Project Update: Coir Recycling and Re-use

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Coir availability and cost has been an ongoing challenge for substrate berry producers in Tasmania, particularly with high freight costs in recent years. While costs have dampened slightly since the challenging COVID period, berry growers still rely on an annual supply of coir for substrate strawberry production due to its ideal growing characteristics for plant growth and yield.

Fruit Growers Tasmania has been managing an ongoing collaborative project with research partner RMCG and three commercial grower partners to help address these challenges by investigating options for coir re-use, recycling and alternative substrate to help extend the coir life and reduce ongoing costs for growers.

Stage 1: Early learnings on coir re-use

The first stage of the project investigated physical properties and structural suitability of reused coir, analysing the rate at which coir degraded over time and impacts on water holding capacity and drainage. Results showed that reused coir still showed suitable soil characteristics including drainage and moisture holding capacity. This demonstrates the potential for the use of coir substrates for more than one growing season in strawberry production.

The project then investigated which other materials were available and suitable to partially replace coir in strawberry production. Wood fibre was considered as the most suitable alternative at this time, particularly when mixed with new or reused coir.

Stage 2: Small-medium scale trials

Trial purpose and setup

The purpose of Stage 2 trials in 2023-24 was to ground-truth findings from the first stage of the project. This aimed to provide further data on the previously trialled mixes and inform treatment selection for the larger, commercial scale trials in Stage 3 of the project (2024-25).

The Stage 2 trials were small-medium sized and involved a range of treatments at each of the three farms. This included use of fresh coir, second year or composted coir, 100% wood fibre and various percentage mixes of wood fibre with either new or composted coir.

Plant growth measurements were undertaken throughout the summer of 2024 by measuring the number and diameter of plant crowns. Due to the large variation in crop layout, planting date and management, trial comparisons were focused within individual farms rather than between farms.

Root development in 100% new coir.
Photo credit: Doris Blaesing

Substrate profile in 100% wood fibre.
Photo credit: Jake Gaudion

Root development in 50/50 coir and wood fibre.
Photo credit: Doris Blaesing

Substrate profile in 100% reused coir.
Photo credit: Jake Gaudion

Root development in 100% wood fibre.
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Substrate profile in 50/50 reused coir and wood fibre.
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Stage 2 Outcomes

Results showed that 100% reused coir treatments significantly inhibited drainage particularly later in the growing season, where the lower part of the substrate profile remained saturated and created anaerobic conditions, inhibiting root growth. This lack of drainage is considered the primary reason for poor plant growth and reduced yield later in the season. Fertiliser salts (EC) accumulated in the reused coir treatments over the season, especially in corners that were difficult to flush with irrigation. This created challenges in managing irrigation and nutrition effectively.

The 100% wood fibre treatments did not perform as well as fresh coir or mixed substrates due to the low moisture holding capacity and high drainage, resulting in the need for increased irrigations. Through the season, the wood fibre profile became waterlogged and anaerobic, thought to be due to smaller particles moving down and clogging pore spaces.

The combination of coir and wood fibre performed relatively well at both farms where it was trialled, as the combination of high and low water holding capacity from the coir and wood fibre respectively appeared to be beneficial to plant growth. Waterlogging in the latter part of the season did not appear to be an issue in these trials.

A key finding from the Stage 2 trials was the importance of considering the overall profitability of the treatment rather than only the yield. Trials showed a 15% decrease in yield in reused coir, however it was anecdotally noted that the reused coir was one of the more profitable treatments due to the reduced costs of new coir inputs, associated labour and coir disposal costs. This highlights the importance of looking at the overall financial outcome when assessing the potential viability.

Troughs have also proven successful on some farms as they eliminate the issue of plastic coir bags from the growing cycle. Plastic bags can be challenging to completely remove from spent coir and pose a challenge as currently they cannot be recycled in Tasmania. Substrate in troughs requires slight adjustments in irrigation, nutrition and plant management, however they can last multiple years and enable easier refilling of free new or reused coir.

Disease testing

To address concerns about potential disease carry-over in reused coir, pathogen testing was undertaken for all treatments in April 2024. *Pythium calde F.* was detected in several substrate samples, however levels were low and did not appear to affect the plants. The results indicate that while disease was present, there does not appear to be a relationship between the age of substrate or type of material and the presence of pathogens.

What's next?

Following the findings from the Stage 2 trials, Stage 3 trials will further explore mixed substrates on large-scale commercial trials in the 2024-25 season.

While wood fibre mixes proved successful on some farms in the Stage 2 trials, the lack of local production of this media and freight costs to supply it from Victoria across Bass Strait deem the product not economically competitive for substrate use in Tasmania. Stage 3 trials have therefore moved towards the use of composted pine bark to provide improved drainage characteristics.

The mixed substrate trials include second year coir and composted pine bark, with assessments to investigate several variables including plant growth, yield, plant health, pathogen profile and substrate structure.

The outcomes of the Stage 3 trials will inform the economic analysis in Stage 4 of the project. This will determine the feasibility of the mixed and reused substrates on a commercial scale and therefore the potential for industry adoption.

Acknowledgements

Funding for this project is provided by the Tasmanian Government through the Agricultural Development Fund program

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