Bionema

Founded on Research – Focused on Nature

Biologicals in Ornamentals: Reducing Chemical Inputs Whilst Boosting Plant Health & Market Value

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A High-Value Industry Facing Zero-Tolerance Pressures

The Value

£1.7bn

UK Production Value (2023)

£1.5bn

Import Value (2023)

£38bn

Potential GDP Contribution (2025)

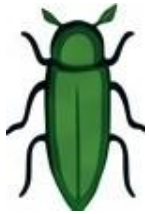
The Threat

Rising Costs

Box tree moth

Bemisia

Xylella



Emerald Ash Borer

- **1,400** pests and diseases affecting plant health
- **Major Threats: Bemisia, Xylella, Box tree moth,** Phytophthora
- **Market Reality: Zero Tolerance** policy on pests for export/retail

Shrinking Chemical Toolbox

The Chemical Reality:

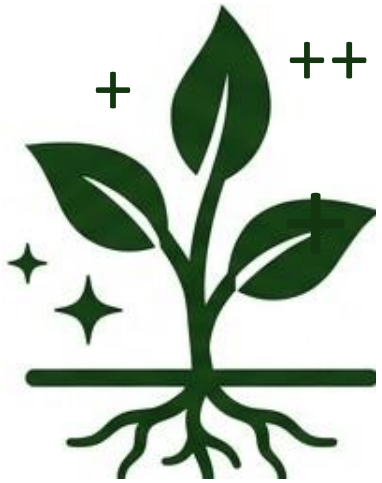
- Fewer authorised activities available due to regulatory bans
- Increasing pest resistance reduces efficacy (600 insects/disease)
- Heavy reliance on 560 EAMUs across >200 crops creates unpredictability

Strategic Risk: Chemistry remains central today, but dependence on a shrinking toolbox is not a sustainable business plan (Defra 2025).

Defining the Modern Biological Toolkit

Biopesticides

Natural pest & disease control



Biostimulants

Protect growth & stress tolerance

Biofertilisers

Bio-solubilise nutrients for crops

The Reality Gap: Why Biologicals Have Varied

Natural Ideal

In nature, predators and prey help to maintain balance. Biological control is a continuous and self-regulating process.

Commercial Product

Commercial biologicals are formulated products whose efficacy relies on proper application, timing, and environmental conditions.

Current Status:

- Biologicals are widely used, especially under protection.
- Confidence varies: Some applications are reliable; others are still being optimised.

While coverage is improving, biological solutions do not yet exist for all ornamental pests and diseases.

Monitoring, timing and application remain critical

Innovation in Formulation

Microencapsulated Formulations (Controlled Release)

- Enables long-term stability and extended shelf life.
- Improves distribution and persistence in **growing media**.
- **Synergy**: Application of biosurfactant/bioemulsifiers with Soil-Jet® improves delivery.

NemaGen®: Encapsulated entomopathogenic nematodes demonstrating controlled release and improved field persistence.

Soil-Jet® biosurfactant: Enhances **soil penetration** and uniform distribution of encapsulated actives.

Case Study: Vine weevil control

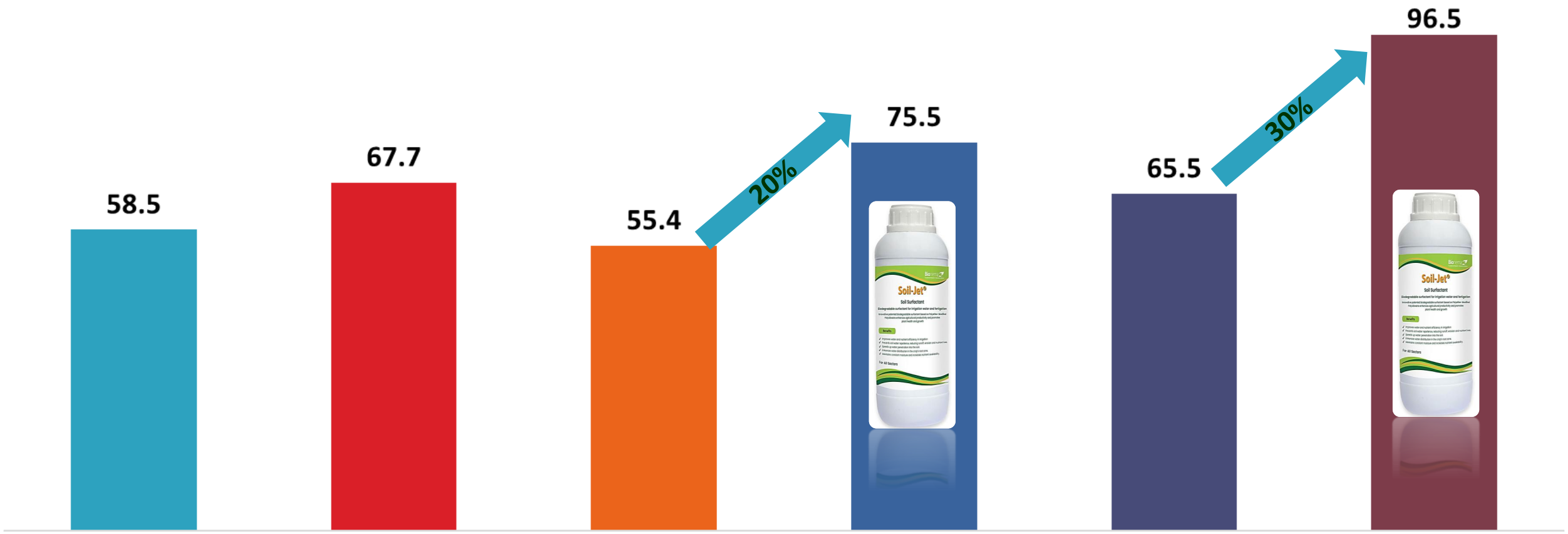
Commercial Nurseries in the UK, Canada, Colombia, Brazil and the Netherlands

Case Study: Vine Weevil Control in Commercial Nurseries

The Trial Protocol:

- **Location:** Commercial Nurseries (UK/CA, NL/CO)
- **Media:** Peat, Coir, and Bark-based substrates (**Peat-free focus**).
- **Treatments:** *Metarhizium* (Fungal biocontrol) vs. NemaGen® (Encapsulated Nematodes).
- **Plant**: *Fuchsia*, *Euonymus*, *Sedum*, *Heuchera,* others

Efficacy Data: Encapsulation + Wetting Agents Deliver >96% Control



The Plant Health Gap in Peat-Free Systems

The Peat-Free Challenge:

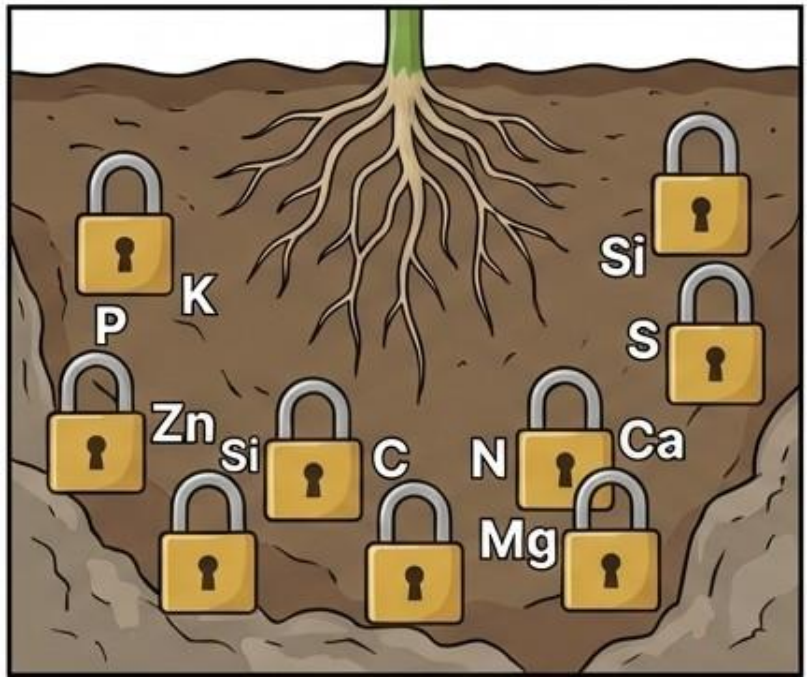
- Transitioning to peat-free substrates increases plant stress and nutrient variability
- Factors such as irrigation, improper handling, and transportation challenges contribute to this stress
- Weaker plants need more 'rescue treatments' to thrive

The Solution:

Biostimulants and B**iofertilisers** improve stress tolerance and promote uniformity in plants, thereby bridging gaps in ornamental production.

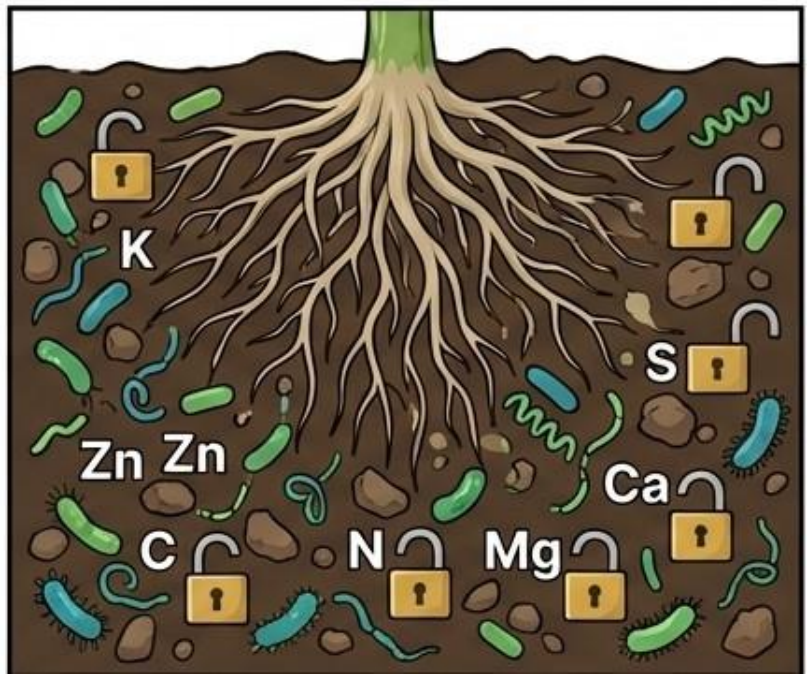
Unlocking Potential: How Biofertilisers Mobilise Nutrients

Locked Nutrients



Biofertiliser Application

Unlocked Nutrients



Mechanism: Biofertilisers solubilise 'locked' nutrients in the substrates, reducing leaching and ensuring consistent uptake

Biofilm-Enabled Biofertiliser: The Challenge (£931K, Innovate UK, 2025)

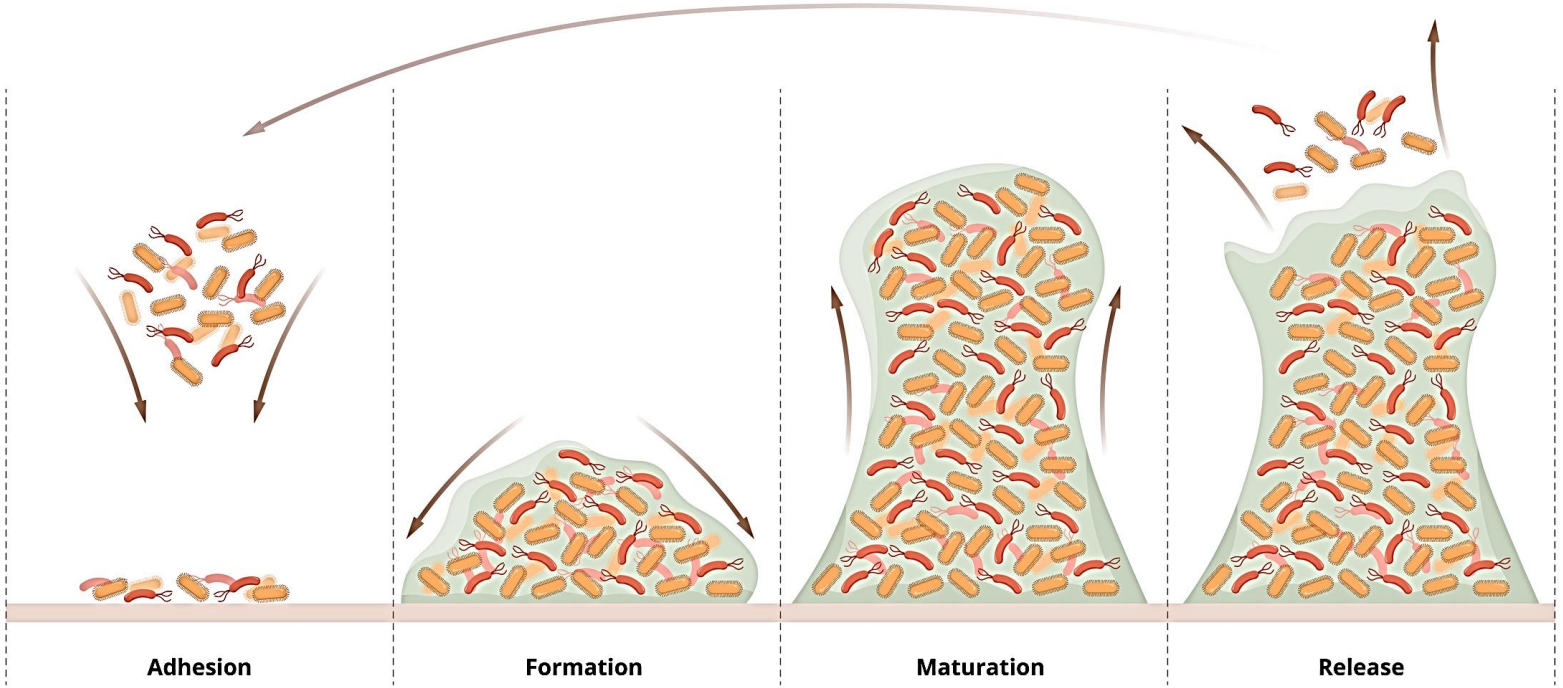
The Challenge

- Microbial biofertilisers often fail to persist in substrates
- Wash-off, drying, and substrate instability reduce activity
- Particularly challenging in **peat-free systems**

How Biofilm-Enabled Systems Works

How It Works

- Microbes form stable communities rather than acting alone
- Biofilm matrix protects microbes and improves root colonisation
- Nutrients are mobilised gradually over time, not in short spikes



Main stages of biofilm formation

Practical Benefits for Growers

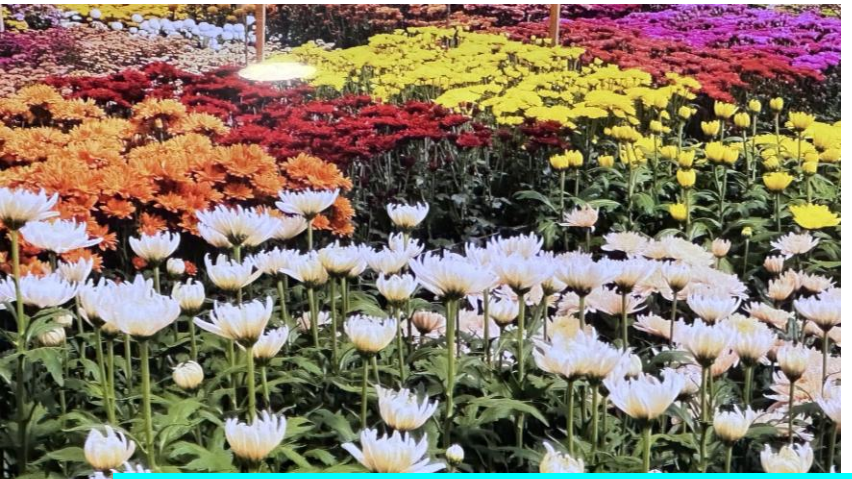
- More consistent nutrient availability
- Reduced fertiliser losses and leaching
- Improved root health and plant uniformity
- Better performance in **peat-free substrates**

Case Study: RootVita® Biostimulant in Wood chips: Wyevale Nurseries Case Study (2023–2024)

Case Study: Application of RootVita® Biostimulant in Poinsettia Production in Canada

Case study: RootVita® biostimulant in Canada

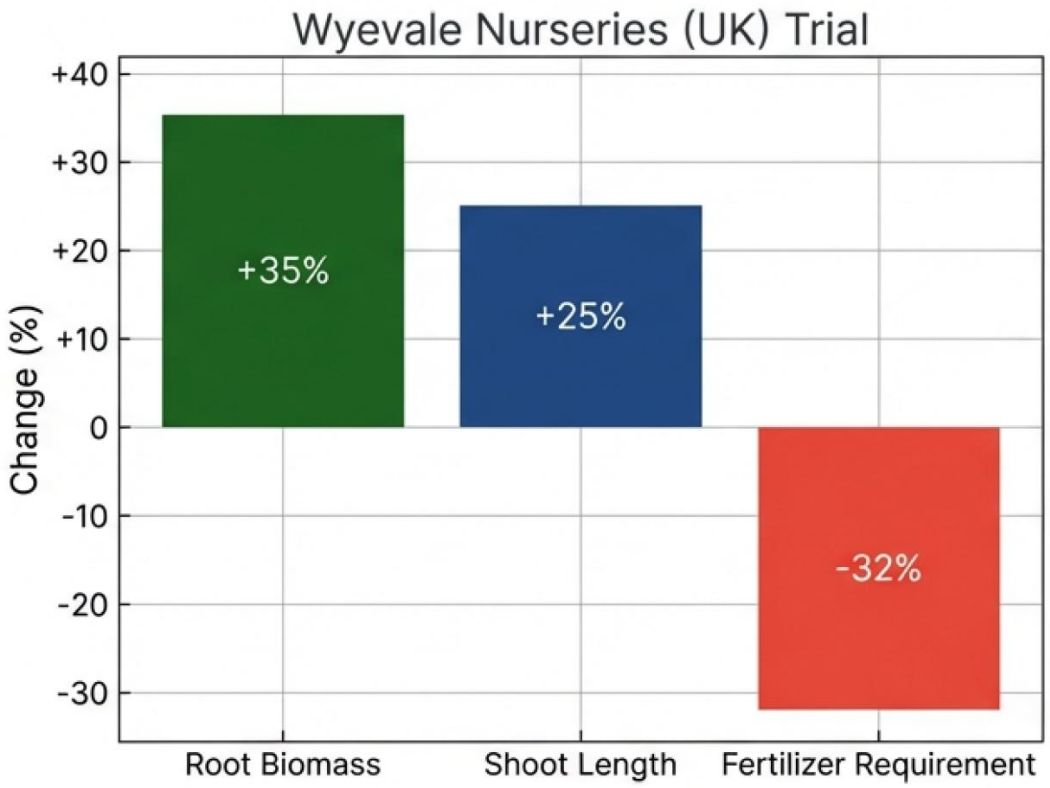


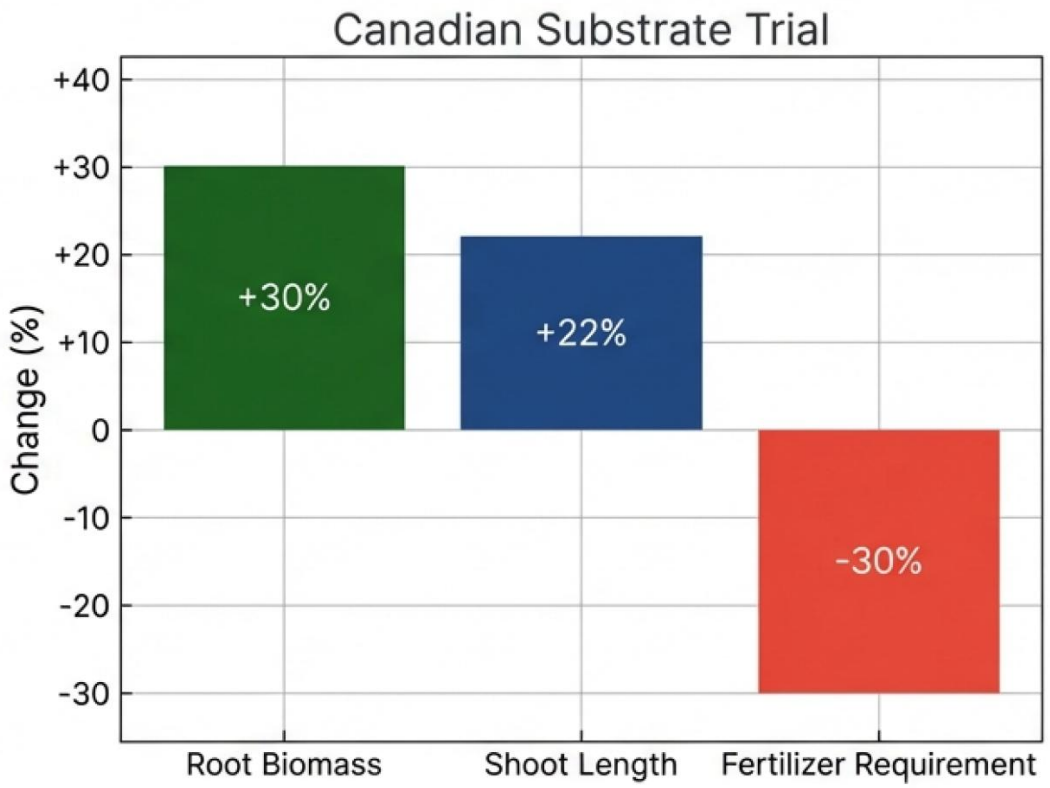




Case Study: Application of NemaGen and Rootvita at Capiro, Colombia

Global Validation

Proven results across different climates and substrates.





Success Depends on Implementation

Critical Success Factors:

- Timing: Application must align with pest life stages.
- Environment: Monitoring substrate moisture and temperature is vital.
- Compatibility: Proper storage and checking formulation quality.
- Technology: Use digital tools to optimize intervention windows.

Biological Advantage: ROI & Business Sustainability

Lower Input Costs

Reduces need for expensive synthetic pesticides and fertilizers.

Operational Efficiency

Decreases labor costs through fewer repeat sprays and rescue treatments.

Consistent Market Value

Maintains high crop quality and export compliance.

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Thank You
For Your Time & Attention