

# Comparison of historical lupin varieties in the West Midlands

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<b>Purpose:</b>	Evaluate the performance of the historical lupin varieties in the West Midlands
<b>Location:</b>	Badgingarra
<b>Soil Type:</b>	Deep yellow sand
<b>Rotation:</b>	2010: Pasture, 2009: Wheat.
<b>GSR:</b>	433mm

## BACKGROUND

At a meeting with the West Midlands Group in February 2011 it was mentioned by local growers that they were not seeing the gains in yields from the new varieties that were reported from the data below in *Table 1*. In order to add some facts to the argument, and consider whether there is a need for further investigation, a Historical Variety Trial was planted at the West Midlands Group's trial site so we could accurately assess the situation.

*Table 1: Yield of each variety grown in trials from 1997 - 2006*

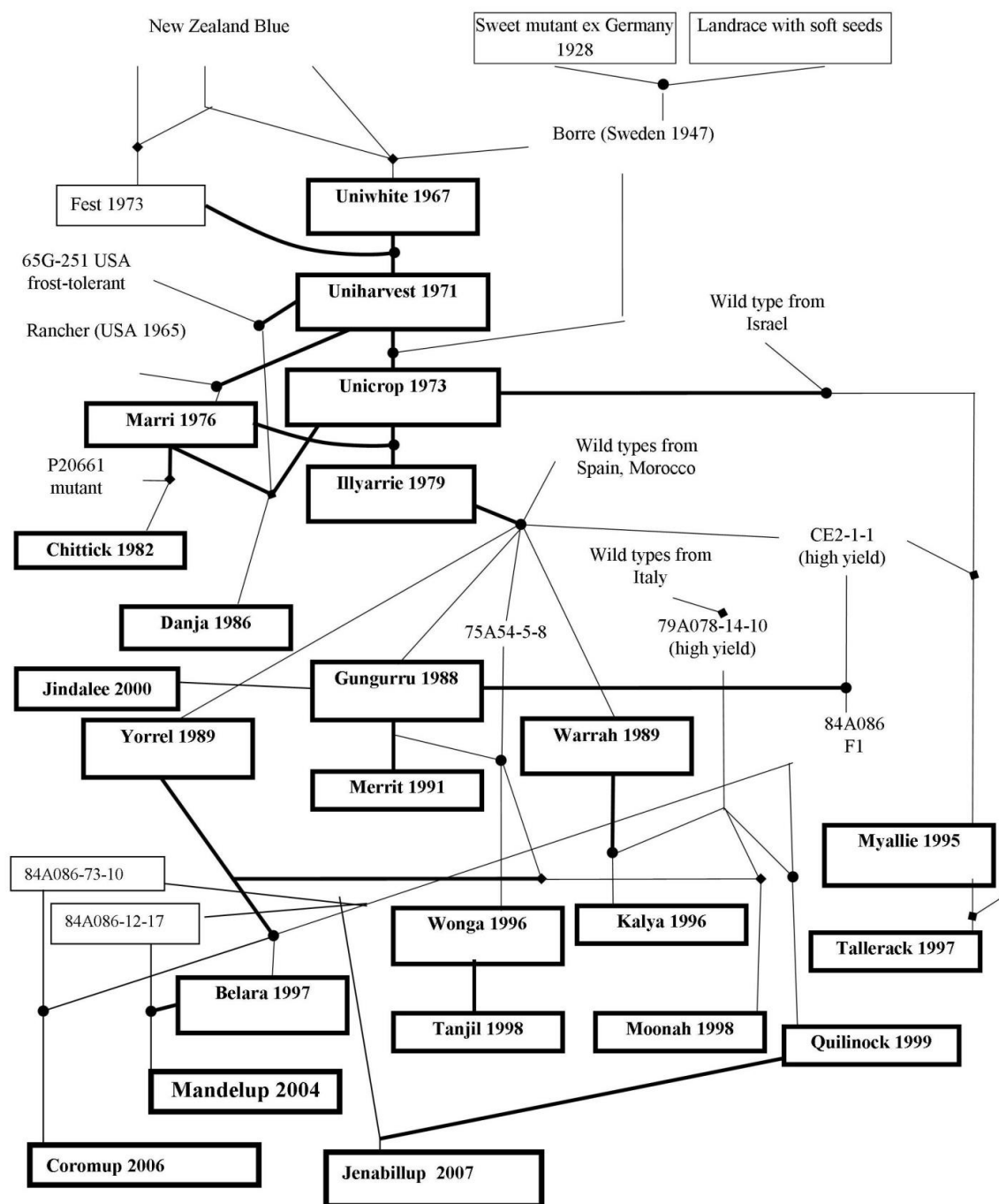
Variety	Year release	No trials	Yield range (t/ha)	Mean yield (t/ha)	% Tanjil
Uniwhite	1967	26	0.028 - 1.929	0.47	40
Uniharvest	1971	33	0.025 - 1.915	0.594	51.3
Unicrop	1973	39	0.028 - 2.433	0.782	67.5
Marri	1976	33	0.041 - 1.718	0.6	51.8
Illyarrie	1979	39	0.041 - 2.53	0.844	72.9
Yandee	1980	39	0.049 - 2.393	0.815	70.4
Chittick	1982	33	0.036 - 2.378	0.696	60.2
Danja	1986	39	0.043 - 2.716	0.932	80.5
Geebung	1987	26	0.041 - 2.104	0.604	52.2
Gungurru	1988	39	0.064 - 3.033	0.959	82.8
Yorrel	1989	39	0.084 - 2.488	0.955	82.5
Merrrit	1991	39	0.043 - 3.05	0.99	85.5
Myallie	1995	39	0.085 - 2.914	1.059	91.5
Wonga	1996	39	0.138 - 2.753	1.102	95.2
Kalya	1996	39	0.065 - 3.048	1.158	100
Belara	1997	39	0.115 - 2.655	1.189	102.7
Tallerack	1997	39	0.079 - 2.949	1.037	89.6
Tanjil	1998	39	0.079 - 3.146	1.157	100
Quilinoock	1999	27	0.224 - 3.218	1.411	121.9
Jindalee	2004	14	0.066 - 1.795	0.881	76.1
Mandelup	2005	14	0.289 - 2.996	1.701	147
Coromup	2006	14	0.448 - 2.773	1.553	134

<b>Jenabillup</b>	2007	5	0.368 - 2.196	1.374	118.7
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Included in the trial was PBA Gunyidi which was named and released in 2011 as a non-shattering replacement for Mandelup; and WALAN2325, which has the potential to be released 2013 as a high yielding, anthracnose resistant, metribuzin tolerant replacement for Tanjil in the anthracnose belt.

The breeding of narrow-leaved lupins commenced in the 1960's with the first variety, Uniwhite, released in 1967. Since then there has been 27 varieties released with 26 of those originating from the Western Australian breeding program. Figure 1 illustrates the pedigree relationship between the varieties. In an Endeavour to measure the progress in breeding, a set of historical varieties was grown at each of the breeding sites since 1997. The results are summarised in Table 1 and cover 39 trials over 14 locations from 1997-2006 (excluding 2002 and 2003).

The release of Mandelup in 2005 represented a yield gain of 32kg/year since Uniwhite (1967) and 28.7kg/year since Unicrop, the first early flowering variety released in 1973.



**Figure 1.** Pedigree relationships among the main narrow-leaved lupin cultivars released in Australia 1967-2007. Circles indicate key single crosses; diamonds represent complex crosses. Bold lines indicate crosses involving Australian cultivars. (Adapted from Cowling 1999)

## TRIAL DESIGN

**Plot size:** 20m x 1.5m

**Repetitions:** 3

**Seeding rate:** 90kg/ha on 18 May 2011

## RESULTS

*Table 2: Comparative lupin variety yields at West Midlands Group site, Badgingarra in 2011.*

Year released	Variety	Yield t/ha	% Mandelup	% Tanjil	Rank
1973	Unicrop	3081.9	85.1	89.1	20
1980	Yandee	3118.8	86.1	90.2	19
1979	Illyarrie	3270.4	90.3	94.6	15
1986	Danja	3302.2	91.2	95.5	13
1988	Gungurru	3157.6	87.2	91.3	18
1989	Yorrel	3239	89.4	93.7	16
1989	Warrah	3565.6	98.4	103.1	8
1991	Merrit	3224.9	89	93.3	17
1995	Myallie	3317.8	91.6	96	12
1996	Kalya	3644	100.6	105.4	5
1996	Wonga	3510	96.9	101.5	9
1997	Belara	3794	104.7	109.7	3
1997	Tallerack	3455.1	95.4	99.9	11
1998	Tanjil	3457.1	95.4	100	10
1999	Quilnock	3755.4	103.7	108.6	4
2004	Mandelup	3622.2	100	104.8	6
2006	Coromup	3580.9	98.9	103.6	7
2007	Jenabillup	3290.8	90.9	95.2	14
2011	PBA Gunyidi	3947.9	109	114.2	2
2013	WALAN2325	4102.9	113.3	118.7	1

**MEAN** 3472.2

**AVSED** 161.2

**CV** 6.6

## DISCUSSION

The results in Table 2 show that the average yield for the trial was 3.47 t/ha with a range from 3 – 4 t/ha. Most of the lines since Tanjil, which was released in 1998 ranked in the top 10 with the exception of Jenabillup. Jenabillup is only recommended for the southern and low rainfall areas due to its low tolerance of metribuzin and moderate susceptibility to anthracnose. The yield of Kalya, Mandelup and Coromup were similar but 4 -5 % better than Tanjil.

The best performing lines were those with superior anthracnose resistance with the new variety PBA Gunyidi, whose anthracnose resistance is between Mandelup and Tanjil, being 109 and 114% better than Mandelup and Tanjil, respectively.

The stand out for yield performance was WALAN2325 which yielded 113% and 118% of Mandelup and Tanjil, respectively. This line has the same level of resistance to anthracnose as Tanjil but is superior in its tolerance to metribuzin. This line will be released in 2013 to replace Tanjil in the system and give growers the option to use metribuzin in weed management.

So have growers in the West Midlands been missing out on the genetic gain made in breeding? Yes and No:

- Yes, because they are constrained by the disease profiles of the area to grow only resistant or moderately resistant lines, these being Tanjil, Wonga, Kalya, Mandelup and Coromup and therefore don't have access to something like Quilnock, which is very susceptible.
- No, because most of the above recommended lines are in the top 10.

In addition, the breeding program has been concentrating on producing an anthracnose resistant, metribuzin tolerant variety specifically to replace all varieties in the coastal West Midlands. Within 2 years there will be a choice of either PBA Gunyidi or the more superior line WALAN2325. These lines should restore some faith back into growing lupins within the West Midlands area.

## **ACKNOWLEDGEMENTS**

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