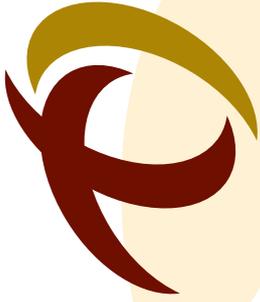


PBA Greenfield[®]

Medium green lentil



PBA

PULSE BREEDING AUSTRALIA

Better pulse varieties faster

High yielding disease resistant medium green lentil



KEY FEATURES

- Highest yielding green lentil variety available in Australia (average yield 11-14% higher than the red lentil variety, Nugget)
- Broadly adapted variety, well suited to medium-rainfall lentil growing regions
- Good early vigour, similar to PBA Ace[®] and Boomer[®]
- Moderately resistant to ascochyta blight and botrytis grey mould
- Improved tolerance to soil salinity, similar to PBA Flash[®] and PBA Bolt[®]
- Well suited to the removal of small broadleaf weed seeds from the harvested sample
- A uniform medium seed size green lentil, with grain weight of 5.0-5.5 g/100 seeds
- Export market development opportunity

MAIN ADVANTAGES

PBA Greenfield[®] is a medium-sized green lentil and is now the highest yielding green lentil variety available in Australia. Its yield is comparable with recent high yielding red lentil varieties.

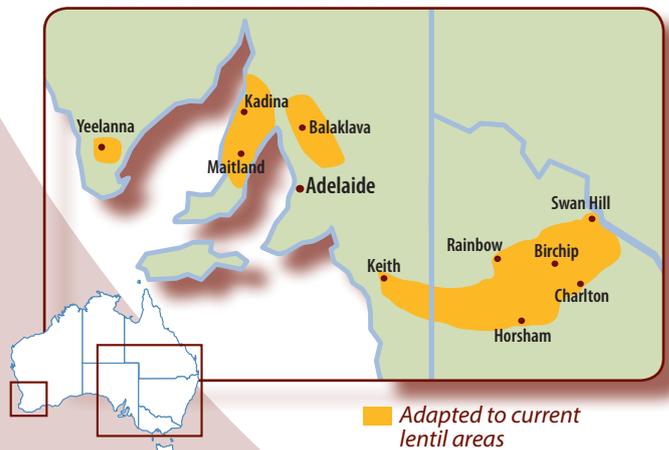
This variety represents a new market opportunity for Australian growers, with potential for development of export markets. On-farm storage will be important for growers of this variety while production and competitive market positions for Australian medium green lentils are established.

SEED PROTECTION & ROYALTIES

PBA Greenfield[®] is protected under Plant Breeder's Rights (PBR) legislation. A PBR bag licence and licence fee applies to the seed. Authorised growers can retain seed from production of PBA Greenfield[®] for their own seed use but not sell seed to other growers.

An End Point Royalty (EPR) of \$5.50/t (incl. GST) applies to this variety when delivered to authorised EPR collectors. Seed is commercialised through PBSeeds and available from 2014.

AREA OF ADAPTATION



another lentil upgrade

YIELD & ADAPTATION

PBA Greenfield[®] has a long term average yield advantage over Nugget and Boomer[®] of around 10%. Its average yield surpasses that of red lentil varieties PBA Blitz[®], PBA Hurricane XT[®] and PBA Jumbo[®].

PBA Greenfield[®] is well suited to medium rainfall lentil growing areas of Victoria, SA, southern NSW and areas of

WA and will perform reliably in a range of environments. The visual appearance of green lentil grain is critical for marketing so viruses, diseases and insect pests will need to be managed vigilantly to ensure high quality grain to market.

2007-2013 LONG-TERM YIELD OF LENTIL VARIETIES (# Yields expressed as a percentage of Nugget)

	South Australia					Victoria		New South Wales		Western Australia	
	Yorke P	Mid North	Lower Ep	Murray Mallee	South East	Wimmera	Mallee	South East	South West	Agzone 1	Agzone 2
Mean Region Yield (t/ha)	2.78	2.28	1.40	1.22	1.59	1.51	1.13	1.15	1.31	1.30	1.31
Green lentils											
PBA Greenfield[®]	111	111		114*	113*	112	114	116*	110*	111*	98*
PBA Giant [®]	98*	103*				106*	112*	112*	103*	101*	101*
Boomer [®]	102	102	101	97	103	102	102	102	102	101	90
Small red											
PBA Bounty [®]	102	102	105	105	92	99	103	109	101	109	98
PBA Herald XT [®]	90	92	92	102	98	96	93	89	91	90	121
PBA Hurricane XT [®]	105	107	107*	119	114	110	111	111	104	106	114
Nipper [®]	97	96	100	94	96	95	87	85	90	92	101
Northfield	88	92	90	91	95	93	92	88	89		
Medium red											
PBA Ace [®]	107	111	105	123	119	116	124	124	115	112	114
PBA Blitz [®]	106	106	115	112	99	102	96	101	93	106	100
PBA Bolt [®]	101	109	108	126	120	114	119	119	101	104	109
PBA Flash [®]	105	109	114	116	114	109	103	105	94	102	98
Nugget	100	100	100	100	100	100	100	100	100	100	100
Large red											
PBA Jumbo [®]	110	108	112	107	103	105	102	106	103	109	93
PBA Jumbo2 [®]	119	117	118*	129*	117*	118	121	126*	117*	122*	111*
Aldinga	96	98	99	100	95	97	101	102	97		

#Data courtesy of NVT, PBA, SARDI, DEPI Victoria, NSW-DPI. Includes up to seven years of data, where available. *Note, these average yields based on <3 years of data

AGRONOMIC AND DISEASE TRAITS OF LENTIL VARIETIES

	Vigour	Flowering time	Maturity	Lodging resistance	Pod drop	Shattering	Ascochyta blight (Foliar)	Botrytis Grey Mould	Boron	Salt
Green lentils										
PBA Greenfield[®]	Good	Mid	Mid/Late	MS	R	MR	MR	MR	I	MI
PBA Giant [®]	Good	Mid	Mid/Late	MS	R	MR/MS	MR	MS	MI	I
Boomer [®]	Good	Mid	Mid/Late	S	R	S	MR	MR/MS	MI	I
Small red										
PBA Bounty [®]	Mod	Mid/Late	Mid	S	R	R	MR/MS	MS	I	MI
PBA Herald XT [®]	Mod/Poor	Mid/Late	Mid/Late	MR/MS	MR	MR	R	R	I	I
PBA Hurricane XT [®]	Mod	Mid	Mid	MR	MR	R	MR	MR/MS	I	I
Nipper [®]	Mod/Poor	Mid/Late	Mid	MR	MR	MR	MR/MS	R	I	MT
Northfield	Mod/Poor	Mid	Mid	MR/MS	MR/MS	MR	MR	S	I	I
Medium red										
PBA Ace [®]	Good	Mid	Mid	MR/MS	R	MR/MS	R	MR/MS	I	I
PBA Blitz [®]	Mod/Good	Early	Early	MR	MR	MR	MR	MR	I	I
PBA Bolt [®]	Mod/Good	Early/Mid	Early/Mid	R	R	R	MR	S	MI	MI
PBA Flash [®]	Mod	Early/Mid	Early/Mid	MR	MR	MR	MS	MR/MS	MI	MI
Nugget	Mod	Mid	Mid/Late	MS	R	R	MR/MS	MR/MS	I	I
Large red										
PBA Jumbo [®]	Mod	Mid	Mid	MS	MR	MR	MR/MS	MS	MI	I
PBA Jumbo2 [®]	Mod/Good	Mid	Mid	MR/MS	MR	R	R	R	MI	I
Aldinga	Mod	Mid	Mid	S	R	MR/MS	MR/MS	MS	I	MI

Key: Mod=moderate, S=susceptible, MS=moderately susceptible, MR=moderately resistant, R=resistant, I=intolerant, MI=moderately intolerant, MT=moderately tolerant.

DISEASE MANAGEMENT

PBA Greenfield[®] has shown good resistance to the two major diseases of lentil (ascochyta blight and botrytis grey mould). This could mean that fungicides may not be necessary in low-medium rainfall areas (i.e. southern Mallee of Victoria).

A fungicide seed dressing is beneficial for the early control of seedling root rots and BGM.

Ascochyta blight (AB)

- PBA Greenfield[®] is rated as moderately resistant (MR) to foliar AB. Foliar resistance is similar to PBA Blitz[®], while being significantly better than PBA Flash[®], Nipper[®] and PBA Jumbo[®]. Its seed resistance is still to be validated. As the visual appearance of the grain is critical for marketing green lentils, disease prevention strategies may still be required.
- Crops should be monitored in severe disease risk environments and if disease symptoms are detected, fungicide should be applied from the start of podding, prior to subsequent rainfall events.

Botrytis Grey Mould (BGM)

- PBA Greenfield[®] is rated moderately resistant (MR) to BGM which will assist in the management of this disease.
- In BGM prone areas, monitor crop growth and apply a preventative foliar fungicide just prior to canopy closure. Further monitoring and sprays may be required in areas with long growing seasons and when plant growth is high and/or prolonged wet spring conditions occur.

VIRUS MANAGEMENT

Virus management is important to avoid grain blemishes, infected seed and yellow stunted plants.

- 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. Avoid keeping sowing seed from areas of the crop containing plants with virus symptoms.
- 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.

AGRONOMY

Agronomic characteristics

Paddock selection and basic requirements for growing PBA Greenfield[®] are similar to other lentil varieties, including the control of insect pests, lucerne seed web moth (*Etiella*) and native budworm (*Helicoverpa*) for high quality grain.

PBA Greenfield[®] has the following specific characteristics:

- Mid-flowering and mid-late maturing.

- PBA Greenfield[®] has good early vigour which may improve weed competition compared to older varieties of lentils.
- PBA Greenfield[®] is rated moderately susceptible (MS) to lodging. Under conditions of high plant biomass (i.e. Yorke Peninsula, South Australia and Wimmera, Vic), crops can lodge at maturity.
- Moderately intolerant to salinity (NaCl), similar to PBA Bolt[®], PBA Flash[®] and Aldinga.

Sowing

- PBA Greenfield[®] is suitable for sowing times similar to PBA Flash[®], Boomer[®] and Nugget.
- Target plant densities of 120 plants/m² adjusting sowing rates to the seed size of this variety and germination percentage of seed used each year.

Herbicide tolerance

- PBA Greenfield[®] has not shown sensitivity to any registered herbicides different to label advice and applied according to label directions.

Crop topping and harvest

- As a mid to late maturing variety, PBA Greenfield[®] matures at a similar time to Nugget and Boomer[®].
- Visual seed quality is critical in green lentils, so correct timing for crop topping, timely harvest and optimum machine setup is important to optimise seed quality. Timely harvest is particularly important for the maintenance of a fresh green coloured seed coat for market appeal.
- PBA Greenfield[®] is rated MR to seed shattering at maturity. It is significantly better than Boomer[®] for this characteristic. Shattering should not be a problem if timely harvest is observed.
- Due to its large seed size, PBA Greenfield[®] is well suited to screening for the removal of small broadleaf weed seeds from the harvested sample.

QUALITY

Seed characteristics

PBA Greenfield[®] is a medium-sized classed green lentil (yellow cotyledon with a green seed coat). Seed size is 30% larger than a medium-sized red lentil such as Nugget (as measured by 100 seed weight), but smaller in size than the large green market class varieties, Boomer[®] and PBA Giant[®]. Seed size of any lentil variety may vary between seasons and locations.



PBA Giant[®]



PBA Greenfield[®]



Boomer[®]

PBA Greenfield[Ⓛ]

Medium green lentil



Better pulse varieties faster

PBA is an unincorporated joint venture between the GRDC, University of Adelaide, SARDI, DEPI Victoria, I&I NSW, DEEDI, DAFWA and Pulse Australia. It aims to deliver better pulse varieties faster.

FOR MORE INFORMATION

Pulse Breeding Australia

www.grdc.com.au/pba

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At PBSeeds we are leaders in the production of fine quality seed and grains. We take great care and pride in ensuring we match our customer's requirements. PBSeeds is proud to partner with PBA and invests in the improvement of Australian lentil varieties.

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Quality assurance

Seed purity is very important in lentils with a restriction of 1% for varieties not of the same type. Prevent seed contamination when changing varieties, particularly where cotyledon or seed coat colour differs. Be particularly careful to avoid contamination of PBA Greenfield[Ⓛ] with red lentils, as the red seeds will contaminate the product appearance and reduce its value.

Variety	Market category	Seed shape	Seed coat colour	Cotyledon colour	Seed size (%) relative to Nugget
Green lentils					
PBA Greenfield [Ⓛ]	MG	Lens	Green	Yellow	130%
PBA Giant [Ⓛ]	LG	Lens	Green	Yellow	170%
Boomer [Ⓛ]	LG	Lens	Green	Yellow	150%
Small red					
PBA Bounty [Ⓛ]	SRP	Round	Grey	Red	85%
PBA Herald XT [Ⓛ]	SRS	Lens	Grey	Red	75%
PBA Hurricane XT [Ⓛ]	SRP	Round	Grey	Red	85%
Nipper [Ⓛ]	SRP	Round	Grey	Red	75-80%
Northfield	SRP	Round	Tan	Red	80%
Medium red					
PBA Ace [Ⓛ]	MRS	Lens	Grey	Red	100%
PBA Blitz [Ⓛ]	MRS	Lens	Grey	Red	115-120%
PBA Bolt [Ⓛ]	MRS	Lens	Grey	Red	100%
PBA Flash [Ⓛ]	MRS	Lens	Green	Red	100-110%
Nugget	MRS	Lens	Grey	Red	100%
Large red					
PBA Jumbo [Ⓛ]	LRS	Lens	Grey	Red	120%
PBA Jumbo2 [Ⓛ]	LRS	Lens	Grey	Red	120%
Aldinga	LRS	Lens	Green	Red	120%

Key: SRS=small red (split), SRP=small red (premium round), MRS=medium red (split), MRD=medium red (dual purpose), LRS=large red (split), LG=large green, MG=Medium green

MARKETING

- PBA Greenfield[Ⓛ] fits into the human food market for medium-sized green lentil, potentially to be consumed whole or split.
- PBA Greenfield[Ⓛ] is expected to fit into the Canadian origin "Richlea" market class but will take some market development work to establish its competitive position
- It should be segregated for marketing unless otherwise stated. As this is an emerging market class for Australian growers, on farm storage prior to marketing is likely to be necessary.
- PBA Greenfield[Ⓛ] will be open marketed with an End Point Royalty (EPR) of \$5.50/t (incl. GST), applied upon delivery.

BREEDING

PBA Greenfield[Ⓛ] (evaluated as CIPAL1104) was developed by conventional plant breeding techniques, selected from a cross of the variety PBA Flash[Ⓛ] with Boomer[Ⓛ] and the breeding line CIPAL205.

PBA Greenfield[Ⓛ] is part of a pipeline of varieties that will be released by PBA. PBA formed a commercial partnership with PBSeeds to multiply, manage and release PBA lentil varieties. PBSeeds and PBA are delivering varieties to growers 2-4 years earlier by fast tracking the identification, multiplication and release of new varieties. The Southern Pulse Agronomy program has been integral to this process.