Delivery partner resource

Horticulture Impact Assessment Program

PT17003 Impact Assessment

June 2026

Hort Innovation

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Executive Summary

The Australian potato industry produced approximately 1.49 million tonnes of potatoes in 2024-25, valued at $1.21 billion, making it one of Australia's most important vegetable industries.[1] Powdery scab, caused by *Spongospora subterranea*, is a significant disease affecting both potato tubers and roots, reducing tuber quality, storage performance, and crop productivity. The Australian processing potato industry alone estimates annual losses from powdery scab at approximately $13.4 million.[2] Managing the disease is challenging and relies heavily on the availability of resistant cultivars, with traditional resistance screening methods requiring large, costly, and time-intensive field or glasshouse trials.

PT17003 Mechanisms and manipulation of resistance to powdery scab in potato roots was funded by Hort Innovation using the Fresh Potato and Processing Potato research and development levies and contributions from the Australian Government. Delivered by the Tasmanian Institute of Agriculture between 2018 and 2023, the project aimed to improve understanding of the mechanisms underpinning root infection by *S. subterranea*, develop more efficient methods for screening resistance, identify resistance mechanisms and genetic markers, and generate disease-resistant potato variants for future evaluation.

The project successfully developed a novel rapid assay for assessing potato root resistance to *S. subterranea*, screened cultivars for relative resistance, generated somaclonal variants with enhanced resistance characteristics, and identified candidate genes potentially involved in pathogen attachment and susceptibility. The project also contributed substantially to scientific knowledge through peer-reviewed publications, conference presentations, industry communications, and engagement with breeders, variety owners, and research organisations.

This impact assessment identified a quantifiable economic benefit associated with leveraged follow-on research funding. The project generated sufficient scientific and industry interest to support the development of a pending Australian Research Council (ARC) Linkage Grant application valued at approximately $1.5 million, with industry co-investment from Simplot Australia and other partners. Given the grant has not yet been awarded, the benefit was estimated using an expected value approach based on the average ARC Linkage Project success rate and an overall confidence adjustment reflecting uncertainty surrounding future funding outcomes.

Using this conservative approach, the project generated a quantified benefit through research leverage, resulting in an estimated net present value (NPV) of -$0.14 million and a benefit–cost ratio (BCR) of 0.84 at a 5% discount rate. These results reflect the project's position as an upstream, enabling research investment, where the primary outputs are knowledge, tools, and scientific capability rather than immediately observable commercial outcomes. Consequently, many of the project's likely benefits could not be robustly quantified within the scope of this assessment.

In addition to the quantified research leverage benefit, the project generated several important unquantified benefits. These include the potential for improved marketable yields and tuber quality through the development and future adoption of disease-resistant cultivars, efficiency gains for breeders through the use

[1] Hort Innovation (2025) Australian Horticulture Statistics Handbook 2024-25

[2] Hort Innovation (2022) Mechanisms and manipulation of resistance to powdery scab in potato roots

of a rapid screening assay, improved varietal selection decisions by growers and breeders, reduced input requirements associated with improved root health, and strengthened industry capability through collaboration and knowledge generation. While these benefits are plausible and supported by the research findings, quantification is constrained by the absence of commercial adoption data, field-scale validation of resistant lines, and limited visibility over breeding and varietal selection decisions within commercial supply chains.

Overall, the assessment finds that PT17003 delivered substantial strategic value to the Australian potato industry by establishing new scientific knowledge, developing novel disease screening tools, identifying promising pathways for resistance breeding, and positioning the industry to attract significant follow-on research investment. The project provides a strong foundation for future research aimed at developing commercially viable disease-resistant potato cultivars and demonstrates the importance of long-term investment in enabling research that underpins future productivity, sustainability, and disease management outcomes.

Context, objective, and details of investment

The Australian potato industry is a valuable contributor to agriculture of Australia. In 2024-25, 1.49 million tonnes, valued at $1,212.7 million were produced, making it an important vegetable crop. The majority (66%) was directed to processing, while 30% was grown for fresh consumption and 3% were exported.[3]

Powdery scab is a globally important potato disease. The Australian processing potato industry estimates it causes losses of $13.4 million p.a..[4] Powdery scab is caused by Spongospora subterranea and affects the appearance and value of tubers and affects roots. In recent years, the importance of root disease caused by this pathogen has been getting more recognition. The disease causes root infection which disrupts root function and leads to reduced growth and yields. Managing these diseases is extremely difficult and largely relies on resistant cultivars. Traditionally, the identification of disease resistance has been based on the visual assessment of disease in large field or glasshouse trials, which are both time and resource intensive.

PT17003 aimed to address the lack of knowledge around pathogen binding, assessment of resistance and using this information to strategically support resistance selection using traditional or novel breeding approaches. The project had the following main objectives:

- develop a rapid, robust and cost-effective means for assessment of cultivar resistance to the root infection phase of S. subterranea interaction with the potato host
- use this assay to select variants of commercial cultivars developed through the use of somaclonal cell selection techniques that show enhanced resistance to pathogen root binding and subsequent disease whilst retaining important agronomic traits
- develop a better understanding of the nature of pathogen root attachment, attempting to identify possible pathogen receptors on roots that could be novel breeding targets for resistance and/or targets for blockers of pathogen attachment
- assess the genetic basis of root attachment to develop gene markers to assist breeding for this trait.

The key research provider was the Tasmanian Institute of Agriculture, part of the University of Tasmania. The funding came from Hort Innovation, using the Fresh Potato and Processing Potato research and development

[3] Hort Innovation (2025) Australian Horticulture Statistics Handbook 2024-25

[4] Hort Innovation (2022) Mechanisms and manipulation of resistance to powdery scab in potato roots

levy and contributions from the Australian Government.

Alignment with Strategic Investment Plan

PT17003 closely aligned with, and significantly contributed towards, the Potato Strategic Investment Plan (SIP) 2022-2026. The project developed a rapid assay and identified molecular markers for root resistance, strengthening technical capability and promoting an innovative culture amongst researchers (Outcome 1). By producing resistant variants, the project supports higher yields and improving root health (Outcome 2). The project is directly relevant to Outcome 3, as higher-quality potatoes result from reduced disease pressure, which enhances marketability, supporting demand for fresh potatoes. Further, the project generated valuable data and cultivar susceptibility and resistance mechanisms, providing actionable insights to guide breeding decisions and disease management strategies.

Overall, the project aligns with the outcomes of the Potato SIP by improving understanding and management of powdery scab in potato roots by developing rapid screening tools, identifying resistance mechanisms and markers, and producing resistant variants, thereby building industry capability, enhancing productivity and sustainability, and providing actionable insights for growers and breeders.

Table 1 Project details of PT17003

Project code	PT17003
Title	Mechanisms and manipulation of resistance to powdery scab in potato roots
Research organisation(s)	Tasmanian Institute of Agriculture, University of Tasmania
Project leader	Professor Calum Wilson
Funding period	2018-2023
Objective	To understand the mechanisms of root infection by *Spongospora subterranea* and develop tools and resistant potato variants to manage powdery scab, improving productivity and sustainability.

Source: Hort Innovation

Related investments

The project was linked with 6 other investments, these are:

- PT17002 – Program approach for pest and disease potato industry investments: coordinated pest and disease research and development across the Australian potato industry. This project aimed to improve collaboration within the industry, dissemination of research outcomes and efficiency of levy investments
- PT20000 – Australian potato industry communication and extension project: supporting Australian potato growers in adopting improved practices on-farm and keeping up to date with the latest industry news, information, technology and resources. This project, called the “PotatoLink” extension and communication program, is nationally coordinated but locally implemented
- PT23002 – An integrated disease management program for the Australian Potato Industry: long-term integrated disease management (IDM) program which targets key soil-borne potato diseases, developing diagnostics and bio controls and IDM strategies targeted to Australian conditions
- PT09039 – Parent project for the Australian Potato Research Program Phase 2: phase 2 of the Australian Potato Research Program. A research and development program for the Australian processing-potato industry that developed new tools and knowledge for managing complex diseases and speeding up evaluation of treatment options

— PT15008 – Extension of the PreDicta Pt potato diagnostic service: expanded the PREDICTA PT testing system to help minimise the impact of soil and seed borne diseases on commercial Australian potato production and to help growers pre-emptively manage disease risk

— PT16002 – Exploring Spongospora suppressive soils in potato production: investigate soils that naturally suppress Spongospora subterranea, identifying soil chemical and biological traits that reduce disease severity.

Governance

The governance structure of PT17003 was designed to ensure strategic alignment, scientific integrity, and effective industry engagement. Hort Innovation provided oversight to ensure the project met its objectives and aligned with industry priorities. The project was funded by Hort Innovation, using the Fresh Potato and Processing Potato research and development levy and contributions from the Australian Government. The Tasmanian Institute of Agriculture (TIA) was the delivery partner, with Professor Calum Wilson as the project lead. Having a university-based research team adds academic rigour, with peer-reviewed methods to ensure scientific credibility.

The TIA adopted a monitoring, evaluation and reporting framework which tracked the desired impacts from project activities. The evaluation process identified which data should be captured, how to capture it and how the analysis of the data would benefit the project. The framework also included a risk mitigation and management plan, a stakeholder engagement plan, communication plan and a commercialisation plan.

Additionally, the final report is publicly available via Hort Innovation, providing full visibility into methods, data, limitations and setbacks, results and recommendations. As well, industry articles were produced for publication in newspapers and/or industry magazines.

The governance structure was well established, with strong leadership and clear reporting arrangements. This supported the delivery of relevant research and ensured insights were generated into resistance mechanisms for powdery scab.

Impact pathway

Table 2 Impact pathway of PT17003

Pathway	Description
Inputs and activities	**Project setup and governance** • Funded by Hort Innovation using industry levies • Milestone-based reporting with continuous feedback and review **Research team, collaboration and capacity building** • Multidisciplinary team drawn from The Tasmanian Institute of Agriculture and New Zealand Plant and Food Research **Stakeholder engagement** • Participation in annual industry and scientific forums to discuss results and distribute industry information to industry stakeholders **Experiments and data** • Trials and analysis undertaken to provide new knowledge
Outputs	**Project planning, governance and reporting** • Project plans, milestones and report available on the Hort Innovation website **Extension, communication, and industry engagement** • Articles published in PotatoLink

Pathway	Description
	• Presentation at all annual potato R&D meetings that were able to be held • Presentations on project outcomes at ad hoc industry meetings • Three refereed journal articles have been published • 3 presentations at separate conferences **Data and knowledge products** • A rapid and robust disease screening system developed to assist in variety choice. Details are provided in a journal article • A listing of available varieties for their relative resistance to pathogen root attachment was developed and shared • Variant clones of industry selected varieties with reduced susceptibility to root disease have been generated • Two scientific articles published on the analysis of the surface proteins of resistant and susceptible potato roots • Three scientific articles published on the new knowledge of physiological and genetic basis of resistance to zoospore attachment to roots • Development of a novel rapid assay for determining resistance of potato cultivars to root attachment by *Spongospora subterranea zoospores (S. subterranea)* • Somatic cell selection proved as an approach for selecting variants resistant to root infection, with variants also showing reduced tuber powdery scab • Trial to confirm the biological importance of root pectin for zoospore root attachment
Outcomes	**Adoption and use of improved screening capability** • Subject to adoption by breeding programs, the new screening tool maybe of immediate value to potato breeders and can be integrated into existing breeding pipelines to enable earlier and more efficient selection for disease resistance. • Major companies and commercial growers can use the assay to assess candidate varieties prior to large scale planting, reducing investment risk. • The availability of a robust laboratory based assay reduces reliance on slower, more variable glasshouse or field based screening methods. **Improved industry decision making on variety selection** • The published resistance ratings provides breeders with independent evidence to inform strategic variety choice. • Companies can make more informed decisions about introduction, retention or phasing out of varieties based on relative susceptibility to root infection. **Increased scientific understanding supporting future research** • This project establishes proof of concept for somatic cell selection as a viable pathway to generate enhanced resistance to root infection and powdery scab, demonstrating a scalable approach that can be strategically applied to other commercially important cultivars. • The somaclonal selection study identified multiple variant lines of industry priority cultivars with enhanced resistance to root infection under laboratory and glasshouse conditions, providing a strong scientific foundation for multi-year field validation studies. Such field studies will be essential to test disease resistance and agronomic performance before commercial deployment. • Root–pathogen interaction studies identified potato genes that may influence susceptibility to zoospore attachment, providing clear targets for future research using gene markers, functional genomics, or gene-editing to develop more resistant cultivars.

Pathway	Description
Impacts	• The project generated international interest in the rapid screening assay and varietal resistance data, contributing to a potential pending ARC Linkage Grant[5] (approximately $1.5M[6]) with industry co-funding from Simplot Australia and Potatoes NZ as partner organisations, representing a potential expansion of investment in this research, equivalent to about 3-5 times the current project. • As the rapid assay provides a more streamlined and cost-effective tool for evaluating potato germplasm than traditional glasshouse or field trials, breeders benefit from efficiency gains through reduced labour and resource requirements. • Adoption of potato varieties with enhanced resistance to *Spongospora subterranea* root infection could increase marketable yield by reducing root dysfunction, root galling, and tuber lesions that negatively affect tuber quality, seed viability, and storage durability. • Improved varietal choice through screening of 153 cultivars for relative resistance informs grower decisions, potentially reducing losses from powdery scab. • Deployment of disease-resistant varieties may reduce the need for irrigation, fertilisers, and fungicides to compensate for poor root health. • Active collaboration with breeders, variety owners and research partners strengthened industry linkages, improved awareness of root infection risks and resistance variability, and aligned project activities with industry priorities through germplasm access, shared testing and ongoing communication of results.

Source: ACIL Allen

[5] https://discover.utas.edu.au/Calum.Wilson/grants?favouritesFirst=true&perPage=25&sort=dateDesc&startFrom=0

[6] https://www.grants.gov.au/Go/Show?GoUuid=e91ab9d7-8b37-4d36-b736-7cccd43382a0 https://www.grants.gov.au/Go/Show?GoUuid=e91ab9d7-8b37-4d36-b736-7cccd43382a0

Cost and benefits

Costs

Cost of the investment

This project was funded by Hort Innovation and University of Tasmania. Hort Innovation contributed $0.59 million in cash and $0.11 million in overhead costs (ex-GST amounts). University of Tasmania contributed $10,397 through in-kind support. Table 3 shows the total nominal cash and in-kind contributions across the duration of the investment.

Table 3 Nominal costs of the investment by contributing partners of PT17003

Contribution	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Hort Innovation – Cash	$157,022	$157,022	$157,022	$0	$117,767	**$588,833**
Hort Innovation - overheads	$36,065	$28,282	$25,752	$0	$20,730	**$110,830**
University of Tasmania – in-kind	$2,799	$2,724	$2,545	$0	$2,329	**10,397**
Total	**$193,087**	**$185,304**	**$182,774**	**$0**	**$138,497**	**$699,663**

Source: Hort Innovation

The total nominal investment of $0.83 million is then adjusted for inflation to represent the real value of the investment. Adjustment for inflation is meant to present historical costs in today's dollars by making periods comparable by converting nominal values to real values by way of adjusting for changes in purchasing power due to inflation.

Costs of the investment, in nominal terms and real terms, are provided in Table 4 below.

Table 4 Real costs of the investment PT17003

Organisation	Hort Innovation	Partner organisation	Total
Nominal costs	$699,663	$8,904	$708,567
Real costs ($2026 financial year)	$823,459	$10,397	$833,856

Source: ACIL Allen, modelled using ABS's implicit GDP deflator

Benefits

Table 5 below summarises the potential benefits of the investment and categorises them into 3 streams: economic, environmental, and social impact. It provides a description of the benefits and how the investment could achieve them. The table also shows the assessment method that was used for each benefit.

Table 5 Summary of potential impacts of PT17003

Type of impact	Assessment	Description
Economic impact	Quantified	**Flow on research** – The project generated international interest in the rapid screening assay and varietal resistance data, contributing to a

Type of impact	Assessment	Description
		potential pending ARC Linkage Grant (approximately $1.5M) with industry co-funding from Simplot, representing a potential expansion of investment in this research, equivalent to about 3-5 times the current project. As the grant is not yet secured, the economic benefit is estimated using an expected value approach. This probabilistic approach provides an estimate of the quantifiable economic benefit arising from flow-on research leverage, while acknowledging uncertainty around funding outcomes. While the project ultimately aims to improve varietal resistance and downstream industry performance, it represents an upstream, proof-of-concept research investment rather than a commercially deployable innovation. At this stage, there is no observable adoption pathway, verified field performance data, or measurable change in grower practice that would allow robust estimation of industry-wide yield or cost impacts. Accordingly, the only benefit that can be quantified with defensible evidence is the expected value of leveraged research funding directly attributable to the project's outputs, with downstream productivity benefits treated as potential but currently unquantifiable.
	Unquantified	**Potential yield and marketable quality improvements –** Adoption of potato varieties with enhanced resistance to *S. subterranea* root infection could increase marketable yield by reducing root dysfunction, root galling, and tuber lesions that negatively affect tuber quality, seed viability, and storage durability. Although glasshouse results indicate that some resistant somaclonal variants can maintain yields comparable to their parent lines, there is no multi-year field dataset linking resistance ratings to realised commercial yield outcomes. Quantification is further constrained by unknown adoption rates, regional and seasonal variation in disease pressure, and limited transparency around what varieties growers plant, particularly where private or licensed cultivars are involved. Variety choice is often influenced by contractual obligations with processors and supermarkets, and resistance data for private varieties were returned confidentially to owners. Without reliable data on planting patterns and field-scale performance, estimating an industry-wide yield impact would require speculative assumptions and is therefore not robust. Notwithstanding these constraints, if resistant traits are successfully incorporated into commercially released varieties and adopted across a meaningful share of the planted area, the aggregate industry impact could be material. Widespread deployment of resistant cultivars could reduce yield and quality losses associated with root infection, lower input requirements, and improve crop reliability across affected production regions. Even modest improvements in marketable yield, tuber quality, or storage performance across affected regions could translate into significant value at industry scale. These outcomes represent potential upside beyond the quantified research-leverage benefit.
	Unquantified	**Efficiency gains and improved varietal choice –** As the rapid assay provides a more streamlined and cost-effective tool for evaluating potato germplasm than traditional glasshouse or field trials, breeders benefit from efficiency gains through reduced labour and resource requirements. In

Type of impact	Assessment	Description
		addition, resistance ratings for 153 cultivars provide information that could influence both breeder parent selection and grower varietal choice, potentially reducing disease-related losses. However, quantification is not feasible because Australia does not currently operate a major domestic potato breeding program and the principal beneficiaries are international breeders, over whom there is no oversight regarding assay uptake. Adoption of the assay has not been tracked and depends on internal priorities and technical capacity within private breeding companies. Grower varietal decisions are commercially sensitive and influenced by licensing arrangements and seasonal market requirements. Given the lack of adoption data and transparency around commercial decision-making, aggregate cost savings or productivity gains cannot be robustly estimated. If widely adopted within breeding pipelines, the assay could accelerate selection cycles and reduce screening costs over multiple generations of varietal development, compounding efficiency gains over time. These dynamic innovation benefits are inherently difficult to observe and attribute, and are therefore not included in the quantified estimate.
Environmental impact	Unquantified	**Reduced input requirements and slowing of disease spread –** Deployment of disease-resistant varieties may reduce the need for irrigation, fertilisers, and fungicides to compensate for poor root health. This can lead to not just reduced input requirements but also reduce pathogen spread and subsequent tuber disease, contributing to overall field health. However, quantification would require long-term, multi-site data linking resistant variety adoption to measurable reductions in input use and disease incidence. Input requirements and disease pressure vary substantially by soil type, climate, season and management practice, and adoption levels of resistant varieties are currently unknown. In the absence of longitudinal farm-level evidence, assigning a monetary or environmental value to these potential benefits would require unsupported assumptions.
Social impact	Unquantified	**Strengthened industry knowledge and research collaboration –** Active collaboration with breeders, variety owners and research partners strengthened industry linkages, improved awareness of root infection risks and resistance variability, and aligned project activities with industry priorities through germplasm access, shared testing and ongoing communication of results. The extent to which these outcomes lead to measurable benefits depends on the degree of practice adoption and information dissemination that occurs as a result of this trust and collaboration. Given the variability and indirect nature of these effects, assigning a robust dollar value would require speculative assumptions and is therefore not appropriate.

Source: ACIL Allen

Data and assumptions

The required data, assumptions and calculations used to estimate the impacts of the investment are presented in Table 6 below. The data were sourced from project data, external sources through literature review,

industry data provided by Hort Innovation and other publicly available databases. Assumptions were informed by stakeholder consultations and are designed to be conservative considering the uncertainties underlying the magnitude of the impacts.

Table 6 Data and assumptions used for PT17003

Data/Assumption	Value, source and rationale
Data	
ARC Linkage Grant	$100,000-$1,500,000 Source: https://www.grants.gov.au/Go/Show?GoUuid=e91ab9d7-8b37-4d36-b736-7cccd43382a0 Based on consultation with Calum Wilson, Tasmanian Institute of Agriculture, University of Tasmania we, have assumed that the research grant for the full $1.5 million has been applied for to support follow on research activities.
Simplot Australia funded Germinate to Exterminate research	$329,557 Source: https://discover.utas.edu.au/Calum.Wilson/grants?favouritesFirst=true&perPage=25&sort=dateDesc&startFrom=0
Probability of successfully obtaining the research grant	40% Source: NCGP Trends: Success Rates https://www.arc.gov.au/ncgp-trends-success-rates *The average success rate for obtaining grant funding for the ARC Linkage Projects is 40%. In the absence of uncertainty around obtaining the grant, we have used 40% as a conservative assumption for this analysis.*
Assumption	
Attribution	Attribution to the project: 99% based on the nominal costs of the investment.
Counterfactual	In the absence of this Hort Innovation investment, the foundational resistance screening data, assay validation, and industry alignment would likely not have been assembled within the same timeframe or at the same scale. While elements of the research may have emerged through alternative pathways over a longer period, this would have depended on fragmented funding, independent academic initiative, or delayed industry coordination. Without the initial proof-of-concept results and demonstrated industry co-investment interest generated by this project, a competitive ARC Linkage proposal of this scale would have been unlikely in the near term. Accordingly, the counterfactual is best characterised as a significant delay and associated deferral of leveraged research funding and downstream innovation rather than a permanent absence of activity.
Adoption	The primary direct beneficiaries of this project are potato breeders (predominantly international breeding companies), biotechnology-focused breeding programs, and research organisations involved in varietal development and disease resistance. These stakeholders are best positioned to adopt the rapid screening assay and integrate resistance data into breeding pipelines. Australian growers and processors will likely benefit from the published information on varietal selection decisions and potentially reduce disease-related yield and quality losses. Additionally, breeders include multinational processing companies which can then benefit downstream growers by incorporating resistance traits into commercially released varieties and those varieties subsequently being adopted within Australian production systems. An adoption rate has not been incorporated into the quantitative analysis due to a lack of industry data rather than the absence of an adoption pathway. While the project generated information that

Data/Assumption	Value, source and rationale
	could be directly used by growers, processors and breeders, there is limited information on varietal planting decisions, the uptake of resistance information in commercial decision-making, or the extent to which the rapid screening assay has been adopted by breeding programs. This highlights a weakness in industry data and benchmarking. Adoption decisions sit with independent breeding companies operating in competitive and commercially confidential environments, and there is no visibility over internal R&D processes or decision-making timelines. Furthermore, downstream adoption by growers depends on market requirements, licensing arrangements, and varietal release cycles that typically span 10–15 years. Given these multiple layers of external decision-making and the absence of observable uptake data, applying an assumed adoption rate would require speculative assumptions and would not be methodologically robust. As such, only research leverage effects (i.e. expected grant funding) have been quantified.
Research grant value	The research grant value is based on the expected ARC Linkage Project application associated with this research stream, combined with confirmed industry co-funding. Simplot Australia is identified as a key co-investment partner supporting progression of the research toward applied and pre-commercial outcomes. This ARC-linked work is expected to sit alongside existing industry-supported research activities, including the *Germinate to Exterminate* program[7] with Simplot Australia, which demonstrates the ongoing parallel investment by industry in complementary disease management and applied research pipelines. Accordingly, the leveraged research value is defined as the total of the expected ARC grant plus the associated industry co-funding contribution. This reflects how follow-on funding is actually structured in practice and provides a more transparent basis for estimating research leverage benefits.
Confidence	A confidence rating has been applied to the overall expected value estimate in the CBA model to reflect uncertainty around the assumptions, potential uptake, and realisation of benefits. Assumed to be 75%, this captures the degree of confidence in the projection of leveraged research funding and associated impacts based on current knowledge and valuation.
Calculations	
Expected funding value	*Total grant value x probability of success*

Source: ACIL Allen

Net impact

A summary of the net impact of the investment is presented in Table 7 at 5% discount rate. The results show that, taking all quantified costs and benefits into account, the investment produced a negative net result. The investment has an NPV of -$0.14 million and a BCR of 0.84. The quantified benefit relates to leveraged research funding, which would be secured (or not) within a short timeframe following project completion. Any associated research activity would also occur within a typical 3-5 year ARC project cycle. Accordingly, the majority of the measurable economic benefit is expected to be realised within approximately 5 years of project completion, rather than accruing progressively over several decades.

[7] https://discover.utas.edu.au/Calum.Wilson/grants?favouritesFirst=true&perPage=25&sort=dateDesc&startFrom=0

The benefit–cost ratio (BCR) of 0.84 and negative NPV, IRR and MIRR reflect the nature of this investment as a predominantly upstream, enabling research activity with benefits that are delayed, uncertain, and largely realised through leveraged follow-on funding rather than direct industry productivity gains. The quantified benefit is limited to the expected value of future ARC Linkage research funding and associated industry co-investment, with the former being probabilistic in nature and does not generate immediate cash flows within the evaluation period.

The negative IRR and MIRR outcomes similarly reflect the absence of early or recurring cash benefits within the analysis period, combined with reliance on a single, uncertain future research leverage event rather than a sustained stream of realised commercial returns. This project primarily generates value primarily through the creating on knowledge, tools and decision support information that sit early in the innovation pipeline, with downstream productivity gains dependent on complex adoption pathways that could not be reliably quantified due to data limitations rather than absence in principle. In particular, while the project provides information that could generate meaningful on-farm and processing efficiencies (for instance, reduced input costs, lower processing losses), there is insufficient industry-wide data on varietal uptake, decision-making behaviour, and realised productivity changes to robustly model these effects. As a result, the quantitative analysis is constrained to the expected value of leveraged follow-on research funding, which is probabilistic in nature and realised over a short ARC funding cycle rather than as a long-term stream of industry benefits. Accordingly, the financial metrics presented should be interpreted as reflecting data and methodological constraints in capturing downstream adoption benefits, rather than an absence or lack of potential economic value arising from the research.

When taking only costs and benefits attributable to Hort Innovation into account, the investment generated an NPV of -$0.14 million and a BCR of 0.84. The benefits attributed to Hort Innovation were 99% since the project was mostly funded by Hort Innovation with in-kind contributions from University of Tasmania.

Table 7 Net impact results of PT17003

	Years after investment completion	
	0	5
Whole investment		
PV of Costs ($m)	$0.83	$0.83
Benefits ($m)	$0.00	$0.73
PV of Benefits ($m)	$0.00	$0.70
NPV ($m)	-$0.83	-$0.14
BCR	0.00	0.84
IRR	Negative	Negative
MIRR	Negative	Negative
Attributable to Hort Innovation		
PV of Costs ($m)	$0.82	$0.82
Benefits ($m)	$0.00	$0.72
PV of Benefits ($m)	$0.00	$0.69
NPV ($m)	-$0.82	-$0.14
BCR	0.00	0.84

IRR	Negative	Negative
MIRR	Negative	Negative

Source: ACIL Allen

Sensitivity analysis

Sensitivity analysis was conducted to test the robustness of susceptibility of the analysis to key assumptions and parameters. Given the uncertainty of a number of assumptions used in this CBA, sensitivity testing is important to determine the appropriateness of underlying assumptions. The results of the sensitivity analysis are presented in Table 8 below.

Table 8 Sensitivity analysis results of PT17003 at 5-year horizon

	NPV (in $M)	BCR	IRR	MIRR
Under standard assumptions (Central case scenario and 5% discount rate)	-$0.14	0.84	Negative	Negative
3% discount rate	-$0.12	0.85	Negative	Negative
7% discount rate	-$0.15	0.82	Negative	Negative
Grant success rate probability (20%)	-$0.49	0.42	Negative	Negative
Grant success rate probability (60%)	$0.21	1.25	9.6%	8.4%
Low confidence (50%)	-$0.49	0.42	Negative	Negative

Source: ACIL Allen

Key findings

The following key findings have been identified for this assessment:

- **Flow on research** was generated from this project, with an estimated value ranging from 3 to 5 times the research cost. This is associated with a pending ARC Linkage Grant, with a value of $1.5 million. While this project has a high probability of success, the average success rate for ARC Linkage Projects is 40% and research grant funding typically has high level of uncertainty. This has been used as a conservative assumption.
- **Potential yield and marketable quality improvements** could result from adoption of potato varieties with greater resistance to root infection. Quantification is constrained by a lack of data linking resistance ratings to yield, and a lack of information around adoption rates, variation in regional and seasonal disease pressure, and limited transparency around varietal choice.
- **Efficiency gains and improved varietal choice** – The rapid assay is a more streamlined and cost-effective tool for evaluating potato resistance when compared to large field or glasshouse trials. Additionally, resistance ratings for 153 cultivars could influence breeders and growers' varietal choice. Quantification is not feasible because adoption of the assay and varietal choice have not been tracked. Varietal decisions can also be constrained by commercial sensitivities and seasonal market requirements.
- **Reduced input requirements and slowing of disease spread** – Development of disease resistance varieties may reduce the need for irrigation, fertilisers, and fungicides to compensate for poor root health. Quantification would require long-term, multi-site data linking adoption of resistant varieties to measurable reductions in inputs and disease incidence.

- **Strengthened industry knowledge and research collaboration** – active collaboration with breeders, variety owners, and research partners strengthened industry linkages, improved awareness of root infection risks and resistance variability, and aligned project activities with industry priorities. Given the variability and indirect nature of these effects, it is not appropriate to quantify this benefit.
- **Key limitation is the absence of adoption and utilisation data across breeding, grower and processing systems,** which reflects the project's role as upstream enabling research rather than a directly observable commercial intervention. While the project generates outputs that could plausibly deliver on-farm productivity gains (yield, input cost reduction, and processing efficiency improvements), these cannot be quantified due to a lack of empirical data linking varietal resistance to commercial performance, unknown adoption rates, and limited transparency in varietal use and decision-making. Future investment would benefit from embedding structured adoption tracking, varietal benchmarking systems, and formal industry data-sharing agreements to enable robust valuation of downstream impacts in subsequent assessments.
- **Future investment opportunity lies in strengthening impact measurement alongside R&D delivery to enable full economic evaluation of research outcomes** including baseline data collection, defined adoption pathways across breeders, processors and growers, and longitudinal monitoring of varietal performance under commercial conditions. This would allow future projects to progress beyond valuation of expected research leverage (e.g. ARC funding) to quantification of realised productivity, input cost savings, and processing efficiency gains. Without such embedded evaluation frameworks, a significant proportion of the project's likely economic value remains unquantifiable despite being biologically and commercially plausible.

Consultations

The following stakeholders were consulted on this assessment:

- Ben Callaghan, R&D manager, Hort Innovation
- Calum Wilson, Tasmanian Institute of Agriculture, University of Tasmania

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