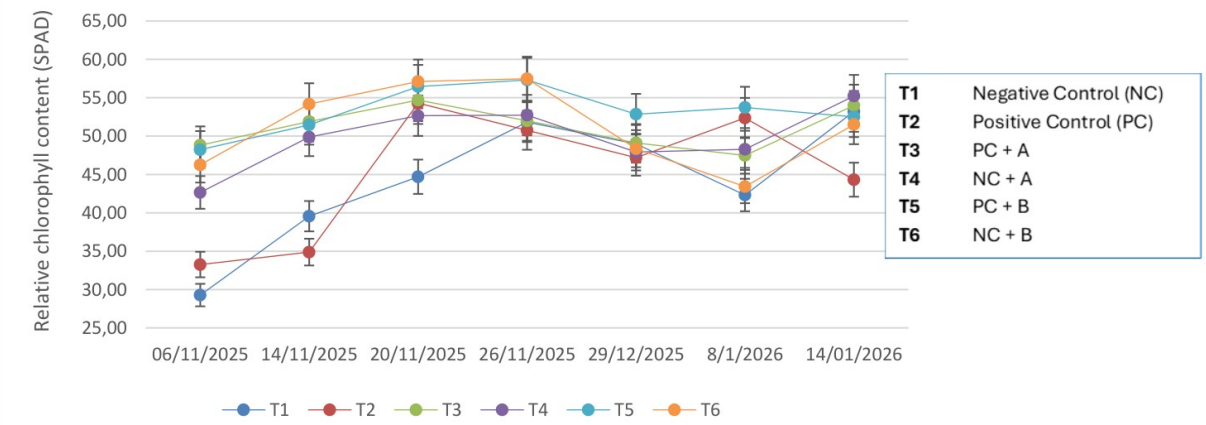

Figure 3.8.2: Relative chlorophyll content (SPAD) of lucerne in soil 2 in a pre-feasibility trial

Final Soil 2 SPAD was 54.00 in T3 and 52.50 in T5, compared with 44.32 in T2. T4 reached 55.22 compared with 53.22 in T1; T6 was slightly lower at 51.52. The fertilised product programmes again supported final leaf greenness. The physiological response was more consistent than the harvested forage-mass response.

2025 pre feasibility results

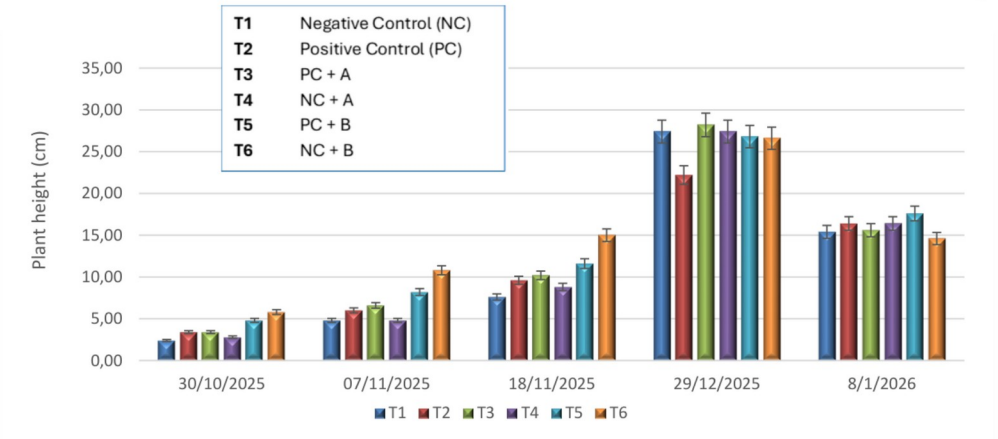

Figure 3.8.3: Plant height (cm) of lucerne in soil 1 in a pre-feasibility trial

Before the subsequent height reduction, T3 reached 28.2 cm compared with 22.2 in T2 on 29 December. Final heights were 15.6 and 16.4 cm; T5 finished at 17.6 cm. The earlier T3 response supports shoot development during the growth cycle. Later reductions are compatible with a harvested or changing canopy and should not automatically be interpreted as inhibited growth.

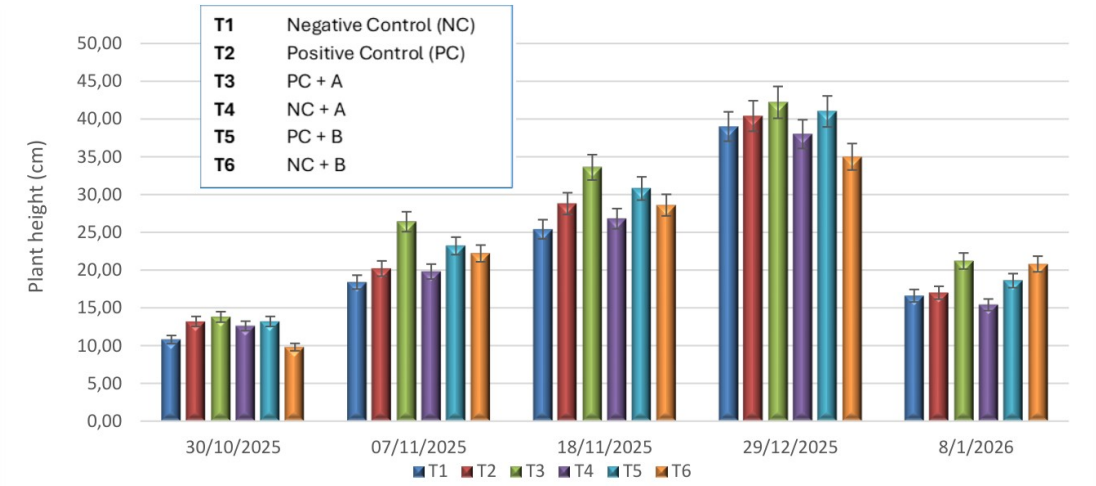

Figure 3.8.4: Plant height (cm) of lucerne in soil 2 in a pre-feasibility trial

T3 reached 42.2 cm before the height reduction, compared with 40.4 in T2, and finished at 21.2 versus 17.0 cm. T6 finished at 20.8 cm compared with 16.6 in T1. Selected programmes supported shoot development and subsequent canopy recovery in clay soil. Harvest timing remains important when comparing measurements from a repeatedly cut forage.

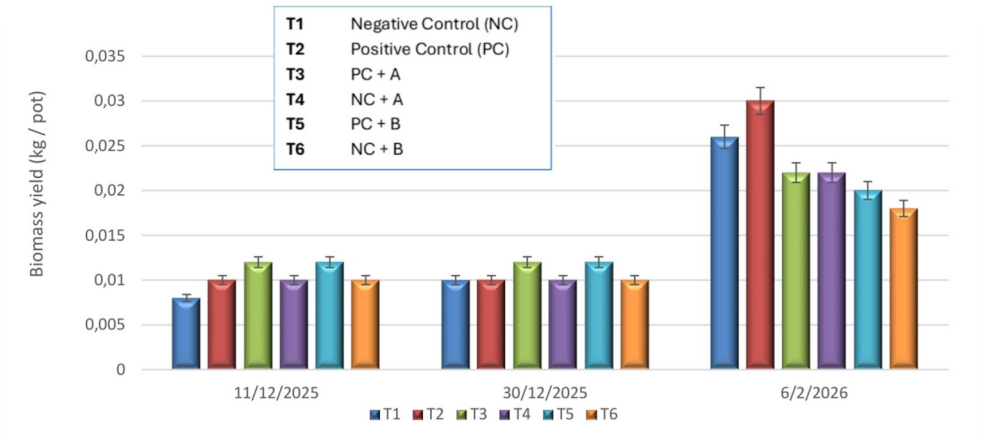

Figure 3.8.5: Biomass yield (kg) of lucerne in soil 1 in a pre-feasibility trial

Summed recorded cut masses in Soil 1 were 0.044, 0.050, 0.046, 0.042, 0.044 and 0.038 kg/pot for T1-T6. T3 and T5 had slightly higher early-cut values but lower final-cut values than T2. The early response did not translate into a cumulative product advantage across these recorded cuts. Forage-yield interpretation therefore remains distinct from the positive greenness observations. It is clear that the plants benefited more from the Magtasium™ treatments in the early summer months than the later months. This could be a function of the soil.

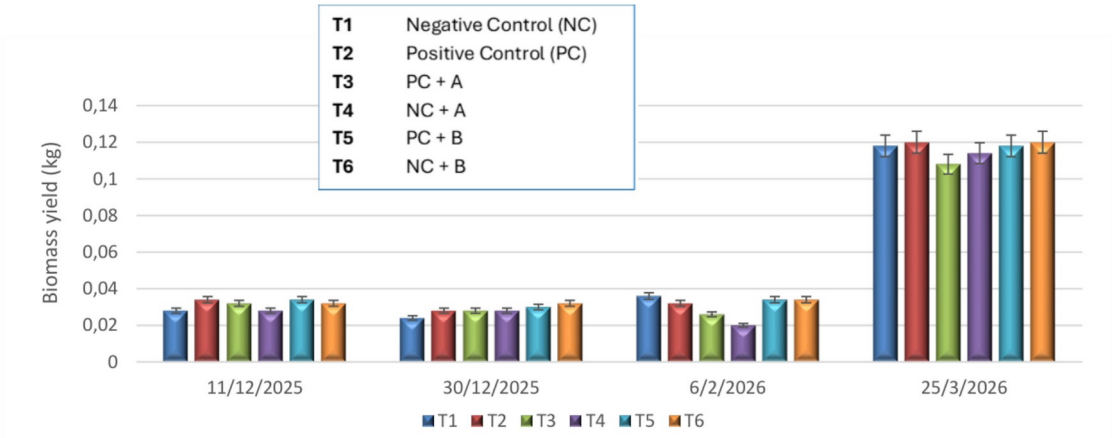

Figure 3.8.6: Biomass yield (kg) of lucerne in soil 2 in a pre-feasibility trial

Summed recorded cut masses in Soil 2 were 0.206, 0.214, 0.194, 0.190, 0.216 and 0.218 kg/pot for T1-T6. T5 was close to T2; T6 was 5.8% above T1. The B programme maintained or modestly improved recorded forage mass in clay soil. The response was smaller than the associated chlorophyll differences, indicating that greenness gains do not guarantee proportional biomass gains.

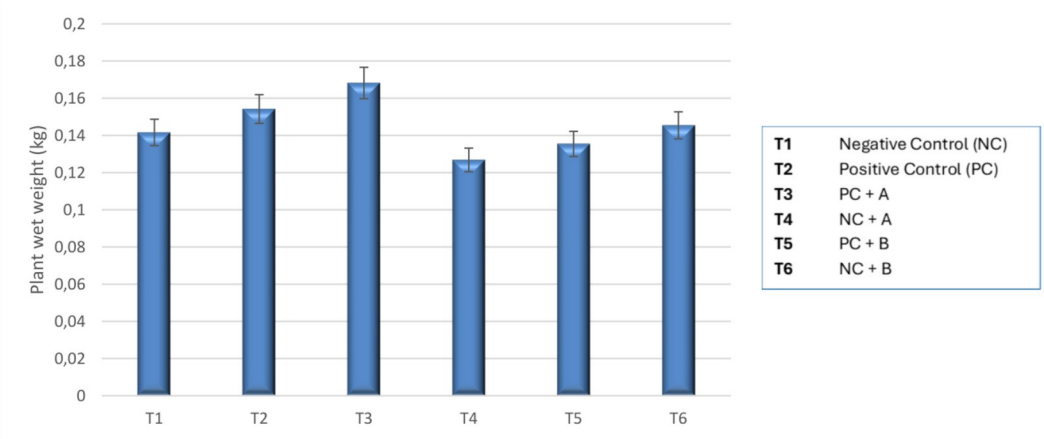

Figure 3.8.7: Plant wet weight (kg) at harvest of lucerne in soil 1 in a pre-feasibility trial

Plant wet mass was highest in T3 at 0.1682 kg, compared with 0.1542 in T2, an increase of 9.1%. T4 was 0.1268 kg compared with 0.1416 in T1. The A programme with fertilisation supported final shoot biomass in Soil 1. Other product comparisons were less favourable, indicating a selective dose response.

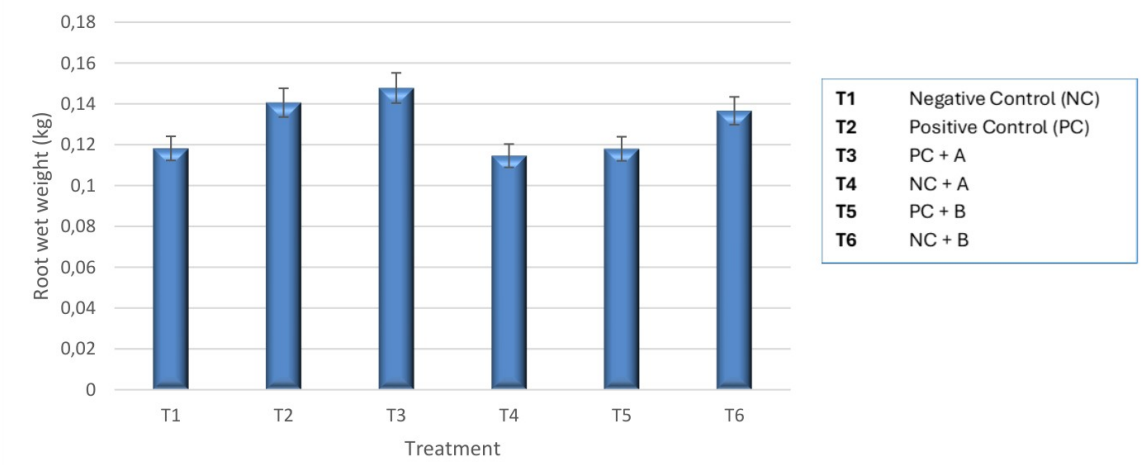

Figure 3.8.8: Root wet weight (kg) at harvest of lucerne in soil 1 in a pre-feasibility trial

Root wet mass was 0.1478 kg in T3 compared with 0.1406 in T2, a 5.1% increase. T6 reached 0.1366 kg compared with 0.1182 in T1, an increase of 15.6%. The favourable root responses support a potential contribution to soil exploration and resource acquisition. Root wet mass is a structural indicator and does not directly quantify nutrient uptake or nitrogen fixation.

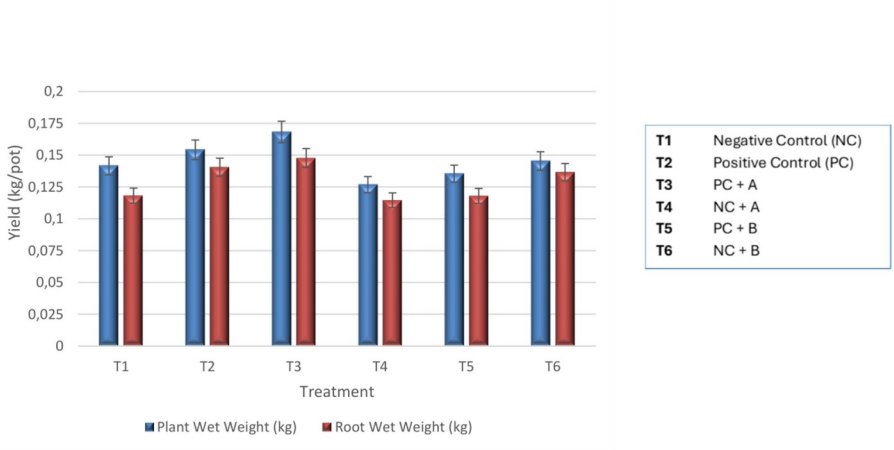

Figure 3.8.9: Plant and root mass (kg/pot) of lucerne in soil 1 in a pre-feasibility trial

Combined shoot plus root wet mass was 0.3160 kg in T3 compared with 0.2948 in T2, a 7.2% increase. T6 totalled 0.2820 kg compared with 0.2598 in T1. Coordinated shoot and root responses strengthen the physiological interpretation for selected programmes. This is a combined presentation of the preceding two measurements and is not independent additional evidence.

Figure 3.8.10: Relative chlorophyll content (SPAD) of lucerne

The valid T1-T3 series had similar descriptive mean SPAD values of 48.22, 47.00 and 48.00. Final values were 46.82, 41.34 and 47.32. The foliar-only unfertilised programme maintained greenness close to the fertilised-only comparator. The chart contains invalid #REF! legend entries, which are excluded from biological interpretation.

The editable source contains the findings for this figure but no accompanying chart image. The recorded SPAD results are retained above.

2026 trial results

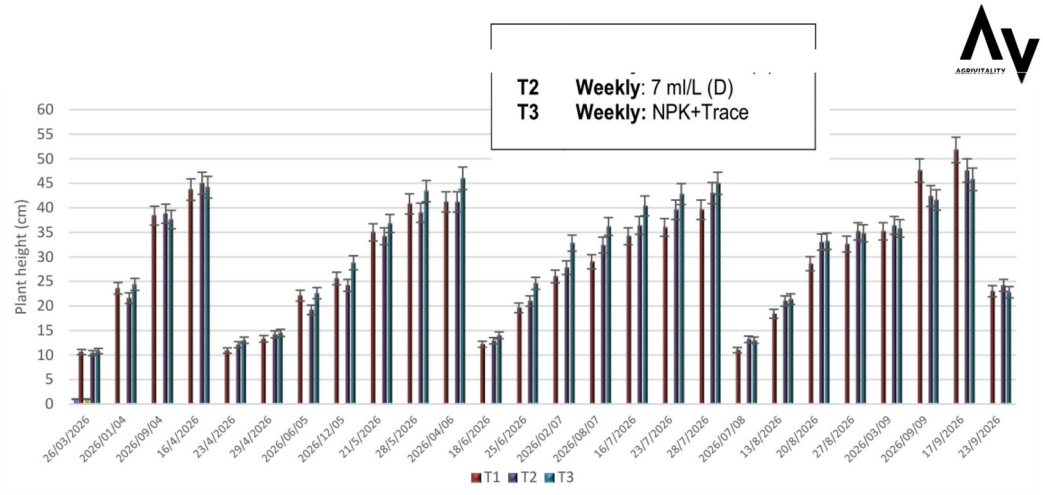

Figure 3.8.11: Plant height (cm) of lucerne

The valid series finished at 23.0, 24.2 and 22.8 cm for T1-T3. Peak height was 51.8 cm in T1, 47.6 in T2 and 46.0 in T3. The product-only programmes supported continued shoot development between cuts. Repeated canopy reductions mean that seasonal mean height is not a direct growth-rate or forage-yield measure.

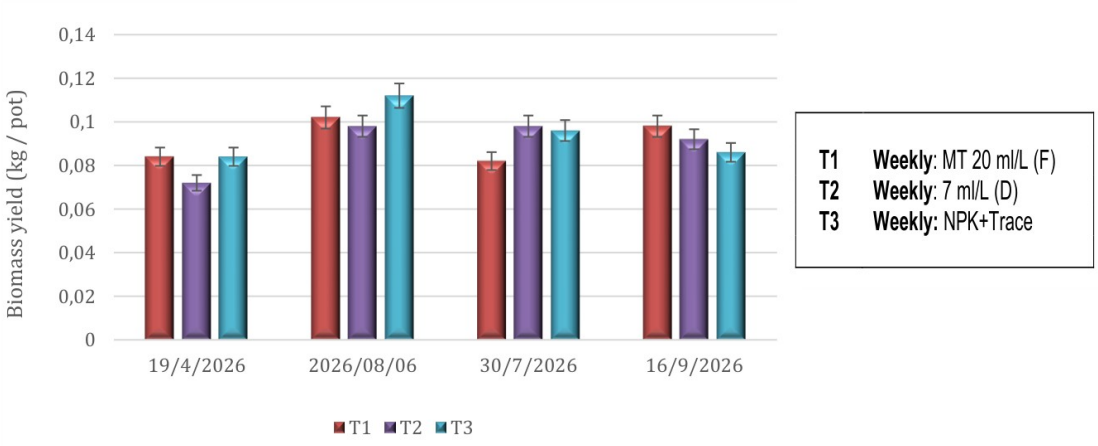

Figure 3.8.12: Biomass yield (kg/pot) of lucerne

Summed mass across four recorded cuts was 0.366 kg/pot in T1, 0.360 in T2 and 0.378 in T3. The product-only programmes were 3.2% and 4.8% below the fertilised-only comparator. The close recorded forage output supports a useful performance-maintenance response under no added NPK plus trace fertigation. It does not establish a fertiliser-replacement rate or a direct nutrient-use-efficiency coefficient.

Lucerne growth performance conclusion

Lucerne showed favourable chlorophyll responses and selected increases in shoot and root mass, providing physiological and structural support for Magtasium™-associated plant performance. Recorded cut-mass responses in the pre-feasibility phase were mixed and smaller than the greenness responses. In 2026, product-only recorded forage output was within 3.2-4.8% of the fertilised-only comparator. This supports a useful performance-maintenance response in the tested nutrient setting, without establishing a fertiliser-replacement rate or an effect on biological nitrogen fixation.

Visual observations



Figure A: Randomised block design of lucerne trial



Figure B: Common visual effects of different treatments

CORPORATE IDENTITY

HALOGEN GREENS
ELEVATING CROP PROTECTION, NATURALLY

SPECIALIZATION

Group 3 Bio Stimulant
(Trials Underway for Registration)

STATUS

- Pending Worldwide Patent
- Conducting Trials

Page 9

CONTACT INFORMATION

+ (27) 87 474 6149

www.halogengreens.com

info@halogengreens.com

- Roodepoort, Gauteng, South Africa (H/O)
- Tarlton, Gauteng, South Africa
- Somerset-West, Western Cape, South Africa
- Fredericton, New Brunswick, Canada

