

PBA Bolt[®]

Medium red lentil



PBA

PULSE BREEDING AUSTRALIA

Better pulse varieties faster

Erect, early maturing red lentil



MAIN ADVANTAGES

PBA Bolt[®] is an erect, early maturing red lentil with medium sized grey seed. PBA Bolt[®] is suited to similar areas to PBA Flash[®] where early maturity, salinity tolerance and erect growth are keys to reliable and profitable production.

PBA Bolt[®] has improved ascochyta blight resistance and higher yield in dry areas or years compared to PBA Flash[®]. It is therefore better adapted to the southern Mallee, particularly where ascochyta blight needs to be controlled in PBA Flash[®].

PBA Bolt[®] is moderately susceptible to Botrytis grey mould and therefore the mid maturing varieties PBA Ace[®], Nipper and PBA Herald XT[®] and the early maturing variety PBA Blitz[®] are more reliable in favourable rainfall areas of the Wimmera, Yorke Peninsula and Mid North.

SEED PROTECTION & ROYALTIES

PBA Bolt[®] is protected under Plant Breeder's Rights (PBR) legislation. A PBR bag licence applies to the seed.

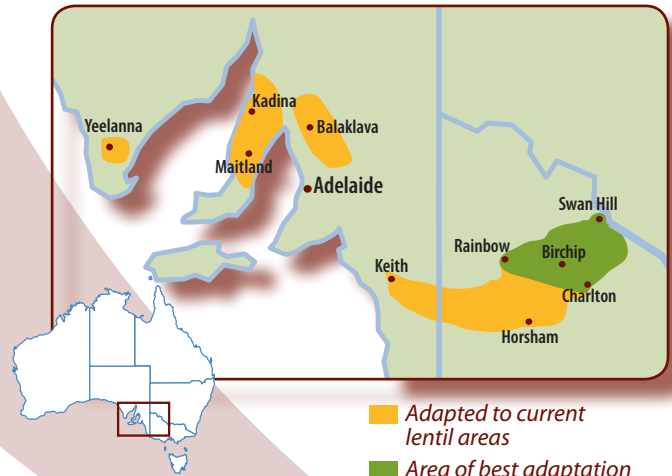
Authorised growers can retain seed from their own production of PBA Bolt[®] for their own seed use.

An End Point Royalty (EPR) of \$5.50/t (including GST) applies to this variety when delivered to authorised EPR collectors. Seed is commercialised by PBSeeds and available from 2013.

KEY FEATURES

- Early maturing red lentil
- Erect plant with the best lodging resistance of all current varieties
- Highest yield of current varieties under drought conditions
- Moderately resistant to foliar and resistant to seed ascochyta blight (AB)
- Moderately susceptible to botrytis grey mould (BGM)
- Plant type, flowering, salt and boron tolerance similar to PBA Flash[®]
- Good replacement for PBA Flash[®] in Mallee and northern Wimmera regions
- PBA Blitz[®] is a better early maturing option where crop-topping is important.
- Adaptation best in cool lower rainfall areas such as the Mallee, northern Wimmera of Victoria and Upper Mid North of SA
- Medium sized red lentil (similar to Nugget and PBA Ace[®]) with a grey seed coat and high milling quality

AREA OF ADAPTATION



■ Adapted to current lentil areas

■ Area of best adaptation



pbseeds
where every seed counts

another lentil upgrade

YIELD & ADAPTATION

PBA Bolt[®] has been the highest yielding early maturing variety in Victoria, WA and NSW and similar in yield to PBA Flash[®] in South Australia.

Its yield advantage occurs in drought years and dry areas when its erect growth habit also makes it easy to harvest. PBA Bolt[®] is lower yielding than PBA Ace[®] but will have an advantage in lower rainfall environments due to its improved

harvestability, salt and boron tolerance.

PBA Bolt[®] has better ascochyta blight resistance than PBA Flash[®] making it a better option where this disease can reduce yield and quality in PBA Flash[®].

PBA Bolt[®] also has a MS rating for BGM and therefore more resistant varieties should be grown in high yielding disease prone areas.

2004-2011 LONG-TERM YIELD OF LENTIL VARIETIES (* Yields expressed as a % of Nugget's yield)

| | South Australia | | | | Victoria | | New South Wales | | Western Australia | |
|-----------------------------|-----------------|------------|------------|------------|------------|------------|-----------------|------------|-------------------|------------|
| | Yorke P | Mid North | Lower EP | South East | Wimmera | Mallee | South East | South West | Zone 1 | Zone 4 |
| Small red | | | | | | | | | | |
| PBA Bounty [®] | 103 | 103 | 104 | 99 | 101 | 102 | 98 | 104 | 102 | 102 |
| PBA Herald XT [®] | 98 | 99 | 97 | 98 | 99 | 98 | 94 | 99 | 92 | 91 |
| Nipper [®] | 100 | 102 | 101 | 102 | 96 | 94 | 93 | 98 | 94 | 89 |
| Northfield | 94 | 93 | 89 | 92 | 90 | 88 | 86 | 91 | - | 85 |
| Medium red | | | | | | | | | | |
| PBA Ace [®] | 110 | 112 | 114 | 117 | 112 | 114 | 118 | 113 | 112 | 114 |
| PBA Blitz [®] | 105 | 107 | 109 | 106 | 102 | 102 | 105 | 103 | 104 | 104 |
| PBA Bolt[®] | 105 | 107 | 109 | 113 | 111 | 111 | 112 | 107 | 106 | 109 |
| PBA Flash [®] | 106 | 109 | 110 | 114 | 101 | 100 | 99 | 104 | 101 | 103 |
| Nugget | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Large red | | | | | | | | | | |
| PBA Jumbo [®] | 108 | 107 | 108 | 108 | 102 | 102 | 104 | 104 | 103 | 102 |
| Aldinga | 98 | 98 | 93 | 97 | 92 | 92 | 95 | 96 | - | 95 |
| Large green | | | | | | | | | | |
| Boomer [®] | 104 | 104 | 105 | 108 | 99 | 99 | 103 | 105 | 100 | 98 |

Data courtesy of NVT, PBA, SARDI, DPI Victoria, NSW-DPI

AGRONOMIC AND DISEASE TRAITS OF LENTIL VARIETIES

| | Vigour | Flower time | Maturity | Lodging resistance | Pod drop | Shattering | Ascochyta blight | | Botrytis grey mould | Boron | Salt |
|-----------------------------|-----------------|------------------|------------------|--------------------|----------|------------|------------------|----------|---------------------|-----------|-----------|
| | | | | | | | Foliage | Seed | | | |
| Small red | | | | | | | | | | | |
| PBA Bounty [®] | Mod | Mid/Late | Mid | S | R | R | MR | MR | MS | I | MI |
| PBA Herald XT [®] | Mod | Mid/Late | Mid/Late | MR | MR | R | R | R | MR | I | I |
| Nipper [®] | Poor/Mod | Mid/Late | Mid | MR | MR | MR | MR | R | R | I | MT |
| Northfield | Poor/Mod | Mid | Mid | MR | MR | MR | MR | R | S | I | I |
| Medium red | | | | | | | | | | | |
| PBA Ace [®] | Good | Mid | Mid | MS/MR | R | MS/MR | R | R | MR | I | I |
| PBA Blitz [®] | Mod/Good | Early | Early | MS | MR | MR | MR | MR | R | I | I |
| PBA Bolt[®] | Mod/Good | Early/Mid | Early/Mid | R | R | R | MR | R | MS | MI | MI |
| PBA Flash [®] | Mod | Early/Mid | Early/Mid | MR | MR | MR | MS | MR | MS | MI | MI |
| Nugget | Mod | Mid | Mid/Late | MS | MR | R | MS/MR | MS | MS/MR | I | I |
| Large red | | | | | | | | | | | |
| PBA Jumbo [®] | Mod | Mid | Mid | S | MR | MR | MR | R | MS | MI | I |
| Aldinga | Mod | Mid | Mid | S | R | MR | MR | MS | MS | I | MI |
| Large green | | | | | | | | | | | |
| Boomer [®] | Good | Mid | Mid/Late | S | MR | MS | MR | MS | MR | I | I |

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

DISEASE MANAGEMENT

PBA Bolt[®] is targeted towards lower rainfall areas where Botrytis grey mould is generally low except if sown early on good soil in a year where crop growth is large. However, it should be monitored for Botrytis grey mould prior to canopy closure to enable the timely application of a preventative fungicide if required.

PBA Bolt's[®] high level of resistance to ascochyta blight makes the need to control this disease low in the areas where PBA Bolt[®] is targeted. This is a significant advantage in risk and cost compared to PBA Flash[®].

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

Botrytis grey mould (BGM)

- PBA Bolt[®] is rated moderately susceptible to BGM which makes management critical in the major lentil growing areas on the Yorke Peninsula, Mid North and Wimmera.
- In BGM prone areas monitor crop growth and apply a preventative fungicide just prior to canopy closure. Further monitoring and sprays may be required when prolonged wet spring conditions occur and in areas with long growing seasons.

Ascochyta blight (AB)

- AB ratings have been updated in the last two years based on the higher levels of infection being observed on PBA Flash[®], Nugget, Northfield and older varieties.
- PBA Bolt[®] is rated as moderately resistant to foliar and resistant to seed infection by AB. Foliar resistance is similar to Nipper[®], Northfield, PBA Blitz[®] and PBA Jumbo[®].
- Crops should be monitored in severe disease risk environments and a fungicide applied at the start of podding in front of rainfall events if disease symptoms are detected.

AGRONOMY

Agronomic characteristics

- Paddock selection and basic requirements for growing PBA Bolt[®] are similar to other lentil varieties. PBA Bolt[®] has the following characteristics:
- Early-mid flowering and maturing similar to PBA Flash[®]. Stems of PBA Bolt[®] may remain green longer than PBA Flash[®] in some years. Plant height and height of pods is excellent in dry years and sites where it is most critical for efficient harvesting, and better than all other varieties.
- Resistant to lodging and has the best combination of pod drop and shattering resistance among all varieties.
- Tolerance to salinity (NaCl) is similar to PBA Bounty[®] and PBA Flash[®], lower than Nipper[®] but higher than all other varieties. PBA Bolt[®], PBA Flash[®] and PBA Jumbo[®] have moderately improved tolerance to boron over all other varieties.

Sowing

- PBA Bolt[®] is suitable for early sowing in lower rainfall areas to maximise grain yield at low risk of AB disease. It is also suitable for later sowing if necessary.
- 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

- The tolerance of PBA Bolt[®] to label recommended rates of registered herbicides is similar to Nugget.
- PBA Bolt[®] is not an 'XT' variety, so will be sensitive to imazethapyr. PBA Herald XT[®] is the only current variety tolerant to applied imazethapyr at label rates and with improved tolerance to flumetsulam and residual levels of sulfonylurea and imidazoline herbicides.

Crop topping and harvest

- PBA Bolt[®] matures at a similar time to PBA Flash[®] but stems may remain greener in some years. Timing should be based on the seed pod and not the colour of the stems.
- As with all lentils correct timing for crop topping, timely harvest and optimum machine setup will optimise yield and seed quality.

QUALITY

Seed characteristics

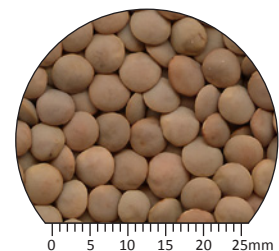
PBA Bolt[®] is a medium-sized lens-shaped red lentil with a grey seed coat. Seed size, as measured by 100 seed weight, is generally similar to Nugget and PBA Ace[®] but smaller than PBA Blitz[®]. In laboratory testing it has similar milling characteristics to other current medium size lentil varieties.



PBA Bolt[®]



Nugget



PBA Ace[®]

PBA Bolt[®]

Medium red lentil



Better pulse varieties faster

PBA is an unincorporated joint venture between the GRDC, University of Adelaide, University of Sydney, SARDI, DPI Victoria, NSW-DPI, DAFF QLD, DAFWA and Pulse Australia. It aims to deliver better pulse varieties faster.

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 Bolt[®] with green lentils such as Boomer[®] as when split the yellow seeds will contaminate and reduce the value of the red lentil split product.

For the purpose of seed cleaning PBA Bolt[®] has a seed size similar to Nugget.

| Variety | Market category | Seed shape | Seed coat colour | Cotyledon colour | Seed size relative to Nugget |
|-----------------------------|-----------------|-------------|------------------|------------------|------------------------------|
| Small red | | | | | |
| PBA Bounty [®] | SRP | Round | Grey | Red | 10% < |
| PBA Herald XT [®] | SRS | Lens | Grey | Red | 20% < |
| Nipper [®] | SRP | Round | Grey | Red | 20% < |
| Northfield | SRP | Round | Tan | Red | 20% < |
| Medium red | | | | | |
| PBA Ace [®] | MRS | Lens | Grey | Red | equal |
| PBA Blitz [®] | MRS | Lens | Grey | Red | 15-20% > |
| PBA Bolt[®] | MRS | Lens | Grey | Red | equal |
| PBA Flash [®] | MRS | Lens | Green | Red | 0-10% > |
| Nugget | MRS | Lens | Grey | Red | - |
| Large red | | | | | |
| PBA Jumbo [®] | LRS | Lens | Grey | Red | 20% > |
| Aldinga | LRS | Lens | Green | Red | 20% > |
| Large green | | | | | |
| Boomer [®] | LG | Lens | Green | Yellow | 50% > |

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, < = seed size less than Nugget, > = seed size greater than Nugget

MARKETING

- PBA Bolt[®] fits into the human food market for medium sized red lentil, particularly to be consumed whole or split. The ascochyta blight resistance of this variety will assist in achieving high grain quality from receipt point to market.
- PBA Bolt[®] should be segregated for marketing unless otherwise stated.
- PBA Bolt[®] will be open marketed with an End Point Royalty, including breeders royalties, of \$5.50/t (including GST) applied upon delivery.

BREEDING

PBA Bolt[®] (evaluated as CIPAL0801) was developed by PBA Lentils, led by DPI Victoria. It was produced by conventional plant breeding techniques from a cross between ILL7685, an erect breeding line from ICARDA, Syria, and 96-047L*99R060, an erect disease resistant PBA breeding line. It is not a genetically modified organism (non-GMO).

PBA Bolt[®] 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, generation of information and release of new varieties.

The Southern Pulse Agronomy program has been integral to the process.

FOR MORE INFORMATION

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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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