PBA Hallmark XT<sup>(H)</sup>
Medium red lentil

High yielding herbicide tolerant lentil

KEY FEATURES
- Highest yielding herbicide tolerant lentil; 5-12% long term yield advantage over PBA Hurricane XT<sup>(H)</sup>
- PBA Hallmark XT<sup>(H)</sup> and PBA Hurricane XT<sup>(H)</sup> have similar herbicide tolerance
  - Tolerant to applied imazethapyr at label rates*
  - Improved tolerance to applied flumetsulam*
  - Improved tolerance to residual levels of sulfonylurea and imidazolinone herbicide*
  * note that permits, product label rates, plant back periods and all label directions for use must be adhered to
- High early vigour
- Mid flowering
- Mid maturity (maturity slightly later than PBA Hurricane XT<sup>(H)</sup>)
- High resistance to botrytis grey mould (R/MR)
- Moderate resistance to ascochyta blight

MAIN ADVANTAGES
PBA Hallmark XT<sup>(H)</sup> builds on the success of the other herbicide tolerant red lentils, PBA Herald XT<sup>(H)</sup> and PBA Hurricane XT<sup>(H)</sup>. It incorporates the same improved tolerance to some Group B herbicides, but with higher grain yields than PBA Hurricane XT<sup>(H)</sup> and improved agronomic characteristics. PBA Hallmark XT<sup>(H)</sup> has greater early vigour, similar ratings to ascochyta blight and improved ratings to BGM when compared to PBA Hurricane XT<sup>(H)</sup>. These features, combined with its herbicide tolerance, will make PBA Hallmark XT<sup>(H)</sup> a preferred variety in many cropping regions.

PBA Hallmark XT<sup>(H)</sup> is the process of APVMA permit and registration for imazethapyr use*.

PBA Hallmark XT<sup>(H)</sup> is a medium red lentil so this variety can provide an alternative market class option to the popular small red lentil PBA Hurricane XT<sup>(H)</sup>.

SEED PROTECTION & ROYALTIES
PBA Hallmark XT<sup>(H)</sup> is protected under Plant Breeder’s Rights (PBR) legislation. A PBR bag licence applies to the seed. Authorised growers can retain seed from production of PBA Hallmark XT<sup>(H)</sup> for their own seed use. An End Point Royalty (EPR) of $3.94/t (including GST) applies to this variety when delivered to authorised EPR collectors, which includes breeder royalties and also the $0.44/t (including GST) herbicide technology royalty to Agriculture Victoria Services Pty Ltd. Seed is commercialised by PBSeeds and available from 2019.

AREA OF ADAPTATION

*Figures embedded*
**YIELD & ADAPTATION**

PBA Hallmark XT® is the highest yielding herbicide tolerant red lentil variety across Australia. It is broadly adapted, with 5-6% higher yields than PBA Hurricane XT® across the main lentil production regions in Victoria and South Australia. Where the improved herbicide tolerance of PBA Hallmark XT® is not an advantage, its yield is competitive against the medium sized PBA Ace® lentil though not against PBA Bolt® in mallee environments where earlier maturity is preferable. PBA Hallmark XT® has similar flowering to PBA Hurricane XT® with slightly later maturity.

PBA Jumbo2® is still the highest yielding lentil in most regions where the herbicide tolerance of PBA Hallmark XT® is not an advantage.

The moderate level of ascochyta blight resistance in PBA Hallmark XT® will support production in medium to higher rainfall lentil growing regions. Furthermore, it has been rated as resistant to moderately resistant to botrytis grey mould, a distinct improvement over PBA Hurricane XT®. This will support its management in favourable seasons.

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**2013-2017 LONG-TERM YIELD OF LENTIL VARIETIES (Yields expressed as a % of Hurricane XT® yield)**

<table>
<thead>
<tr>
<th>South Australia</th>
<th>Victoria</th>
<th>New South Wales</th>
<th>Western Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site mean yield (t/ha)</td>
<td>Yorke P</td>
<td>Mid North</td>
<td>Lower EP</td>
</tr>
<tr>
<td>Small Red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBA Hurricane XT®</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>PBA Herald XT®</td>
<td>86</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>PBA Bounty®</td>
<td>108</td>
<td>104</td>
<td>109</td>
</tr>
<tr>
<td>Nipper®</td>
<td>96</td>
<td>89</td>
<td>95</td>
</tr>
<tr>
<td>Northfield</td>
<td>88</td>
<td>88</td>
<td>85</td>
</tr>
<tr>
<td>Medium Red</td>
<td>PBA Hallmark XT®</td>
<td>105</td>
<td>106</td>
</tr>
<tr>
<td>PBA Ace®</td>
<td>105</td>
<td>107</td>
<td>99</td>
</tr>
<tr>
<td>PBA Blitz®</td>
<td>112</td>
<td>106</td>
<td>91</td>
</tr>
<tr>
<td>PBA Bolt®</td>
<td>101</td>
<td>103</td>
<td>100</td>
</tr>
<tr>
<td>PBA Flash®</td>
<td>107</td>
<td>105</td>
<td>106</td>
</tr>
<tr>
<td>Nipper®</td>
<td>98</td>
<td>96</td>
<td>100</td>
</tr>
<tr>
<td>Large Red</td>
<td>PBA Jumbo2®</td>
<td>120</td>
<td>117</td>
</tr>
<tr>
<td>PBA Jumbo®</td>
<td>108</td>
<td>103</td>
<td>97</td>
</tr>
<tr>
<td>Aldinga</td>
<td>97</td>
<td>95</td>
<td>92</td>
</tr>
</tbody>
</table>

*Data courtesy of NVT, PBA, SARDI, DEPI Victoria, NSW-DPI.*

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**AGRONOMIC AND DISEASE TRAITS OF LENTIL VARIETIES**

<table>
<thead>
<tr>
<th></th>
<th>Vigour</th>
<th>Flower time</th>
<th>Maturity</th>
<th>Lodging resistance</th>
<th>Pod drop</th>
<th>Ear Shattering</th>
<th>AB Foliar (SA)</th>
<th>AB Foliar (VIC/NSW/WA)</th>
<th>AB Seed</th>
<th>Botrytis grey mould</th>
<th>Boron</th>
<th>Salt</th>
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<tbody>
<tr>
<td>Small red</td>
<td>PBA Hurricane XT®</td>
<td>Mod</td>
<td>Mid</td>
<td>Mid</td>
<td>MR</td>
<td>MR</td>
<td>R</td>
<td>MR*</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS</td>
</tr>
<tr>
<td>PBA Herald XT®</td>
<td>Poor/Mod</td>
<td>Mid/Late</td>
<td>Mid/Late</td>
<td>MR</td>
<td>MR</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>PBA Bounty®</td>
<td>Mod</td>
<td>Mid/Late</td>
<td>Mid</td>
<td>S</td>
<td>R</td>
<td>R</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS</td>
<td>I</td>
</tr>
<tr>
<td>Nipper®</td>
<td>Poor/Mod</td>
<td>Mid/Late</td>
<td>Mid</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS/MS</td>
<td>MR</td>
<td>MR</td>
<td>R</td>
<td>MR</td>
</tr>
<tr>
<td>Northfield</td>
<td>Poor/Mod</td>
<td>Mid/Late</td>
<td>Mid/Late</td>
<td>MS/MS</td>
<td>MS/MS</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>R</td>
<td>S</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Medium red</td>
<td>PBA Hallmark XT®</td>
<td>Mod/Good</td>
<td>Mid</td>
<td>Mid</td>
<td>MR</td>
<td>MR</td>
<td>R</td>
<td>MR/MS</td>
<td>MR</td>
<td>R</td>
<td>MR</td>
<td>MS</td>
</tr>
<tr>
<td>PBA Ace®</td>
<td>Good</td>
<td>Mid</td>
<td>Mid</td>
<td>MS/MS</td>
<td>R</td>
<td>MS/MS</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>MR</td>
<td>MS</td>
<td>I</td>
</tr>
<tr>
<td>PBA Blitz®</td>
<td>Mod/Good</td>
<td>Early</td>
<td>Early</td>
<td>MS/MS</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS</td>
<td>I</td>
</tr>
<tr>
<td>PBA Bolt®</td>
<td>Mod/Good</td>
<td>Early/Mid</td>
<td>Early/Mid</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>MR</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>MR/MS</td>
<td>I</td>
</tr>
<tr>
<td>PBA Flash®</td>
<td>Mod</td>
<td>Early/Mid</td>
<td>Early/Mid</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>MR/MS</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Nipper®</td>
<td>Mod</td>
<td>Mid/Late</td>
<td>Mid</td>
<td>MS</td>
<td>R</td>
<td>MR</td>
<td>MS/MS</td>
<td>MR/MS</td>
<td>MS/MS</td>
<td>I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Large red</td>
<td>PBA Jumbo2®</td>
<td>Mod/Good</td>
<td>Mid</td>
<td>Mid</td>
<td>MS/MS</td>
<td>MR</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>MS</td>
</tr>
<tr>
<td>PBA Jumbo®</td>
<td>Mod</td>
<td>Mid</td>
<td>S</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS/MS</td>
<td>S</td>
<td>MS</td>
<td>MS</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Aldinga</td>
<td>Mod</td>
<td>Mid</td>
<td>S</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>

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

*Hurricane XT® is likely to be downgraded to MR/MS in SA in the near future with an increasing number of Hurricane XT® virulent isolates occurring in SA.*
DISEASE MANAGEMENT

There are two major diseases of lentil in Australia. PBA Hallmark XT® has shown a moderate level of disease resistance to ascochyta blight (AB) and has high resistance to botrytis grey mould (BGM).

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

Ascochyta blight (AB)
- **South Australia:** PBA Hallmark XT® is rated Moderately Resistant to Moderately Susceptible (MR/MS) to foliar AB in South Australia, similar to PBA Hurricane XT®. Although PBA Hurricane XT® is currently rated MR to AB, it is likely to be downgraded in the near future to MR/MS as well, due to accumulating evidence of a more prevalent PBA Hurricane XT® virulent AB isolate on the Yorke Peninsula and lower mid-north regions of South Australia. Crops in these regions should be monitored for AB and growers should plan to spray to protect pods ahead of rain events should symptoms be detected.
- **Victoria, NSW, WA:** PBA Hallmark XT® is currently rated Moderately Resistant (MR) to foliar AB in Victoria, New South Wales and Western Australia, the same as PBA Hurricane XT®. In any areas where there are more intense lentil rotations, prevalence of lentil crops and conditions favouring disease development, growers should be aware that the AB isolates can change over time, changing a variety’s level of resistance. Crops should always be monitored to check for this disease, and preventative fungicides applied to protect pods ahead of rain events should there be evidence of AB.
- Crops should be monitored in severe disease risk environments and if disease symptoms are detected, fungicides should be applied from the start of podding, prior to rainfall events.

Botrytis grey mould (BGM)
- **PBA Hallmark XT®** is rated Resistant to Moderately Resistant (R/MR) to BGM. This is a significant improvement over PBA Hurricane XT®, is better than all other medium red lentils, and equivalent to PBA Jumbo2®.
- In BGM prone areas, crops should still be monitored, and preventative foliar fungicide applied 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.

AGRONOMY

Paddock selection and basic requirements for growing PBA Hallmark XT® are similar to other lentil varieties.

PBA Hallmark XT® has the following characteristics:
- Mid-flowering and mid-maturing (maturity slightly later than PBA Hurricane XT®).
- Vigour and plant height are improved compared to PBA Hurricane XT® and is equivalent to PBA Bolt®.
- Generally good resistance to lodging, similar to PBA Hurricane XT®, but can still lodge under conditions of high plant biomass.
- Moderately intolerant to salinity (NaCl), an improvement over PBA Hurricane XT® but still more sensitive than Nipper®.
- Intolerant of high soil boron, similar to PBA Hurricane XT® and Nipper®.

Sowing
- In BGM prone areas PBA Hallmark XT® should perform similarly to PBA Jumbo2® in regard to early sowing.
- Target plant densities of 120 plants/m² adjusting sowing rates for seed size and germination % of the seed used each year.

Herbicide tolerance
- **PBA Hallmark XT®** has tolerance to imazethapyr (similar to PBA Hurricane XT®) when applied pre- or post-emergence.
- **PBA Hallmark XT®** has improved tolerance to flumetsulam (e.g. Broadstrike®) applied in crop.
- In conventional lentil varieties flumetsulam (applied according to label directions) may cause height reduction, crop discoloration, delayed flowering and yield loss.
- When flumetsulam is applied to PBA Hallmark XT® or PBA Hurricane XT® (according to label directions) the risk of crop damage and yield loss is minimised.
- **PBA Hallmark XT®, like PBA Hurricane XT® and PBA Herald XT®, shows reduced sensitivities to some sulfonylurea and imidazolinone herbicide residues from previous crop applications**.
- Growers must adhere to permits, product label rates, plant-back periods and all label directions for use.
- Preliminary evaluation in screening nurseries suggests that PBA Hallmark XT®, like PBA Hurricane XT®, PBA Herald XT® and Nipper®, is more sensitive to Group C herbicides (e.g. metribuzin and simazine) than other lentil varieties. However, label rates of metribuzin have been used on most lentil evaluation trials. When applying herbicides, follow all label guidelines and avoid application under conditions that would increase the risk of plant damage.

Crop dessication and harvest
- The maturity timing of PBA Hallmark XT® is later than PBA Blitz®, PBA Bolt® and PBA Flash®, slightly later than PBA Hurricane XT®, PBA Jumbo2®, PBA Ace® and earlier than Nugget and PBA Herald XT®.
- As with all lentils, correct timing for crop dessication, timely harvest and optimum machine setup will optimise yield and seed quality.
Better pulse varieties faster

Pulse Breeding Australia (PBA) is an unincorporated joint venture between the GRDC, University of Adelaide, University of Sydney, SARDI, DEDJTR Victoria, NSW DPI, and QLĐ DAF. It aims to breed and drive the adoption of improved pulse varieties for Australian growers.

**MORE INFORMATION**

**Lentil Grownotes,**

**Lentils Ute Guide,**

Pulse Breeding Australia

www.grdc.com.au

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www.pbseeds.com.au

**MARKETING**

- PBA Hallmark XT™ fits into the medium sized red lentil class for the human food market.
- The good level of disease resistance will assist it in achieving high grain quality from receipt point to market.
- PBA Hallmark XT™ should be segregated for marketing unless otherwise stated.
- PBA Hallmark XT™ will be open marketed with an End Point Royalty (EPR) of $5.94/t (including GST), applying upon delivery.

**BREEDING**

PBA Hallmark XT™ (evaluated as CIPAL1422) was developed by conventional plant breeding techniques and selected from a cross with PBA Herald XT™ and PBA Bolt™. It was developed by the PBA Lentil Program using technology from Agriculture Victoria Services Pty Ltd. The Southern Pulse Agronomy program has also been integral to the evaluation process. PBA Lentils formed a commercial partnership with PBSeeds to multiply, manage and release the PBA Hallmark XT™ lentil variety.

**QUALITY**

**Seed characteristics**

PBA Hallmark XT™ is a lens shaped medium red lentil with a grey seed coat. Seed size (as measured by average 100 seed weight) is slightly larger than PBA Ace™ and PBA Bolt™ but less than PBA Flash™ and PBA Blaze™. As with all lentil varieties, seasonal variations may occur.

**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 Hallmark XT™ with green lentils, such as PBA Giant™ or PBA Greenfield™, as when split the yellow kernel of the green lentil seeds will contaminate and reduce the value of the red lentil product.

**Seed size (%) relative to Nugget**

Variety | Market category | Seed shape | Seed coat colour | Cotyledon colour | Seed size (%) relative to Nugget
---|---|---|---|---|---
**Small red**
PBA Hurricane XT™ | SRS | Round | Grey | Red | 85
PBA Herald XT™ | SRS | Lens | Grey | Red | 75
PBA Bounty ™ | SRS | Round | Grey | Red | 90
Nipper ™ | SRS | Round | Grey | Red | 75-80
Northfield | SRS | Round | Tan | Red | 80

**Medium red**
PBA Hallmark XT™ | MRS | Lens | Grey | Red | 105
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 Jumbo2 ™ | LRS | Lens | Grey | Red | 120
PBA Jumbo ™ | 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), LRS=large red (split)

**PBSeeds are leaders in the production of fine quality seed and grains, with a strong history and passion for the pulse industry.** We take great care and pride in ensuring we meet our customer’s requirements. PBSeeds aims to distribute seed locally to growers via a national network of over 200 members. PBSeeds is proud to partner with PBA and invests in fast tracking the delivery of improved pulse varieties to growers and industry.

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