



Closing the loop: Black Soldier Fly (BSF) technology to convert agricultural waste

BSF Project Update #3 December 2021

Overview

The project activities are progressing well and all deliverables under Milestone 2 and 3 have been met. The project end date was formally extended into 2023.

The key focus this quarter were the manure trials. The team collaborated across the discipline groups on how manure rearing could work. There have been some challenges with dependent workplans and travel restrictions this quarter, but the regular team meetings have helped to manage any issues.

Communication & Engagement

- ❖ A dedicated project website has been developed for the project: <https://www.bsfwastetoprofit.com/>
- ❖ Articles have been published, including:
 - ✓ ABC news article, November 2021. [Link](#).
 - ✓ Pig333 article, January, 2022. [Link](#).
- ❖ Development of a draft “BSF fact or fiction” document for inclusion on a Community of Practice website.
- ❖ The ABC media communicated the project, including a televised report on primetime 7pm News and on radio, *Great Southern & South West Rural Report*.

- ❖ Dr Sasha Jenkins presented two *Flash Talks* in Session 12 at the Australasian Pig Science Association (APSA) conference, 18th November 2021 ([Link](#)):
 - ✓ Valuing the costs of waste management in the pork industry
 - ✓ Assessing the potential of black soldier fly technology to convert piggery manure into slow release fertiliser
- ❖ Discussions on regulatory engagement requirements, inputs and processes were completed.
- ❖ A wide range of researchers, representatives from AMPC and other stakeholders visited BSF facility at the UWA's Shenton Park Open Day on 12th October, 2021.



UWA's Shenton Park Open Day, October 2021.

Snapshot of results

- Fresh pure manures mix with no additives processed for 19 days was found to be the most successful of the small-scale trials
- The inclusion of manures frass to the soil at 5t/ha or greater has more than doubled the productivity of rye grass compared to mineral fertiliser application alone and 2.5t/ha or greater has doubled the grain production of wheat.
- Nearly 60% of surveyed growers would be interested in using a BSF-based product as additional organic fertiliser or soil improvers on their farm and respondents generally had a strong preference for high carbon-content products.



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Research Activities

Screening and optimisation of waste streams

- Small scale trials on manure mix (with and without additives) were completed successfully at 7, 14 and 19 days.
- Large scale trial (>600kg manures) is currently being processed

Economic feasibility, socio-economic costs and benefits, and market evaluation

- A market gap analysis was conducted for BSF fertiliser products
- Data for the upcoming benefit-cost analysis has been collected from the field trials and a preliminary framework developed
- Data has been collected on end-users' perception of BSF fertiliser products (results under embargo)

Assess the environmental risks of BSF products (frass and larvae)

- Final harvest of the large BSF frass experiment was completed and the manures frass experiment will have its final biomass cut completed by end of January.
- Microcosm experiment to investigate the impact of different frass amendments on GHG emissions has been completed. Currently in the process of data analysis and interpretation.
- Laboratory trial to investigate the slow-releasing effect of N after embedding the BSF frass is being prepared for publication (near completion).

Develop a granulated and/or pelletised fertiliser product

- Binding agents are being improved, and development of a mechanised pelletisation process is ongoing.

Develop a slow release encapsulated fertiliser product

- Growth accelerator trials are in progress comparing four defatted soldier fly-based formulations to conventional fertilisers.
- A leaching trial has been completed with growing plants as part of the growth accelerator trial
- Three plant scans have been performed, enabling plant uptake profiling, and relative treatment differences calculated via artificial intelligence algorithms based on 3D plant selection data.



Growth accelerator and reaction vessel trials

HAVE YOUR SAY

If you are a livestock producer, meat processor, or potential end-user of BSF fertiliser product and would like to be involved, then get in touch with a [project team member](#) and participate in the stakeholder consultation survey.

Next Steps

BSF Frass experiments will be undertaken to track the changes in soil nitrogen over the season, assess wheat and canola yields, and determine the cumulative biomass produced by pasture species. Pot trials will determine the greenhouse gas potential, nitrogen leaching, and the fate and persistence of pathogen in frass amended soils. Publications, including fact sheets and reports, will be available in early 2022.

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