



Office Use Only

Project Code	
Project Type	

FINAL REPORT 2023

Final reports must be submitted using the online application form at www.sagit.com.au with this Word document attached **within two months** after the completion of the Project Term.

PROJECT CODE	EP 120
PROJECT TITLE	Eyre Peninsula internship in applied grains research

PROJECT DURATION <i>These dates must be the same as those stated in the Funding Agreement.</i>					
Project start date	1/07/2020				
Project end date	30/06/2023				
SAGIT Funding	2020/21		2021/22		2022/23

PRINCIPAL INVESTIGATOR <i>(responsible for the overall project and reporting)</i>		
Title:	First Name:	Surname:
Mr	Andrew	Ware
Organisation:	EP Ag Research Trust	
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ADMINISTRATION CONTACT DETAILS <i>(responsible for all administrative matters relating to project)</i>		
Title:	First Name:	Surname:
	Naomi	Scholz
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PROJECT REPORT: *Please provide a clear description for each of the following:*

Executive Summary (200 words maximum)

A few paragraphs covering what was discovered, written in a manner that is easily understood and relevant to SA growers. A number of key dot points should be included which can be used in SAGIT communications.

Encouraging, fostering, and developing capacity in grains research, development and extension on Eyre Peninsula is critical for the industry to continue to increase productivity, sustainability and innovation into the future.

The Eyre Peninsula internship in applied grains research program helped move towards this by introducing two recent graduates to grains R,D&E. Each of these graduates spent 12 months learning a range of skills that helped them:

1. Improve their understanding local grains research, development, and extension issues/ building empathy with Eyre Peninsula growers.
2. Develop a network of researchers, advisors, and leading Eyre Peninsula growers.
3. Develop skills and experience in applied field research: planning, managing, measuring, and analyzing field experiments.
4. Develop skills and experience in communicating.

Through the course of their internship each of the interns worked on projects that contributed significantly in areas that growers in the region identified as important and where gaps in knowledge existed.

On completion of their 12 months each of the interns gauged that their knowledge, the range of skills that they had developed and the networks they had built had vastly accelerated their ability to contribute to the grains R,D&E sector into the future.

Project objectives

A concise statement of the aims of the project in outcome terms should be provided.

To improve the capacity of grains research, development, and extension in the Eyre Peninsula region.

To further develop applied research skills of recent graduates so they will be able to make an improved contribution to the grains R, D & E industry in South Australia.

Overall Performance

A concise statement indicating the extent to which the project objectives were achieved, a list of personnel who participated in the Research Project including co-operators, and any difficulties encountered and the reasons for these difficulties.

How well were project objectives achieved?

The projects of objectives were achieved:

1. Improvements in capacity of grains, research, development, and extension on Eyre Peninsula were achieved through engaging two interns to work in the region for 12 months.
2. Recent graduates developed their applied research skills through the intern program that enabled them to create and deliver their own research projects.

List of personnel

2021 Intern: Rhaquelle Meiklejohn
2022 Intern: Rebekah Fatchen

People who spent time working with the interns: Dr Therese McBeath, Dr Greg Rebestzki, Dr Steve Marcroft, Amanda Cook, Jacob Giles, Mark Saunders, Gary Miller, Ashley Flint, Dr Murray Unkovich, Dr Marg Evans

Co-operators: Todd Matthews, Dan Adams, Bruce Heddle and Kerran Glover

Difficulties

The largest difficulty was experienced when recruiting the 2022 intern. Application numbers were low and a decision not to appoint was made with the first call of applications. A review suggested that advertising earlier and being part of Waite Campus student events to raise awareness of the program may improve graduate interest.

Participation in the January 2023 SAGIT led workshop on intern programs, was beneficial in providing guidance on other improvements that could be achieved in the intern program.

KEY PERFORMANCE INDICATORS (KPI)

Please indicate whether KPIs were achieved. The KPIs **must** be the same as those stated in the Application for Funding and a brief explanation provided as to how they were achieved or why they were not achieved.

KPI	Achieved	If not achieved, please state reason.
Appoint regional intern for 2021	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Appoint regional intern for 2022	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
2021 Regional Intern delivers report on their activities, including key findings for research project.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
EPARF Management Group conduct review of Intern position. What worked/ what could be improved. Report delivered to SAGIT as part of annual reporting.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
2022 Regional Intern delivers report on their activities	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Final Report delivered to SAGIT – including a review of the success/shortcomings and impact of the project	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

TECHNICAL INFORMATION (Not to exceed **three** pages)

Provide sufficient data and short clear statements of outcomes.

2021 Intern

Rhaquelle Meiklejohn commenced the role 2021 Research Intern on 4 February 2021.

Rhaquelle's activities during the year were broken into four broad categories, targeted towards developing her skill set in applied agronomy R,D&E for the Eyre Peninsula environment.

Understanding local grains research, development, and extension issues/ building empathy with Eyre Peninsula growers

- Rhaquelle attended the SARDI Upper Eyre Peninsula grower meetings (number = 8) during March 2021 where local research and grower issues were discussed.
- She also attended AIR EP low and medium rainfall RD&E committee meetings where local issues were discussed and prioritised.
- During spring she attended a range of grower focused field days conducted across Eyre Peninsula (number = 8).

Developing a network of researchers, advisors and leading Eyre Peninsula growers.

Collaborative linkages were made through:

- Attending 2021 GRDC Update, Adelaide; Minnipa Ag Centre field day; Hart Field Day, GRDC National Grower Network meeting on Yorke Peninsula; Australian Brassica Conference; toured through AGT facility at Roseworthy.
- Participating when visiting scientists came to EP for collaborative work, eg Steve Marcroft, Marcroft Grains Pathology and Therese McBeath, CSIRO.
- Rhaquelle attended meetings and field days held by AIR EP, EP independent consultants, and field days delivered by re-sellers.
- For her research project she cultivated collaborative links with the CSIRO team that developed the long coleoptile wheat germplasm and was a co-author of the GRDC update presentation delivered across the Southern Region in early 2022.

Developing skills and experience in applied field research: planning, managing, measuring and analyzing field experiments

- After hearing about the breadth and scale of local issues in March 2021 grower meetings Rhaquelle identified that making better use of soil water as something she saw merit in addressing. From there she planned and designed trials to assess how long coleoptile wheat coupled with soil moisture below the traditional seeding depth could be used to take advantage of early sowing opportunities. She then selected the site, conducted appropriate soil testing, calculated seeding rates, packed seed and seeded the trial.
- From there she developed a protocol, in-conjunction with CSIRO, on the range, scope and timing of the measurements needed to be captured from the trial and which then she implemented and organized data.
- Rhaquelle was involved in harvesting the site, conducting grain quality measurements, and the analysis of the data.
- She was also involved in assisting to make decisions on what weed control, nutrition, disease and insect control measures were necessary.
- During the year Rhaquelle completed the SAGI-Sth Statistics training workshops.

Developing skills and experience in communicating

During the year Rhaquelle delivered information to a range of audiences as well as being asked to critique how effective other researchers were in delivering their research message to growers.

- Rhaquelle delivered a presentation to a local school on genetically modified crops and she presented on the concept of long coleoptile wheat to a grower field day (around 70 people in attendance), as well as several smaller ad-hoc field days.
- Rhaquelle wrote an article for the AIR EP blog during the growing season on her research project and two grower targeted articles for the 2021 EP Farming Systems book. These are attached to this report.

As part of the 12 months of her internship, Rhaquelle spent over six weeks attending grower meetings, conferences, workshops and training events. She also spent three weeks working at the Minnipa Ag Centre.

At the commencement of her internship Rhaquelle documented her goals for the 12 months. Her review at the conclusion saw that she had exceeded her expectations. Rhaquelle agreed to stay with EPAG Research to continue her work on long-coleoptile wheat and frost management. The long-coleoptile work has been developed into a paper re-submitted with revision in late Feb 2023.

To further develop capacity in the grains applied R,D& E sector EPAG Research hosted a 2nd year Charles Sturt University student for three weeks of work experience in 2021 and worked with Hart Field Site group towards hosting an intern reunion (unfortunately cancelled due to covid restrictions). Andrew Ware also offered to share a speaking spot at the 2022 GRDC updates with Rebekah Allen, Hart Field Site Group, to help give her experience in presenting to a different audience.

2022 Intern

Rebekah Fatchen commenced on 6 February 2022.

Rebekah's activities during the year were broken into four broad categories, targeted towards developing her skill set in applied agronomy R,D&E for the Eyre Peninsula environment.

Understanding local grains research, development, and extension issues/ building empathy with Eyre Peninsula growers

- Rebekah attended the Cropping After the Storm and SARDI Upper Eyre Peninsula grower meetings (number = 4) during March 2021 where local research and grower issues were discussed.
- She also attended AIR EP low and medium rainfall RD&E committee meetings where local issues were discussed and prioritised.
- During spring she attended range of grower focused field days conducted across Eyre Peninsula (number = 5).

Developing a network of researchers, advisors and leading Eyre Peninsula growers.

Collaborative linkages were made through:

- Attending 2022 (virtual) and 2023 GRDC Update, Adelaide; Minnipa Ag Centre field day; and Hart Field Day.
- Participated in the AIR EP Innovation Tour – where nine researchers and advisors from all over Australia toured Eyre Peninsula for four days talking with growers and advisors about issues and potential solutions.
- Participating when visiting scientists came to EP for collaborative work, eg Murray Unkovich and Therese McBeath, CSIRO.

- Rebekah attended meetings and field days held by AIR EP, EP independent consultants, and field days delivered by re-sellers.

Developing skills and experience in applied field research: planning, managing, measuring and analyzing field experiments

- After hearing about a number of issues in February/ March 2022 grower meetings (including Cropping after the Storm forums) Rebekah identified that the 2022 growing season presented a reasonably unique opportunity to evaluate if the high yield potential present with large summer rainfall events could be realized through strategic nitrogen strategies. From there she planned and designed trials to assess how nitrogen strategies could be refined through a better understanding of soil characteristics and nitrogen mineralisation. She then assisted with site selection, conducted appropriate soil testing, calculated seeding rates, packed seed and seeded the trials.
- From there she developed a protocol, on the range, scope and timing of the measurements needed to be captured from the trial and which then she implemented and organized data.
- Rebekah was involved in the harvesting process, conducting grain quality measurements, and the analysis of the data.
- She was also involved in assisting to make decisions on what weed control, disease and insect control measures were necessary for the trial sites.
- In February 2022 Rebekah completed the SAGI-Sth Statistics training workshops.

Developing skills and experience in communicating

During the year Rebekah delivered information to a range of audiences as well as being asked to critique how effective other researchers were in delivering their research message to growers.

- Rebekah presented one of her trials to the Minnipa Agricultural Bureau sticky beak day (around 30 people in attendance) and talked about her experience as an intern to the 2022 SAGIT Update in Adelaide.
- Rebekah wrote an article grower targeted article for the 2022 EP Farming Systems book covering the work she did in her field trials. This is attached to this report.

As part of the 12 months of her internship, Rebekah spent over six weeks attending grower meetings, conferences, workshops and training events. She also spent one week working at the Minnipa Ag Centre.

At the commencement of her internship Rebekah documented her goals for the 12 months. Her review at the conclusion saw that while she had met most of her expectations, she may not be ready to continue in a career in grains research, development and extension at this time. Rebekah confirmed that the skills and knowledge she had gained in the 12 months of the internship were invaluable in further developing the base knowledge she had obtained in her under-graduate study and her goal was to continue working in the grains industry on Eyre Peninsula.

Issues: Despite a very successful recruitment process in 2020, a similar approach in 2021 saw a much-reduced field of applicants in terms of quantity and quality. The review deemed that future recruiting drives need to have firsthand engagement with final year agricultural science students in the first semester to raise awareness of the intern program, followed by a more extensive advertising campaign.

It was planned for the intern to spend two weeks with independent consultants located on Eyre Peninsula, but the delayed start to the 2021 season put extra pressure on the consultants to deliver to their clients in a reduced timeframe and made it hard to fit the intern in. However, during course of the year, Rhaquelle got to spend over a week with all the Eyre Peninsula Independent consultants, participating in their small group meeting discussions. Rhaquelle also got to spend time attending events held by retail agronomists that added different insight on the dissemination of research and development information.

CONCLUSIONS REACHED &/OR DISCOVERIES MADE (Not to exceed **one** page)

Please provide concise statement of any conclusions reached &/or discoveries made.

The drive and desire to be able to foster and develop applied grains research, development and extension capacity on Eyre Peninsula remains a high priority for the region.

There were many facets of the 2021 and 2022 program that were highly successful. The interns were able to develop research projects relevant to the region and deliver them at a high level (publication submitted in peer review journal). The both of the interns were able to develop their understanding EP farming systems, and the regions' grain R,D&E priorities, as well as creating a network of growers, researchers and advisors not only across the region but in other parts of the country as well.

The projects developed by each of the interns on long coleoptile wheat and being able to reduce yield gap after a wet summer with nitrogen strategies both contributed to local grower and advisor knowledge in areas where gaps had been identified.

INTELLECTUAL PROPERTY

Please provide concise statement of any intellectual property generated and potential for commercialisation.

N/A

APPLICATION / COMMUNICATION OF RESULTS

A concise statement describing activities undertaken to communicate the results of the project to the grains industry. This should include:

- *Main findings of the project in a dot point form suitable for use in communications to farmers;*
- *A statement of potential industry impact*
- *Publications and extension articles delivered as part of the project; and,*
- *Suggested path to market for the results including barriers to adoption.*

Note that SAGIT may directly extend information from Final reports to growers. If applicable, attach a list of published material.

Main findings

- Improving capacity in the grains R,D,&E sector on Eyre Peninsula was achieved through engaging two recent graduates in a 12 month intern program.
- Each of the interns developed skills in applied R,D&E through establishing their own research project, targeting a local issue and having the opportunity to work across a broad portfolio of projects already occurring in the region.
- Through completing the internship each of the interns has much higher capacity to deliver and contribute to applied grains R,D&E into the future.

Statement of potential industry impact

The short-term impact of the Eyre Peninsula intern project is the direct learnings from each of the interns' projects:

- The long coleoptile wheat work saw growers adopt deeper seeding in 2022 and gave them the confidence to establish crops in situations previously not thought possible.
- Going forward this has the ability to transform the way crops are established, providing growers the tools to establish crops in most seasons that will allow for optimal yields to be achieved regardless of break to season rainfall.
- The nitrogen strategy work has direct applications in raising awareness of how the size of yield gaps are and how nitrogen strategies can be refined through better understanding of soil characteristics, mineralisation and productive history.
- This will be worked through with growers and advisors as part of the GRDC funded National Risk Management Initiative over the next five years.

Longer term the benefits that will come over the careers of the two interns is harder to estimate. Grains R,D&E needs to be viewed as a positive and viable career pathway to graduates in an environment where demand for agricultural science graduates is extremely high. If the internships help influence graduate career choices then they are effective.

Articles:

Meiklejohn, R., Ware, A., McBeath, T., and Rebetzki, G. (2022) Long coleoptile wheat on the Eyre Peninsula. In 2021 EP Farming Systems Summary.

Fatchen, R., Giles, J., and Ware, A. (2023) Closing the yield gap through better matching nitrogen supply to yield potential. In 2022 EP Farming Systems Summary: currently in publication.

Both attached.

Path to market

The work initiated by both interns through their projects will be continued and built on through two GRDC investments commencing in 2023:

- Integration of long coleoptile wheat into Australian farming systems.
- National Risk Management Initiative – AIR EP project, Theme 1 Nitrogen management.



Above: Andrew Ware (EPAG Research), Rhaquelle Meiklejohn (intern 2021), Rebekah Fatchen (intern 2022) and Bryan Smith (AIR EP Board Chair).
Below: Ted Langley (SAGIT), Bryan Smith (SAGIT), Andrew Ware (EPAG Research), Rebekah Fatchen and Andrew Polkinghorne (AIR EP).



POSSIBLE FUTURE WORK

Provide possible future directions for the research arising from the project including potential for further work and partnerships.

Building and maintaining capacity in the South Australian grains industry:

- Grains sector (SAGIT, ideally in partnership with GRDC, PIRSA and University of Adelaide) do an audit of current and forecast R,D& E capacity in South Australia in order identify any potential future skills shortage and develop a plan to remedy it.
- Implement training program for early career managers to develop their mentoring skills.
- Create opportunities for early career researchers (particularly from regional areas) to have joint training and network amongst each other.