Mandelup$^{\phi}$

Narrow leaf lupin

VMP 2011 #01

KEY FEATURES

- **Consistently high yielding variety across all southern states.**
- **Excellent height and vigour in low-medium rainfall environments.**
- **Early maturity – suitable for crop-topping (although some yield loss is likely).**
- **Good anthracnose resistance.**
- **Good resistance to aphid colonisation (not usually a problem in eastern states).**

Where Mandelup$^{\phi}$ fits into the farming system

This lupin has a fit where growers want a consistently high yielding variety suitable for stock feed and some niche food markets. Mandelup$^{\phi}$ has shown good adaption to a range of rainfall zones, but its performance has been best in low rainfall areas where its quick maturity, height and vigour are favourable attributes. Its early maturity has also enabled growers to crop-top Mandelup$^{\phi}$ as a part of a herbicide resistance management strategy.

Breeding and Development

Mandelup$^{\phi}$ (tested as WALAN2141) was bred by WA Department of Agriculture in co-operation with the National Lupin Breeding Programme.

Variety Characteristics

Mandelup$^{\phi}$ is an early flowering and early maturity variety with low alkaloid content. It has excellent vigour and harvest height in low rainfall regions. It was selected for its high yield, anthracnose resistance and tolerance to the herbicide metribuzin in WA (not registered in eastern states). Its anthracnose resistance is an improvement over Quilinock$^{\phi}$ and Jindalee$^{\phi}$, but is less than Wonga$^{\phi}$ and Tanjil$^{\phi}$.

Mandelup$^{\phi}$ appears similar to Jenabillup$^{\phi}$ for pod shatter in short season environments, such as Agzones 1, 2 & 3 in WA. In cooler environments pod shatter is less of a problem.

Agronomic and Disease Features of Narrow-leafed Lupin Varieties

Eastern States varieties

Variety	Flowering time	Height	Lodging	Pod Shatter	Drought Tolerance	Aphid Resistance	Brown leaf spot	Pleiochaeta Root Rot	CMV seed transmission	Anthracnose	Phomopsis	
											Stem	Pod
Mandelup$^{\phi}$	**Very early**	**Tall**	**MS**	**MR**	**MR**	**R**	**I**	**R**	**MR**	**MR**	**MR**	**R**
Wonga$^{\phi}$	Early-mid	Medium	MR	MS	MS	MR	I	R	R	R	R	S
Moonah$^{\phi}$	Early	Tall	MR	R	MR	MR-S	S	R	MS	MR	MR	MS
Quilinock$^{\phi}$	Early	Short	MS	MR	MR	-	I	R	MR	VS	MR	MS
Jindalee$^{\phi}$	Mid-late	Medium	R	MR	-	-	I	R	MS	S	R	-

Western Australian varieties

Variety	Flowering time	Height	Lodging	Pod Shatter	Drought Tolerance	Aphid Resistance	Brown leaf spot	Pleiochaeta Root Rot	CMV seed transmission	Anthracnose	Phomopsis	
											Stem	Pod
Mandelup$^{\phi}$	**Very early**	**Tall**	**MS**	**MR**	**MR**	**R**	**MS**	**R**	**MR**	**MR**	**R**	**R**
Belara$^{\phi}$	Early	Medium	MS	MR	MR	MR	MS	R	MS	MS	R	MR
Coromup$^{\phi}$	Early	Tall	MS	R	MR	R	I	R	MR	MR	R	R
Jenabillup$^{\phi}$	Mid	Tall	MR	R	MR	MS	R	R	MS	MS	I	R
Tanjil$^{\phi}$	Late	Medium	MR	R	MS	R	I	R	R	R	MR	R

VS = very susceptible, **S** = susceptible, **MS** = moderately susceptible, I= Intermediate, **MR** = moderately resistant, **R** = resistant.
= may be more vulnerable to late infection due because of its late maturity.

Yield and Adaption

Mandelup(ф) has consistently out-yielded most current commercial varieties in low-medium rainfall zones (<400mm annual rainfall). It has also yielded well in high rainfall areas but can be prone to lodging in very high production situations (long season, wetter, cooler sites). Its yield is close to that of Jenabillup(ф) in the higher rainfall areas. but it has tolerance to metribuzin, an attribute that Jenabillup(ф) does not have.

Long–term Relative Grain Yield t/ha 2004-2010 as a percentage % of Mandelup(ф)

Eastern States

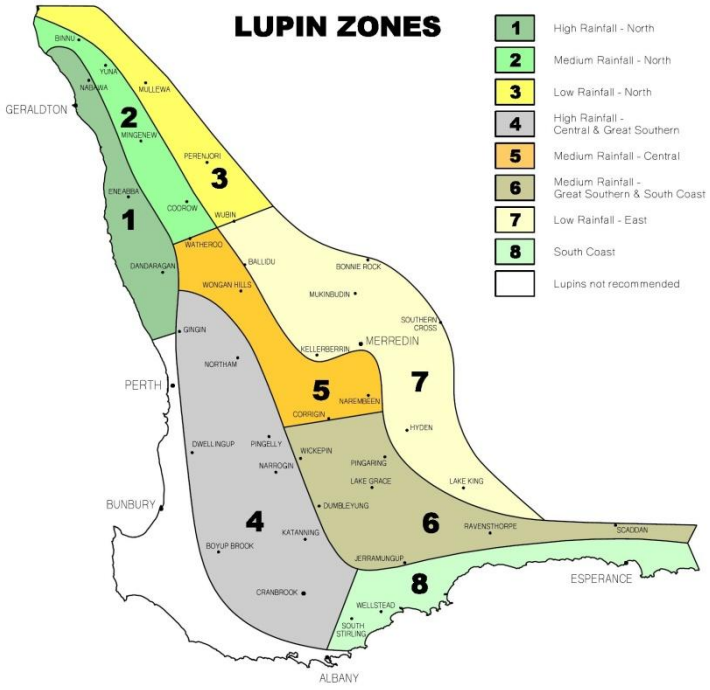
Variety	SA Mid North	SA Murray Mallee	SA South East	SA Lower E P	VIC Mallee	VIC Nth Central	NSW Long Season	NSW Short Season
Coromup(ф)	97(6)	92 (6)	95 (18)	96 (11)	95 (11)	94 (4)	96 (32)	95 (14)
Jenabillup(ф)	102 (5)	98 (5)	101 (14)	102 (9)	97 (9)	100 (4)	102 (39)	100 (23)
Jindalee(ф)	90 (6)	89 (6)	87 (19)	84 (12)	87 (9)	86 (3)	88 (41)	88 (24)
Mandelup(ф)	**100 (6)**	**100 (6)**	**100 (19)**	**100 (12)**	**100 (11)**	**100 (4)**	**100 (41)**	**100 (24)**
Moonah(ф)	94 (5)	89 (5)	90 (14)	92 (9)	92 (9)	-	93 (19)	92 (7)
Wonga(ф)	88 (6)	90 (6)	88 (18)	91 (11)	91 (10)	89 (4)	88 (41)	91 (24)
Mandelup(ф) t/ha	***1.81***	***1.35***	***1.99***	***1.99***	***1.08***	***1.40***	***2.08***	***1.93***

Western Australia (note: the 8 lupin agzones in WA are different to the 6 Agzones for other grains)

Variety	WA Lupin Agzone 1	WA Lupin Agzone 2	WA Lupin Agzone 3	WA Lupin Agzone 4	WA Lupin Agzone 5	WA Lupin Agzone 6	WA Lupin Agzone 7	WA Lupin Agzone 8
Belara(ф)	94 (8)	94 (11)	94 (7)	92 (10)	94 (10)	95 (5)	93 (8)	95 (4)
Coromup(ф)	96 (9)	97 (14)	97 (10)	92 (12)	96 (13)	95 (5)	97 (8)	93 (5)
Jenabillup(ф)	102 (9)	100 (14)	100 (10)	103 (12)	101 (13)	102(5)	100 (8)	105 (5)
Mandelup(ф)	**100 (9)**	**100 (14)**	**100 (10)**	**100 (12)**	**100 (13)**	**100 (5)**	**100 (8)**	**100 (5)**
Quilinock(ф)	95 (5)	95 (7)	96 (7)	96 (9)	98 (7)	98 (3)	97 (5)	97 (4)
Tanjil(ф)	93 (9)	92 (14)	92 (10)	90 (12)	92 (13)	95 (5)	91 (8)	90 (5)
Mandelup(ф) t/ha	***2.69***	***2.33***	***1.25***	***2.06***	***1.50***	***1.36***	***1.44***	***2.48***

Data courtesy NVT data base, SARDI, DPI Vic, I&I NSW and DAFWA

Western Australia



Grain Quality

Alkaloid levels of Mandelup(ф) seeds are low and similar to Wonga(ф). The protein content is higher than Belara(ф), but less than Quilinock(ф), Jindalee(ф), and Wonga(ф). The highest protein accumulating lupin variety is Coromup(ф)

Seed quality of lupin varieties (as a percentage of Mandelup(ф)).

Variety	Seed weight	Seed protein	Seed Oil	Seed Alkaloid
Belara(ф)	100	100	100	100
Coromup(ф)	104	106	101	125
Jenabillup(ф)	104	99	100	87
Mandelup(ф)	**100**	**100**	**100**	**100**
Quilinock(ф)	103	102	94	100
Tanjil(ф)	91	101	105	133
Mandelup(ф) *actual figures*	*154 mg*	*35.6%*	*6.6%db*	*0.010%*

Data is from advanced variety trials in WA from 2000 to 2005. Results are % dry based (%db) (Courtesy DAFWA).

Management Package

(Consult local grower guides for more detailed information)

Areas of adaptation;

Mandelup$^{\phi}$ is:

- Suitable for low and medium rainfall areas of NSW, SA, Victoria and Western Australia.
- Yields have been consistently higher than current varieties in districts with annual rainfall < 400mm.
- Mandelup$^{\phi}$ has improved harvest height and should be easier to harvest if late sown or in low rainfall seasons.
- Its susceptibility to lodging in high rainfall areas may result in harvest difficulties.
- It is susceptible to black pod syndrome, so it may be less suited than Jenabillup$^{\phi}$ in those higher rainfall areas where black pod syndrome is a regular problem.

Seeding;

Sowing times and sowing rates for Mandelup$^{\phi}$ are:

- Sow from mid-April until mid May in low rainfall areas. In high-rainfall sowing may need to be delayed to avoid lodging.
- Sowing rates will vary according to seed size and germination percentage. Establish 35 to 45 plants/m^2, relative to growing region and sowing time.
- If CMV symptoms were seen in the previous seed crop, a seed test is advisable.
- Always request a germination test report when purchasing new seed, and always test farmer retained seed.

Weed control;

Most registered herbicides can be used on Mandelup$^{\phi}$ at label rates. It has shown a low margin of safety to Eclipse® (similar to Jindalee$^{\phi}$.) Mandelup$^{\phi}$ has shown good triazine tolerance in trials. Plants weakened by herbicides are more susceptible to root and foliar diseases. Use similar guidelines and strategies as for other lupin varieties. The early flowering of Mandelup$^{\phi}$ and its ability to fill pods rapidly makes it **suitable for crop topping**. Timing of chemical application or swathing/windrowing is very important as serious yield loss and/or reduction of seed viability can occur – see Other Reading.

Mandelup$^{\phi}$ has shown good tolerance to metribuzin, making it a suitable variety where difficult broad-leafed weeds are present. Metribuzin is not registered on lupins in all states – check labels for details.

Disease management

- Mandelup$^{\phi}$ has improved resistance to anthracnose over Jindalee$^{\phi}$ and Quillinock$^{\phi}$, but less than Wonga$^{\phi}$ and Tanjil$^{\phi}$
- Observe all anthracnose quarantine restrictions and import regulations. Anthracnose is not present in NSW or Victorian lupin crops, and is only very isolated in SA.
- Mandelup$^{\phi}$ has good resistance to Phomopsis stem infection, similar to Jindalee$^{\phi}$ and Belara$^{\phi}$.
- It has intermediate resistance to brown leaf spot, similar to Jindalee$^{\phi}$ and Wonga$^{\phi}$. Manage brown leaf spot in all varieties by rotation, cereal stubble retention, and fungicide seed treatment.
- CMV seed transmission rates in Mandelup$^{\phi}$ are higher than in Wonga$^{\phi}$, but lower than in Jindalee$^{\phi}$.
- Mandelup$^{\phi}$ is like most lupin varieties other than Jenabillup$^{\phi}$ in that it is susceptible to Black Pod Syndrome (PBS). Hence it will lose as much as 30% of yield potential where this disease and seasonal conditions are prevalent.
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Insects;

Mandelup$^{\phi}$ has resistance to aphid colonisation and feeding damage similar to Kalya$^{\phi}$ and Wonga$^{\phi}$. For other insect pests (particularly mites, lucerne flea, thrips, and native budworm), follow the same monitoring and control guidelines as for other lupin varieties.

Harvesting;

Mandelup$^{\phi}$ fills its pods rapidly, making it suitable for swathing/windrowing to control weeds or advance harvest time, but timing is very important. Mandelup$^{\phi}$ has good pod and seed shedding resistance, but timely harvest is important to maximise grain quality. If harvest is delayed or under extreme dry conditions, harvest at the coolest times such as early morning or at night to avoid shattering or pod drop.

Harvest Mandelup$^{\phi}$ lupins being retained for sowing seed as soon as it is ready to maximise seed quality.

Seed Availability;

Mandelup$^{\phi}$ is produced and marketed by Seedmark (ph 1800 112 400) under licence to Viterra seeds in SA, Victoria and NSW. Seed can be ordered direct from retail outlets. It is free-to-trade in WA.

Mandelup$^{\phi}$ is protected under Plant Breeders' Rights PBR and has an End-Point Royalty (including management fee) of $2.30/t (GST exc.) for all grain produced except farmer kept seed.

Western Australia	Eastern States
The Seed Group Alliance 08 9045 4036 0428 711 375	seedmark **Phone 1800 112 400**
ASG, 08 9651 1069 COGGO Seeds, 08 9368 8750 Coorow Seeds, 08 9952 1088 EDSCO, 08 9045 4036 WC Diamond & Co. 08 9664 2011	VITERRA™ **Viterra: 1800 018 205** **www.viterra.com.au** SA - 0437 011 907 VIC/NSW - 0458 009 804

Further reading:

For lupin management guidelines see:

- DAFWA- Jenabillup- DAFWA Farmnote 313, June 2008
- DAFWA- "Producing Lupins" Bulletin # 4720 (www.agric.wa.gov.au)
- I&I NSW publications (www.dpi.nsw.gov.au): Winter Crop Variety Sowing Guide 2011 ; Weed Control in Winter Crops 2011 ;
  Insect & Mite Control in Field Crops 2009 ; Germination Testing & Seed Rate Calculation ; Windrowing Lupins
- Vic DPI "Winter Crop Summary 2011" (www.dpi.vic.gov.au).
- SARDI "Lupin variety sowing guide 2011" (www.sardi.gov.au)
- Pulse Australia (www.pulseaus.com.au).

This VMP has been jointly prepared by: Alan Meldrum, Trevor Bray and Wayne Hawthorne (Pulse Australia), Andrew Ware (SARDI) and Ian Pritchard (DAFWA). Past contributions from David Luckett (previously Lupin breeder, I&I NSW), Jim Egan (previously SARDI) and Ivan Mock (previously DPI Vic) are acknowledged.