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TULLY FALLOW CROPS

2019

BACKGROUND

- ✓ Break crops – Organic N a bonus
- ✓ Soybeans, Cowpeas and Dolichos Lab Lab
- ✓ More opportunity for mixed species?

PLANTING

✓ LEGUMES CAN PLANTED THREE WAYS:

- After the old cane crop is sprayed/disc'd out legumes can be broadcast and lightly disc'd in.
- After the old cane crop is sprayed out/disc'd out pre-formed beds can be set and legumes planted on these beds.
- Planted beside the old cane which is then sprayed out using the herbicide Verdict. This is particularly good for the very high rainfall areas to avoid any soil erosion.

TYPES OF FALLOW

LEGUME FALLOWS - IN ROTATION WITH SUGARCANE -SOIL HEALTH

- Break crop – breaking monoculture. This is a major reason to grow legume fallows in the Tully region.
- Green manure.
- Allows the decrease of nematodes and pathogens that build up in the soil over a typical cane crop cycle of 5-6 years.
- Organic Nitrogen is a bonus and estimates of potential available N from legumes are important.



Photo 1 Typical Tully Legume fallow at Warami 2016.

A) DOLICHOS LAB LAB – RHONGI OR 527

- Easily established.
- Some drought tolerance once established.
- Excellent growth under warm humid conditions.
- Root rot resistant.
- Can produce organic N - Inoculation will improve the nodulation for organic N– see appendix 1.

B) COWPEAS – MERINGA, EBONY / CALYPSO

- Easily established – broadcast and lightly disc/harrow in or plant in pre formed beds.
- Green manure.
- Adapts to a wide range of soil types especially sandy soils and loams.
- Spreads easily and can help choke out some weeds and grasses.
- Meringa Cowpeas are susceptible to waterlogging and root rot but Ebony (or Calypso) can handle the waterlogging.
- Typical seeding rate is 20-25kg/ha.

C) SOYBEAN - LEICHARDT

- Best planted in rows at consistent depth seeding rate 50kg/ha.
- Soft seed – If planting by broadcasting use 50% more seed because seed can be damaged by broadcast action.
- Tends to grow erect and blue top/blackberry nightshade can be a problem.
- Potentially higher organic N production than Dolichos or Cowpea.
- Inoculation is essential for nodulation see appendix 1.



Photo 2 Mixed Cowpeas/Soybeans Feluga 2017

POTENTIAL N FROM LEGUMES TULLY MARCH - APRIL 2015 -18

- ✓ TSL tests samples of legume crops to give an approximation of potential N provided prior to cane planting.
- ✓ Legumes tested – Soybean, Dolichos, and Cowpea.
- ✓ Potential N is a bonus , the main purpose is for a break crop.

METHOD

1. Take a 1m*1m portion of biomass from within a typical section of a legume flow crop.
2. Weigh to give wet mass (kg).
3. Place in oven for 48hours.
4. Re weigh as dry mass (kg).
5. Using SRA tables (Appendix 2) calculate potential N.



Photo 3 Soybean Tom Harney Syndicate March 2015



Photo 4 Soybean Harney's during sampling

RESULTS – 2015

Table 1 Summary of Sampling March 2015.

LEGUME TYPE	MULTIPLICATION FACTOR	WET MASS T/HA	DRY MASS T/HA	POTENTIAL N KG/HA
Soybeans	3.5	8	1.7 (22%)	60-70
Cowpeas	2.8	5	1.3 (26%)	30-40
Lab Lab	2.3	6	1.6 (26%)	30-40

- Going by these results, a grower who has an average crop of Cowpeas sprayed out around Easter time, and left on the surface to break down, with no cultivation until 3-4 weeks before planting should be able to reduce the Urea side dressing by 30-40kg/ha.

RESULTS - 2016

Table 2 Summary March 2016 (Camilleri's)

LEGUME TYPE	MULTIPLICATION FACTOR	WET MASS T/HA	DRY MASS T/HA	POTENTIAL N KG/HA
Cowpeas	2.8	8.2	2.0	40-50

- This crop of Cowpeas in 2016 was expected to yield 40kg/ha N

2017 RESULTS

Table 3 Summary March 2017 (SJ Farming Warrami)

LEGUME TYPE	MULTIPLICATION FACTOR	WET MASS T/HA	DRY MASS T/HA	POTENTIAL N KG/HA
Soybeans	3.5	8.9	2.8	90
Cowpeas	2.8	8.5	2.8	50-60

RESULTS 2018

Table 4 SJ Farming Warrami

LEGUME TYPE	MULTIPLICATION FACTOR	WET MASS T/HA	DRY MASS T/HA	POTENTIAL N KG/HA
Soybeans	3.5	8.6	2.2	80
Cowpeas	2.8	8.1	1.8	40-50

Table 5 Moran's Feluga

LEGUME TYPE	MULTIPLICATION FACTOR	WET MASS T/HA	DRY MASS T/HA	POTENTIAL N KG/HA
Soybean	3.5	8.7	2.3	80-90
Cowpeas	2.8	8.0	2.1	50-60

DISCUSSION

- In the wet tropics legume fallows are grown primarily for the Organic matter break crop / green manure effect to break up sugarcane monoculture. Organic N is also a benefit and while the potential level of Organic N supplied by the legume crop can vary, the estimated amount should be included in the overall N budget but only if the legumes are not disced in >1 month before planting.
- Ideally legumes should be sprayed out 4-6 weeks prior to cane planting and the residue allowed to rot down. This provides a) Soil cover in case of late wet season rain and b) allows the organic N to stay close to the soil surface and not move downwards through the soil profile before planting. Depending on the soil type and seasonal conditions, ground preparation for cane planting can then take place closer to planting (eg 2-3 weeks) to ensure the new cane roots have access to this organic N.
- Where the legume residue is worked in a long time before planting eg >1-2 months, it is possible that very little organic Nitrogen will be left in the upper profile of the soil, as it would have started to move through the soil profile before the cane was planted. In this case the legume value would mainly be for organic matter and breaking soil disease cycles, not Organic N.
- Legumes can be planted beside old cane and verdict used to spray out cane, especially in the wettest parts of the district to minimize soil disturbance. In this case the legumes grow up beside the cane as it ratoons. Once the cane is about 50-60cm the cane be sprayed out using the herbicide Verdict. This will kill the cane and the legumes will keep growing.



Photo 5 and 6 planting legumes beside old ratoons Camilleri El Arish Nov 2017

- Other Fallow Crop Species
- > **Millett** – fast striker, deep roots.



Photo 7 Soybean and Millet, Feluga

- > **Sunflower** – deep roots – can bring Phosphorous up from lower down in the soil profile.
- > **Chickpea** – fast growing, smaller crop , produces N, good break crop.
- > **Forage Sorghum** – tall plant, sterile seed, deep roots.
- > **Mustard** – Brassica family - produces a chemical known as isothiocynate The same active ingredient that is in the artificially generated soil fumigant Vapam.
- > **Rhubarb**.
- > **Sunn Hemp** – Crotalaria used in Brazil – hard to get seed.
- > **SRA** – mixed fallow trial- up to 8 species.



APPENDIX 1 INOCULANT TYPES

CROP	INOCULATION TYPE
Soybean	Group H
Dolichos	Group I
Cowpeas	Group I
Chickpea	Group N

APPENDIX 2 SRA LEGUME N GUIDELINES – COPIED FROM SRA WEBSITE

LEGUME CROP	N %	CROP DRY MASS (T./HA)	N DISCOUNT (KG/ HA)	N DISCOUNT (KG/ HA) IF HARVESTED *
Soybean	3.5	8	360	120
		6	270	90
		4	180	60
		2	90	30
Cowpea	2.8	8	290	100
		6	220	70
		4	145	50
		2	70	25
Lab Lab	2.3	8	240	80
		6	180	60
		4	120	40
		2	60	20

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