HALOGEN GREENS

AGRIVITALITY



RESEARCH REPORT 2026

Magtasium™ Preliminary Trial Results: Carrots

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

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RESEARCH, TECHNOLOGY & INNOVATION INSTITUTE

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HALOGEN GREENS
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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™ carrot pot trial

Magtasium™ is a liquid, Group-3, Bio-Stimulant. Magtasium™ supported greener leaves and heavier carrot roots in selected programmes. The response was measured above and below the soil.

1. What was tested

The aim was to test Magtasium™ as a Bio-Stimulant by measuring leaf greenness, growth, root number and root mass. Greenhouse pots contained sandy-loam or clay soil in the 2025 screening, followed by a 2026 application trial. Feeding water for fertilised treatments had a reported **EC of 0.87**. EC describes the level of dissolved salts in the feeding water.

2. What the trials showed

What was measured	Magtasium™ programme	Comparison	% increase / decrease
Root mass in sandy loam	112 g with dose B and fertiliser	68 g with fertiliser alone	+64.7%
Root mass in clay	412 g with dose A and fertiliser	338 g with fertiliser alone	+21.9%
Root mass in 2026	417.5 g under T3	362.5 g under T1	+15.2%
Average root count in 2026	8.75 under T2	5.00 under T1	+75.0%

The 2025 results compare product treatments with matching fertiliser-only controls. All three 2026 programmes received Magtasium™ and fertiliser. Their codes identify different application programmes, explained in the treatment table that follows.

3. What this means for your farm

The strongest result was more root mass, not simply more roots. This is a useful reason for carrot growers to test Magtasium™ where better root development is the goal.

Compare treated and untreated plants at the same fertiliser level. Weigh the roots and count them, so you can tell whether the programme gives more roots, larger roots or both. Use the soil-specific results to select a starting dose and confirm application timing from the trial records.

Trial context and 2025 treatments

The pre-feasibility programme began in 2025, with some measurements and harvests continuing into early 2026. The experimental layout was a randomised block design with five replicates. Soil 1 was sandy loam and Soil 2 was clay. Moisture was maintained as non-limiting. Carrot cultivar: Chantanay Karoo.

Code	Nutrition and product programme
T1	Negative control: no product treatment; no designated fertilisation
T2	Positive control: non-nutrient-limiting fertilisation; no product treatment
T3	Positive control plus Magtasium™ dose A
T4	Negative control plus Magtasium™ dose A
T5	Positive control plus Magtasium™ dose B
T6	Negative control plus Magtasium™ dose B
Dose A	20 mL/L water foliar application weekly plus 5 mL/L drench weekly
Dose B	40 mL/L water foliar application weekly plus 10 mL/L drench weekly

The most informative product contrasts are T3 versus T2 and T5 versus T2 within the fertilised setting, and T4 versus T1 and T6 versus T1 within the unfertilised setting.

2026 Carrot treatment programme

Code	Interval	Foliar mL/L	Drench mL/L	NPK plus trace
T1	Weekly	20	-	Yes
T2	Every 2 weeks	20	2.5	Yes
T3	Every 4 weeks	20	2.5	Yes

Treatment codes are used consistently within each phase; they are not interchangeable between the 2025 screening and 2026 application trial.

Source schedule discrepancy

The methodology table lists T2 every 2 weeks and T3 every 4 weeks. The carrot graph legends label T2 weekly and T3 every 2 weeks. The results narrative calls T2 fortnightly and T3 four-weekly, matching the methodology table. Both source schedules are retained; the original trial records are needed to resolve the difference.

Measurements and interpretation

SPAD (Soil Plant Analysis Development) is a non-destructive meter-based index of relative leaf greenness. It supports comparisons of chlorophyll-related physiological status within a crop and programme; it is not a direct measurement of leaf nitrogen or photosynthetic rate.

Application rates above are formulation volumes per litre of application water. They cannot be converted to hectare rates without spray or drench volume, plant density and application-frequency records. Only treatments explicitly designated NPK plus trace received the complete nutrient programme.

The source report presents descriptive comparisons. Where numerical means are stated, percentages are calculated from the recorded values. Graphs and photographs are reproduced as complete images. The source states that statistical significance could not be independently assessed from the available report material. Pot-scale harvest masses must not be read as estimates of commercial field yield.

Reading the results

The following pages retain the source figure numbers and scientific findings. The 2025 and 2026 programmes are presented separately, followed by the carrot conclusion and visual observations.

2025 pre feasibility results

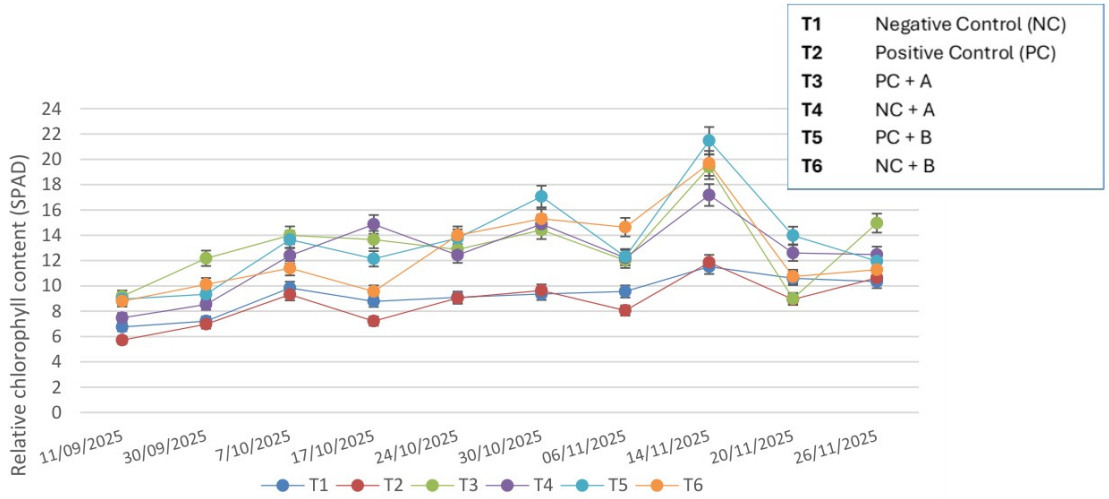

Figure 3.1.1: Relative chlorophyll content (SPAD) of Carrots in soil 1

Descriptive mean SPAD was 13.17 in T3 and 13.47 in T5, compared with 8.74 in T2. T4 and T6 averaged 12.51 and 12.55, compared with 9.31 in T1. All product treatments supported greater mean leaf greenness than their nutrition controls in Soil 1. The low absolute readings should be interpreted within carrot leaf anatomy and the measurement method.

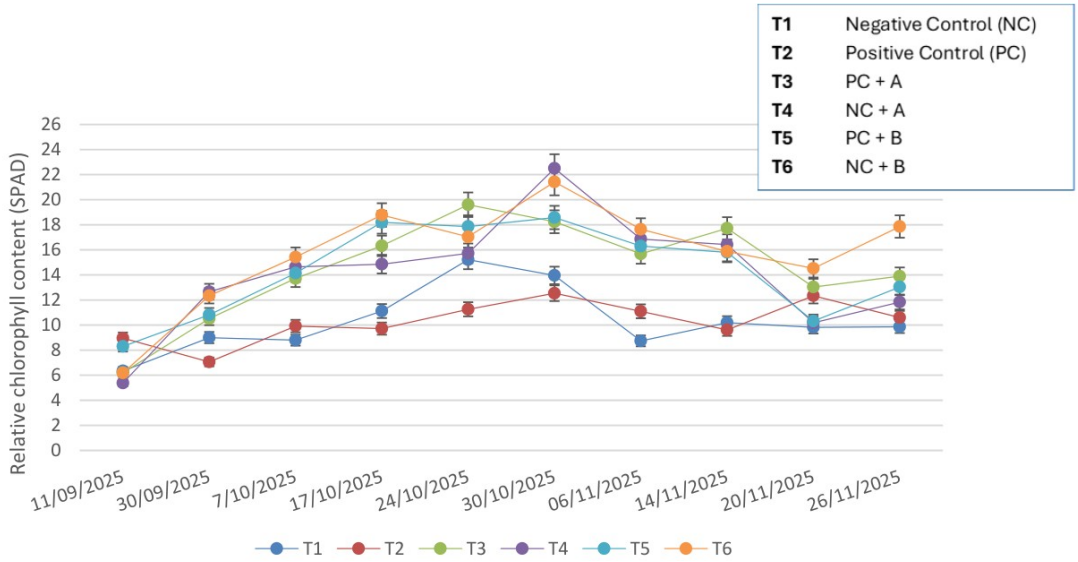

Figure 3.3.2: Relative chlorophyll content (SPAD) of Carrots in soil 2

Descriptive mean SPAD ranged from 14.11 to 15.71 in product treatments, compared with approximately 10.31 in both controls. T6 finished at 17.86 compared with 9.86 in T1. The repeated greenness response across both soils supports a physiological response in carrot. It remains a relative optical indicator rather than a direct measure of chlorophyll mass or nitrogen uptake.

2025 pre feasibility results

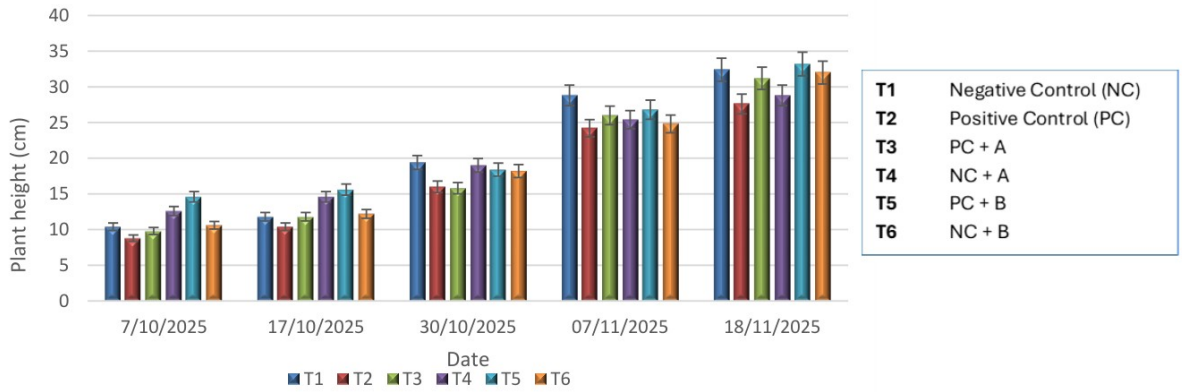

Figure 3.3.3: Plant height (cm) of Carrots in soil 1

Final height was 33.2 cm in T5 compared with 27.6 in T2; T3 reached 31.2 cm. T4 and T6 finished at 28.8 and 32.0 cm, compared with 32.4 in T1. The fertilised product programmes supported shoot growth in Soil 1. The unfertilised comparisons were less favourable, showing that stronger greenness need not produce taller shoots.

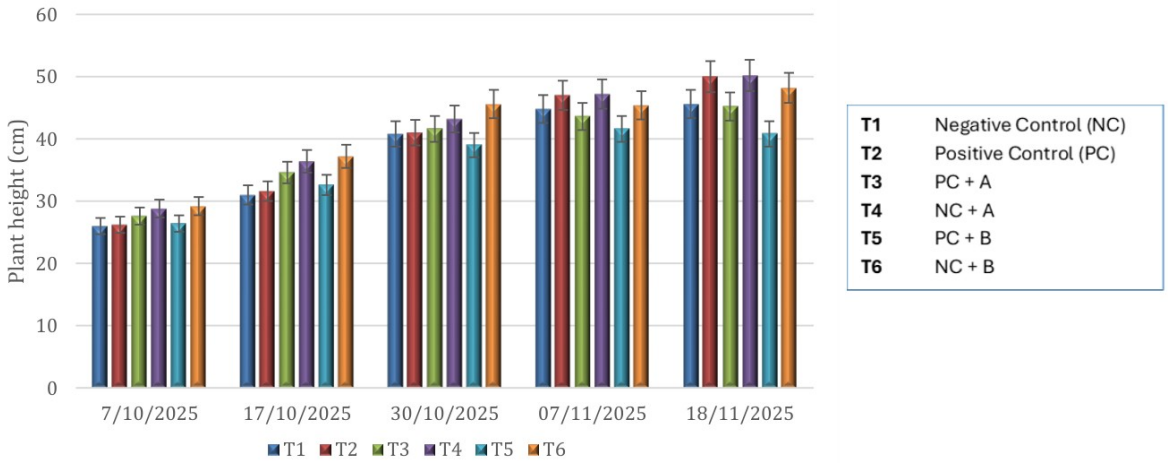

Figure 3.3.4: Plant height (cm) of Carrots in soil 2

Final height was 50.2 cm in T4 and 48.2 in T6, compared with 45.6 in T1. T3 and T5 finished at 45.2 and 40.8 cm, below T2 at 50.0 cm. The unfertilised product treatments supported stature in clay soil, while fertilised product treatments did not exceed the fertilised control. Soil-specific responses are evident.

2025 pre feasibility results

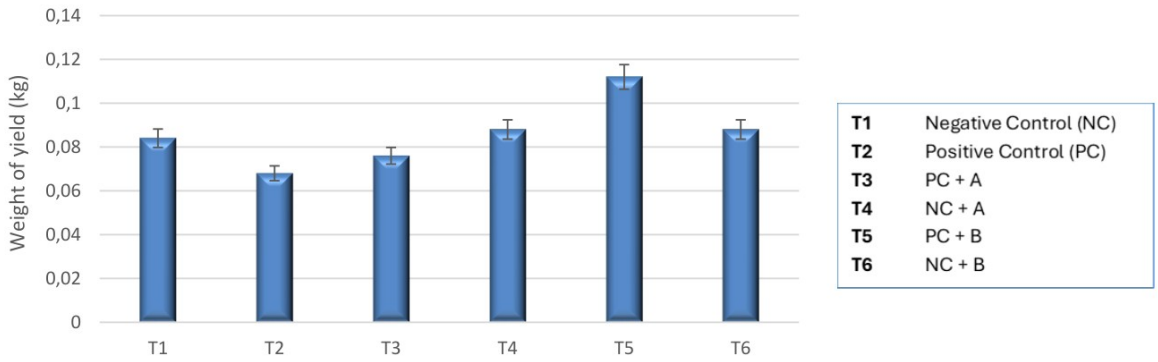

Figure 3.3.5: Yield (kg) of Carrots in soil 1

Root yield was highest in T5 at 0.112 kg compared with 0.068 kg in T2, a 64.7% increase. T3 was 0.076 kg; T4 and T6 were both 0.088 kg compared with 0.084 in T1. The B programme with fertilisation produced the strongest harvest response in Soil 1. Smaller favourable responses in the other comparisons support a broader but variable effect on storage-root development.

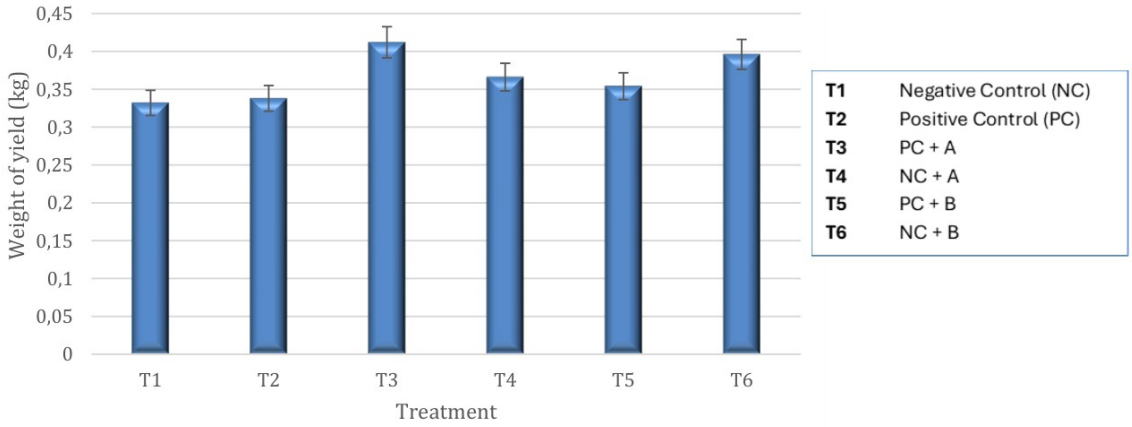

Figure 3.3.6: Weight of yield (kg) of Carrots in soil 2

T3 root yield was 0.412 kg compared with 0.338 kg in T2, an increase of 21.9%. T4 and T6 produced 0.366 and 0.396 kg, compared with 0.332 in T1. All product programmes exceeded their corresponding control for root yield in clay soil. The lower dose with fertilisation produced the largest response in this soil.

2025 pre feasibility results

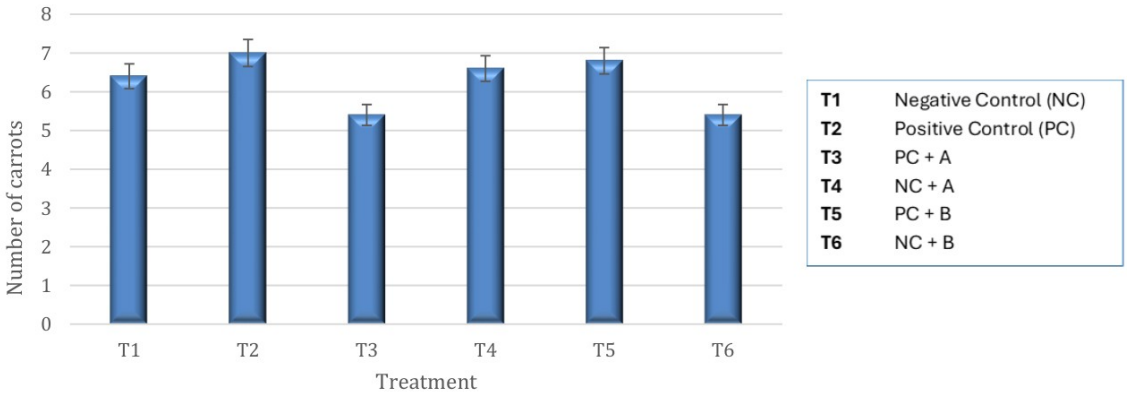

Figure 3.3.7: Number of Carrots in soil 1 at harvest

Mean root counts were 6.4, 7.0, 5.4, 6.6, 6.8 and 5.4 for T1-T6. T5 produced more root mass than T2 despite a slightly lower count. Root number does not explain the yield response on its own. Greater root size or mass contributed to the favourable T5 harvest response in Soil 1.

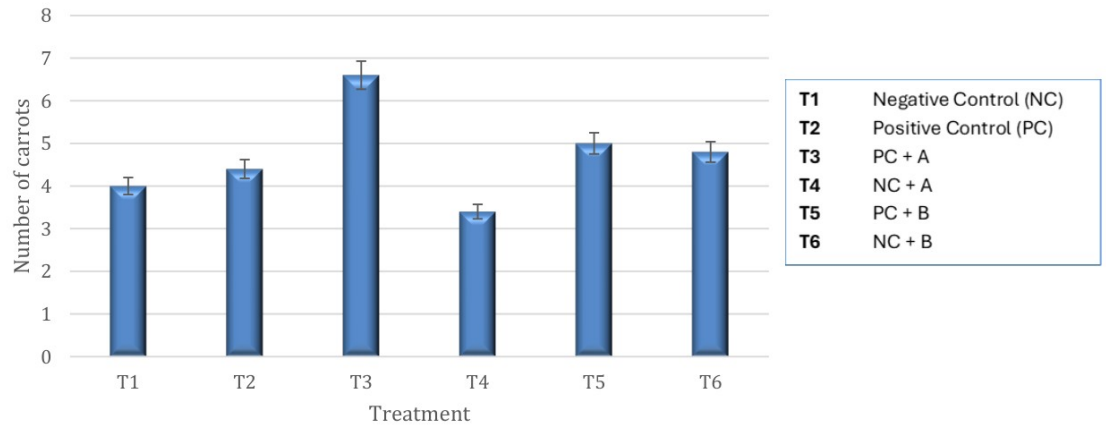

Figure 3.3.8: Number of Carrots in soil 2 at harvest

T3 had 6.6 roots compared with 4.4 in T2; T6 had 4.8 compared with 4.0 in T1. T4 had the lowest count at 3.4 despite a higher root mass than T1. Different programmes improved root yield through different combinations of root number and root size. This supports considering both yield components when interpreting product response.

2026 trial results

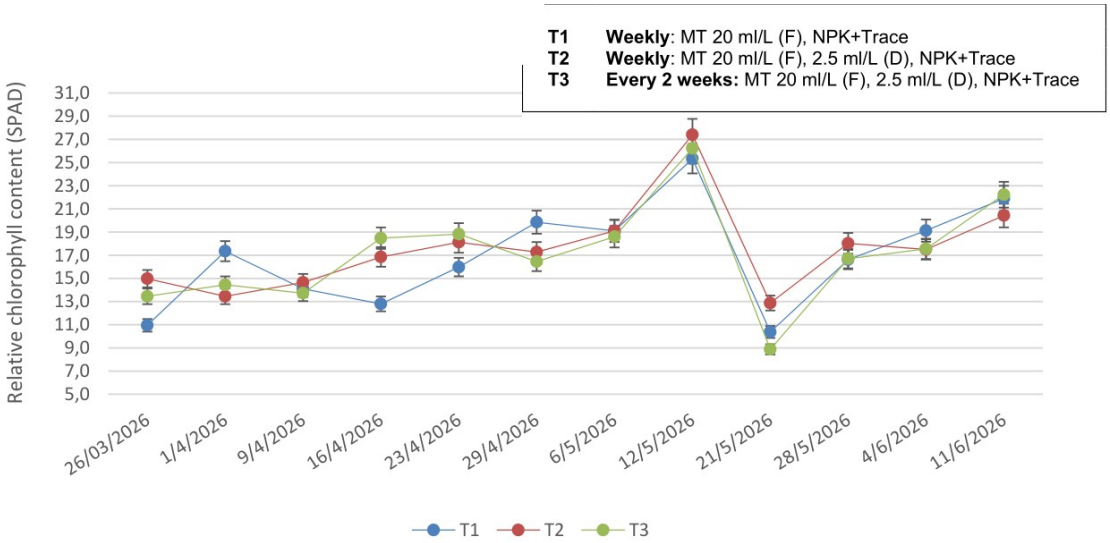

Figure 3.3.9: Relative chlorophyll content (SPAD) of Carrots

The three fertilised programmes had similar descriptive mean SPAD values of 16.96-17.55. Final readings were 21.90, 20.42 and 22.23 for T1-T3. The application intervals maintained comparable leaf greenness. The modest separation suggests that harvest root mass is a more useful discriminator for these programmes.

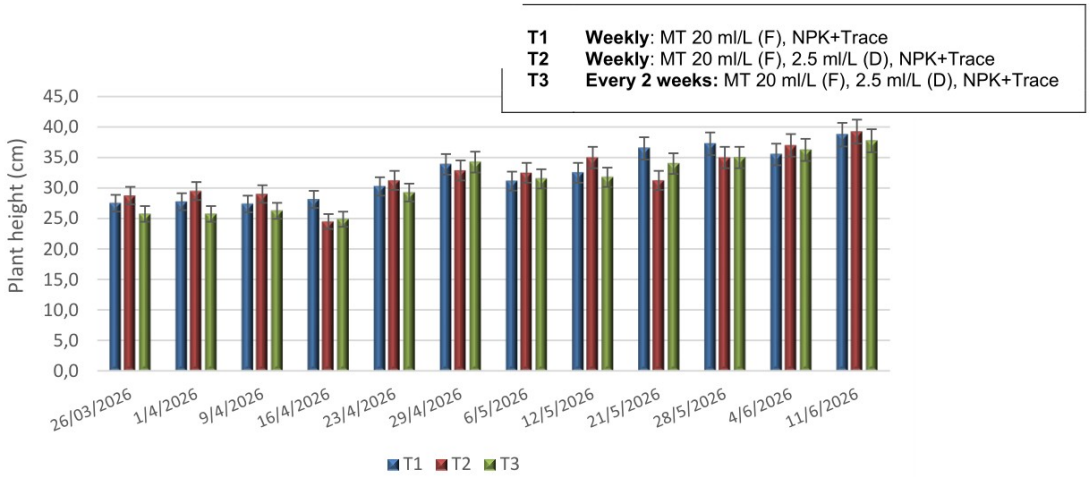

Figure 3.3.10: Plant height (cm) of Carrots

Final heights were 38.75, 39.25 and 37.75 cm for T1-T3. All three increased from their first observation, with similar overall stature. Comparable shoot growth across application intervals indicates that root-yield differences were not simply a consequence of taller foliage.

2026 trial results

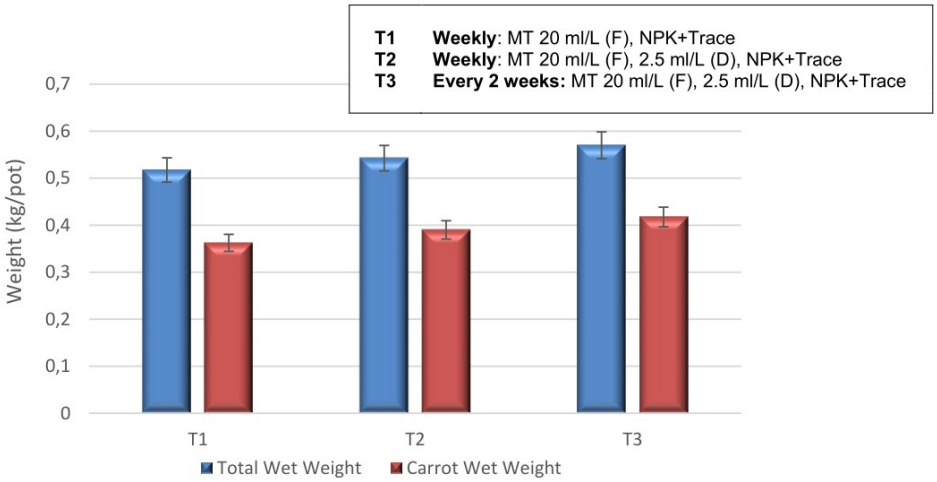

Figure 3.3.11: Total weight of harvest

Storage-root wet mass increased from 0.3625 kg/pot in T1 to 0.3900 in T2 and 0.4175 in T3. Total wet mass was 0.5175, 0.5425 and 0.5700 kg/pot, respectively. The four-weekly combined programme had 15.2% more storage-root mass than the weekly foliar-only programme under the same fertilisation status. This supports interval optimisation for root production.

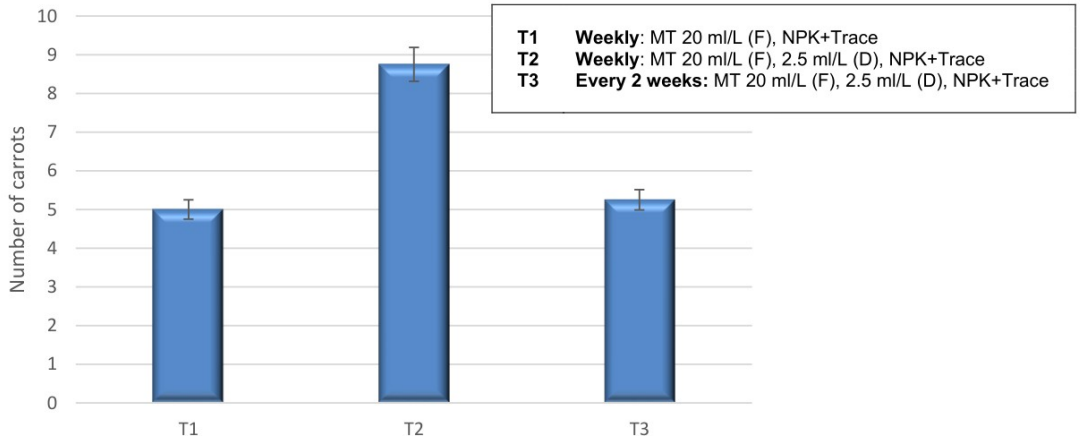

Figure 3.3.12: Number of Carrots at harvest

T2 had the highest mean root count at 8.75, compared with 5.00 in T1 and 5.25 in T3. T3 nevertheless had the greatest root wet mass. The fortnightly programme favoured root numbers, while the four-weekly programme favoured total root mass. Product scheduling can therefore affect yield components differently.

Carrot growth performance conclusion

Carrot provides coherent support across physiological and harvest endpoints. All pre-feasibility product treatments increased descriptive mean SPAD relative to their nutrition controls in both soils. Root-yield responses were especially favourable with dose B plus fertilisation in sandy loam and dose A plus fertilisation in clay soil. In 2026, the four-weekly combined programme produced the greatest storage-root mass, while the fortnightly programme produced more roots. The response supports targeted optimisation of root number and root size within a complete nutrition programme.

Visual observations



Figure A: Randomised block design of carrot trial

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SPECIALIZATION

Group 3 Bio Stimulant
(Trials Underway for Registration)

STATUS

- Pending Worldwide Patent
- Conducting Trials

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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

