

CBA Captain[®]: a new desi variety for the northern region

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Key words

chickpea variety, desi, yield, disease resistance, Ascochyta blight, Phytophthora root rot, phenology, grain quality

GRDC code

DAN00094, DAN00151, DAN00176, DAN00212, BLG205, BLG209, BLG111, 9177999

Take home message

CBA Captain[®] is a new broadly adapted desi chickpea variety for the northern region and other chickpea growing areas of Australia. The variety was evaluated as CICA1521 and has higher yields in northern NSW and southern QLD than PBA HatTrick[®]. CBA Captain[®] has a medium seed size and is expected to have similar disease ratings to PBA HatTrick[®]. Seed of CBA Captain[®] is available in the northern region for the 2021 season from the following seed partners; Galleon Grains, PB Agrifood, PB Seeds and Woods Seeds.

Significant yield advantage over PBA HatTrick[®]

CBA Captain[®] has been included in National Variety Trials (NVT) since 2015. During this six-year period there have been two favourable seasons in north west NSW (2016 and 2020) and a number of dry seasons (2018 and 2019). CBA Captain[®] has shown great consistency in yield despite the highly variable seasons. In the southern areas of north-west NSW, CBA Captain[®] has consistent yield gains over PBA HatTrick[®] (Table 1). At the time of writing this paper, the long term yield reporter using 2020 trials were not available. Readers are encouraged to visit nvtonline.com.au.

Table 1. Long term yield (2015-2019) of CBA Captain[Ⓟ] and current chickpea varieties, expressed as a % of the mean yield, in NVT in Trangie, Narromine and Coonamble. The mean yield of all varieties in each of the 5 contributing trials was used to assign that trial to a 'yield grouping'. This enables varietal performance to be better evaluated in different yield situations

		Yield group (t/ha)			
		1	1.5	2.0	3.0
	Mean yield (t/ha)	0.91	1.25	1.84	2.96
Variety	No trials in total & for each yield group	2	1	1	1
CBA Captain[Ⓟ]	5	108	110	110	112
Kyabra [Ⓟ]	5	113	98	97	68
PBA Boundary [Ⓟ]	5	110	101	103	89
PBA Drummond [Ⓟ]	1	107			
PBA HatTrick [Ⓟ]	5	101	95	96	88
PBA Seamer [Ⓟ]	5	95	102	102	115

Source: <https://app.nvtonline.com.au/lty/table/chickpea-desi/nsw/nw/trangie,narromine,coonamble/?lty-type=yield&stacked=1>

Table 2. Long term yield (2015-2019) of CBA Captain[Ⓟ] and current chickpea varieties, expressed as a % of the mean yield, in NVT at Bellata, north west NSW. The mean yield of all varieties in each of the 4 contributing trials was used to assign that trial to a 'yield grouping'. This enables varietal performance to be better evaluated in different yield situations

		Yield group (t/ha)		
		1.0	1.5	2.0
	Mean yield (t/ha)	0.96	1.18	1.65
Variety	No trials in total & for each yield group	2	1	1
CBA Captain[Ⓟ]	4	109	121	104
Kyabra [Ⓟ]	4	113	68	96
PBA Boundary [Ⓟ]	4	104	95	96
PBA Drummond [Ⓟ]	1	115		
PBA HatTrick [Ⓟ]	4	97	86	96
PBA Seamer [Ⓟ]	4	96	116	102

Source: <https://app.nvtonline.com.au/lty/table/chickpea-desi/nsw/ne/bellata/?lty-type=yield&stacked=1>

Ascochyta blight

CBA Captain[Ⓟ] has undergone Ascochyta blight (AB) testing in the field at Tamworth and Horsham as well as single isolate testing under controlled conditions in Adelaide and Tamworth.

An increase in the aggressiveness of the AB pathogen has been observed both in the northern and southern regions (Ford et al., 2018). Increased levels of disease have been recorded on CBA Captain[®] and other varieties such as PBA Seamer[®] from these isolates collected in 2017 compared to isolates collected in 2015 (Table 4). The distribution of the more aggressive isolates in the northern region is currently unknown, due to the reduced chickpea area and dry seasons over the past two years, however a cautious disease rating from the NVT pulse disease rating system for CBA Captain[®] is expected. For northern isolates this is likely to be a Moderately Susceptible rating for *Ascochyta* blight. At the time of writing this paper the 2021 NVT pulse disease ratings were unavailable. Readers are encouraged to visit nvtonline.com.au for updated AB ratings.

Table 4. Mean disease index of chickpea varieties in single isolate AB screening conducted at Adelaide. The index is calculated as the sum of (% main stems broken + % of stems with lesions + % side branches with disease + % leaves with disease) divided by 4. (0 = healthy plant, 100 = heavily diseased plant)

Name	Isolate collection location and year							
	Yallaroi NNSW 2015	Curyo VIC 2015	Graman NNSW 2016	Curyo VIC 2016	Gurley NNSW 2017	Pt Broughton SA 2017	Gurley NNSW 2017	Curyo VIC 2018
CBA Captain[®]	40	50	77.1	76.3	29.2	26.7	67.9	89.6
Kyabra [®]			100	100	100	100	100	100
PBA Boundary [®]	81.3	67.9	100	100	77.1	55.4	90	100
PBA Drummond [®]	97.1	100	100	100	66.7	97.5	83.3	100
PBA HatTrick [®]	87.5	61.7	86.3	94.2	66.7	48.8	67.9	68.3
PBA Seamer [®]	31.7	37.5	83.8	90.8	29.2	39.2	65.4	84.6
<i>Lsd</i>	20.6	27.2	18.1	16.2	24.7	19.2	26.6	28.6

Phytophthora root rot

CBA Captain[®] was included in *Phytophthora* root rot (PRR) yield loss trials conducted at Warwick QLD, over several years (Table 5). Yield losses for CBA Captain[®] from PRR in these trials have ranged from 38.7 to 93.4 %. Similar variability in yield loss has also been observed for PBA HatTrick[®]; an explanation of the seasonal impacts on yields and varietal PRR disease rankings is provided in Bithell et al., 2018. In 2020, NVT pulse disease rating testing was conducted for PRR for the first time. It is expected that a review of all variety ratings for PRR will be conducted to align with the NVT disease rating definitions. The 2020 ratings were not available at the time of writing this report, please see nvtonline.com.au for updated ratings.

Table 5. Yield (t/ha) in the absence of PRR and yield loss (%) from PRR across 2016 to 2018 for CBA Captain[®] and other current chickpea varieties. Adapted from Bithell et al., 2018, Bithell et al., 2019

Name	2016		2017		2018	
	Yield (t/ha) in the absence of PRR	% yield loss from PRR	Yield (t/ha) in the absence of PRR	% yield loss from PRR	Yield (t/ha) in the absence of PRR	% yield loss from PRR
CBA Captain[®]	4.06	75.1	2.74	93.4	1.94	38.7
PBA Boundary [®]	3.98	95.2	2.63	82.5		
PBA Drummond [®]					2.49	68.1
PBA HatTrick [®]	4.02	90.0	3.31	78.2	2.28	40.5
PBA Seamer [®]	4.08	76.7	3.23	90.4	2.81	61.5
Yorker	4.06	68.3	3.50	97.3	2.84	40.1

Phenology and other agronomic traits

CBA Captain[®] is early flowering when sown in the mid-May to mid-June sowing window, approximately six days earlier than PBA HatTrick[®] (Table 6). Flowering data collected from early May sown chilling tolerance trials (BLG111) indicates that CBA Captain[®] can flower up to 24 days earlier than PBA HatTrick[®] depending on winter daytime temperatures. An increased understanding of the drivers of chickpea phenology is expected with new GRDC investments in this area. Although there is some data indicating that CBA Captain[®] may produce pods earlier in some environments (e.g. Kingaroy, 2019), it is expected that days to first pod is similar to current varieties.

Table 6. Phenology data (2017-2020) collected for CBA Captain[®] and current chickpea varieties from breeding and chilling tolerance trials in northern NSW and southern QLD

Sowing date	Location	CBA Captain [®]		Kyabra [®]		PBA Drummond [®]		PBA HatTrick [®]		PBA Seamer [®]	
		DTF	DTP	DTF	DTP	DTF	DTP	DTF	DTP	DTF	DTP
15/6/2017	Spring Ridge	102		103				103		102	
23/5/2018	Moree	91		96		97		98		97	
7/5/2018	Tamworth	101	134	112	134	120	134	125	135	126	134
12/6/2018	Tamworth	96	108	99	108	97	108	102	108	99	
13/5/2019	Narrabri	77	108	83	106			80	108		
15/5/2019	Breeza	106	122	105	123			105	122		
17/5/2019	Kingaroy	79	91	82	95			81	96		
10/06/2020	Narrabri	86		88		88		89		88	

DTF = days to flower from sowing
DTP = days to pod from sowing

CBA Captain[®] has early to mid-maturity, earlier than PBA HatTrick[®]. CBA Captain[®] has an erect plant type with good height to lowest pod and plant height. Under the high biomass producing conditions of 2016 and 2020, CBA Captain[®] had less lodging than PBA HatTrick[®] at seven sites across northern NSW and southern QLD (Table 7).

Table 7. Mean lodging score at northern NSW and southern QLD breeding sites in 2016 and 2020 for CBA Captain[®] and current chickpea varieties. 1 = erect, 9 = flat.

Location	Year	CBA Captain [®]	Kyabra [®]	PBA Drummond [®]	PBA HatTrick [®]	PBA Seamer [®]
Edgeroi	2016	3.7	2.3		5.3	5.3
North Star	2016	4.3	3.0		7	3.3
Rowena	2016	5.3	5.3		6.7	6.3
Warwick	2016	6.0	6.3		6.3	5.3
Warra	2016	3.3	2.0		6.0	2.7
Roma	2016	3.7	3.0		6.0	4.7
Rowena	2020	1.7	1.3	1.3	3.0	1.0

In December 2020, Tamworth Agricultural Institute received more than 240 mm of rain. Plots of CBA Captain[®] were observed to have remained standing with good harvestability compared to PBA HatTrick[®] which had lodged considerably.

In 2019 and 2020, large seed multiplications and demonstration blocks of CBA Captain[®] were harvested by commercial harvesters throughout the northern region. No negative feedback regarding the harvestability of CBA Captain[®] were reported.

Grain quality

CBA Captain[®] has a yellow-brown seed coat and angular seed shape, not unlike PBA HatTrick[®]. The seed size of CBA Captain[®] is larger than PBA HatTrick[®], similar to PBA Seamer[®] and PBA Drummond[®] but smaller than Kyabra[®] (Table 8). CBA Captain[®] has a higher or similar split yield than PBA HatTrick[®] and PBA Drummond[®] at six sites across southern QLD and northern NSW.

Table 8. Seed size (grams per 100 seeds) and split yield % (SY%) for CBA Captain[®] and other current chickpea varieties at six sites in northern NSW and southern QLD

Site Year	CBA Captain [®]		Kyabra [®]		PBA Drummond [®]		PBA HatTrick [®]		PBA Seamer [®]	
	100 SW	SY%	100 SW	SY%	100 SW	SY%	100 SW	SY%	100 SW	SY%
Roma 2017	19.8	52.9	21.9	72.5			20.1	40.8	20.8	44.8
Spring Ridge 2017	22.5	53.2	24.6	45.1			18.9	44.3	21.3	55.7
Warra 2017	21.7	72.3	24.2	67.5			22.5	70.5	24.1	73.7
Moree 2018	21.5	41.2	25.1	46.9	22.2	36.7	20.2	42.9	21.5	42.0
North Star 2018	23.7	46.0	27.2	64.1	24.0	39.7	22.0	39.2	23.5	45.3
Warra 2019	22.3	50.7	24.2	32.6	22.4	38.0	21.8	37.4	22.2	38.7

100SW = grams per 100 seeds

SY% = split yield % (yield of dhal using a standard SKE milling method without pre-conditioning seeds; Wood et al 2008).

Seed partners

CBA Captain[®] will be delivered to the northern region through the following seed partners; Galleon Grains, PB Agrifood, PB Seeds and Woods Seeds to distribute seed to QLD and NSW.

Acknowledgements

CBA Captain[®] was developed by the PBA Chickpea program (led by NSW Department of Primary Industries). The partners of the PBA Chickpea program were: GRDC, NSW DPI, Department of Agriculture and Fisheries (QLD), Agriculture Victoria and the South Australian Research and Development Institute.

The research undertaken as part of this project is made possible by the significant contributions of growers through trial cooperation and the co-investment of the GRDC. The authors would like to thank them for their continued support.

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