

COGGO

Council of Grain Grower Organisations Limited
ACN 091 122 039

Final Report

COGGO Research Fund for 2015 projects

A project completion report covering the project. The acceptance of a satisfactory report against the objectives of the project, and agreement on the sharing of any commercial returns and/or IP will trigger payment within 4 weeks, by COGGO for any outstanding payments.

This Final Report should be completed with reference to the Research and Intellectual Property Agreement (the Research Agreement) signed between the proponent and COGGO Pty Ltd.

1. Project information

Project title	Investigate the performance of an alternative oilseed crop, Camelina, in the Mid West region. Assess the influence of nutrition on the oil content, protein, oil quality and Omega 3 and erucic acid levels.
Commencement Date	March 2015
Completion Date	Sept 2017

Name of Proponent	COOROW SEEDS & AGRARIAN
ACN/Legal Name or ABN	41 115 404 683
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Project Number	
Date Received	

2. Project results	This section provides a final report against the Project Aim and the Planned Outputs for the Project.
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Achievement of the Project Aim	Brief statement of achievement in relation to the aim of the project
<p>The aim of the project was to assess the performance of an alternative oilseed in the Mid West. The camelina performed poorly in the trial and yield was quite negligible across the trial. The yield results from the 9 different fertilizer treatments were not statistically significant. We cannot indicate whether nutrition influences the yield of Camelina in the Mid West.</p> <p>A second aim of the project was to assess the influence of nutrition on the quality traits of the oil produced from the camelina. The camelina trial has nine nutritional treatments. There were 3 phosphate rates and three nitrogen rates. The phosphate rate did not influence the oil quality but the amount of nitrogen did influence oil quality content. The addition of nitrogen decreased the Erucic acid (omega 9) content and the Omega 3 content. The addition of nitrogen increases the Omega 6 content. This indicates that to get more of the desirable oils – Omega 3 and 9, less nitrogen is important. Omega 6 is already available from numerous other sources and in fact the ratio to omega 3 is disproportionate to ideal levels with current oil sources like sunflower, corn and vegetable oils. Western diets require more omega 3 sources so to maximize the true benefit of Camelina oil, less nitrogen will deliver the best oil quality result.</p>	

Project Outputs		Please provide a report on the achievement, or otherwise, of the project outputs as per the planned outputs provided in the Project Proposal.
1	-	<p>Output 1 (from Project proposal)</p> <p>Identify whether nutrition influences the quality of Camelina grown in the Mid West.</p> <p>Nutrition does influence the quality of the oil of Camelina grown in the Mid West. The addition of phosphate had no effect on the oil quality. The addition of nitrogen did influence the oil quality. The additional nitrogen decreased the level of both omega 3 and 9 levels in the camelina. The addition of nitrogen increased the level of omega 6 levels present in the camelina.</p>
2	-	<p>Output 2 (from Project proposal)</p> <p>Quantify the oil content, quality, omega 3 and erucic acid levels of the production under different nitrogen levels.</p> <p>All the harvested samples were sent to Chemistry Centre for analysis. The samples were tested for protein content, and fatty acid profiles. The results were then sent off for statistical analysis. The statistical analysis indicated that there was no influence of phosphate on protein or fatty acid levels of omega 3, 6, and 9 (erucic acid). The addition of nitrogen did influence the results of omega 3, 6, and 9. As the nitrogen application rate increased the omega 3 and 9 levels in the camelina decreased. In contrast, as the nitrogen application rates increased the omega 6 levels increased.</p>

3	-	Output 3 (from Project proposal) Produce a fact sheet on growing Camelina successfully. The fact sheet would address agronomic influences such as soil type and nutrition that affect the oil quality. We want to equip farmers with the information to successfully grow an alternative oilseed crop that meets the market demands. It will include a gross margin evaluation.
		Comment: Please see attachment

Project results	Please provide brief statements on the results of the Project
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Please see attached sheet.

3. Project resources	This section describes use of the funding listed in the initial plan and any refunds due to COGGO
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Expenditure of funds requested from COGGO	\$ Total funds budgeted	\$ Total funds expended (actual)	\$ Total funds requested from COGGO*	\$ Total COGGO funds expended	\$ Refund due to COGGO of any unexpended COGGO funds
Salary/Contractors	11800.00	6000.00	11800	4155.50	0
Operating costs	18200.00	25844.5	18200	25844.50	0
Capital					
TOTAL	30000.00	31844.50	30000.00	30000.00	0.00

*Funding provided by COGGO.

IMPORTANT: Return of unused funds to COGGO is required as per *Clause 3.3* of the Research Agreement.

4. Commercialisation	Insert details of the proposed commercialisation process, as applicable, with reference back to the planned commercialisation plan in the project proposal) for any outputs from the project. This should include recommendations for the commercialisation of the results of the project and the registration or other protection of Project IP and Project Confidential Information as per the Research Agreement.
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Camelina has some very desirable traits that make it very attractive for human and feed consumption. Camelina Oil contains the second highest level of omega 3 fatty acid. Camelina oil is registered for human use throughout Europe, USA and Scandinavia but not in Australia. The meal by-product is also not registered for use in the feed industry. There is demand for Omega 3 in the Aquaculture industry. Early testing shows that it is a suitable substitute for fish oil and meal in ratios. The inclusion of camelina meal in poultry, cattle and pig diets is also showing great benefits. The crop must yield higher to compete for farmers' land. The grower needs a higher yield or higher prices than canola with a stronger market for a decision to be made to grow this alternative oilseed option. Without higher yields Camelina will not be an alternative oilseed option for growers in the Mid West. Yield results will need to be closer to canola. Past research into Camelina in the early 2000s resulted in only 2 sites where Camelina out yielded canola.

The results of this trial show that nutrition and particularly nitrogen does influence the quality of the oil content. To maximise the omega 3 and omega 9 and decrease the omega 6, growers will need to ensure that they do not over fertilize the Camelina crop with nitrogen.

The markets would need to pay a premium price to reap the benefits of Camelina. Higher value product can go a long way to offset the loss of yield compared to canola.

For Camelina to become more commercialized, yield and price would need to improve. There would need to be more research done into different varieties and suitability to different regions. Governments would need to approve the use of the meal in feed rations. As well the oil would need to be approved in all countries.

There is also an interest in camelina for industrial purposes such as a biodiesel for use in jet airplanes etc. Again the yield would need to improve for this to become a viable option. At a low yield the only other compensation would be a very high price. High costs would impede the potential growth of the biodiesel if it cannot compete with current fuels.

It is understood that this may require further discussion and agreement with COGGO via its' agent GIWA, as per the undertakings given and terms agreed, in the project proposal. This can be the subject of an appended letter and attachments. In all cases such discussion and subsequent agreements need to be governed by *Section 8 Project IP, Improvements and Project Confidential information* of the Research Agreement.

5. Communication/ Extension

Insert details of how the communication and extension of the project outcomes has been achieved to date and recommendations for future activities to disseminate and promote adoption of the results of the Project.

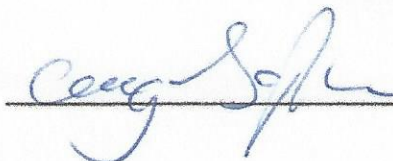
A fact sheet on Camelina production has been prepared. It provides information on seeding rate, timing, and paddock preparation. A gross margin is also provided.

Note: As per *Clause 7.3 (b) (ii)* of the Research Agreement COGGO may require the Researcher to produce an edition of the Final Report in a form suitable for general distribution. If so required by COGGO, the Researcher must produce a non-confidential version of the Final Report within 28 days of receiving a request to that effect from COGGO.

6. Certification

The Project Supervisor and the Research Organisation certify that all information contained in, and forming part of, this final project report is complete and accurate. The project supervisor and research organisation further warrant that the project complied with all the relevant guidelines affecting the conduct of research, for example in relation to ethics, bio-safety, environmental legislation, GMAC or National Health and Medical Research Council Codes.

Project Supervisor's signature

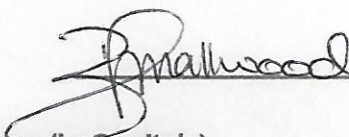


Name (in Capitals)

Craig Topham

Date: 18.9.17

Research Organisation signature



Name and title of authorised signatory (in Capitals)

BARBARA SMALLWOOD

21.09.17

Date:

Completed Final Project reports

Email to coggoresearchfund@giwa.org.au or mail to
COGGO Research Fund, GIWA, PO Box 1081, Bentley DC, WA 6983

For any further enquiries please email questions to coggoresearchfund@giwa.org.au
Or phone (08) 6262 2128

COGGO representative

For the purpose of this Project agreement contract, COGGO will be represented by Grains Industry Association of Western Australia (GIWA), or such other representative that is nominated by COGGO as authorised to operate on behalf of COGGO.

**PROJECT SYNOPSIS SUITABLE FOR GENERAL PUBLICITY
AND COGGO WEBSITE**



Camelina

Camelina sativa

Also called false flax, gold-of-pleasure, German sesame, Siberian oilseed

- ⇒ Alternative oil crop for lower rainfall areas
- ⇒ More resistant to heat and drought stress than canola
- ⇒ Low input crop with little in season maintenance
- ⇒ Resistance to blackleg and Alternaria brassicae
- ⇒ No known insect pest
- ⇒ Harvest conventionally



PLANT CHARACTERISTICS

- Brassicaceae family – oilseed crop in Europe and North America
- Seeds – orange colour and a length of 1.5-2cm
- Plant height 30-120cm
- Branched smooth or hairy stems
- Alternate leaves, arrow– shaped, sharp pointed about 5-8cm long
- Pale yellow flower, produces seed pod 6-14mm round, pods more or less shatter proof



AGRONOMICS



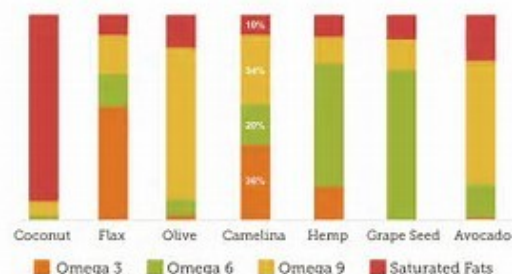
- Short season – 85-100 days
- Light or medium soils, well –drained, wide range of soil pH
- Requires little water or nitrogen (similar rates to mustard), higher rates of nitrogen can decrease the content of highly desirable omega 3 and 9
- Minimal seedbed preparation required well suited to min-till
- Seeding depth 1cm
- Row spacing 9"
- Weed control – limited with only some specialized oilseed herbicides for perennial weed control
- Highly resistant to blackleg and Alternaria brassicae but can be susceptible to sclerotinia stem rot
- Harvest at 8% moisture
- Allelopathic traits

GROSS MARGIN

Income \$/ha		Variable costs (\$/ha)	
Price \$/T	\$1000.00	Operations	
Less cartage	\$50.00	Seed	\$10.00
Less storage	\$5.00	Fertilizer	\$42.00
Less		Herbicide	\$19.00
		Insecticide	\$ 5.40
On farm price \$/T	\$945.00	Fungicide	
Yield (kg/ha)	750	Insurance	\$3.50
		Harvesting	\$55.00
Gross income (\$/ha)	\$708.75	Gross variable costs (\$/ha)	\$134.90
		Gross margin (\$/ha)	\$573.85

GRAIN & OIL QUALITIES

- Seed contains up to 40% oil
- High levels (34%) of omega 3 fatty acids (ALA), second only to linseed
- High in unsaturated fatty acids
- Low levels of omega 6 fatty acids
- High in vitamin E
- High oil extraction >80%
- High crude protein up to 47%, 10% fibre
- Rich in antioxidants specifically gamma tocopherol
- Highly stable and very resistant to oxidation and rancidity
- Light pale straw colour well suited to cold pressed unbleached health oil



USES

- Human food—cold pressed extra virgin Camelina oil, Camelina relish, Camelina dressing, Camelina seed, Camelina seed cake, currently registered for food use in Europe, the US and Scandinavia, would be ideal for protein bars
- Cosmetics & pharmaceuticals —pale colour and good emollient qualities make it a good basis for creams and lotions
- Aquaculture—fish oil r& meal replacement - highly digestible and correct balance of omega 3 & 6
- Bio-energy and Industrial - Biodiesel and jet fuel, lubricants
- Animal feed—horse industry , poultry, cattle feed

