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<u>Next Meeting</u>	**'AGM'**
<u>Venue</u>	**Richardson Theatre, Roseworthy Campus**
<u>Date</u>	**<u>WEDNESDAY 25th JULY</u>**
<u>Time</u>	**<u>7.30 pm</u>**

AGM

<u>Speakers</u>

TBA by SMS and email

Pulse Varietal Herbicide Tolerance Update

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Key Outcomes

1. Broadstrike® was the most damaging treatment in lentils with all tested cultivars recording a 10-12% yield penalty at the label recommended rate.
2. Raptor® and Spinnaker® were the most damaging in beans, yield reductions of 18-20% and 14-16% were observed respectively.
3. No yield reductions occurred in chickpea varieties despite visual damage symptoms being observed in a number of treatments.
4. Newly released field pea variety PBA Oura showed high levels of herbicide tolerance compared to the other varieties assessed.

Treatments

A series of trials were conducted in 2011 to assess the herbicide tolerance of newly released and commonly grown varieties of field pea, chickpea, faba bean and lentils at the Minlaton central YPASG site. A range of commonly used herbicides and tank mixes were applied at label recommended, and higher than recommended rates to provide information on varietal tolerances and safety margins. Several weeks after herbicide treatments were applied; trials were assessed for damage and again approximately 3-5 weeks later. This involved visual scoring and NDVI readings (Normalised Difference Vegetative Index), using a hand-held Greenseeker. Grain yield was also recorded and results were analysed using spatial analysis techniques.

Trial Results

The 2011 growing season commenced with high sub-soil moisture and slightly below average rainfall. This soil moisture profile provided good conditions for early growth and development. As the season progressed rainfall remained below average and signs of moisture stress were evident later in the season. High levels of ryegrass were present in all trials and were sprayed to minimise any influence on trial results.

Lentil

New cultivar PBA Jumbo was introduced in 2011 herbicide tolerance trials, whilst cultivars PBA Blitz, PBA Bounty, PBA Flash and Nipper remained from the previous year. All lentil varieties responded very similar across all herbicide treatments. Broadstrike® was the most damaging herbicide treatment in all lentil varieties. Yield reductions in response to Broadstrike® application ranged from 10-12% at the recommended label rate.

No other herbicide treatment significantly reduced lentil grain yields when applied at the recommended rate during 2011. Brodal Options® and Diuron caused no reduction in yield at either rate, although visual damage was observed at the high rate of Diuron. Metribuzin applied PSPE caused severe chlorosis and significant reductions in biomass at both herbicide rates in all varieties. Grain yields were not significantly reduced at the recommended rate, but substantial yield losses were observed at the higher rate, hence a narrow safety margin exists in all lentil varieties tested. Testing from previous years suggest PBA Bounty and Nipper are more sensitive to Metribuzin than the other varieties tested.

Simazine and Terbyne® also caused severe chlorosis and biomass reductions at both herbicide rates and significant yield reductions at the higher rate. As a result a narrow safety margin was observed in all varieties during 2011. Lentils are typically more sensitive to both these herbicides than other pulse crops, so care should be taken when selecting herbicide rates. From longer term data (Table 1), as identified with Metribuzin PBA Bounty and Nipper appear more susceptible to yield reductions caused by fellow Group C herbicides Simazine and Terbyne®.

Faba Bean

During 2011, newly released variety PBA Rana was assessed for herbicide tolerance for the third successive year as well as check variety Nura. PBA Rana and Nura bean responded similarly to all herbicides applied. Both varieties suffered significant yield reductions to Raptor® and Spinnaker® at the recommended label rates. These imidazolinone (Group B) herbicides were very damaging during 2011 with grain yields reduced by 18-20% for Raptor® and 14-16% for Spinnaker®. A moderate level of visual damage was observed across both herbicide treatments and varieties at the recommended rate. This was the first year of testing in both PBA Rana and Nura where significant yield reductions occurred at the recommended rate of Raptor®. From the long term summaries it is quite common for Spinnaker® to cause significant yield losses and a narrow safety margin exists in all bean varieties tested over the last 10 years (Table 2). Yield losses are known to be more severe in dry seasons where the crops are unable to recover from herbicide damage incurred early in the season, especially in Spinnaker® the more damaging of the two. From the below average growing season rainfall encountered during 2011 yield penalties from these herbicides could be expected.

Nura and PBA Rana responded very similar to Terbyne® as both varieties showed yield reductions at the higher application rate. From the three years of testing of both these varieties to this herbicide, it was the first where a narrow safety margin was observed. Visual herbicide damage symptoms, such as leaf curling, slight chlorosis and early biomass reductions were recorded in both bean varieties at the higher herbicide rate. Diuron, Simazine and the new pre-emergent herbicide Outlook® recorded no significant yield reductions at either herbicide rate for any of the varieties tested.

Chickpea

In 2011 the same three chickpea varieties were tested as the previous year, this included Genesis 090, Genesis 114 and PBA Slasher. It was a safe year for all herbicide treatments, no significant yield reductions were observed in any of the chickpea varieties across all herbicides tested. Despite no yield reductions occurring, low levels of visual damage were observed in all varieties tested for Balance®, Metribuzin, Simazine and Terbyne® treatments. Refer to Table 3 for long-term results.

Field Pea

In 2011, four pea varieties were assessed for herbicide tolerance. This included PBA Gunyah, PBA Twilight and Kaspa as tested in previous years. Newly released variety, PBA Oura was also assessed for the first time during 2011. All herbicides tested were relatively safe across most varieties during 2011. PBA Twilight was sensitive to Metribuzin, incurring a 13% yield reduction at the label recommended rate. Metribuzin was the most damaging herbicide treatment during 2011 with significant yield reductions at higher rates to all other varieties except PBA Oura. This was also reflected in the visual assessments; significant reductions in biomass were observed in all varieties with the exception of PBA Oura. This variety has also been found to have improved tolerance to metribuzin in PBA herbicide tolerance screening trials in both controlled environment testing and field screens on red brown earths in the Mid North of SA.

PBA Oura showed a high level of tolerance across a range of herbicides compared to the other varieties tested. Kaspa has showed narrow safety margins when treated with Metribuzin, Simazine and Diuron as yield reductions were observed at the higher than recommended rates of these herbicides.

Brassica juncea and canola (*Brassica napus*) in low rainfall South Australia - trials over the past several years, blackleg and new varieties

Trent Potter[1], Jack Kay[1] and Leigh Davis[2] [1]SARDI, Struan, [2]SARDI, Minnipa Agricultural Centre

1. *Brassica juncea* compared to *Brassica napus*

Why do this research?

Research into *Brassica juncea* in Australia has occurred over the past 25 years with the aim of developing an oil crop with equivalent oil quality to canola (Burton et al., 2003). *B. juncea* has many characteristics that should make it a viable crop in lower rainfall areas of Australia including good early vigour, early flowering, good blackleg tolerance, shatter tolerance and higher grain yields than canola when site yields are 1.2 t/ha or less.

Both canola and *B. juncea* have ready acceptance as both crops have been shown to fit into cropping rotations and act as disease break crops (Potter et al., 1997; Angus et al., 1999).

The first canola quality *B. juncea* cultivars were commercialised in 2008 and have low erucic acid, low glucosinolates and oleic acid levels of greater than 60%.

What happened?

Seasons at Lameroo were characterised by a hot dry finish in 2008, high rainfall in 2009 and 2010, April to October rainfall being 168, 269 and 231 mm respectively. At Minnipa, drought in 2008 was followed by high rainfall in 2009 and 2010, April to October rainfall being 139, 333 and 386 mm respectively. However, trials at Minnipa in 2010 were not sown until late May due to the late break.

Table 1. Dry matter (g/m^2), measured at different growth stages and harvest index for canola (44C79) and juncea (OasisCL) at Lameroo in 2008-2010

Year	Elongation DM (g/m^2)		Flowering DM (g/m^2)		Harvest DM (g/m^2)		HI	
	44C79	**OasisCL**	**44C79**	**OasisCL**	**44C79**	**OasisCL**	**44C79**	**OasisCL**
2008	145	100	389	216	264	289	0.13	0.11
2009	124	119	363	201	377	430	0.26	0.24
2010	122	119	361	311	797	790	0.18	0.15

Table 2. Grain yield (t/ha) of canola and juncea at Minnipa in 2009

Entry	TOS 1*	TOS 2*	TOS 3*
Canola			
Hyola 50	2.74	2.52	1.83
Tarcoola	2.56	2.19	1.47
44C79	2.33	2.01	1.26
Juncea			
Dune	2.02	1.56	0.94
JC6019	2.13	1.63	1.17
Sahara CL	1.88	1.20	0.66
Oasis CL	2.33	1.73	1.09
SARDI515M	2.37	1.93	1.36
Site mean	**2.30**	**1.85**	**1.22**
CV%	7.52	6.88	7.14
LSD (P=0.05)	*0.202*	*0.146*	*0.102*

* TOS 1, 3 May, TOS 2, 27 May, TOS 3, 11 June

Table 3. Grain yield (t/ha) of canola and juncea at Minnipa in 2010

Entry	**TOS 1***	**TOS 2***	**TOS 3***
Canola			
44C79	1.46	1.58	1.29
Hyola50	1.62	1.70	1.58
Tarcoola	1.54	1.65	1.44
Juncea			
OasisCL	1.13	1.05	0.84
SaharaCL	1.01	1.01	0.98
SARDI515M	1.24	1.21	1.00
Site mean	**1.33**	**1.37**	**1.19**
CV%	6.06	4.60	8.92
LSD (P=0.05)	*0.097*	*0.069*	*0.121*

* TOS 1, 27 May, TOS 2, 11 June, TOS 3, 24 June

In both years in time of seeding trials, canola produced higher grain yields than juncea (Tables 2 and 3).

Brassica juncea has often been shown to produce higher grain yields than *B. napus* in lower rainfall conditions. However, at Lameroo, in 2010 canola produced higher grain yields than juncea and similar grain yields in 2008 and 2009 where site mean yield was 0.32 and 0.75 t/ha respectively. At Minnipa, in the time of sowing trials, high grain yields were achieved and canola did produce higher yields than juncea. This would be expected as above average rainfall ensured high yields.
However, at the late (June) sowings in both years the juncea did not perform as well as canola. The relatively good performance of canola in 2009 and 2010 may be due to the wet cool conditions of both years.
Data from a range of trials has shown that *B. juncea* can produce higher grain yields than *B. napus* at low yield levels. The main exceptions were in northern NSW where *B. juncea* was better adapted.
Data from Minnipa show that the relative yield performance of *B. juncea* was higher than *B. napus* when growing season rainfall was less than 200 mm.

Table 4. Area (ha) of crop types sown in recognised low rainfall areas of South Australia in 2010 Source: PIRSA crop reports

Region	**Total cereal**	**Total pulse**	**Total *Brassica***
	(ha)	(ha)	(ha)
Western Eyre Peninsula	565,000	7,200	1,500
Eastern Eyre Peninsula	470,000	11,200	3,000
Upper North	360,000	40,000	13,000
Northern Murray Mallee	260,000	1,500	3,000
Southern Murray Mallee	241,000	2,000	6,000
Total low rainfall	**1,896,000**	**61,900**	**33,500**

Total break crops make up a very small component of the total area cropped in low rainfall areas of South Australia (Table 4). Based on current rotations, if *B. juncea* could be grown on 10% of the total cereal growing area in the low rainfall winter cereal zones, the production area for Australia would be over 600,000 ha year (Norton et al., 2005)
In South Australia, we have estimated that up to 165,000 ha could be grown at maximum uptake of *B. juncea*. In order to achieve this uptake, additional herbicide tolerant types will be needed and improved grain yield and quality will also be necessary to compete with *B. napus*

2. Blackleg in canola in lower rainfall areas

A survey was conducted of canola crops in the southern Mallee in October 2011 to investigate the levels of blackleg in that district. A range of crops were sampled (Table 5) and 50 plants were taken randomly across the field (approximately 1 plant every 10 m travelled).

Table 5. Mean internal infection and % of plants with more than 50% internal infection at 16 paddocks in the southern Mallee 2011

Location	Rating 2011	Variety	Mean % internal infection.	% plants with more than 50% internal infection.
Parilla	MS-S	Tanami	17.5	12
Pinnaroo	MS	43C80	22.1	12
Pinnaroo	MS	43C80	13.9	6
Pinnaroo	MS	44C79	26.7	16
Pinnaroo	MS	44C79	21.7	10
Lameroo south west	MS	44C79	18.7	14
Lameroo south west	MS	44C79	5.3	0
Lameroo south west	MS	44C79	11.0	6
Parilla north	MS	44C79	19.4	18
Parilla north	MS	Scaddan	2.6	0
Lameroo west	MR-MS	44Y84	11.8	8
Lameroo west	MR-MS	45Y82	18.2	12
Lameroo south west	MR	FighterTT	5.1	6
Parilla	MR	HurricaneTT	3.2	0

In previous years we have scored a variety (ATR-Beacon, BravoTT or Tawriffic TT) at the NVT trial at Lameroo to determine the level of infection with blackleg. The level has always been low (2, 5, 0% in 2004-2006 respectively).
The data presented in Table 5 show that we are now seeing a greater level of blackleg in the southern Mallee and that many of the crops are being sown to varieties that have a low level of blackleg resistance. The increase in blackleg can be attributed to a greater area being sown to canola in 2010 and 2011, as well as the summer and autumn rain in 2010-11 that resulted in a likely more rapid and greater release of blackleg spores throughout the district. With a further increase in area being cropped to canola in 2012 blackleg may begin to be an issue in the Mallee.

While the levels of internal infection are not as high as noted in the medium to high rainfall zone, if the amount of blackleg continues to increase, we should be looking to move to varieties with better resistance or consider limited use of fungicides in future.

Yield gains during five decades of wheat breeding

Wheat varieties are a common topic of discussion among broad-acre farmers across Australia, and variety presentations are always well attended at field days. Wheat breeding has evolved since the green revolution of the 1960s when semi-dwarf wheats replaced tall wheats prone to lodging. But how much did wheat yield improve over all these years? What are the physiological changes in the crop associated with breeding for yield? Are there implications for crop management?

Working closely with industry, SARDI crop scientists Chris Lawson and Victor Sadras set out to answer these questions. Industry support includes funding by GRDC's initiative on water use efficiency (DAS00089); Peter Hooper and colleagues at Hart field site providing agronomic insight and material support with the trials; Roseworthy and SARDI Clare staff providing agronomic support; and Snowtown farmer Don Whiting and plant breeders Tony Rathjen (University of Adelaide) and Haydn Kuchel (AGT) providing expert advice and seed.

Field trials were established in 2010 and 2011 across the mid-north of South Australia to compare a selection of popular wheat varieties released between 1958 and 2007: Heron (1958), Gamenya (1960), Halberd (1969), Condor (1973), Warigal (1978), Spear (1984), Machete (1985), Janz (1989), Frame (1994), Krichauff (1997), Yitpi (1999), Wyalkatchem (2001) and Gladius (2007).

The trials demonstrated that yield has steadily increased over the last fifty years at a rate of 18kg per hectare per year. This rate compares well with rates reported for other breeding programs worldwide. It is encouraging that yield progress is not slowing down over time.

The increase in yield was associated with an improvement in harvest index; new varieties produce more grain per kg of biomass. Newer varieties also grow faster between stem elongation and flowering. This period, which in South Australia generally occurs between August and October, is critical for yield. Enhanced crop growth in this period leads to greater grain number. This finding has implications for management: ensuring good conditions during this period, in particular crop protection and nitrogen supply, is critical to capture the yield benefits of high yielding varieties.

Breeding for yield improved the ability of wheat to uptake soil nitrogen. Newer varieties are much better at mining the soil than older varieties. This reinforces the need to monitor soil nitrogen and to improve the nitrogen nutrition of crops to capture the benefits of improved varieties, particularly in the period between stem elongation and flowering.

Newer varieties achieve higher yield with the same amount of water use. The agronomic implication of this finding is that our water use efficiency benchmark needs an update. The benchmark of 20 kg grain/ha per mm of water use was largely developed using Halberd, a variety released in 1969. We find the benchmark for current varieties under SA conditions is close to 24 kg grain per ha per mm.

This work shows the outstanding success of local breeding programs in increasing yield and the practical value of asking questions about the physiology of the crop. This research is critical at a number of levels, from crop breeding and management to farm profitability and long term food security. Further improvements in wheat yield associated with both improved varieties and better agronomy are more likely to arise from a focus on the critical pre-flowering period.

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Yam Daisy/Murnong/*Microseris lanceolata*

A forgotten agricultural plant?

EJ Eyre, 'Discoveries in Central Australia', Vol 1, p42.

Exploration of the Mid North of SA

June 27 (1840).-In crossing the southern extremity of these large plains, we came suddenly upon a small party of natives engaged in digging yams of which the plains were full; they were so intent upon their occupation that we were close to them before they were aware of our presence; when they saw us they appeared to be surprised and alarmed, and endeavoured to steal off as rapidly as they could without fairly taking to their heels, for they were evidently either unwilling or afraid to run; finding that we did not molest them they halted, and informed us by signs that we should soon come to water, in the direction we were going. This I knew to be true, and about three o'clock we were in front of a watercourse, I had on a former journey named the" Rocky river," from the ragged character of its bed where we struck it.

We had been travelling for some distance upon a high level open country, and now came to a sudden gorge of several hundred feet below us, through which the Rocky River wound its course. It was a most singular and wild looking.

Beth Gott, 'Murnong-*Microseris scapigera:* a study of the staple food of Victorian Aborigines. Aust. Aboriginal Studies, 1983 vol 2, pp2-18.

[editorial comment: this article is seminal to the understanding of the role of the Yam Daisy as a staple food plant in 'dryland' conditions. Here it has been extensively edited for the sake of brevity. For those interested in following up references, they should refer to the original article. Apparently F von Mueller, the famous Director of the Melbourne Botanical Gardens, suggested the Yam Daisy should be cultivated in cold countries as a vegetable.]

Murnong was widespread throughout the higher rainfall cropping zones of Victoria, NSW and SA but does not extend into the arid zone, except for the Flinders Ranges, nor into the tropics. Murnong is tolerant of a wide range of soil conditions. In the Murray-Darling systems, murnong seems to have been most abundant close to the rivers and billabongs.

It is a perennial small daisy, springing up from a swollen tuber, resembling a small round radish or a tapering carrot, white to dark brown on the surface, whitish or semi-translucent inside, and crisp in texture. The tuber is usually found in the top 10 cm of soil, and lies dormant during summer. However, in the autumn a rosette of upright smooth leaves develops from buds on the stem base. The leaves are long, thin and soft, variable even on a single plant; sometimes they have projecting teeth to form a 'rosette'. When broken, all parts of the plant, exude latex, a milky substance, 'dandelion milk', which leaves a dark stain on the fingers.

One or more small white roots grow down from their axils and begin to swell into a new tuber or tubers and at the same time the old tuber begins to shrivel. New tuber are produced the plant flowers. At this time the plant is very vulnerable if the leaves are completely removed by grazing animals and the shrivelled old tuber often becomes bitter-tasting.

Historical accounts in Victoria describe murnong as 'generally diffused on grassy lands' (Backhouse 1843); 'chiefly on the open plains' (Dawson 1881); 'will thrive in the poorest of soil' (Thomas in NSW Leg. Counc. 1845:997). Records extending back to the 1840s list it in every major area of the Victoria, however, its greatest abundance was undoubtedly on the open plains. In 1840 Robinson quoted Munro, a settler in north-central Victoria, describing 'millions of murnong or yam, all over the plain'. Curr 1842, says 'the wheels of our dray used to turn them up by the bushel'. At the present time, although widely scattered, the plant is abundant only in very small local patches. F.M. Bailey, in 1839, has left a note 'in the early days of South Australia the colonists used to eat the fleshy roots of this plant-following the practice of the natives by whom it was largely used for food. I was fond of it as a boy .

Murnong was gathered by women using the digging-stick, often referred to as a yam-stick. "even small children could gather them easily: as soon almost as they can walk, a little wooden shovel is put into their hands, and they learn thus early to pick about the ground for those roots and a few others (Mitchell 1839) In Victoria, Mitchell describes the Aborigines 'spread over the field, digging for roots'. At Colbinabbin, near Echuca, yams were so abundant and so easily procured, that one might have collected in an hour, with a pointed stick, as many as would have served a family for the day (Curr 1886). Robinson described on 24 July 1841, women 'spread over the plain as far as I could see them . . . each had a load as much as she could carry'; conservatively one might assess such a load at 8 kg.

The Port Phillip tribes baked these roots in a hole made in the ground, where half melt down into a sweet, dark-coloured juice. Robinson, made drawings of an oven of stones and earth used to 'bake their murnong and emu and other animals'.

Dixon suggested that breaking-up of the clumped tubers, with some parts of the clump inevitably remaining in the soil, equivalent to the well-known horticultural practice of thinning tuberous perennials, would have promoted the growth and spread of the plants. And Batey suggests that the Aborigines were aware of the value of loosening the soil to promote growth of the plant which he calls it 'accidental gardening'. Fire applied during the dry season, as seems to have been the practice in Victoria, would not be harmed the underground tubers, but clear away any dead vegetation, leaving open ground, fertilised by ash, eminently suitable for growth.

Some native Australian animals certainly ate murnong, but it was the introduction of hard-hoofed, close-cropping domestic animals which initially disastrously reduced its abundance. Cure gives a graphic picture of what happened: several thousand sheep not only learnt to root up these vegetables [murnong] with "their noses, but they for the most part lived on them for the first year, after which the root began gradually to get scarce.

In 1845, ten years after the first settlement, a Select Committee of the NSW Legislative Council, asked witnesses if the natural food of the Aborigines had declined. Malcolm, Fyans and Robinson all agreed that murnong had greatly diminished-'continued grazing of stock had rendered edible roots exceedingly scarce'.

CW Schurmann, Lutheran Missionary, 'The Aboriginal Tribes of Port Lincoln' in JD Woods 'The Native Tribes of South Australia' !879.

It has been asserted that the Aborigines of this country will eat anything. This opinion has probably arisen from seeing them eat many things which to an European would be very disgusting, such as grubs, foul eggs, intestines of animals, etc. Yet there are articles of food relished by white men that a native would not touch; for instance, some kinds of fish, oysters, or shell-fish of any kind, the common mushroom, etc, although they eat almost all other kinds of fungus. The natives divide their food into two general classes, namely, ***paru***, which denotes animal food of every description, and ***mai***, which comprises all vegetable nutriments. To the latter class belong a variety of roots, such as *ngamba, ngarruru, nilai, winnu,* and other kinds, which are nearly all of the size and shape of a small carrot or radish. These are all roasted in hot ashes, and peeled before they are eaten, and have more or less a bitter taste.

[Editorial Comment: Little doubt that it is the Yan Daisy being discussed here. It is interesting that several words are recorded and we can speculate whether these denoted different stages of growth, cooking methods or even types of the species. Schurmann made a notable contribution by extensively recording the languages and he virtually lived among the Indigenous People.]

D Schubert, ' Karvel's People' , 1997. P119 quoting JC Liebelt in an interview with an Adelaide Paper

Each family taking up land had to be responsible for the price, viz. £7 an acre, which eventually we were able to payoff, besides the amount which had been advanced by Mr Angas as passage money. **At first our principal means of subsistence were buttercup roots, which we had to grub out with our hands, and opossums, the catching of which we learnt from the blacks.** After a short time, Mr Duncan McFarlane put some sheep on the land, and I, among others, tended them, acting as our own dogs. Being then supplied with rice flour, maize flour, and potatoes, we started clearing and planted wheat, the seed costing £1 per bushel.
[Editorial comment: Undoubtedly the roots, for a number of reasons, were not of a Buttercup, and the likely species was the Yam Daisy.]

Kate Grenville, 'Searching for the Secret River' 2006, p131-132.

[Editorial comment: This book describes Grenville's detailed research into constructing her quite famous novel, **'The Secret River'**. This extract recounts the verbal history from the Indigenous group central to the historical basis to the novel.]

The Darug was one of the groups which bore the full brunt of European expansion. The smallpox epidemic in 1789 killed many of them. Many of the attacks the Gazette described were made by Darug men and many of those killed would have been Darug. Those first thirty years of warfare, disease and displacement must have severely disrupted their culture.

This meant that the Darug weren't easy to learn much about, two hundred years later. But there were descendants who were reconstructing the language and the culture. I asked around, found a contact and picked up the phone.

I expected a polite rebuff, but Auntie Edna Watson, a Darug elder, and later another descendant, John Gallard, heard me out while I tried to explain. Solomon Wiseman my ancestor. My need to fill in some of the holes in the family story. My awareness that the story I was exploring wasn't a comfortable one.

Trying to explain made me realise how little I knew what I was doing and where all this obsessive work might lead me.

As these Darug people began to speak to me I listened and scribbled, page after page. They told me some stories I knew already, others I didn't: stories about boys thrown into the river to die, about men's hands being cut off, about burnings and shootings.

And they told me about the yam daisies.

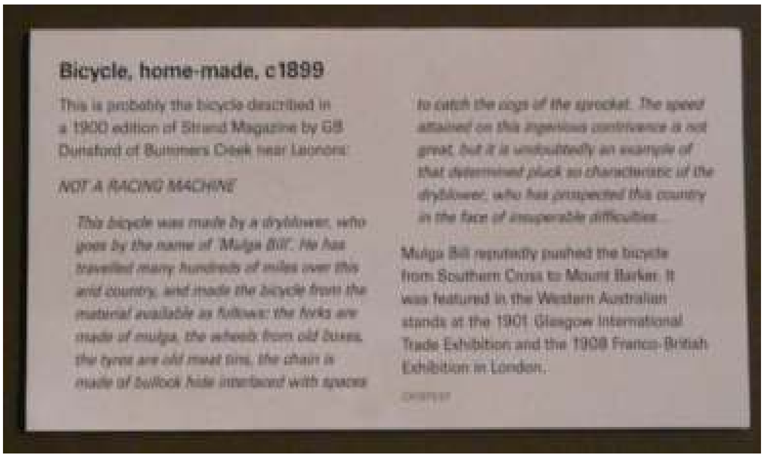
Yam daisies are edible tubers that used to grow in vast numbers on the river-flats. They have a yellow flower a bit like a dandelion and a cluster of tubers that-in John's words-'hung down like the fingers of a hand'. The Darug dug them up and ate the roots, but would re-plant one of the 'fingers' so there'd be a crop again the following year.

Listening to them tell me about those yam daisies, I began to realise how important they were. They were a staple of the Darug diet, the source of bulk and carbohydrate, playing the same role that potatoes did in the Irish diet. Fish and game and other plants were added to that staple but wouldn't always have been enough on their own.

The yam daisies grew on the same rich soil that the Europeans chose for their own crops. The newcomers dug them up as weeds, and planted corn and wheat. When the Darug people came back, expecting to harvest their yam daisies, and found them replaced by other crops, they harvest them instead.

After I got off the phone I sat for a long time looking out at the front yard, trying to absorb the significance of what I had learned.

The story of the yam daisies made sense of conflict all over the country. It was the story of settlement in miniature. One event came after another, no one understood what the other side was thinking, and at the end there was bad trouble. It was never a simple matter of right and wrong.



Here is an image of the bicycle made of wood. It is on display at the WA museum of mining in Kalgoorlie.
Photos curtesy of Colin Jenner

Why is it so?

Why are these toadstools growing down the middle of the track? Best (and correct) answer will receive a bottle of wine from Max Tate!

Photograph curtesy of Ben Lethbridge and Max Tate