

## 2020/2021 Summer Crop Case Study Far North Queensland Soybean Variety Trial

### Trial Overview

The purpose of the trial was to determine varietal suitability for existing and new soybean cultivars for far North Queensland.

### Trial Location/ Paddock History

The trial was located in the Lakeland irrigation region of the lower Cape of Far North Queensland. The trial was planted within a commercial field of Hayman Soybeans under a Centre Pivot Irrigator. The field had a seed crop of Sunflowers grown during Spring of 2020 and was planted to Corn the spring prior. The field had been kept weed free following the harvest of the Sunflowers until planting.

### Trial design & methodology

#### Aim

To evaluate different soybean varieties across the different regional environments.

#### Treatments

Eight (8) varieties were planted in a randomized plot design (Fig. 1).

- Mitchell – Stockfeed/green manure
- Leichardt – Human Consumption (HC)
- Kuranda – HC plus Sempra® tolerance
- Mossman – HC plus Sempra® tolerance
- Stuart - HC
- Hayman - HC
- Wincup – HC experimental line out of southern Texas USA
- SC10-179-2 – HC experimental long-season variety

Column		NORTH →							
		1	2	3	4	5	6	7	8
Row	1	SC10-179-2	Mossman	Hayman	Wincup	Leichardt	Mitchell	Stuart	Kuranda
2	Mitchell	Stuart	Leichardt	Kuranda	SC10-179-2	Hayman	Wincup	Mossman	
3	Leichardt	Wincup	Mossman	Mitchell	Stuart	Kuranda	Hayman	SC10-179-2	
4	Kuranda	Hayman	SC10-179-2	Stuart	Mossman	Wincup	Mitchell	Leichardt	
		Rep 1		Rep 2		Rep 3		Rep 4	

Figure 1- Plot design was matched to the grower/ commercial situation with each variety replicated four times.

### Planting

Planting took place on January 25th, into excellent moisture. Seed was inoculated with rhizobia and allowed to dry prior to planting. The grower's 8 row John Deere max-emerge precision planter was used as per setting for the commercial Hayman Soybean crop sown the same day. Each plot consisted of two rows, 82cm apart with a 15-metre plot length. The trial was direct drilled into the standing Sunflower stubble and planted with the grower's commercial fertiliser blend of 50L/ha of ClearStart20 plus Zinc. The rows were planted in a nearly north-south direction.

### Establishment

Nine days after sowing the trial was inspected. All varieties were fully emerged with the first true leaf starting to form. A disconnected hose at planting had impacted two plots, with only one row of establishment, but overall, it was successful (Fig. 2).



Figure 2- Site establishment 9 days after sowing

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## Establishment

Return inspection on March 16<sup>th</sup> (50 days after sowing, Fig.3), the crop was already in full bloom and all plots were at R2, with the exception of 1 plot each of SC10 and Stuart being at R3. Dry matter (DM) cuts were taken from 50cm row cuts and established plant counts were taken. Vn was also recorded on the main stem to monitor if there were any varieties that had more blooming nodes.

Establishment plant counts were, on average, between 15-20/m<sup>2</sup> with 12-14 nodes on the main stem. Fresh weights were recorded and highest in Stuart, followed by Wincup and Leichardt, with Kuranda recording the lowest. DM weights were recorded post drying.



Figure 3- At 50 days DM cuts (left) and blooming node counts were undertaken. Leichardt variety at R2 with 15 blooming nodes on the main stem (right).

Although post-emergent broadleaf weed control (Basagran®) was applied on March 1<sup>st</sup>, and an insecticide application with Cypermethrin was applied March 10<sup>th</sup>, the inspection revealed significant presence of *Helicoverpa spp.* larvae at 5-15mm, indicating the spray had been unsuccessful. With pods starting to form it was recommended that an application of systemic insecticide be undertaken as soon as practical to ensure damage was mitigated. Growing conditions were excellent with rainfall providing sufficient soil moisture.

## Maturity

By mid-April, all varieties were at varying stages of seed fill (R5/R6) with no mature pods. Grasshoppers were observed to be causing leaf damage, however, there was no damage to the pods or seeds. The crop received an irrigation on April 15<sup>th</sup> to meet plant peak water use demand.



Figure 4 (left)- April 15<sup>th</sup> inspections revealed grasshopper damage to leaves (left).



Figure 5 (below)- May 12<sup>th</sup> near maturity inspections (R7/R8) undertaken.

The crop matured in mild conditions and the crop was ready for desiccation on May 29<sup>th</sup>, 124 days after sowing. Prior to harvest the final plot length was measured, as was plot height (Fig. 6). Also recorded was a lodging score from 1-5 (Fig. 7). Results corresponded with extent of borer damage that caused stem collapse.

*“Grasshoppers were observed to be causing leaf damage, however, there was no damage to the pods or seeds.”*

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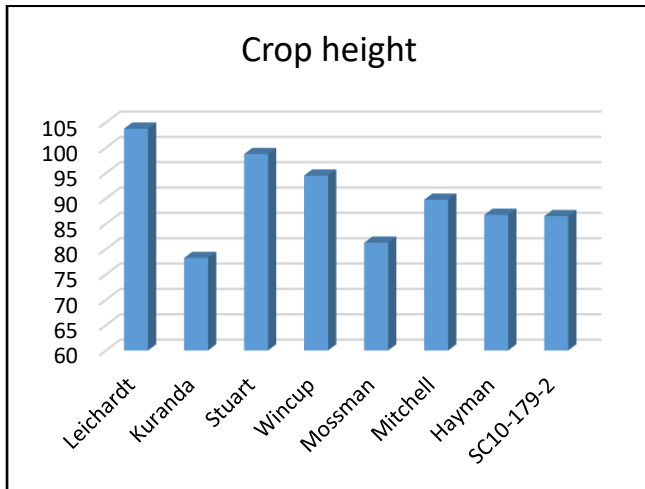


Figure 6- Crop height prior to harvest

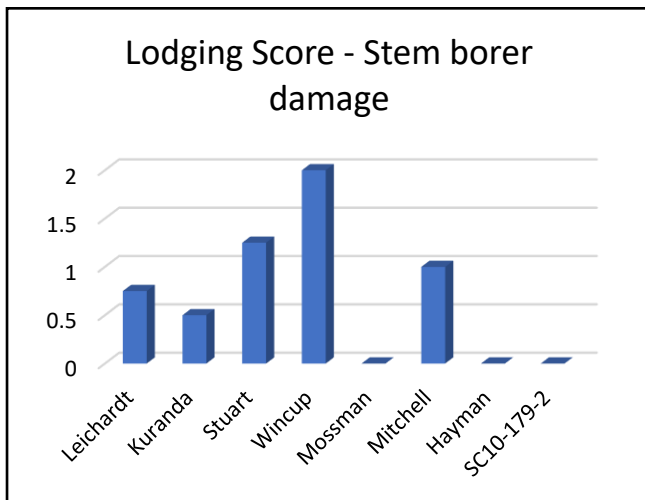


Figure 7- Lodging scores taken prior to harvest that reflected impact of borer damage causing stem collapse.

There were clear varietal differences in stem borer damage, with Wincup impacted most, whilst several varieties (i.e., Mossman & Hayman) had no impact. Lodging impacted final yield, with collapsed stems unable to be picked-up by the harvester. Leichardt was the tallest, correlating with Vn results taken at finish of flowering.

### Glossary

V(n) n represents the number of nodes on the main stem with fully developed leaves.

R(n) n represents a reproductive stage. R1 = commence flowering. R5 = commence pod fill.

### Yield Results

Harvest was carried out with a Hedge 125 plot harvester on the 4<sup>th</sup> of June, 129 days after sowing. Individual plot samples were collected, graded, and weighed to record plot yield (Fig. 8). Sub-samples of each plot were taken and analysed for protein and oil content. Initial results identified that Leichardt had the highest average yield of 2976kg/ha, followed by Kuranda at 2858kg/ha, with five others yielding in the 2700's. These results are still very encouraging given the extremely late planting date.

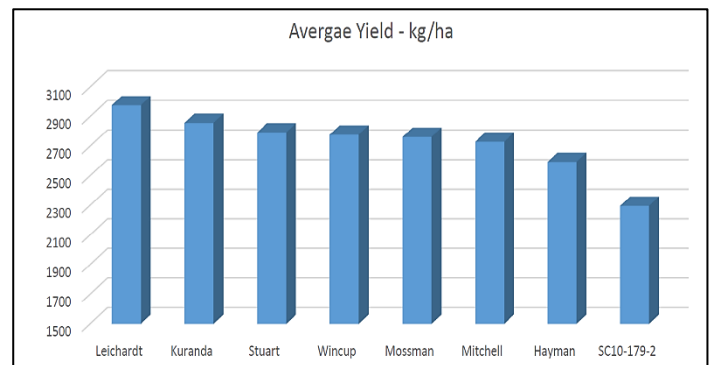


Figure 8- Average yield results of the randomised plots

### Recommendations

The results demonstrate that the available planting window may be a considered determinate in varietal selection. To explore this further, it is recommended that a "time of sowing by variety" trial would be of benefit in the 2021/2022 season.

Management or selection of varieties based on tolerance to stem borer, in seasons when conditions predict high likelihood of infestation, should also be a consideration in soybean crop planting decisions.

*Farmacist would like to acknowledge the work of Tony Matchett (Savannah Ag) for his contracted efforts over the course of this trial and the cooperative grower Martin Arnold (M&M Cropping, Lakeland)*