

ASX and MEDIA RELEASE

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## **ROOTS strengthens Agriculture Technologies IP portfolio with two provisional US patent applications**

### **Highlights:**

- **Two additional patent applications filed with the US Trademark Office, for new agriculture technologies that complement Roots' existing product suite**
- **First application relates to the use of drip irrigation infrastructure (and drip holes) to deliver hot/cold air between drip irrigation intervals, and influence canopy/root zone air temperatures**
- **Second application relates to a unified system and method for controlling temperatures of irrigation & liquid fertilisation (known as 'Fertigation') under one controlled system/unit**
- **The technologies described in the patents have the potential to significantly improve unit economics for farmers and deliver stronger agronomical results, with lower capex and reduced energy costs**
- **Aligns with Roots' strategy to build a strong IP portfolio based innovative agtech solutions and commercial applications, amid the ongoing climate crisis affecting agriculture production**

**Roots Sustainable Agricultural Technologies Limited (ASX: ROO, "Roots" or "the Company")** is pleased to confirm that it has filed two provisional patent applications with the United States Patent and Trademark Office ("USPTO").

The provisional filing provides the Company with a global priority date on both patents. The decision to file followed an extensive period of analysis and patent searches, which indicated a lack of apparent conflict with existing patents for the relevant technologies Roots has submitted for review.

### **Patent Application 1: Micro-Climate Management**

The first provisional patent application relates to in-house technology developed by Roots that targets a solution for micro-climate management in commercial agriculture operations.

The innovative concept relates to the new dual-use of drip irrigation equipment, to push temperature-regulated air (either hot or cold) between irrigation intervals.

The apparatus positively influences the plant canopy and/or root zone area, facilitating the release of regulated air temperatures from the dripper holes within the existing irrigation system.

The functionality relates to the ability to remove water from the drip irrigation line at the end of each irrigation cycle, and push air through the drip nozzles to create a favorable micro-climate for each plant. The innovation can be used adjunct to existing lines or as part of new dual-use installations.

The patent application includes six variations relating to the new dual use of drip irrigation equipment to moderate canopy and/or root zone temperatures, for both covered and open agriculture.

Through the development of its technology, Roots aims to provide an alternative to existing air management equipment. The patent covers IP protection for its micro-climate platform, which could provide a more cost-effective and environmentally friendly operational solution for greenhouse farmers.

Existing products in the covered agriculture (Greenhouse) sector use air heating and cooling equipment that require large capital and operating expense outlays, while also carrying a negative environmental impact due to high energy use.

The resulting IP would complement Roots' existing commercial offering, which comprises its Root Zone Temperature Optimization Technology ("RZTO") and Heat Exchange Probes ("HEPS").

The patent application follows a recent sale of the Company's root zone cooling equipment to customers in the United Arab Emirates, to optimize air temperature for coffee plantations (*see ASX Announcement dated 16 August 2022*).

The RZTO can be sold in combination with Roots' new drip irrigation/aeration product, which has the potential to facilitate significant capital savings coupled with operating and energy savings.

#### **Patent Application 2: Temperature optimization**

The second provisional patent application relates to a coordinated system which unifies a number of temperature-related critical functions that are currently served by separate equipment, in order to achieve optimal growth conditions. The functions are:

1. Optimization of Root zone temperatures
2. Optimization of Irrigation water temperatures
3. Optimization of fertilization liquid temperatures

For the purpose of the application, optimization in this case is defined as 'an ability to provide a relatively narrow range of optimal temperatures year-round, regardless of season'.

Among global agriculture trends in 2022, the importance of maintaining optimal root zone temperature is emerging as a primary variable in each plant's overall performance.

The unified unit in this application is able to maintain optimal root zone temperatures in a closed-cycle growing apparatus, with an open ended source of water coupled with an integrated fertigation fluid tank.

The technology offers an improved irrigation water solution, which assists farmers avoid extreme water temperatures (causing plants to wither with excessive cold irrigation, or wilting when irrigation water is too hot).

Excessive variation in water temperatures is currently a cause of significant damage to overall productivity and damages the financial potential of each growth cycle.

The new IP adds another product to Roots' product mix and can be scaled up from small to large acreage areas, both in covered and open agriculture. A prototype has been built and tested at Roots' experimental greenhouse in Israel.



**Boaz Wachtel, ROOTS's CEO and Chairman, commented:** "These applications mark a continuation of the group's broader strategy, as we continue to build an extensive IP portfolio for our suite of agriculture technology solutions. The technology applications within two IP filings could both present significant commercial opportunities for ROOTS globally. In the event the applications progress with the USPTO, the Company plans to leverage opportunities for both direct sales and complementary solutions as part of strategic collaboration initiatives."

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#### **About Roots Sustainable Agricultural Technologies Ltd:**

Israeli-based, Roots Sustainable Agricultural Technologies Ltd. is developing and commercialising disruptive, modular, cutting-edge technologies to address critical problems faced by agriculture today, including management of plant's root zone temperatures and the shortage of water for irrigation.

Roots has developed proprietary know-how and patents to optimise performance, lower installation costs, and reduce energy consumption to bring maximum benefit to farmers through their two-in-one root zone heating and cooling technology and off the grid irrigation by condensation technology.

Roots is a graduate company of the Office of the Israeli Chief Scientist Technological Incubator program. For more information visit [www.Rootssat.com](http://www.Rootssat.com)

#### **About Root Zone Temperature Optimization (RZTO):**

Root Zone Temperature Optimization (RZTO) optimises plant physiology for increased growth, productivity and quality by stabilising the plant's root zone temperature. Using Ground source heat exchange (GSHE) installations either alone, or in combination with heat pumps, or with heat pumps alone, ROOTS is able to provide accurate range of root zone temperatures for farmer and the plants to obtain the multiple benefits.

This significantly increases yields, increases growing cycle planting options, improves quality, mitigates extreme heat and cold stress while significantly reducing energy consumption by stabilising and optimising the ROOTS zone temperature.

*This announcement was authorised to be given to the ASX by the Roots Executive Directors, Mr Boaz Wachtel and Mr Sharon Devir.*

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