

Love them legumes - recent adventures with lentils, peas and beans

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Key messages

PBA Bolt[®] is a good first choice for Esperance lentil growers, with PBA Ace[®] an option for early sowing or longer seasons. The new XT line CIPAL1422 performed well and may be a valuable alternative to PBA Hurricane XT for those growers wishing to use imazethapyr (e.g. Spinnaker[®]) or facing SU carryover issues.

PBA Hurricane XT[®] provides useful tolerance to SU carryover compared to field pea and conventional lentil varieties.

PBA Hurricane XT[®] tolerated label and double label rates of Spinnaker[®].

PBA Samira[®] was the highest yielding released faba bean variety at Wittenoom Hills.

Aims

There appears to be renewed interest from growers and the agricultural community in legume break crops to complement canola and cereals in the rotation. For example in the Esperance region a number of farmers bulked up lentil seed in 2016 in anticipation of sowing larger areas in 2017. This paper summarises some of the experiments conducted in 2016 by DAFWA in partnership with the GRDC via the Tactical Break Crop Agronomy Project DAW00227 which supports the growing interest in legume crops.

Method

DAW00227 conducted 52 field experiments throughout WA in 2016, 14 of which were grain legume experiments. Seven of these grain legume experiments will be reported on here: a faba bean variety experiment at Wittenoom Hills with seed supplied by Jeff Paull of PBA/University of Adelaide; a vetch variety experiment at Grass Patch with seed supplied by Rade Matic of SARDI, 3 lentil variety experiments at Kumarl, Grass Patch and Wittenoom Hills with seed supplied by Dr Matthew Rodda of PBA/AgVic; and 2 lentil herbicide experiments at Grass Patch. Only key information from the experiments will be shown in this paper with more detail available online or from the author.

Results

Faba Variety

The faba bean experiment was sown on 6 May 2016 at Wittenoom Hills and emerged evenly. Conditions were cool and wet which suited faba beans. Foliar fungicides were not applied. Disease levels were low but we observed some differences between cultivars. In particular it was noted later in the season in September when there was a low level mix of botrytis and cercospora that the cultivar AF11023 had lower levels of infection than other cultivars.

Spring conditions were cool and faba beans grew well and consequently yields above 4 t/ha were obtained. No named variety out yielded PBA Samira[®] – which is the variety of choice for growers in the Esperance region. Five numbered lines out yielded PBA Samira[®] - AF12025, AF11212, AF09169, AF10089 and AF12026 by nine to 18%. AF09169 is being multiplied with an eye towards commercial release. The numbered line AF11023 with lower disease infection produced similar yields to PBA Samira[®].

Vetch Variety

The experiment was sown on 3 May 2016 into wet soil and the plants emerged very evenly. Conditions at Grass Patch were cool and wet in winter and cool in spring which produced even plots and good biomass production. Vetch lines 37731, 37102, 37107, 37657 and 37695 produced equal highest seed yields of 1.9 to 2.2 t/ha. Mid and late flowering varieties Timok[®] and Morava[®] produced similar yields to Volga[®] of 1.8 t/ha, which was not expected, but may have been the result of the long cool spring.

Lentil Variety

Nine named varieties and 21 lines were tested in the lentil variety experiments, but results for released varieties and two near release lines are presented here. The majority of lentil plots grew well at the 3 sites in WA in 2016 and yields were higher than expected. The Kumarl site in particular had very good conditions and plots were very uniform with average yields of 1.7 t/ha. Both Grass Patch (2.0 t/ha) and Wittenoom Hills (1.8 t/ha) suffered from transient waterlogging which affected some plots and those were excluded from analysis. CIPAL1422 which is destined to be the new XT lentil variety (with improved botrytis grey mould resistance) performed well, producing equal or higher

yields than PBA Hurricane XT[®] or PBA Herald XT[®]. Of the large red varieties, PBA Jumbo2[®] outperformed PBA Jumbo[®] – which was expected. In the medium red lines, PBA Bolt[®] which has been bulked up by a number of growers in the Esperance region in 2016 performed well, with no variety out-yielding it. CIPAL1301 which is the next conventional variety set for release did not match the yield of PBA Bolt[®] at any site in WA in 2016. The long cool spring appeared to suit the mid-season variety PBA Ace[®] which performed well at all sites ranking number 1 overall and in the top 5 at all sites.

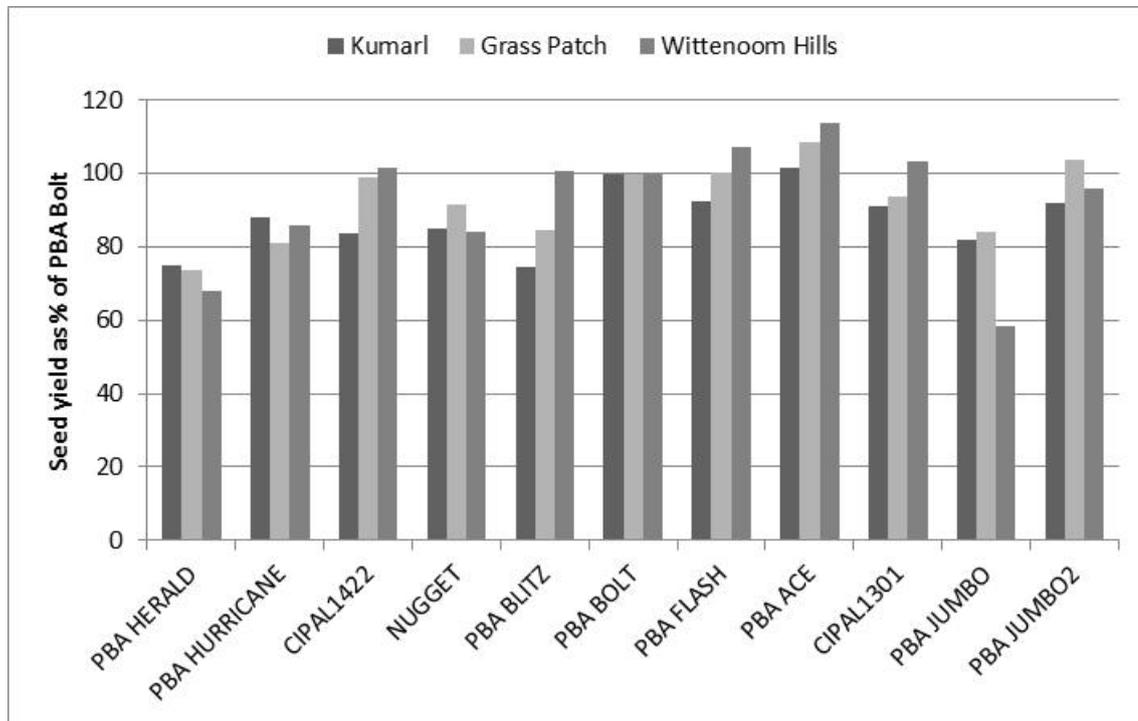


Figure 1 Seed yield (% of PBA Bolt[®]) in 2016 WA Lentil Variety experiments (Lsd for Kumarl = 17%, Grass Patch = 23% and Wittenoom Hills = 21%)

Tolerance to ‘IMI’ herbicide

The XT range of lentils which include PBA Hurricane XT[®] have been selected for tolerance to imidazolinone (IMI) herbicides with imazethapyr (e.g. Spinnaker[®]) being registered for use in commercial XT lentils. In order to demonstrate the improved performance of PBA Hurricane XT[®] compared to PBA Bolt[®] and field pea variety PBA Gonyah[®] a range of IMI herbicides at low, medium and high rates were applied at Grass Patch in 2016 using 100 L/ha water volume onto a site with a clay top-soil with pH of 7.8. Products and timing included Spinnaker[®] (imazethapyr 700 g/kg) applied post sowing pre-emergent (PSPE) and post-emergent (Postem) applications of Raptor[®] (imazamox 700 g/kg) or Intervix[®] (imazamox 33 g/L + imazapyr 15 g/L) on 1 July, 6 weeks after sowing when the crop was at ~ 6 node stage,

Both PBA Gonyah[®] and PBA Hurricane XT[®] tolerated all rates of Spinnaker[®] (Figure 2). PBA Bolt[®] tolerated Spinnaker[®] at low and medium label rates and showed a trend for reduced yield at high rates. PBA Bolt[®] appeared to be sensitive to all rates of Raptor, PBA Gonyah[®] was sensitive at the high rate and PBA Hurricane XT[®] tolerated all rates. PBA Hurricane XT[®] maintained yield at all Intervix[®] application rates, whilst PBA Gonyah[®] was sensitive to medium and high rate, and PBA Bolt[®] appeared to be sensitive to all rates of Intervix[®] (data for Raptor[®] and Intervix[®] not shown).

Note Products constituting imazethapyr (700 g a.i/kg) such as Spinnaker[®] are only permitted to be used on XT lentil varieties such as PBA Hurricane XT[®] and PBA Herald XT[®] at 70 to 100 g/ha (PER14369). Products containing imazamox such as Intervix[®] and Raptor[®] are not registered/permitted for use on any lentil varieties.

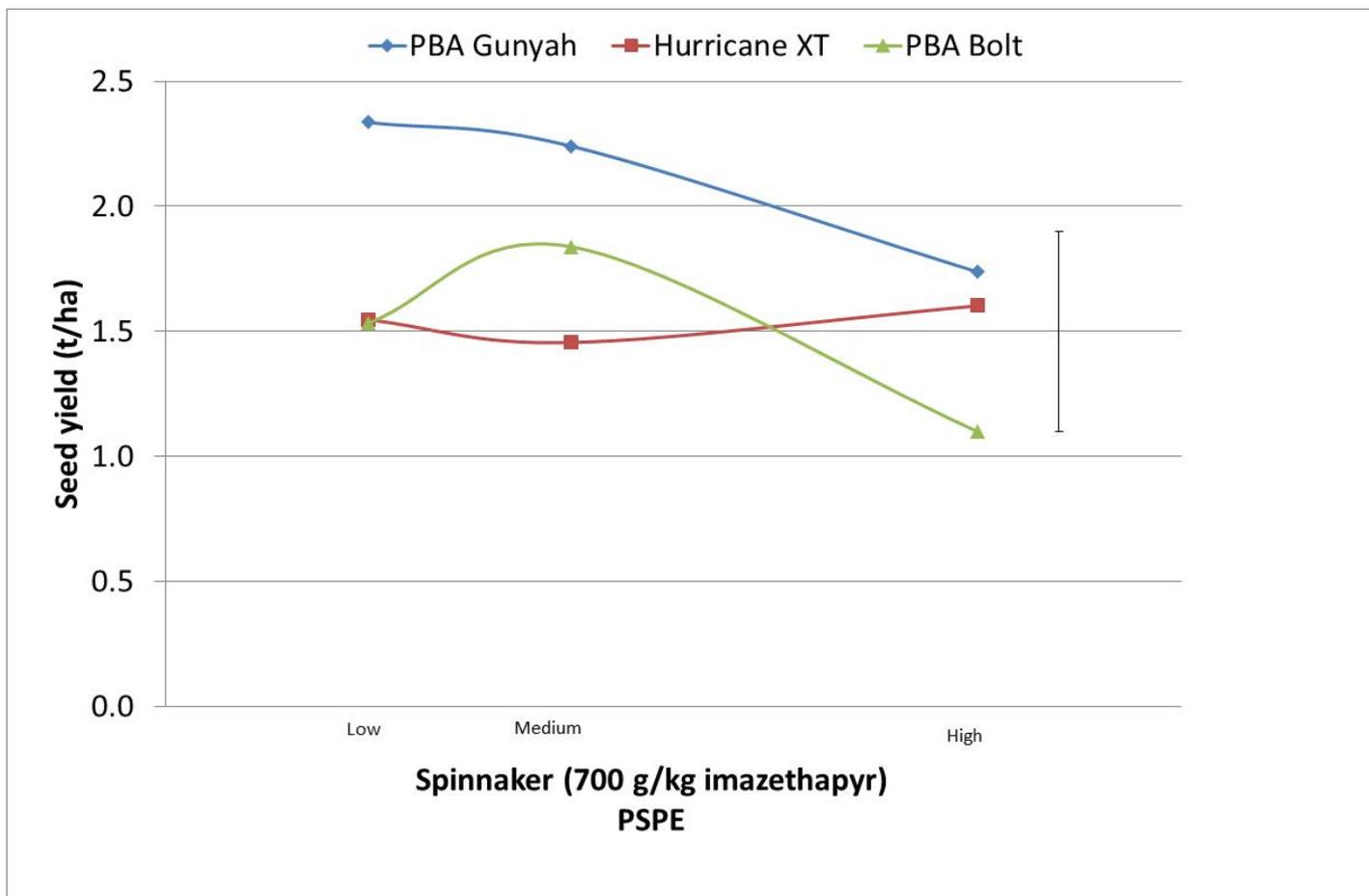


Figure 2 Response of two lentil varieties (PBA Bolt[®] and PBA Hurricane XT[®]) and one field pea variety (PBA Gunyah[®]) to increasing rates of Spinnaker[®] applied Post sowing Pre-emergent (30 May – 5 Days After Sowing) at Grass Patch in 2016. Vertical line indicates Lsd at P = 0.05.

Tolerance to SU residues

The XT range of lentils which include PBA Hurricane XT[®] have been selected for tolerance to sulfonylurea (SU) residues. In order to demonstrate the improved performance of PBA Hurricane XT[®] compared to PBA Bolt[®] and field pea variety PBA Wharton[®] to sulfonylureas, Glean[®] (chlorsulfuron 750 g/kg), Ally[®] (metsulfuron methyl 600g/kg), Logran B-Power[®] (butafenacil 200 g/kg + triasulfuron 520 g/kg) and Intervix[®] (imazamox 33 g/L + imazapyr 15 g/L) were applied at rates labelled here as full, 1/2, 1/4 and 1/8th immediately before sowing. Data for Ally[®], Logran B-Power[®] and Intervix[®] are not shown.

All rates of Glean[®] reduced the yield of PBA Bolt[®] and PBA Wharton[®]. PBA Hurricane XT[®] showed tolerance to chlorsulfuron rates at 1/4 or 1/8th rate applied immediately before sowing (IBS) with no significant yield loss, while higher rates of half and full reduced yield significantly (Figure 3).

All rates of Logran B-Power[®] reduced the yield of both lentil varieties and the field pea variety PBA Wharton[®], however the magnitude of yield loss was lowest for PBA Hurricane XT[®] at less than 0.5 t/ha for 1/8 to half rates compared to > 1.4 t/ha for PBA Bolt[®] and PBA Wharton[®]. Full rates of Logran B-Power[®] effectively killed all varieties.

Both PBA Wharton[®] and PBA Hurricane XT[®] tolerated the full rate of Intervix[®] applied IBS, whilst PBA Bolt[®] tolerated all rates except the full rate.

PBA Hurricane XT[®] tolerated all rates of Ally[®], PBA Wharton[®] tolerated the 1/8 rate but higher rates reduced its yield, and all rates of Ally[®] reduced the yield of PBA Bolt[®] significantly.

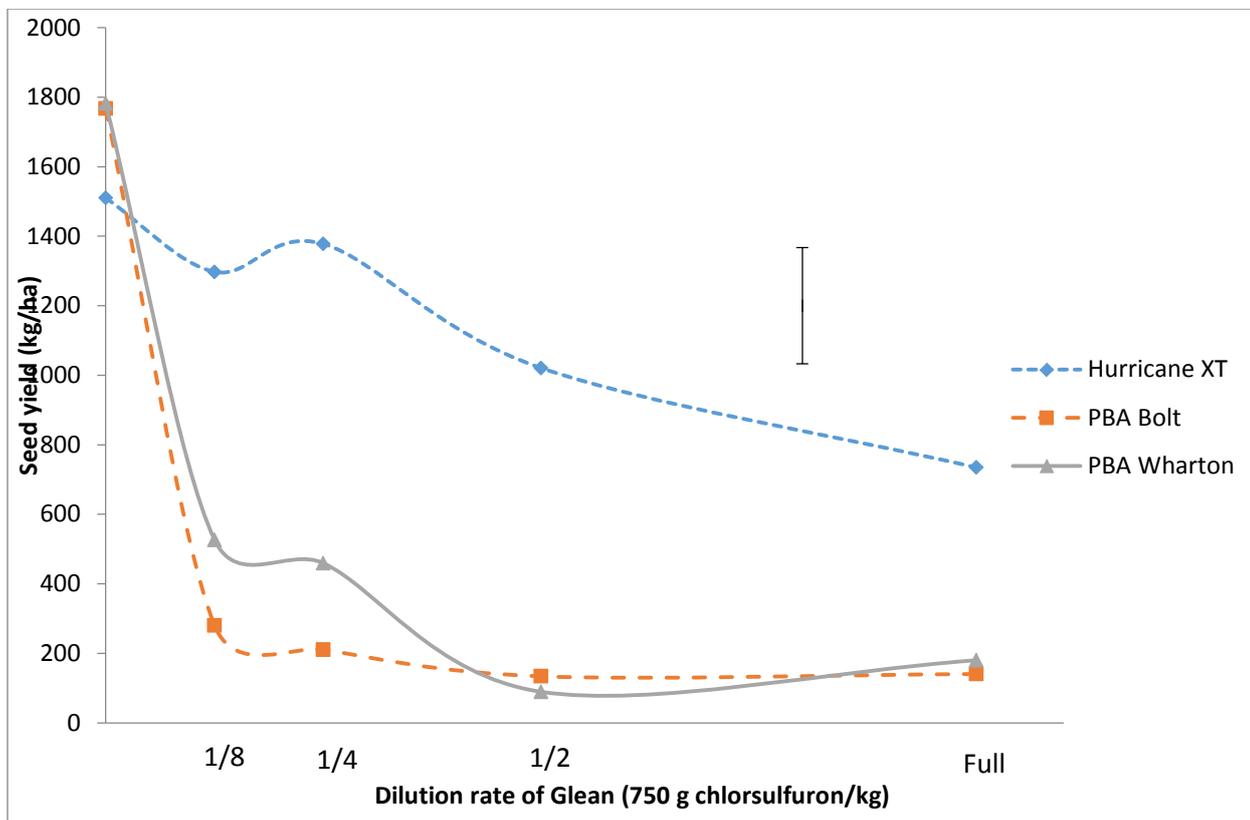


Figure 3 Response of two lentil varieties (PBA Bolt[®] and PBA Hurricane XT[®]) and one field pea variety (PBA Wharton[®]) to increasing rates of Glean[®] (750 g chloresulfuron/kg) applied one day before sowing (IBS) at Grass Patch on 25 May 2016. Vertical line indicates Lsd at P = 0.05

Conclusion

Pulse crops produced excellent biomass and seed yield in the Esperance region in 2016. Frost damaged some grower's crops but our experiments managed to be located so as avoid most of the frost and in the cool spring set up excellent yields. The latest lentil varieties appear to provide superior yield potential and we can expect more grower interest in them if prices remain at current levels. PBA Hurricane XT[®] demonstrated superior tolerance to SU residues and imazethapyr PSPE, whilst PBA Bolt[®] performed creditably in the absence of herbicide stress.

Faba beans have consistently produced good yields in the Esperance region for a number of years and currently available varieties have very useful levels of disease resistance. The uptake of faba beans will be reliant on early sowing opportunities, improved price signals and increased seed availability in WA.

Key words

Pulses, lentil, faba bean, herbicide

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