2014 Rural Finance Crop Challenge

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Introduction

In the Rural Finance Crop Challenge teams of farmers, advisers, researchers and academics compete against one another to achieve the highest gross margin. The competition is hosted by Southern Farming Systems and sponsored by Rural Finance. The CSIRO and DEDJTR Victoria are providing impartial monitoring of in season crop performance from each team as part of the GRDC Crop Sequencing project.

The choice of crop, in-crop management and marketing is at the discretion of each team. In 2014 team captains were instructed to grow a legume or oilseed break crop with the aim of achieving the best gross margin whilst also reducing weed numbers. In 2015 all plots will be sown to bulk wheat and monitored for weeds.

The Crop Challenge at Inverleigh was based on 7 teams from the east of the western districts and the Lake Bolac site featured 10 teams from the west of our region. Missed applications due to poor conditions at Lake Bolac during the season leading to weed blowouts and six out of ten crops failing, only the Inverleigh results will be discussed here.

Inverleigh: summary of the 2014 Crop Challenge

At Inverleigh in 2014 the seven teams sowed faba bean, linseed, lupin, canola and field pea (Table 1). Inputs and yields were low compared to previous years but high market prices meant gross margins were roughly on par with those seen in the 2011 Pulse Challenge. Yield was the key determinant of gross margin in 2014.
Marcus Oldham are the winners at the Inverleigh site with the highest gross margin of $544/ha. They also had the highest yielding crop and equal lowest cost of production of all the teams.

Table 1. Summary of the yield, cost of production and gross margin of the ten teams competing at Inverleigh in 2014. Teams are ranked by gross margin.

Rank	Team	Crop	Variety	Yield (t/ha)	Cost of production ($/t)	Gross margin ($/ha)
1	Marcus Oldham	Faba bean	Nura	2.17	204	544
2	Pulsators	Faba bean	Farah	2.10	204	527
=3	AGF Seeds	Linseed	Wintalin	0.85	522	237
=3	Germinators	Faba bean	Rana	1.63	292	237
4	Landmark	Lupin	Mandelup	1.30	270	208
5	SFS Boys	Field pea	Oura	1.29	250	161
?	SFS Girls	Canola	Hyola 575 CL	3.30[1]	233	766

[1] Estimated yield only.

The harvest of SFS Girls' canola was marred by header blockages, meaning that the yield presented in Table 1 is an estimate only as no yield data was obtained at harvest. Had their canola yielded greater than or equal to 2.83 t/ha they would have won the competition. Although the estimated yield of 3.3 t/ha – based on their inputs for the season and historical yield data for that variety – puts them firmly in first place with a gross margin of $766/ha, they have been disqualified from winning as there is uncertainty surrounding this result.

In 2014 forward grain marketing didn't play a role in the outcome of the competition, with only one team choosing to market grain during the season for a small loss.

Breakdown of inputs and their costs

The team captains supplied a worksheet at the start of the competition detailing variety choice, sowing rate, seed treatment and choice of sowing date as well as any seedbed fertiliser required and any herbicides to be incorporated by sowing or applied post sowing-pre emergence. Other pesticide and fertiliser decisions were received later in the season and carried out as instructed by the team captains. A breakdown of these costs during the season is shown in Table 2.

Table 2. Team costs analysis throughout the growing season. Note that Fixed Costs includes the cost of each sowing, fertilising, spraying and harvesting operation.

	Marcus Oldham	Germ's	Pulsators	AGF Seeds	Landmark	SFS Girls	SFS Boys
Variety	Nura	Rana	Farah	Wintalin	Mandelup	Hyola 575 CL	Oura
Seed + treatment	182	182	182	90	90	118	138
Seedbed fertiliser	90	38	56	63	50	63	38
Pre-em herbicide	15	10	21	24	23	15	22
Post-em herbicide	2	21	3	108	17	24	0
Fungicide	14	2	31	0	0	0	0
Insecticide	5	0	0	1	4	48	1
Fertiliser	0	25	0	0	20	275	0
Desiccant	0	0	0	23	0	35	0
Fixed costs	135	159	135	135	147	191	125
Total Cost ($/ha)	**443**	**437**	**428**	**421**	**351**	**734**	**322**

Input costs were $50-100 lower than in previous years of the Crop Challenge, perhaps due to the dry season and resulting conservative management by team captains. Clearly, SFS Girls had by far the highest total costs of all teams. This is due to multiple slug baitings after sowing and the application of 400 kg/ha urea (split into two timings) plus 150 kg/ha sulphate of ammonia. At the other end of the scale, Landmark and SFS Boys had the lowest total costs because they spent little money on fungicide, herbicide or insecticide in-season. All other teams had total costs in the $420-450 range.

Although input costs were lower, crop yields were also low mainly due to the dry season constraining yield potential (Table 1) which meant that costs of production were higher than expected (Figure 1).

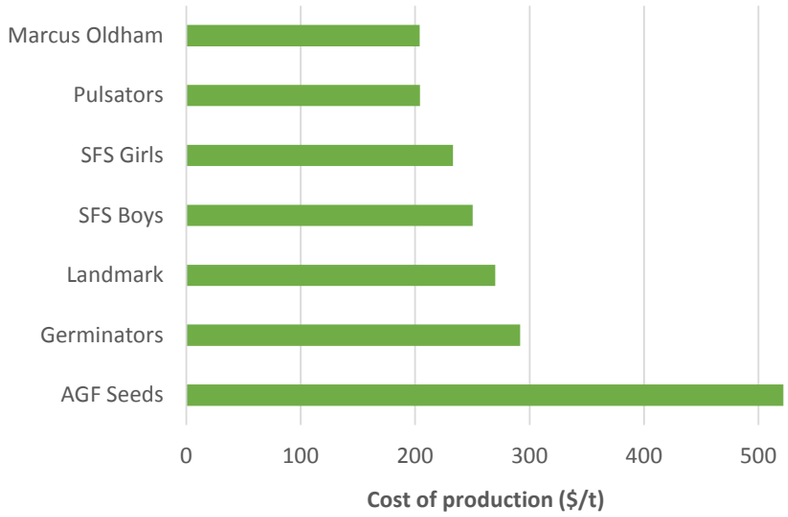


Figure 1. A comparison of the costs of production ($/t) of the seven teams competing at Inverleigh.

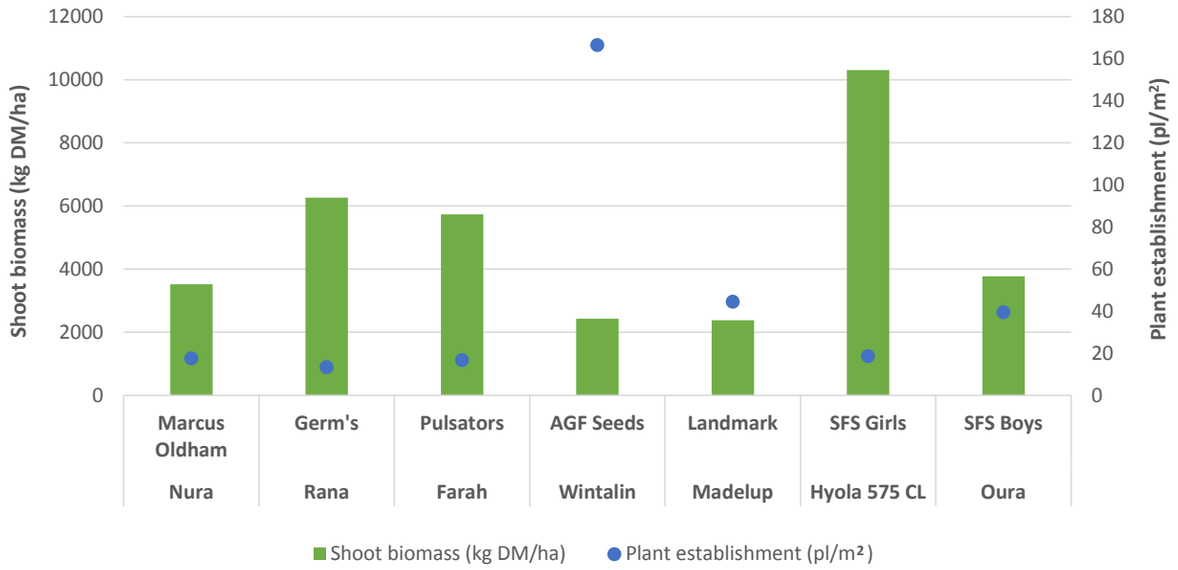
Marcus Oldham and Pulsators had the two highest yielding crops and also had equal lowest costs of production at $204/t. The lower-than-expected yields of the SFS Boys, Landmark and Germinators started pushing their production costs upwards of $250/t. SFS Girls, whose total costs were double that of the next highest team, were able to dilute their input costs over a high (estimated) canola yield. Although AGF Seeds had similar inputs to other teams, low yields due to wild radish infestation meant that the cost of producing a tonne of linseed was in excess of $520.

Sowing and establishment

The SFS Boys' Oura peas were sown in the first week of July; all other teams were sown earlier on the 23 May. Crops and varieties sown are shown in Table 1. Five teams grew pulses as their break crop option while SFS Girls opted for a Clearfield canola variety and AGF Seeds sowed Wintalin linseed, an oilseed crop previously untested at this site.

Plant establishment was good for the peas, lupins, canola and linseed but lower than expected for the faba beans (Figure 2). Lupins were sown at 100 kg/ha, linseed at 45 kg/ha and the field peas at a high rate of 125 kg/ha to compensate for the later sowing date. The three faba bean varieties were all sown targeting 25 pl/m^2 but they established at less than 20 pl/m^2. Establishment of linseed was very good at 167 pl/m^2 but the plant stand was quite sparse, allowing wild radish to take over the plots

Figure 2. Shoot biomass and establishment of the seven break crops grown at Inverleigh.



Marcus Oldham's shorter variety Nura had the lowest biomass of the three faba bean crops yet it yielded slightly higher. SFS Girls' canola had an above ground biomass just over 10 t/ha despite a low plant stand of 19 pl/m^2; plants were observed to compensate for low numbers by branching prolifically and were no doubt helped along by ample nutrition.

In-crop management

Rainfall was below average in every month of 2014 except for April and July. The dry growing season meant that there was lower yield potential but also low weed and disease pressure in 2014, although slugs were still a problem at establishment for the canola. SFS Girls spent $48/ha on slug baiting to combat this threat.

Although weed pressure from wild radish was generally low where the plots were sown in 2014, linseed proved to be a poor competitor and so the AGF Seeds crop required hand rouging at a cost of $105/ha (Table 2). All other teams had crops that could successfully out-compete the low radish numbers and they did not suffer from poor weed control, unlike in previous years of the crop challenge.

All three teams growing beans – Marcus Oldham, Pulsators and Germinators – applied fungicide early on but no significant disease developed thanks to dry conditions. No other teams applied any fungicide.
Four teams including Landmark applied insecticide early on as a preventative measure against pests but none were observed apart from some red-legged earth mite in the lupins which caused minor damage.

Nutrition and fertiliser

At the Inverleigh site before sowing there was 210 kg/ha of mineral N (ammonium NH4 and nitrate NO3) stored in the top metre of the soil profile across all teams. Nearly 80% of this N was stored in the top 40 cm of the profile. Soil phosphorous, potassium and sulphur levels appeared adequate.

All teams applied 60-100 kg/ha mono-ammonium phosphate as starter fertiliser at sowing except for AGF Seeds who used di-ammonium phosphate. Marcus Oldham also requested 1 t/ha compost spread on the soil surface prior to sowing. It is unknown of this soil conditioner has affected contributed to yield.

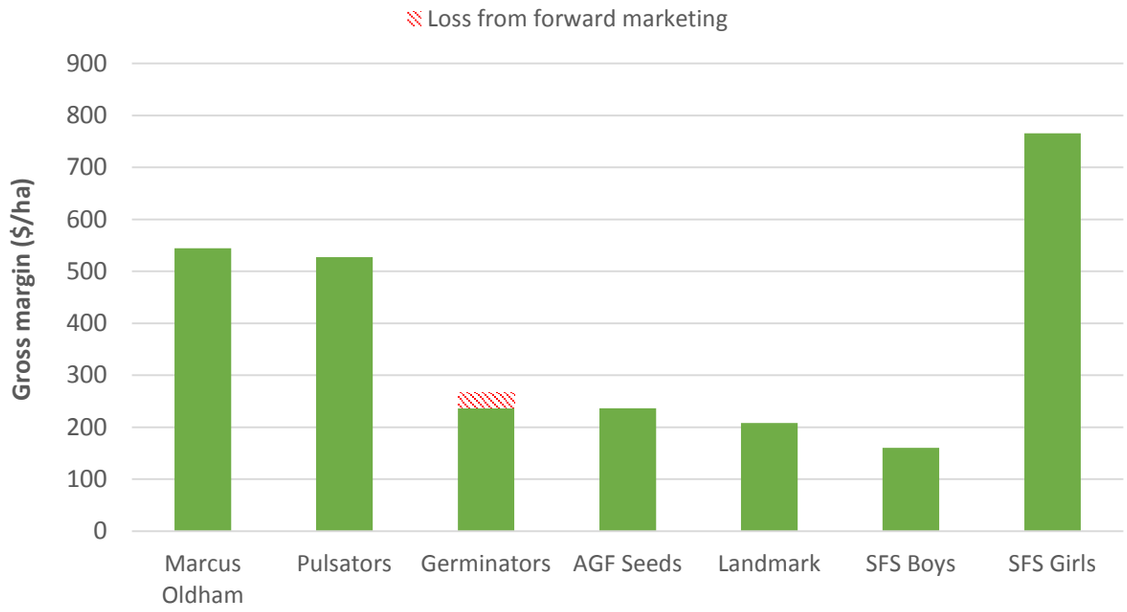
Only three teams applied any sort of fertiliser in-crop: Germinators, Landmark and SFS Girls. Germinators and Landmark both applied trace elements, with Landmark opting for an SJB AG-Nutri trace elements solution and Germinators applying molybdenum, zinc and copper and a small dose of urea. Given their yields it is unlikely that trace elements increased yields of the faba beans of lupins to which they were applied.

SFS Girls went all-out on their canola crop in spite of the dry season, applying 200 kg/ha urea at rosette stage and another 200 kg/ha urea and 150 kg/ha sulphate of ammonia at yellow bud. Given this fertiliser regime and the yields of Hyola 575 CL obtained at other sites over a range of seasons, we estimated their yield to be 3.3 t/ha.

Grain marketing

For the purposes of the competition all teams had the option to market grain from sowing until harvest, with prices emailed to team captains fortnightly. There were two marketing mechanisms available for teams in 2014: forward pricing based on 0.25 tonne lots and the spot price published on the day of harvest. If grain tonnages are oversold on the day of harvest, teams are required to buy back the relevant tonnages at prices equivalent to the harvest spot price.

Figure 3. Gross margin per hectare and the loss from marketing for the two teams who forward sold grain.



Only one team, Germinators, participated in grain marketing in 2014 (Figure 3). They forward sold 2 t of faba beans in early July at a price of $440/t. Unfortunately their final yield was only 1.63 t/ha, meaning that they had to buy back 0.37 t at the harvest price of $455/t. The final impact on their gross margin was a loss of $30/ha which put them in equal third place with AGF Seeds with a gross margin of $237/ha.

Relationship of cost of production and yield to gross margin

The profitability of any crop is highly sensitive to changes in both yield and price. In past Crop Challenges, cost of production ($/t) and crop yield (t/ha) have been strong indicators of financial return. On average, these indicators have been able to predict 75-90% of the variation in gross margin.

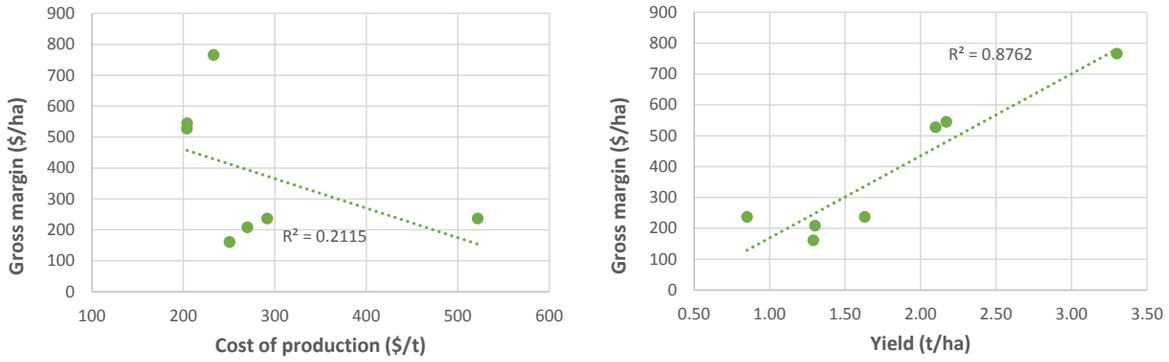


Figure 4. The relationship of cost of production (left) and yield (right) to gross margin at Inverleigh in 2014.

In 2014 due to low yields and vastly different cost structures across the teams, yield was a substantially better indicator of final gross margin (Figure 4).