Milestone report 102

Project title:

Pest management for the Australian sweetpotato industry

Project code:

PW22000

Milestone number:

102

Project leader:

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Delivery partner:

Department of Agriculture and Fisheries

Report author/s:

Project team

Date:

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Report confidentiality:

Is the report confidential?

☒ No

☐ Yes (whole report)

☐ Yes (sections of report are confidential)

If sections of the report are confidential, list them here:

Disclaimer:

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Public summary

The project aims to identify management approaches for key pests in sweetpotato, primarily nematodes and sweetpotato viruses. This project builds on a long-term body of work with a holistic approach. Plant-parasitic nematodes and viruses can severely impact crop yields and quality, leading to economic losses Plant-parasitic nematode diversity in Australian sweetpotato production is under-examined. The project will investigate population diversity in Australian sweetpotato growing soils through surveillance, characterisation, and pathogenicity testing to facilitate effective control strategies. Ongoing screening of a range of suitable cover crop varieties prioritised by industry to build on set of standard recommended cover crops resistant to several nem species.

The project commenced September 2023 with the signing of the contract. Collaborator agreements are in draft form awaiting feedback and signing. Soil samples have been received from key growing regions of Central Qld, Bundaberg and Cudgen with nematode identification commencing. Root samples were examined for the presence of nematode damage, and female root-knot nematodes were excised for molecular identification.

A field trial to investigate varietal susceptibility to reniform nematodes has been designed with planting scheduled for early March 2024. Project collaborators have commenced the first crossing of nematode resistant parents to produce potential *M.j. javanica* resistant seedlings and true seed collected.

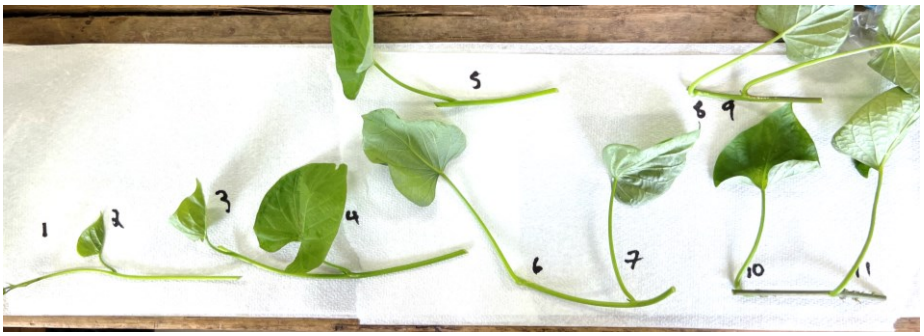
Sixteen grower lines and ten negative and positive Department of Agriculture and Fisheries accessions entered the pathogen testing process in January 2024. Alternative sample extraction methods are under evaluation to enhance diagnostic capacity. To improve accuracy and detection capability, an experiment to investigate virus location within plants was established in February 2024.

Achievements

Table 1. Achievements

Achievement criteria	Delivery partner assessment: • Achieved • Partially achieved • Not achieved	Justification
Project administration:		Collaborator agreements have been drafted and are awaiting feedback and signing. The project team held a planning meeting on 24 January 2024. A M&E plan, risk assessment, program logic and Gantt chart have been developed.
Objective 1: **Field sampling and pack shed surveys on 3 soil types initiated. Initial sampling underway.**	Commenced	Twelve samples have been received at DAF EcoSciences Precinct for nematode diagnostics: five from central Queensland, six from Bundaberg and one from Cudgen. Nematodes were extracted from soil samples using the Whitehead tray method (Whitehead and Hemming 1965) and were quantified and morphologically identified by microscopy. Where present, juvenile root-knot nematodes were manually picked out of solution for molecular species determination. Root samples were examined for the presence of nematode damage, and female root-knot nematodes were excised for molecular identification. Root-knot nematode species was determined by specific PCR assays which have been previously validated as sensitive and specific to local populations.
Objective 2: **Nematode identification and characterisation commenced.**	Commenced	Root-knot nematode was detected in one central Queensland sample and 3 Bundaberg samples (one at a high level, >3000/200mL soil). The root-knot species was characterised as *Meloidogyne javanica* for all samples, although one Bundaberg field was determined to have a mixed population of both *M. javanica* and *M. incognita*. Reniform nematode (*Rotylenchulus reniformis*) was present in 4 central Queensland samples (2 at high levels, >8000/200mL soil) and one Bundaberg sample. A selection of other plant-parasitic species were detected in some samples (spiral *Helicotylenchus dihystera* and *Rotylenchus brevicaudatus*, reniform *Rotylenchulus parvus*, stubby-root *Paratrichodorus* sp., ring *Criconemella* sp., and dagger *Xiphinema* sp.), but none of these plant parasites are known to cause damage on sweetpotato (Clark *et al* 2013) and they were not present in numbers that might suggest an emerging problem. Lesion nematode (*Pratylenchus zeae*) was detected in moderate numbers in one Bundaberg sample. As lesion nematode species are responsible for serious damage to storage roots in some countries, the population level and potential damage will be monitored at this site. If damage is suspected the population will be cultured for an inoculation experiment.

		<table><tr><th>Code</th><th>Sample Type</th><th>Root-knot *Meloidogyne* spp.</th><th>Reniform *R. reniformis*</th><th>Lesion *Pratylenchus* sp.</th><th>Molecular ID</th></tr><tr><td>CQ1</td><td>Soil</td><td>0</td><td>8055</td><td>0</td><td></td></tr><tr><td>CQ2</td><td>Soil</td><td>0</td><td>8280</td><td>0</td><td></td></tr><tr><td>CQ3</td><td>Soil</td><td>92</td><td>29</td><td>0</td><td>*M. javanica*</td></tr><tr><td>CQ4</td><td>Soil</td><td>0</td><td>2</td><td>0</td><td></td></tr><tr><td>CQ5</td><td>Weed Roots</td><td>0</td><td>0</td><td>0</td><td></td></tr><tr><td>B1</td><td>Soil</td><td>3330</td><td>0</td><td>0</td><td>*M. javanica*</td></tr><tr><td>B2</td><td>Soil</td><td>48</td><td>0</td><td>0</td><td>*M. javanica* and</td></tr><tr><td>B3</td><td>Storage Root (from B1</td><td></td><td></td><td></td><td>*M. javanica*</td></tr><tr><td>B4</td><td>Soil</td><td>0</td><td>0</td><td>0</td><td></td></tr><tr><td>B5</td><td>Soil</td><td>0</td><td>2</td><td>0</td><td></td></tr><tr><td>B6</td><td>Soil</td><td>0</td><td>0</td><td>74</td><td></td></tr><tr><td>NSW1</td><td>Soil</td><td>0</td><td>0</td><td>0</td><td></td></tr></table>
Objective 4: **Varietal susceptibility benchmarked.**	Commenced	Field trials for varietal susceptibility to *R.reniformis* initiated. Three soil samples from potential trial sites were received for nematode diagnostics. The samples were collected from previous nematode management (BRF block B6) and nematicide (BRF block C1) trials where reniform nematode had reached high population levels. Following the conclusion of previous management trials, a cover crop of susceptible mung bean (cv. Jade) had been planted into the trials in an attempt to maintain the reniform nematode population. Following nematode extraction, counts showed an extremely high reniform population in the B6 block and high reniform population in the C1 block: <table><tr><th></th><th colspan="2">Plant-parasitic nematodes/200 mL soil (corrected for extraction efficiency)</th></tr><tr><th>Sample details</th><th>Reniform *Rotylenchulus reniformis*</th><th>Root-knot *Meloidogyne* spp.</th></tr><tr><td>B6 (former extensive trial site)</td><td>16605</td><td>135</td></tr><tr><td>B6 (former intensive trial site)</td><td>12690</td><td>90</td></tr><tr><td>C1 (former nematicide site)</td><td>3825</td><td>225</td></tr></table> Root-knot nematode was also present in all three samples, but at less than one percent of the reniform population in the B6 samples. Its presence may be a confounding factor in a variety trial for reniform nematode, but root-knot nematode is extremely common in sweetpotato fields and it would be extremely unlikely, if not impossible, to find a trial site with both a high reniform nematode population and no root-knot nematode present. Trial plans have been developed, propagation of varietal planting material is underway and groundwork has commenced at the trial site at Bundaberg Research Facility. Planting is scheduled for March 2024. Screening of new varieties for susceptibility to Root-Knot species *M.javanica*. Project collaborators have commenced the first crossing of nematode resistant parents to produce potential *M.j.* javanica resistant seedlings and true seed collected. References *Clark, C. A., Ferrin, D. M., Smith, T. P., & Holmes, G. J. (Eds.) (2013). Compendium of sweetpotato diseases, pests, and disorders. St. Paul, MN: APS press.* *Whitehead AG, Hemming J (1965) A comparison of some quantitative methods extracting small vermiform nematodes from the soil. – Annal. Appl. Biol. 55: 25-38.*
Objective 7: **Improve accuracy and detection**	Commenced	16 grower lines were placed into the pathogen testing process in early January 2024. Plants were virus indexed along with five PT check plants and five positive control plants replicated three times. Evaluation is ongoing. 26 samples were saved to membranes for antibody assays (SPCV, SPFMV and SPCFV). 26 samples were tested

capability of the existing diagnostic tools. Diagnostics underway.		for SPLCV, SPFMV and SPCFV using LAMP and SPLCV and SPFMV using qPCR. Results will be compiled when evaluation is completed.  *Image 1, Virus indexing of grower lines, Jan 2024, Gatton Research Facility.* A virus sampling study aimed at determining the spatial distribution of SPLCV within infected sweetpotato plants was installed in the GRF glasshouse. Aim: to investigate most efficient plant sampling strategies to detect SPLCV. Pre-trial preparation: Ten plants were propagated from each of the Gatton Research Facility (GRF) accessions (cv. Beauregard) of different health status in October 2023. GRF: 2100 (+SPLCV), GRF: 300 (+SPLCV and SPFMV), GRF: 100 (PT negative). One vine cutting from each of four propagated plants per accession was divided into five sections or 'treatments' from tip to base, (nodes 1 & 2, nodes 3 & 4, nodes 6 & 7 and base nodes). An additional four propagated plants from each accession were destructively sampled to provide root sections. Two nodes and two root sections from each vine cutting were graft indexed in mid-February 2024.  *Image 2, Vine sections prepared for virus indexing, February 2024, Gatton Research Facility.*
Objective 8: **Develop high throughput capacity for sweetpotato viral disease diagnostics. Adaptation and evaluation underway.**	Commenced	Alternative methods of sample extraction are under evaluation in the virus laboratory at GRF.

Outputs

Table 2. Output summary

Output	Listed in M&E Plan: • Yes • No	Description	Evidence and data
Signed contract. Draft collaborator agreements.	No		Signed contract (head agreement). Draft subcontracts awaiting signing.
M&E plans	Yes	Program logic, Monitoring and Evaluation plan and Risk assessment completed.	M&E plans at Appendix 1.
Field trial plans	Yes	This trial will investigate the effects of Reniform nematode on yield of thirteen sweetpotato varieties with four replicates.	Trial designed, groundwork commenced 26 February at Bundaberg Research facility. Planting scheduled for March 2024. Glasshouse spatial experiment plans, experiment implemented.
List of survey samples to date.	Yes	Field and pack shed survey initiated and nematodes under identification.	List of survey samples to date and results of nematode identification.

Outcomes

Table 3. Outcome summary

Outcome as listed in M&E Plan	Progress to achieving outcome	Evidence and data	Progress: • On track • Off track
There are no outcomes at this stage of project commencement.			

Refereed scientific publications

No publications to report.

Intellectual property

No project IP or commercialisation to report.

Issues and risks

Nil to report

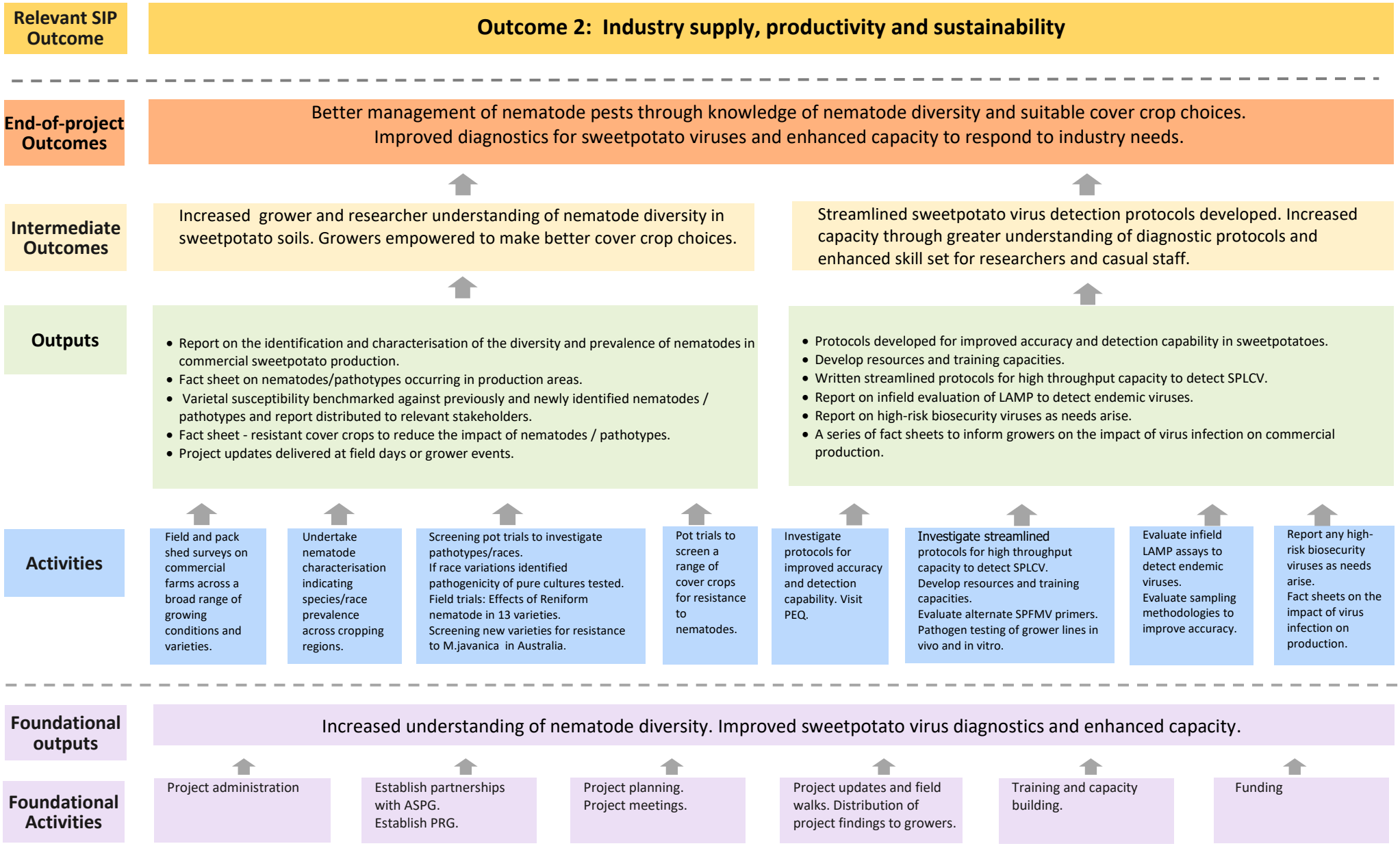
Other information

Appendices

Appendix 1: Program logic, Monitoring and evaluation plan, Risk register and Stakeholder engagement plan.

1. Program logic

Diagram 1. Program logic PW22000 Pest management for the Australian sweetpotato industry



2. Key evaluation questions

Table 1. Project key evaluation questions

Key evaluation questions	Relevant?	Project-specific questions
Effectiveness		
1. To what extent has the project achieved its expected outcomes?		To what extent has the project improved farmer knowledge of nematode pathotypes, information on suitable cover crops and varietal resistance status, thereby reducing the level of nematode damage in sweetpotato crops?
Relevance		
2. How relevant was the project to the needs of intended beneficiaries?		To what extent has the project met the needs of the sweetpotato industry levy payers?
Process appropriateness		
3. How well have intended beneficiaries been engaged in the project?		How well have the sweetpotato growers, and other stakeholders been engaged in the project, extension activities such as farm walks, field days, project updates?
4. To what extent were engagement processes appropriate to the target audience/s of the project?		How accessible were extension events to industry levy payers and did they incorporate their preferred learning style?

3. Project monitoring plan

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Table 2. Project monitoring plan for

Logic level	What to monitor	Performance expectation (KPIs) and/or monitoring questions	Data collection – method (e.g. survey) and source (e.g. growers)	Timing of, and responsibility for, data collection
	Example: Provision of data or development of a new management protocol in a related project; Formation of project team	*Example: Monthly provision of data*	*Example: Record keeping (Delivery Partner of related project)*	*Example: Monthly (Project leader)*
Foundational activities	*Project administration, Establish PRG. Project planning. Project team meetings. Conduct PRG meetings.* *Project updates delivered at field days or grower events and at two project updates p.a. in Bundaberg and Cudgen.*	*Minimum of 4 project team meetings p.a., more as required. Monthly catch ups. Two PRG meetings per year. Written and oral communication with ASPG CEO on regular basis.* *Two project updates p.a. in each region.*	*Meeting minutes. Presentations, fact sheets, grower - feedback*	*Throughout project.* Sandra Dennien and project team.
	Example: Field trials; Technology development; International engagement; Workshops; Publications; Training packages; Number of growers accessed training/attendance at extension events; Industry development services; Minor use permits; New varieties; New standards or protocols	*Example: Extension participation (number of growers and other stakeholders)*	*Example: Record keeping (Industry Development Officer)*	*Example: Ongoing (Industry Development Officer)*
Activities and outputs	***Objective 1 Field samples of commercial sweetpotato farms. Sampling should cover broad range of growing conditions, varieties, and crop densities.*** *Nematode pathotypes collected from the field tested for resistance by using the reproductive factor method on Sweetpotato cultivars across a population range to determine damage potential.* *Pure cultures of five Root-knot nematode species tested by specific PCR assays and maintained.*	*Field and pack shed surveys (Bundaberg 20, Cudgen 10, other regions 20) across soil types and regions completed.* *Pathotype resistance testing trials conducted.* *Pure cultures established and maintained.*	*Record of soil surveys - growers and researchers.* *Pot trial results – Nematode pathotype screening and record of cultures maintained- researchers.*	*By project end. Project team*
	Objective 2 Case characterisation indicating race prevalence across cropping regions. *Nematodes extracted from survey samples identified and quantified. Morphological identification and molecular analysis used to determine RKN species present in the samples collected from the 3 soil types/regions (Bundaberg red volcanic and grey sandy soils and Cudgen red soil) and to monitor for new and emerging nematode pests*	*Morphological and molecular identification of nematodes from 50 survey samples across soil types and regions. Monitoring for new nematode pests.*	*Record of nematodes identified from 50 samples*	*Throughout project. Nematology team*
	Objective 3 Undertake sequence comparison between previously and newly identified nematodes. *Close collaboration will be maintained throughout the duration of project.*	*Project team will liaise with CSIRO via annual meetings and forward nematode samples if different pathotypes are identified.*	*Records kept of pathotypes identified.*	*Throughout project. Project leader. Nematology team.*
	Objective 4 Varietal susceptibility benchmarked against previously and newly identified nematodes / pathotypes and report distributed to relevant stakeholders. *To identify if different pathotypes of M. incognita and/or M. javanica exist at different sweetpotato growing locations, a series of pot trials will be conducted.* *If objective 2 identifies possible race variation, pure cultures will be established. Pathotypes will then be tested for pathogenicity.* *The field heavily infested with R.reniformis will be used to conduct an infield evaluation of pathogenicity of current commercial sweetpotato varieties at Bundaberg Research Facility (BRF) in year one.* *Screening of new varieties for resistance to M.javanica in Australia on multiple sites and various*	*Three to six screening pot experiments yrs two and three using selected nematode populations (M. incognita and/or M. javanica) against current commercial varieties.* *If objective 2 identifies race variations, cultures (up to three pure populations) established and bulked up over a 6-to-12-months to test pathogenicity of pathotypes/races.* *Field trial to investigate effects of Reniform nematode on 13 varieties -yr 1.* *Screening of new varieties for resistance to M.javanica in Australia on multiple sites and various soil types.*	*Pot and field Trial results analysed.* *Initial results determine further testing.* *Report on experiments distributed to growers and stakeholders as trials conclude.* *Researchers and collaborators.*	*By project end. Project team and collaborators.*

	soil types during years 1, 2 and 3.			
	Objective 5 Screen a range of cover crops to identify suitable break crops to reduce the impact of nematodes on sweetpotato. *Screen previously identified cover crops against any newly identified nematodes.* *Screen cover crops prioritised by industry to build on set of standard recommended cover crops resistant to several nematode species*	*Pot experiments to screen cover crops (10 cultivars p.a.) prioritised by industry and/or against any newly identified nematodes.*	*Report on experiments distributed to growers and stakeholders as trials conclude.* *Researchers and collaborators.*	*Throughout project. Nematology team*
	Objective 6 Establish single point of contact.	*Project leader becomes single point of contact to liaise with PRG and ASPG in relation to sweetpotato virus detection and Pathogen testing.*	*Contact PRG and ASPG and agribusinesses and growers to inform.*	*Early in project. Project leader*
	Objective 7 Improve accuracy and detection capability of existing diagnostic tools. *Continue evaluation of LAMP Protocols for improved accuracy and detection capability.* *Visit PEQ.*	*Glasshouse and laboratory experiments – spatial sampling for SPLCV.* *Project team report on PEQ visit.*	*Record of glasshouse and laboratory experiments, reports, written protocols and lab tested. - Researchers*	*Evaluation throughout project. Sweetpotato team*
	Objective 8 High throughput capacity for diagnostics of sweetpotato viruses *Develop resources and training capacities.* *Streamlined protocols investigated for high throughput capacity.* *Alternate SPFMV primers.* *Pathogen testing of grower lines in vivo and in vitro.*	*Glasshouse and Laboratory evaluation as part of screening of grower lines, positive and negative controls and pathogen testing.* *Upskilling of existing staff through molecular assays and in vitro plant propagation, engage UQ casuals.*	*Written protocols developed, record of training kept - Researchers.*	*Throughout project. Sweetpotato team.*
	Objective 9 Demonstrate field deployment of sweetpotato virus diagnostic tools. *Evaluate infield LAMP assays to detect endemic viruses.* *Evaluate sampling methodologies to improve accuracy.*	*In field LAMP assays conducted and results used to determine further work.* *Glasshouse and Laboratory evaluation of sampling methodologies*	*Report on infield evaluation of LAMP to detect endemic viruses - Researchers*	*Years 2 and 3, Sweetpotato team.*
	Objective 10 Report on high-risk biosecurity viruses *Report on high-risk biosecurity viruses as needs arise.*	*Ad hoc on farm monitoring. Report any detections of concern to DAF management to contact Biosecurity.* *Maintain national and international relationships for up-to-date information and collaboration in the event of an incursion.*	*Results of ad hoc on farm monitoring provided to individual growers.* *Fact sheets to inform growers on the impact of virus infection on commercial production - Researchers*	*Report on high-risk biosecurity viruses as required throughout project.* *Fact sheets developed by project end.* *Sweetpotato team.*
	Example: Changes in knowledge, attitudes and skills of growers on a specific best practice; Access to new information for business decision making	*Example: Number of growers indicating an increase in knowledge of how and why a best practice should be implemented*	*Example: Event questionnaire (Growers)*	*Example: Intermittent and as required for Milestone Reports (Project team member)*
Intermediate outcomes	*Increased grower and researcher understanding of nematode diversity in sweetpotato soils.*	*Growers empowered to make better cover crop choices.*	*Grower questionnaire*	*By project end*
	Increased capacity through greater understanding of diagnostic protocols and enhanced skill set for researchers and casual staff.	*Streamlined sweetpotato virus detection protocols developed and in use.*	*Experiment results provide Increased accuracy and capacity through streamlined protocols and training sessions. Researchers.*	*By project end*

	Example: Uptake and adoption of a specific best practice by growers; Implementation of a new protocol; A change in value/volume/quality	*Example: Practice change by a target percentage of production base (and result of that practice change)*	*Example: Surveys and case studies (Growers)*	*Example: Annually and at end of project for Final Report (Project leader)*
End-of-project outcomes	*Better management of nematode pests through knowledge of nematode diversity and suitable cover crop choices.*	*By end of project, 60% of growers utilising cover crops specific to nematode populations/races on their farms or other project recommended management practices.*	*Grower feedback to determine cover crop species use. Report on the identification and characterisation of the diversity and prevalence of nematodes in commercial sweetpotato production. Information distributed to growers to improve nematode management strategies. Researchers.*	*End of project- final report. Project leader*
	Improved diagnostics for sweetpotato viruses and enhanced capacity to respond to industry needs.	*DAF Sweetpotato Pathogen testing Laboratory has enhanced capacity to respond to industry needs through the upskilling of staff.*	*Improved protocols written from practical applications. Increased glasshouse and laboratory capacity.*	*End of project- final report. Project leader*

4. Project Risk Register template

Project Risk Register: PW22000 Pest management for the Australian sweetpotato industry

Table 3. Project Risk Register

The risk What could happen?	**Potential risk causes/sources** What could happen? What would cause it?	**Potential risk impacts** How would the risk impact on delivery of the project?	**Risk controls** What controls are in place, or will be in place, to manage the risk?	**Risk likelihood with controls in place** Refer to Table 2. Risk likelihood scale	**Risk consequence with controls in place** *Refer to Table 3. Risk consequence scale*	**Treated risk assessment** *Refer to Table 4. Risk assessment matrix*	**Risk evaluation** Could you defend this level of risk is acceptable? *Yes/No*	**Person responsible** Who is the person/s responsible for monitoring and managing the risk?
Loss of key personnel	*Resignation/illness*	*Loss of key sweetpotato expertise, knowledge and project management. Grower liaison. Sweetpotato virus diagnostic and agronomy skills, trial implementation. Nematology team management, nematology expertise, advice, technical and molecular skills.*	*Other team members cover roles. Project team trained in multiple skills; Regular team meetings to share information on progress; Central storage of project data/information. Recruit new staff.*	*Remote*	*Moderate*	*Low*	*Yes*	*Project team*
Eric Coleman	*Resign from project/illness*	*Provision of planting material for trials, storage and curing facilities. Sweetpotato knowledge and experience.*	*Rachael Langenbaker, Jean Bobby produce planting material, source alternative trial sites. Difficulty to install curing and storage facilities at Gatton or Bundaberg research facilities.*	*Remote*	*Moderate*	*Low*	*Yes*	*Sandra Dennien Rachael Langenbaker, Jean Bobby*
Unable to find on-farm trial sites.	*Difficulty finding grower willing to host trial sites and any associated field days. Difficulty finding suitable trial site. Biosecurity issues, lack of water. Loss of trial through accidental grower mistake.*	*Delay in trial implementation or unable to trial research findings on-farm; Disruptions to work time; Unable to hold adoption activities.*	*Liaise with industry , good communication, visits and updates, source alternative trial site.*	*Possible*	*Moderate*	*Medium*	*Yes*	*Sandra Dennien Rachael Langenbaker*
Grower reluctance to provide samples	*Sensitivities around guava root-knot nematode detections. Uncertainty around unresolved market access implications.*	*Poor coverage of 3 proposed study areas, insufficient samples for nematode characterisation.*	*Open communication and maintenance of good relationships with industry and individual growers. Seek alternative sources for samples.*	*Possible*	*Moderate*	*Medium*	*Yes*	*Project team*
Unfavourable weather for trials	*Wetter than average weather, floods, cyclone, drought,*	*Possible delays in trial implementation, surveys, harvest and assessment. May need to*	*Ability to undertake trials in a different region or vary project timeframes*	*Possible*	*Moderate*	*Medium*	*Yes*	*Project team*

		repeat trials. Delay in delivering project outputs						
Low grower engagement in adoption activities	*Growers unable or unwilling to attend. Time commitments and other higher priority issues e.g. labour. Early establishment of industry networks and ensuring RD&E includes 'best bet' or realistic options appropriate for industry – as per PRG*	*Low uptake of new practices.*	*Development of stakeholder engagement plan; Early establishment of industry networks; Close liaison with project Team member with knowledge transfer expertise.*	*Unlikely*	*Minor*	*Low*	*Yes*	*Sandra Dennien Rachael Langenbaker*
Research Facility or Laboratory equipment failure	*Damage to key Research Facility or laboratory equipment*	*Delays in undertaking field and glasshouse trials, harvest, assessment and laboratory diagnostics. May need to repeat trials. Delay in delivering project outputs.*	*Liaise with appropriate trades to facilitate timely repair.*	*Possible*	*Moderate*	*Medium*	*Yes*	

Stakeholder engagement plan

Project code: PW22000 Pest management for the Australian sweetpotato industry

Table 4. Stakeholder engagement plan

STEP 1 Stakeholder identification and relationship classification	STEP 2 Partnership role and contribution	STEP 3 Partnership constraints and required actions	STEP 4 Engagement strategies and frequency	STEP 5 What resources are required?	STEP 6 Responsibility for actions
A. Grower groups, associations, peak industry bodies					
ASPG Inc.	*Sweetpotato grower group, provides links to growers.*	*Available time commitment from CEO.*	*Collaborate, Involve, Consult, Inform*	*No specific additional resources required.* *Throughout project. Provide updates to newsletters (PW21000), project meetings. Field walks. Presentations at grower meetings. Verbal and electronic communication.*	*Sandra Dennien, Rachael Langenbaker, project team*
Individual growers	*Key people with critical crop specific knowledge. Field trial co-operators, field survey site collaborators*	*Time constraints around key farm activities and higher priority issues e.g. labour. Many stakeholders are action rather than classroom orientated.*	*Inform, consult, involve, collaborate, empower*	*Throughout project. Grower updates, Presentations at grower meetings Factsheets and other publications Verbal and electronic communication*	*Sandra Dennien, Rachael Langenbaker, project team*
Project Reference Group	*Key people with critical sweetpotato knowledge. Ensure research is appropriate for the industry and a good return on investment.* *Ensure maximum benefit from grower levy funding.*	*Time constraints around key farm activities.*	*Collaborate, Involve, Consult, Inform*	*Six monthly project meetings. Verbal and electronic communication.*	*Sandra Dennien, Project team*
D. Agribusiness input and AgTech technology suppliers and advisers					
Various local agribusinesses	*Key people providing agronomic advice to growers. Key element of the farming system.*	*Lack of awareness of project activities.* *A wide area of focus rather than sweetpotato, therefore need to ensure messages are succinct and to the point*	*Inform*	*Throughout project. project updates and presentations. Factsheets and other publications. Verbal and electronic communication.*	*Sandra Dennien, Rachael Langenbaker, Mary Firrell*