



Restoring Soil Health with Microbial Innovation

Could beneficial microorganisms help restore degraded soils and improve agricultural resilience? [River Stone Aquaculture Innovations](#) is developing a biological soil-restoration technology that harnesses emerging molecular knowledge using diverse microbial communities derived from marine aquaculture systems to support soil health, plant growth and sustainable food production.

By encouraging the natural growth of beneficial microorganisms, their technology aims to renew ecological processes that contribute to productive and resilient agricultural systems. The approach aims to help address challenges including soil degradation, drought, plant disease and declining productivity, while reducing reliance on synthetic inputs.

The Science Behind the Solution

Soil Microbes Show Promise for Crop Health and Productivity

Researchers at Western Sydney University's Hawkesbury Institute for the Environment have evaluated Swift Grow, a biologically derived soil amendment, for its ability to support plant growth and suppress disease in lettuce and potato crops challenged by the soil-borne pathogen *Ralstonia solanacearum*.

The six-month study found that Swift Grow consistently outperformed untreated and conventional NPK fertiliser treatments, improving plant growth, nutrient availability, soil quality and disease suppression across both crops.

The strongest responses were observed in lettuce, where Swift Grow produced the highest biomass and yields while reducing disease severity and maintaining beneficial soil microbial diversity. In potatoes, the amendment delivered moderate but consistent improvements in plant growth, yield and disease suppression under pathogen pressure.

Complementary DNA sequencing analysis conducted at Western Sydney University revealed that the product contains a diverse microbial community dominated by beneficial *Bacillus* species, alongside fungi and other microorganisms associated with nutrient cycling, soil health and environmental resilience. The findings highlight the growing potential of microbial-based approaches to support sustainable agriculture, soil restoration and resilient food production systems.

Benefits for Agriculture

Healthier Soils

- Restores depleted soil biological activity
- Encourages beneficial microorganisms
- Improves long-term soil productivity

Stronger Crops

- Supports healthy plant development
- Helps increase crop yields
- Improves crop performance under challenging conditions

Environmental Benefits

- Protects pollinators such as bees
- Supports healthier waterways
- Reduces impacts associated with synthetic chemical use
- Contributes to sustainable agricultural systems

Better Food Production

- Supports nutrient-rich crop production
- Aims to improve grain quality and protein levels
- Helps increase overall farm productivity

The ARC Training Centre for Smart and Sustainable Horticulture (ARC TC-SaSH) is thrilled to share this ground-breaking news from our Centre partner, SWIFT GROW®. You can find out more about their remarkable findings using the links below.

SWIFT GROW®

A Down-to-Earth Game Changer for the Future of Agriculture

Three videos and additional information provided by River Stone Aquaculture Innovations on the research findings and new technologies supporting drought and saline resilience, and ultimately adding value for human health:

- [3min video: Our Technology's Value to Human Health](#)
- [5min video: Swift Grow 2024/25 Saudi Arabia desert trial](#)
- [9min video: Swift Grow Drought & Saline Resilience Technology Explainer](#)
- [Swift Grow DNA Sequenced Species](#)
- [WSU Research Paper on Swift Grow Lettuce and Potato Pathogens](#)
- [PDF Swift Grow information pack](#)
- [Completed Scientific Research](#)

River Stone Aquaculture Innovations

[River Stone Aquaculture Innovations](#) is an Australian agricultural technology and sustainable aquaculture company known for producing chemical-free barramundi and eco-friendly biological products like [Swift Grow](#). Founded by genetic engineer Joseph Ayoub, the enterprise operates out of New South Wales, including research collaborations tied to Western Sydney University's Hawkesbury campus.

ARC TC-SaSH PhD Recruitment News

In exciting news on the PhD recruitment front, we are pleased to announce the appointment of the following scholarships:

- **Ms Adetoro Adetayo:** Thesis title - Enhancing energy and resource efficiency in high-tech greenhouses for sustainable horticulture, supervised by Graciella Metternicht
- **Mr Jocelyn Paine:** Thesis title - Dynamics of Technology Adoption Decision Making in Horticulture Supply Chains, supervised by Dilupa Nakandala
- **Mr Muhammad Usman Khaliq:** Thesis title - Crop Physiology and Phenotyping in Vertical Farms, supervised by Oula Ghannoum/Wen Hu (Linkage)
- **Mr Jiaming Zhang** - Thesis title – Crop Phenotyping Using Computer Vision and Machine Learning in Protected Systems – supervised by Yi Guo
- **Mr Golam Rabbani** - These title - Optimising Crop Photosynthesis in Protected Systems – supervised by Oula Ghannoum/Rob Sharwood

We eagerly anticipate sharing more updates with you soon from the [ARC Training Centre for Smart and Sustainable Horticulture \(ARC TC-SaSH\)](#).

Contact:

[Michelle Ewers](#) | Centre Manager

ARC Training Centre for Smart & Sustainable Horticulture

Hawkesbury Institute for the Environment

M: 0418 174 966 | E: m.ewers@westernsydney.edu.au

<https://www.smarthorticulturecentre.com>

WESTERN SYDNEY
UNIVERSITY



Hawkesbury Institute
for the Environment



ARC TRAINING CENTRE FOR
smart & sustainable
HORTICULTURE