Multiple Cutter System for Plant Tissue Culture (2016-045)

Cutting and Potting Technique for Reduced Labor and Increased Product Output

Market Overview

This micro-propagation technique utilizes a specialized electric knife and potting process, allowing for increased output and decreased labor time. Plant tissue culture via micro-propagation is used for almost the entirety of the banana, sugarcane, floral, and medicinal plant markets, with the demand for tissue-cultured plants growing by roughly 20% each year. In the United States alone there are more than 70 established commercial tissue culture facilities with production capacities reaching 200 million plantlet units per year. Most micro-propagation costs are associated with labor, which limits the types of crops can be profitably produced in a laboratory setting. Clemson University researchers have developed a novel micro-propagation technique that involves quick, efficient electric knife cuts and an innovative potting method. This technology decreases the required labor per plant and broadens the variety of crops that can be produced cost-effectively in the laboratory.

Application

Plant tissue culture via micro-propagation

Stage of Development

Functional prototype

Advantages

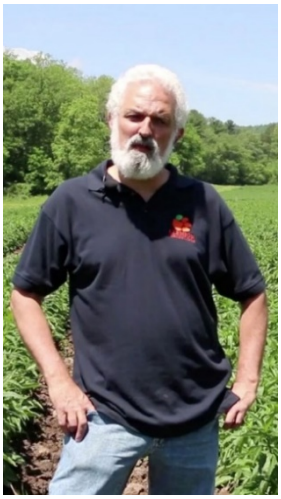
- Novel cutting technique can harvest dozens of shoots at once, increasing micro-propagation efficiency.
- Original cutting vessel remains sterile, allowing for multiple harvests in a single crop season.
- Cost of labor per plant cut is greatly reduced, increasing profit margins.

Technical Summary

This novel method involves a simple vessel and tool to approach to mechanized cutting of elongated plant shoots. The vessel is inverted so that the root matrix resides in a narrow lid at the bottom of the container, while the shoots remain in the larger part of the vessel at the top. Removing the vessel's top allows a blade to access the rooted base of the shoots. A modified electric knife can then harvest dozens of shoots in one motion by cutting at the base. With the motion of the operator's wrist, rotating the root matrix in the narrow lid allows the harvested shoots to drop into a sterile receiver, while cutting across the remainder of the vessel surface. The base of the rooted coppice has one or more buds allowing for rapid regrowth of another shoot when the vessel is reassembled. Fresh medium or water may be added to the matrix so regrowth is of high quality. The vessel ants its contents remains sterile and can be harvested several times during a crop season.

Country	Serial No.	Patent No.	CURF Ref. Number	Inventor
United States	NA	NA	2016-045	Dr. Jeffery Adelberg

About the Inventor



Dr. Jeffery Adelberg is a Professor of Horticulture at Clemson University. He earned his Ph.D. in Plant Physiology from Clemson University in 1993. His research focuses primarily on high-value plant propagation systems, liquid-based systems and process design, plant mineral nutrition, vessels and environmental control, integration of laboratory and greenhouse acclimatization, and the responses of difficult-to-propagate medicinal plants to environmental conditions. His work also includes a micro-greens project encompassing mineral nutrition, vessels and packaging, and cleanroom process development.

For More Information

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