Nugget

Red Lentil

VMP 2011 #04

KEY FEATURES of Nugget

- **Nugget is broadly adapted red lentil with high yield potential, but is better suited to medium to longer growing seasons.**
- **Nugget provides a medium risk for botrytis grey mould and ascochyta blight, both of which can be managed.**
- **Nugget has fair lodging resistance and is moderately resistant to shattering at harvest.**
- **Early sowing has proved beneficial in dry years**
- **Nugget is similar to other lentils in being susceptible to seed borne viruses Cucumber Mosaic Virus (CMV) and Alfalfa Mosaic Virus (AMV), so seed testing is recommended.**
- **Crop topping and desiccation is possible with Nugget, but do not do it too early.**

Where Nugget fits into the farming system:

Nugget has become the main-stream lentil variety in southern Australia, and provides a medium risk variety for botrytis grey mould and ascochyta blight for growers in traditional lentil areas. Newer varieties with different market types and agronomic attributes are becoming available, but Nugget will still be retained by some growers.

Variety Characteristics:

Breeding: Nugget was commercialised from an introduced line after pedigreed seed selection by the Coordinated Improvement Program for Australian Lentils (CIPAL) led by Dr Michael Materne (DPI Victoria), now part of Pulse Breeding Australia. It was selected for its improved resistance to botrytis grey mould and ascochyta blight, and its uniformity of its medium sized, grey seed. It was released after evaluations in Vic, SA, NSW and WA.

Agronomic Characteristics:

- Nugget is a medium to large-sized red lentil with a grey seed coat.
- It has resistance to grey mould and ascochyta blight similar to Boomer$^{\phi}$.
- It grows taller and more vigorously than most varieties other than Boomer$^{\phi}$, and can be prone to lodging, grain shattering and potentially botrytis grey mould when sown early in seasons that are favourable for growth.
- Nugget usually flowers at a similar time and matures slightly earlier than Boomer$^{\phi}$, but if sown early, can flower and mature later than Boomer$^{\phi}$, especially in warmer temperatures.
- It may be prone to shattering at maturity in strong winds if harvest is delayed.
- Nugget has similar intolerance to high soil salinity (NaCl), soil boron concentrations and sodicity compared to Digger, Boomer$^{\phi}$ and PBA Blitz. Newer varieties PBA Flash and PBA Jumbo have slightly better tolerances.

Agronomic features & disease resistance

Name	Ascochyta Blight		Botrytis Grey Mould	Vigour	Plant height	Lodging	Pod Drop	Shattering	Flowering Time	Boron	Salt	Maturity
	Foliage	Seed										
Aldinga	MR	MS	MS	Moderate	Medium	S	MR	MR	Mid	I	I	Mid
Boomer$^{\phi}$	MR	MS	MR	Good	Tall	MS	MR	MS	Mid	I	I	Late
Digger	MS	MS	MR	Moderate	Medium	MS	MR	MR	Mid	I	I	Mid/Late
Nipper$^{\phi}$	R	R	R	Poor/Mod	Short	MR	MR	MR	Mid/Late	I	MT	Mid
Northfield	R	R	S	Poor/Mod	Short	MS	MR	MR	Mid/Late	I	MI	Mid
Nugget	**MR**	**MS**	**MR***	**Moderate**	**Medium**	**MS/MR**	**MR**	**MR**	**Mid**	**I**	**I**	**Mid/Late**
PBA Bounty$^{\phi}$	MR	MR	MS	Moderate	Short/Med	MS	MR	MR	Mid/Late	I	MI	Mid
PBA Blitz$^{\phi}$	R	MR	MR	Mod/Good	Med/Tall	MR	MR	MR	Early/Mid	I	I	Early
PBA Flash$^{\phi}$	MS	MS	S	Moderate	Medium	MR	MR	MR	Mid	MI	MI	Early/Mid
PBA Jumbo$^{\phi}$	R	R	MS	Moderate	Medium	MS	MR	MR	Mid	MI	MI	Mid

Key: **S** = susceptible, **MS** = moderately susceptible, **MR** = moderately resistant, **R** = resistant, **I** = Intolerant, **MT** = moderately tolerant

Yield and adaptation

- Nugget has broad adaptation, similar to Boomer(Þ), and has been successfully grown in traditional lentil growing areas.
- It is well suited to medium rainfall lentil growing areas of SA, Victoria and southern NSW.
- Nugget yields similarly but generally lower than Boomer(Þ) in all regions of Australia, but similar to Nipper(Þ)
- Nugget has been higher yielding than Nipper(Þ) in drier, shorter season areas (Mallee, lower rainfall lentil growing regions of SA and in WA). Nugget and Boomer(Þ) are taller and earlier flowering than Nipper(Þ), so are more suited to low rainfall areas, late sowing dates and drought years in more favourable lentil areas.

National Variety Trials – NSW, SA Long Term Yields as % of Nugget: 2004-2010

	NSW		SA				
	South-east	South-west#	Lower EP	Mid North	Yorke P	South East	Mallee
Aldinga	- (-)	93 (5)	- (-)	- (-)	- (-)	- (-)	- (-)
Boomer(Þ)	102 (5)-	104 (3)	104 (7)	103 (20)	104 (24)	104 (7)	102 (3)-
Digger	97 (7)	95 (5)	96 (7)	- (-)	- (-)	95 (3)	- (-)
Nipper(Þ)	97 (7)	96 (3)	99 (9)	100 (22)	98 (26)	98 (7)	98 (3)
Northfield	88 (7)	91 (5)	90 (9)	91 (20)	91 (23)	91 (6)	- (-)
Nugget	100 (7)	100 (5)	100 (9)	100 (22)	100 (26)	100 (7)	100 (3)
PBA Blitz(Þ)	- (-)	- (-)	106 (5)	106 (13)	105 (17)	104 (4)	- (-)
PBA Bounty(Þ)	102 (7)-	- (-)	103 (7)	103 (22)	103 (26)	101 (7)	102 (3)
PBA Flash(Þ)	105 (7)	- (-)	108 (9)	108 (22)	106 (26)	107 (7)	109 (3)
PBA Jumbo(Þ)	108 (7)	- (-)	108 (6)	110 (16)	111 (20)	109 (4)	- (-)
Nugget yield (t/ha)	*0.98 (7)*	*0.86 (5)*	*1.29 (9)*	*1.99 (22)*	*2.27 (26)*	*1.93 (7)*	*1.47 (3)*

Numbers in ( ) = site years. * Yield data courtesy of National Variety Trials (NVT). # = 2000-2008
Data also courtesy of SARDI, DPI Vic, NSW DPI before 2005

National Variety Trials – Vic, WA Regional Long Term Yields as % of Nugget: 2004-2010

	Vic			WA
	Wimmera	Mallee	North-Central#	Agzone 4
Aldinga	- (-)	(-)	93 (3)	-
Boomer(Þ)	100 (20)	102 (12)	-	100 (3)1
Digger	95 (20)	96 (10)	95 (3)	96 (3)
Nipper(Þ)	96 (24)	96 (15)	-	92 (3)
Northfield	89 (22)	89 (13)	92 (3)	-
Nugget	**100 (24)**	**100 (15)**	**100 (3)**	**100 (3)**
PBA Blitz(Þ)	104 (16)	104 (9)	-	-
PBA Bounty(Þ)	102 (24)	103 (15)	-	104 (3)
PBA Flash(Þ)	104 (24)	103 (15)	-	108 (3)
PBA Jumbo(Þ)	106 (18)	108 (11)	-	-
Nugget yield (t/ha)	*1.18 (24)*	*1.41 (15)*	*1.36 (3)*	*0.69 (3)*

Numbers in ( ) = site years. Yield data courtesy of National Variety Trials (NVT). # = 2000-2007
Data also courtesy of SARDI, DPI Vic, NSW DPI before 2005

Quality Characteristics

- Nugget has a gret seed coat
- Grain size is considered to be the medium sized, red lentil standard, being larger and flatter than Northfield or Nipper(A), smaller than Aldinga, and similar to Digger and Cassab.
- Importing countries indicate that seed of Nugget is proven to be suitable for existing human-consumption markets for use as splits and whole seed (skin intact). Nugget is not generally used for footballs (dehulled, intact kernels).
- To meet current National Pulse Receival Standards, few lentil varieties can be co-mingled for delivery. Nugget grain should not be mixed with or contaminated by another lentil variety unless otherwise stated. Digger, Cassab and probably the new variety PBA Blitz are the only varieties that are marketed as a "Nugget type".
- Small red lentil varieties like PBA Bounty, Nipper and Northfield should not be mixed with Nugget.
- Larger seeded red lentil varieties like Aldinga and PBA Jumbo cannot be mixed with Nugget.
- Varieties like PBA Flash, Northfield and Aldinga that have a different seed coat colour cannot be mixed with Nugget.
- Green lentils must never be a contaminant of any red lentil.

Management Package

(Consult local grower guides for more detailed information)

This VMP updates and reinforces those management issues with Nugget lentils that may be different to other lentil varieties. Refer to existing guides for other general lentil management issues.

Maintain Purity of Seed Crops:

Do not let Nugget seed crops be contaminated with other lentil varieties that have different sizes and/or coloured seed coats or cotyledons. Ensure that there are no self-sown lentils in the crop, and avoid physical contamination through machinery, storage or handling facilities.

Seeding Rate: Target seeding rates to achieve standard plant densities of 120 plants/m^2 in Nugget, with adjustment for seed size and germination percentage. Do not reduce seeding rates to allow a more open canopy for crop-topping. Early canopy closure is critical for controlling herbicide resistant ryegrass.

Sowing Date: Target sowing date for Nugget is the same as for Northfield, Aldinga or Nipper(ф). Earlier may be desirable in lower rainfall/short growing season areas, but the risk of yield and quality losses from disease in early sown Nugget, Northfield or Boomer(ф) is greater than with Nipper(ф). Avoid sowing Nugget too late, particularly in lower rainfall/short season areas as plant height, harvestability and grain yield can be reduced.

Row Spacing: Recent commercial experience and DPI Vic trials have shown it is safe to widen lentil row spacing to 30 cm, provided that it is inter-row sown into standing stubble, otherwise lodging may be greater without the stubble trellising effect.

Herbicide Sensitivity:

Herbicide screening at Kalkee Vic (black cracking clay) and Minlaton SA (calcareous alkaline soils) shows that Nugget performs similar to Boomer(ф) and Nipper(ф) at label recommended rates of PSPE herbicides recommended in lentils. Broadstrike® POST is the most damaging herbicide treatment used on lentils in SA, but yield loss in Nugget appears similar to that in Boomer(ф) and Nipper(ф) when damage has occurred.

In SA, Nipper(ф) appears to have a lower safety margin than Nugget to metribuzin and other non-registered PSPE herbicides. Boomer(ф) may be less tolerant to Brodal Options® POST, but evaluation is continuing.

Virus Management:

- For viral diseases a threshold of <0.1% seed infection is recommended for sowing in high risk areas, and <0.5% seed infection for sowing in low risk areas. Use virus free seed where possible.
- The spread of virus can be managed by controlling summer weed hosts for virus, ensuring the crop covers the ground quickly (sow early and avoid low sowing rates), the early application of insecticide to control aphids, and monitoring and control of aphids during the season.
- Harvest parts of the crop that have no plants with virus symptoms for use as sowing seed in the following year.

Disease Management:

Management of disease in Nugget is similar to Boomer(ф). Control of botrytis grey mould and ascochyta blight on the seed remains critical as the seed needs to be marketed free of disease blemish.

<u>Ascochyta blight</u>

- High risk situations are when infected seed is sown, there is a close lentil rotation or sowing is too early and cold wet conditions prevail.
- Unlike in Nipper(ф), the risk of Ascochyta seed infection increases with sowing earlier than normal.
- Seed treatment and preventative fungicide treatments from the start of podding may be required in higher risk situations if ascochyta blight is identified in the crop at flowering.

<u>Botrytis Grey Mould</u>

- Botrytis grey mould is most severe in seasons when rainfall occurs in spring and crops are bulky and lodged.
- Nugget can lodge more than Nipper(ф) but less than Boomer(ф) when crop growth is good, thus effective early botrytis grey mould control is imperative in moderate or high risk situations, including early sowing.
- In high risk situations, delay sowing, use wider row spacing to delay canopy closure, and consider an application of a recommended fungicide before canopy closure to protect against botrytis grey mould. Additional botrytis grey mould control or protection may be required in high rainfall and or long growing season environments, and further monitoring will be required.
- A recommended fungicide seed dressing is beneficial for controlling seedling root rots, ascochyta blight and botrytis grey mould to ensure good plant establishment.

Rolling: Nugget paddocks need to be rolled post sowing to enhance harvest efficiency, or avoid contamination with dirt, stones etc, particularly in areas or seasons where pod height is low or lodging occurs. Beware of rolling after emergence if the crop is brittle from frosts and cold conditions.

Crop topping: Nugget matures early enough to be crop-topped to prevent weed seed set, particularly ryegrass. It can on occasions become too tall for weed-wiping of ryegrass seed heads emerged above the canopy. Avoid all chemical withholding periods.

Windrowing: Windrowing has occasionally been successful with Nugget, but they must be bulky windrows that are rolled immediately after swathing.

Desiccation and Harvest:

Timely harvest is very important in all lentil varieties to prevent losses from pod drop and maximise seed quality.

Desiccation may assist with timely harvest but timing is critical to avoid producing immature seeds. See management guides, eg "Meeting lentil quality demanded by markets" www.pulseaus.com.au.

Marketing:

An End Point Royalty of $5.50 per tonne (GST inclusive) applies to Nugget. It must be delivered to nominated receivers, but this is most of the major lentil marketers anyway.

Seed Availability and PBR:

Nugget is not protected by Plant Breeders Rights, but seed sales agreements prevent any unauthorised commercial propagation or any sale, conditioning, export, import or stocking of propagating material of this variety. Growers are allowed to retain seed from production of this variety for their own use as seed.

Nugget

Seed Supply enquiries: seedmark **Phone 1800 112 400**

Agronomic Enquiries: Contact:

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Other Reading: For red lentil management guidelines, see:

- Grain Legume Handbook 2008
- Pulse Australia publications: "Meeting lentil quality demanded by markets", "Lentil disease management strategy for southern region GRDC" and supplements, and "Pulse seed treatments and foliar fungicides" (www.pulseaus.com.au)
- SARDI fact sheet "Lentil variety sowing guide 2011" www.sardi.sa.gov.au/pdfserve/fieldcrops/research_info/sowing_guide/lentilfs.pdf
- NSW DPI publications (www.agric.nsw.gov.au): "Winter Crop Variety Sowing Guide 2011" ; Pulse Point 20 "Germination testing and seed rate calculation"; "Weed Control in Winter Crops 2011"; "Insect and Mite Control in Winter Crops";
- Vic DPI "Winter Crop Summary 2011" and fact sheets (www.dpi.vic.gov.au).

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