# FAR CULTIVAR EVALUATION

# spring sown wheat and barley 2015/2016

FOUNDATION FOR ARABLE RESEARCH

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# introduction and welcome

Five of the top performing spring sown barley cultivars yielded an average of 10 t/ha or above across the Canterbury trials in the 2015-16 season. They all have been in CPT2 for three years or less, showing that progress is being made in barley breeding. Of the named cultivars, standout performers from the four year average analysis include Sanette, Scholar, Shada, RGT Planet and Piper. These cultivars are showing stability across different environments and performing well in all regions tested.

The bread wheat Discovery which is now in its third year of the spring sown CPT2 trials is showing consistently high yields in both Canterbury and the southern North Island.

FAR welcomes any queries or suggestions to further improve these booklets, or if you require any additional information that we have not included please contact us.

Rob Craigie Research Manager

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# wheat - trial site details



2015/2016 trial site location map

#### KAIRANGA-MANAWATU

Kairanga silt loam, Dryland Trial operator: Kevin Sinclair, Plant & Food Research Host farmer: Brian and Mark Saunders

This dryland trial was sown into a crop of Raffles on 29 October 2015 following maize. The trial received 100 kg/ha urea in January. One herbicide and two fungicides were applied during December and January. No PGR or insecticides were applied. The trial established well and was harvested on 3 March 2016 after a dry summer.

#### DARFIELD - CENTRAL CANTERBURY

No trial this season.

#### **METHVEN - MID CANTERBURY**

Mayfield silt loam, Irrigated Trial operator: John van den Bosch, PGG Wrightson Grain Host farmer: Craige Mackenzie

The trial was sown on 21 August 2015 in a crop of Discovery, following barrier grass. Five applications of urea totalling 600 kg/ha were applied between October and December. Five herbicide applications, two insecticides and a PGR were applied during September to December. The trial received four fungicide applications. Twelve irrigations totalling 144 mm were applied from mid-October to early February. The trial was harvested on 4 March 2016.

#### WAKANUI - MID CANTERBURY

Wakanui silt loam, Irrigated Trial operator: Andy Hay, Plant & Food Research Host farmer: Bonifant Partnership Ltd

Sown in a surrounding crop of Discovery on 11 September 2015, this trial followed a radish and winter feed wheat crop. The trial received three applications of urea totalling 230 kg N/ha. One herbicide application, a foliar insecticide and one PGR were applied between October and November, along with two fungicide applications. Twelve applications of irrigation totalling 190 mm were applied to the crop. The trial was harvested on 26 February 2016.

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# wheat - agronomic comment

CULTIVAR	Years in FAR trials	BYDV	Septoria leaf blotch	Stripe rust	Leaf rust	Powdery mildew	Fusarium head blight <sup>1</sup>	Straw strength	Crop height	Maturity	Sprouting susceptibility
Conquest	13	MRMS	MR	MR	MSS*	MS	MS	Mod-stiff	Medium	Early-int	Low
Discovery (KWM31)	ო	(MS)	MR	MRMS	MRR	MRR	(MR)	Stiff	Tall	Intermediate	Low-mod
Raffles	14	MS	MR	MSS	MSS	MR	MS	Moderate	Tall	Intermediate	Low
Reliance	4	MRMS	MS	MR	MSS	MSS	(SM)	Mod-stiff	Short-med	Early-int	Low
Saracen	9	(MS)	MR	MR	MSS	MR	MS	Stiff	Short	Intermediate	Low
Sensas	9	(WS)	MS	MR	MRMS	MR	(SM)	Stiff	Medium	Early	Low
Viceroy	9	(MR)	MS	MR	MS	MS	(WSS)	Stiff	Med-tall	Intermediate	Low
CRWT218	-	(MR)	(MS)	(MR)	MS	MS	Unknown	Stiff	Tall	Intermediate	Low-mod

Spring Sown Wheat Agronomic Comment 2015/2016 Season

<sup>1</sup> Fusarium head blight ratings are based on limited data because of infrequent infections.

Scores followed by  $^{\star}$  indicate resistance is affected by pathotypes present (score is an average) (brackets) indicate there is limited NZ trial data to assess resistance.

"Unknown" indicates there is insufficient trial information in NZ to assess resistance.

Disease susceptibility sourced from FAR-funded Disease Nurseries and CPT trials (assessments carried out by Plant & Food Research).

Sprouting susceptibility comments are sourced from FAR funded Sprouting Nurseries carried out by Plant & Food Research.

MRMS = intermediate resistance MS = moderately susceptible S = susceptible MSS = mostly susceptible MR = moderately resistant Kev

MRR = mostly résistant R = resistant Spring Sown Wheat Cultivar Evaluation 2015/2016 Season - yield (t/ha)

CULTIVAR	Kairanga	Methven	Wakanui	Canterbury mean yield	Seasons in FAR trials
Region	Manawatu	Mid Canterbury	Mid Canterbury		(Spring sown)
Soil type	Kairanga silt loam	Mayfield silt loam	Wakanui silt loam		
Dryland / Irrigated	Dryland	Irrigated	Irrigated		
Previous crop	Maize	Grass	Radish		
Sow date	29 Oct	21 Aug	11 Sep		
Harvest date	3 Mar	4 Mar	26 Feb		
Conquest	6.1	8.2	6.9	7.6	13
Discovery (KWM31)	7.8	10.0	8.0	9.0	ę
Raffles	7.9	9.6	7.6	8.6	14
Reliance	6.5	8.8	5.6	7.2	4
Saracen	7.4	6.8	6.3	6.5	9
Sensas	7.0	9.3	7.5	8.4	9
Viceroy	7.1	8.0	7.2	7.6	9
CRWT218	6.8	7.4	6.7	7.1	1
Site mean yield (t/ha)	7.0	8.4	7.0	7.7	
LSD 5%	0.5	0.6	0.5	1.3	
CV%	4.9	4.9	4.7	7.9	

# wheat - 2015/2016 grain quality 7

## Spring Sown Wheat Grain Quality Data 2015/2016 Season

## Southern North Island

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No. (seconds)
Conquest	40	78	14.5	1.2	395
Discovery (KWM31)	45	78	13.0	1.1	374
Raffles	48	77	12.4	1.9	435
Reliance	45	77	14.7	0.7	405
Saracen	40	76	12.4	2.4	399
Sensas	46	82	13.1	0.4	386
Viceroy	43	81	13.1	2.1	396
CRWT218	42	75	13.6	1.3	397
Mean	44	78	13.4	1.4	398
LSD 5%*	-	-	-	-	-

\* No LSD available since only one site in the North Island, therefore only one data value per cultivar.

#### Canterbury

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No. (seconds)
Conquest	39	74	13.5	1.6	432
Discovery (KWM31)	44	72	12.3	2.0	357
Raffles	45	72	12.4	1.8	405
Reliance	38	72	13.7	2.2	384
Saracen	35	66	12.6	4.2	381
Sensas	42	77	12.3	1.3	400
Viceroy	38	75	12.4	3.3	363
CRWT218	34	68	12.8	2.8	366
Mean	39	72	12.7	2.4	386
LSD 5%	4.7	3.4	1.0	1.6	60

Averaged over two sites.

The quality data for each region is also presented as a 4 year mean on the individual cultivar description pages.

page

Spring Sown Wheat - 4 year adjusted mean - relative yield by site

page

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CULTIVAR	Kairanga	Darfield *	Methven	Wakanui	Canterbury mean yield	Seasons in FAR trials
Region	Manawatu	Central Canterbury	Mid Canterbury	Mid Canterbury		(Spring sown)
Dryland / Irrigated	Dryland	Irrigated	Irrigated	Irrigated		
No. of trials	4	3	4	4	11	
Conquest	92	97	98	95	97	13
Discovery (KWM31)	108	106	111	113	110	ო
Raffles	110	102	107	110	107	14
Reliance	96	66	102	94	66	4
Saracen	66	97	91	92	94	Q
Sensas	95	94	104	66	66	Q
Viceroy	103	104	100	101	102	Q
CRWT218	98	-	88	98	93	1
Site mean yield (t/ha)	8.6	9.8	9.4	10.2	9.8	
LSD (estab. cv)	7.3	8.5	7.3	5.5	6.4	
LSD (new vs estab.)	11.5	12.0	11.5	8.7	10.1	

\* No Darfield trial this year, so is a 3 year mean.

These 4-year adjusted mean relative yields are also presented in graphical form on the following pages for each individual cultivar. LSD (new vs estab.) is for comparing a "new" (first year) cultivar with an "established" cultivar. LSD (estab. cv) is for comparing two "established" cultivars (that have both been in all trials).

wheat - 4 year adjusted mean

# wheat cultivar descriptions

# CONQUEST

YEAR 13

Conquest is a premium bread cultivar so tends to have lower yields than other cultivars. This cultivar has become mostly susceptible to leaf rust but is moderately resistant to Septoria tritici blotch and stripe rust. Although grain weights are low, Conquest produces high test weights, proteins and falling numbers along with excellent sprout resistance.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



Note: Darfield is a three year mean.

## DISCOVERY (KWM31)

YEAR 3

Consistently high yielding bread cultivar in both Canterbury and southern North Island. Shows good resistance to most diseases. Produces high grain weights but lower than average protein content and falling number. A tall stiff strawed variety with low to moderate sprouting risk. Discovery is susceptible to shattering.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Septoria leaf blotch Stripe rust Leaf rust Powdery mildew Fusarium head blight	Moderately su Moderately Intermediate r Mostly Mostly Moderately	isceptible resistant esistance resistant resistant resistant
FIELD CHARACTERISTICS		
Straw strength Crop height Maturity Sprouting risk	Inte Low-	Stiff Tall ermediate moderate
GRAIN QUALITY (4 year means)	Sth Nth Island	Canterbury
TGW (g) Test weight (kg/hl) Protein (%) (N% x 5.7) Screenings (%) Falling number (sec)	47 74 12.2 1.2 320	51 75 12.1 0.7 352
END USE		Bread
BACKGROUND		
Breeder Agent	Limagrain Eu PGG Wright	rope S.A. son Grain

Note: Darfield is a three year mean.

# wheat cultivar descriptions

# RAFFLES

YEAR 14

Above average to mostly high yielding feed and gristing wheat. Good performer in southern North Island. Watch for disease as Raffles is mostly susceptible to stripe and leaf rust, and moderately susceptible to BYVD and fusarium head blight. Moderately resistant to Septoria tritici blotch and powdery mildew. Good grain weight, with low sprouting risk and a high falling number. A tall variety with intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



Note: Darfield is a three year mean.

## RELIANCE

YEAR 4

A New Zealand bred, premium grade bread cultivar with yields slightly higher than Conquest. Monitor for disease as Reliance is mostly susceptible to leaf rust and powdery mildew and to a lesser degree to Septoria tritici blotch and fusarium head blight. Has moderate resistance to stripe rust. A moderate to stiff strawed cultivar producing high proteins with a low sprouting risk.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



Note: Darfield is a three year mean.

# SARACEN

YEAR 6

An average (southern North Island) to below average (Canterbury) yielding medium grade bread wheat. Shows moderate resistance to Septoria tritici blotch, stripe rust and powdery mildew. Saracen is mostly susceptible to leaf rust. Lower than average protein content and grain weight. Saracen has excellent straw strength and low sprouting risk.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)

Kairanga		9	9		]
Darfield		97			
Methven		91			
Wakanui		92			
80	85 90	95 100	0 105 1	10 115 1	4 20
DISEASE RESIS	STANCE				
BYDV Septoria leaf b Stripe rust Leaf rust Powdery milde Fusarium head	lotch w   blight	Mo	oderatel Modera Modera Mostl Modera oderatel	y suscepti tely resist tely resist y suscepti tely resist y suscepti	ble ant ant ble ant ble
FIELD CHARAC	TERISTICS	S			
Straw strength Crop height Maturity Sprouting risk				S Sh Intermedi L	tiff ort ate ow
<b>GRAIN QUALITY</b>	' (4 year m	eans) Sth	Nth Isla	nd Canter	bury
TGW (g) Test weight (kg Protein (%) (N% Screenings (%) Falling number	ı/hl) % x 5.7) ) <sup>.</sup> (sec)		42 72 11.5 1.6 343	42 73 12. 1.9 369	1 9
END USE				Bre	ead
BACKGROUND					
Breeder Agent		PI	ant & Fo	ood Resea uisetti See	rch eds

Note: Darfield is a three year mean.

# SENSAS

YEAR 6

Sensas is the only true spring wheat cultivar in New Zealand. It is a medium grade bread wheat with average yields. Sensas has good resistance to rusts and powdery mildew. High test weight and low screenings. This stiff strawed variety matures early with low sprouting risk. Due to its true spring character and early maturity it is well suited to late spring sowings but should not be planted before July to avoid frost risk at flowering.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Septoria leaf blotch Stripe rust Leaf rust Powdery mildew Fusarium head blight	Moderately su Moderately su Moderately Intermediate r Moderately Moderately su	isceptible isceptible resistant esistance resistant isceptible
FIELD CHARACTERISTICS		
Straw strength Crop height Maturity Sprouting risk		Stiff Medium Early Low
GRAIN QUALITY (4 year means)	Sth Nth Island	Canterbury
TGW (g) Test weight (kg/hl) Protein (%) (N% x 5.7) Screenings (%) Falling number (sec)	47 79 12.6 0.7 362	45 79 12.6 0.6 371
END USE		Bread
BACKGROUND		
Breeder Agent	RAG PGG Wright	T, France son Grain

Note: Darfield is a three year mean.

# wheat cultivar descriptions

# VICEROY

YEAR 6

Viceroy is a New Zealand bred medium grade bread wheat with average yields. Watch for disease as Viceroy shows susceptibility to most diseases with the exception of BYDV and stripe rust. It has above average test weight and falling number. This variety has a stiff straw with low to moderate sprouting risk.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



Note: Darfield is a three year mean.

## **CRWT218**

YEAR 1

A new potential premium milling wheat producing low yields in its first year of CPT2 trials. CRWT218 out-yielded Conquest by an average of 6% in CPT1 trials. Moderately susceptible to Septoria tritici blotch, leaf rust and powdery mildew, but shows some resistance to BYDV and stripe rust. Below average grain weight, test weight and falling number. A tall stiff strawed variety with intermediate maturity and low to moderate sprouting risk.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Septoria leaf blotch Stripe rust Leaf rust Powdery mildew Fusarium head blight	Moderately Moderately so Moderately Moderately so Moderately so	/ resistant usceptible / resistant usceptible usceptible Unknown
FIELD CHARACTERISTICS		
Straw strength Crop height Maturity Sprouting risk	Int Low-	Stiff Tall ermediate •moderate
GRAIN QUALITY (4 year means)	Sth Nth Island	Canterbury
TGW (g) Test weight (kg/hl) Protein (%) (N% x 5.7) Screenings (%) Falling number (sec)	43 72 12.7 1.1 364	38 71 12.6 1.6 361
END USE		Bread
BACKGROUND		
Breeder Agent	Plant & Food Luis	Research etti Seeds

# barley - trial site details



2015/2016 trial site location map

#### WANGANUI

Marton clay loam, Dryland Trial operator: Kevin Sinclair, Plant & Food Research Host farmer: Paul Mackintosh

This dryland trial was sown on 29 October 2015 into a field of Putney following a barley crop. The trial received 150 kg/ha urea in late November. One herbicide, two fungicide applications and a foliar insecticide were applied in December. No PGR was used. The trial established well and was harvested on 16 February 2016.

#### MARTON

Kiwitea silt loam, Dryland Trial operator: Kevin Sinclair, Plant & Food Research Host farmer: Murray Knox

The trial was sown on 3 November 2015 into a field of Fairview following a three year pasture phase. The trial received 60 kg/ha urea in early December. One application of herbicide and a fungicide were applied to the crop during the growing season. No PGRs were used. The trial established well and was harvested on 15 February 2016.

#### WOODEND

Waimakariri silt loam, Dryland Trial operator: Matt Hicks, Cropmark Seeds Ltd Host farmer: Ian Batchelor

This new site replaces the previous Ohoka site. The trial was sown on 14 September 2015 into a field of dryland Sanette following a previous barley crop. The trial received 300 kg/ha Crop 20 prior to sowing. One herbicide, an insecticide, two fungicide applications and a PGR where applied to the trial. The crop was harvested on 17 February 2016, following a dry growing season.

#### DUNSANDEL

Templeton silt loam, Irrigated Trial operator: Matt Hicks, Cropmark Seeds Ltd Host farmer: Nigel Barnett

This trial was sown on the 8 September 2015 in a paddock of Tavern following pasture. The trial received 150 kg/ha urea in November. Two herbicides, one fungicide and a foliar insecticide were applied during the growing season. No PGRs were used. A total of 215 mm of irrigation was applied in five applications. The trial was harvested on 24 February 2016.

# **barley** - trial site details

#### METHVEN

Lyndhurst silt loam, Irrigated Trial operator: John van den Bosch, PGG Wrightson Grain Host farmer: Alan and Brendon Moore

The trial was sown on 20 August 2015 into a field of Tavern following green feed oats. Urea totalling 240 kg/ha was applied in two applications during the growing season. The crop received two herbicide applications, one foliar insecticide and a PGR. Three fungicides were applied between November and December. The trial received six irrigations totalling 175 mm. The trial was harvested on 18 February 2016.

#### PENDARVES

Lismore silt loam, Irrigated Trial operator: Andy Hay, Plant & Food Research Host farmer: Ross Duncan

The trial was sown on 9 September 2015 into a field of Chill barley following kale. The trial received a total of 250 kg/ha urea in two applications. Three herbicides, two insecticides, four fungicides and a PGR were applied during the growing season. The trial received a total of 332 mm of irrigation. The trial established well and was harvested on 18 February 2016.

#### ST ANDREWS

No trial this season.

#### BALFOUR

Oreti silt loam, Dryland Trial operator: Stewart Armstrong, Plant & Food Research Host farmer: Wilkins Farming

The trial was sown on 12 October 2015 into a field of Dash following swedes. An application of 445 kg/ha urea was applied to the crop. The trial received one herbicide and two fungicide applications during the growing season. The crop matured early due to the dry conditions and was harvested on 9 March 2016.

#### CHATTON

Waikoikoi silt loam, Dryland Trial operator: Matt Hicks, Cropmark Seeds Ltd Host farmer: John Gardyne

The trial was sown into a field of Tavern on 21 October 2015 following a winter wheat crop. A total of 500 kg/ha urea was applied to the trial. One herbicide, a PGR and three fungicide applications were made during the growing season. Some brackling was noted at harvest on 18 March 2016.

# barley - agronomic comment

Spring Sown Barley	Agronomi	c Comme	ent 2015	//2016 Seas	on				
CULTIVAR	Years in FAR trials	BYDV	Scald	Net blotch (net form)	Leaf rust	Powdery Mildew	Straw strength	Crop height	Maturity
Booma	œ	(MR)	MS	MR	MS*	MR	Moderate	Med-tall	Early-int
Bumpa	6	MR	MS	MS	MR	MRR	Moderate	Med-tall	Early-int
Calibre	9	(MS)	MSS	MR	MS	MR	Moderate	Med-tall	Early-int
Dash	20	(MR*)	MSS*	MS*	MR	MS	Stiff	Short	Early
Fairview	13	MS	MSS	MR	MS*	HS	Moderate	Medium	Early-int
Garner	9	(MS)	MS*	MR	MS	MR	Stiff	Tall	Intermediate
Jimpy	6	(MR)	MR	MR	MS	MS	Mod-stiff	Medium	Int-late
Kelim	4	(MR)	MS	MR	MS	(MRR)	Stiff	Tall	Intermediate
Liberator	Ŋ	(MR)	MR	MS	MS	(MR)	Moderate	Medium	Intermediate
Milford	ო	(MR)	MS	MS	MR	(MRR)	Stiff	Short	Intermediate
Piper (SYN411-287)	2	(MS)	MS	MS	MS	(MRR)	Stiff	Medium	Intermediate
Quench	10	MS	MS*	MS	MSS	MRR	Stiff	Medium	Int-late
RGT Planet (SFR85-014)	2	(MS)	(MR)	MS	MS	(MRR)	Moderate	Medium	Early-int
Sanette	4	(MS)	MR	MR	MS	(MRR)	Moderate	Medium	Early-int
Scholar (SYN411-285)	S	(MS)	MS	MS	MR	(MRR)	Stiff	Medium	Int-late
Shada (SYN410-235)	က	Unknown	MS	MS	MS	(MRR)	Moderate	Medium	Intermediate
Snakebite	8	(MS)	MS	MSS	MS	MS	Stiff	Medium	Early-int
Sumit	9	(MS)	MS	MS	MS	MS	Stiff	Short-med	Early-int
Tavern	15	MS	MR	MS	MSS	MR*	Stiff	Short-med	Intermediate
CRBA144	0	(MR)	MR	MS	MRMS	(MRR)	Moderate	Medium	Intermediate
CRBA146	-	Unknown	MR	MR	MRMS	(MRR)	Moderate	Medium	Intermediate
CRBA148		Unknown	MS	MR	MS	(MRR)	Moderate	Med-tall	Intermediate
SY413-345	-	Unknown	MR	MR	MS	(MRR)	Mod-stiff	Short-med	Early
SY413-347	-	Unknown	MS	MRMS	MS	(MRR)	Mod-stiff	Short-med	Early-int
Disease susecptibility sour CPT trials (assessments ca Scores followed by * indica	ced from FAI rried out by ite resistance	R-funded Di Plant & Foo is affected	sease Nu d Researc by patho	rseries and ch). types present	Key HS = hi S = sus	ghly suscep ceptible	tible MF	3MS = intermed 3 = moderately	liate resistance resistant

au iouypes pi y Y (score is an average). קק

"Unknown" indicates there is insufficient trial information in NZ to assess resistance.

(brackets) indicate there is limited NZ trial data to assess resistance.

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MRR = mostly resistant

R = resistant

MS = moderately susceptible MSS = mostly susceptible

# <sup>nage</sup> | **barley** - 2015/2016 yield (t/ha)

## Spring Sown Barley Cultivar Evaluation 2015/2016 Season - yield (t/ha)

CULTIVAR	Wanganui	Marton	Southern NI	Woodend	Dunsandel	
Region	Manawatu	Manawatu	mean	North Canterbury	Mid Canterbury	
Soil Type	Marton clay loam	Kiwitea loam		Waimakariri silt loam	Mayfield silt Ioam	
Dryland/Irrigated	Dryland	Dryland		Dryland	Irrigated	
Previous crop	Barley	Pasture		Barley	Pasture	
Sowing date	29 Oct	3 Nov		14 Sep	8 Sep	
Harvest date	16 Feb	15 Feb		17 Feb	24 Feb	
Booma	9.5	8.0	8.8	7.9	8.3	
Bumpa	9.4	8.2	8.8	7.9	8.4	
Calibre	9.5	8.1	8.8	8.1	8.2	
Dash	8.7	7.9	8.3	7.5	7.9	
Fairview	9.0	7.7	8.4	8.0	7.7	
Garner	9.7	8.2	9.0	8.2	8.5	
Jimpy	8.9	6.9	7.9	7.7	8.7	
Kelim	9.9	8.3	9.1	7.8	8.9	
Liberator	10.2	8.6	9.4	8.7	9.4	
Milford	9.6	8.3	9.0	7.3	8.3	
Piper (SYN411-287)	10.4	9.0	9.7	8.5	9.3	
Quench	9.8	8.5	9.1	7.7	8.6	
RGT Planet (SFR85-014)	10.2	9.0	9.6	8.5	8.9	
Sanette	10.2	8.9	9.6	8.2	9.0	
Scholar (SYN411-285)	10.0	9.2	9.6	8.6	9.7	
Shada (SYN410-235)	10.1	9.3	9.7	8.6	9.7	
Snakebite	9.0	7.9	8.5	8.2	8.4	
Sumit	9.6	8.6	9.1	7.9	8.4	
Tavern	8.5	7.0	7.8	7.9	8.6	
CRBA144	9.9	8.7	9.3	8.0	8.8	
CRBA146	10.0	9.0	9.5	8.0	9.1	
CRBA148	9.8	8.2	9.0	8.3	9.0	
SY413-345	10.2	9.1	9.6	8.7	9.0	
SY413-347	10.0	9.0	9.5	8.4	9.5	
Site mean yield (t/ha)	9.7	8.4	9.0	8.1	8.8	
LSD 5%	0.4	0.3	0.4	0.3	0.3	
CV%	3.2	2.6	2.2	2.4	2.7	

- Cultivar not included in that particular trial.

Methven	Pendarves	Canterbury	Balfour	Chatton	Southland	Seasons in
Mid Canterbury	Mid Canterbury	mean	Northern Southland	Central Southland	mean	FAR trial (Spring
Lyndhurst silt Ioam	Lismore silt Ioam		Wendonside silt loam	Waikoikoi silt Ioam		sown)
Irrigated	Irrigated		Dryland	Dryland		
GF Oats	Kale		Swedes	Wheat		
20 Aug	9 Sep		12 Oct	9 Oct		
18 Feb	18 Feb		9 Mar	18 Mar		
10.5	11.3	9.5	6.4	8.5	7.4	8
10.3	11.0	9.4	7.0	8.9	8.0	9
10.1	10.7	9.3	6.3	8.0	7.1	6
9.9	10.9	9.0	8.0	8.5	8.2	20
9.2	10.8	8.9	-	-	-	13
10.1	11.3	9.5	7.0	8.3	7.6	6
10.6	10.5	9.4	-	-	-	9
9.7	11.2	9.4	6.0	8.6	7.3	4
10.4	11.0	9.9	7.2	7.9	7.6	5
9.7	11.1	9.1	6.5	8.5	7.5	3
10.7	11.6	10.0	7.7	9.0	8.4	2
10.0	10.6	9.2	6.8	8.2	7.5	10
10.3	11.4	9.8	7.4	8.9	8.2	2
10.9	11.8	9.9	7.1	8.6	7.8	4
11.1	11.5	10.2	7.8	9.3	8.6	3
10.9	11.9	10.3	7.5	8.8	8.2	3
10.6	10.6	9.4	6.9	8.4	7.7	8
10.2	11.2	9.5	6.7	8.1	7.4	6
10.7	10.8	9.5	6.4	8.2	7.3	15
11.2	11.1	9.8	7.0	9.0	8.0	2
10.0	11.5	9.6	7.1	9.0	8.0	1
10.4	11.7	9.8	7.2	9.4	8.3	1
10.9	11.3	10.0	7.4	9.3	8.4	1
10.6	12.0	10.1	8.0	8.8	8.4	1
10.4	11.2	9.6	7.1	8.6	7.9	
0.5	0.3	0.4	0.5	0.5	0.7	
3.5	1.8	3.2	4.9	3.8	4.6	

# $\frac{18}{18}$ **barley** - 2015/2016 grain quality

## Spring Sown Barley Grain Quality Data 2015/2016 Season

## Southern North Island

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 6.25)	Screenings (%)
Booma	47	69	10.5	2.1
Bumpa	51	68	10.0	1.3
Calibre	51	67	9.6	1.7
Dash	46	68	10.7	1.9
Fairview	50	69	10.3	0.8
Garner	51	67	10.1	1.6
Jimpy	52	69	10.9	0.4
Kelim	51	67	10.2	1.0
Liberator	50	66	9.6	2.0
Milford	53	68	10.2	1.2
Piper (SYN411-287)	55	66	9.5	0.8
Quench	51	69	10.3	0.8
RGT Planet (SFR85-014)	55	67	9.5	1.0
Sanette	53	67	9.9	0.8
Scholar (SYN411-285)	49	67	9.1	1.8
Shada (SYN410-235)	51	66	8.7	3.0
Snakebite	55	69	10.6	0.5
Sumit	52	69	10.4	1.0
Tavern	53	71	10.9	0.4
CRBA144	52	68	10.1	0.6
CRBA146	53	67	9.8	0.9
CRBA148	52	70	9.3	0.9
SY413-345	52	66	9.5	0.8
SY413-347	56	67	9.0	1.0
Mean	52	68	9.9	1.2
LSD 5%	3	1	1.0	0.9

## Canterbury

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 6.25)	Screenings (%)
Booma	45	64	9.7	3.1
Bumpa	50	64	10.0	2.1
Calibre	49	64	9.5	2.5
Dash	45	63	9.8	2.5
Fairview	48	65	10.0	2.3
Garner	49	64	9.1	2.3
Jimpy	49	65	9.6	1.6
Kelim	51	64	9.7	1.7
Liberator	49	63	8.6	1.8
Milford	48	61	9.4	3.4
Piper (SYN411-287)	54	63	9.4	1.5
Quench	49	63	9.3	2.2
RGT Planet (SFR85-014)	52	63	9.0	1.5
Sanette	51	63	9.4	1.6
Scholar (SYN411-285)	47	64	9.0	2.0
Shada (SYN410-235)	50	62	8.5	2.8
Snakebite	52	64	9.7	1.3
Sumit	49	62	9.4	2.4
Tavern	49	65	9.5	1.5
CRBA144	50	65	9.7	1.1
CRBA146	51	63	9.3	1.4
CRBA148	51	64	9.2	1.3
SY413-345	51	63	9.2	1.7
SY413-347	54	62	9.1	1.8
Mean	50	64	9.4	2.0
LSD 5%	1	1	0.6	0.7

The quality data for each region is also presented as a 4 year mean on the individual cultivar description pages.

# $\frac{20}{20}$ **barley** - 2015/2016 grain quality

## Southland

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 6.25)	Screenings (%)
Booma	43	62	12.3	3.0
Bumpa	49	62	13.0	1.6
Calibre	47	61	12.6	1.9
Dash	42	61	12.7	2.7
Fairview	-	-	-	-
Garner	46	60	12.0	1.7
Jimpy	-	-	-	-
Kelim	49	61	12.4	1.4
Liberator	44	58	12.0	2.8
Milford	49	61	11.9	1.8
Piper (SYN411-287)	50	60	12.2	1.7
Quench	46	61	12.5	1.6
RGT Planet (SFR85-014)	50	60	12.0	1.4
Sanette	49	59	12.7	1.5
Scholar (SYN411-285)	45	63	11.7	1.9
Shada (SYN410-235)	47	59	11.4	2.7
Snakebite	49	61	12.4	1.1
Sumit	47	60	12.0	1.4
Tavern	46	63	12.8	1.3
CRBA144	48	62	12.7	1.2
CRBA146	48	60	12.4	1.5
CRBA148	48	63	12.2	0.9
SY413-345	49	61	11.6	1.3
SY413-347	53	59	11.7	1.5
Mean	47	61	12.2	1.7
LSD 5%	3	2	0.6	1.0

- Cultivar not included at that particular site.

The quality data for each region is also presented as a 4 year mean on the individual cultivar description pages.

# notes

## Spring Sown Barley - 4 year adjusted mean - relative yield by site

CULTIVAR	Wanganui	Marton	Southern NI mean	Woodend	Dunsandel
Region	Manawatu	Manawatu		North Canterbury	Mid Canterbury
Dryland / Irrigated	Dryland	Dryland		Dryland	Irrigated
No. of trials	4	4	8	2	4
Booma	99	94	97	100	98
Bumpa	99	95	97	98	98
Calibre	91	97	94	98	96
Dash	98	97	97	96	95
Fairview	91	92	92	96	90
Garner	99	99	99	99	97
Jimpy	90	88	89	96	98
Kelim	100	100	100	98	99
Liberator	99	102	100	102	102
Milford	102	97	99	94	99
Piper (SYN411-287)	108	106	107	105	102
Quench	101	101	101	96	98
RGT Planet (SFR85-014)	108	108	108	105	102
Sanette	103	104	103	104	104
Scholar (SYN411-285)	98	107	102	104	107
Shada (SYN410-235)	107	108	108	101	107
Snakebite	100	93	97	98	99
Sumit	101	101	101	102	98
Tavern	90	85	88	99	96
CRBA144	105	106	106	99	100
CRBA146	103	108	105	99	104
CRBA148	101	98	100	102	102
SY413-345	105	108	107	107	102
SY413-347	103	107	105	104	108
Site mean yield (t/ha)	9.1	8.0	8.5	8.4	9.6
LSD (estab. cv)	7.0	4.7	7.2	6.8	4.8
LSD (new vs estab.)	11.1	7.4	11.4	9.7	7.6

- Cultivar not included at that particular site.

\* No trial at St Andrews this year.

LSD (estab. cv) is for comparing two "established" cultivars (that have both been in all trials).

Methven	Pendarves	St Andrews*	Canterbury mean	Balfour	Chatton	Southland mean	Seasons in FAR trials
Mid Canterbury	Mid Canterbury	South Canterbury		Northern Southland	Central Southland		(Spring sown)
Irrigated	Irrigated	Irrigated		Dryland	Dryland		
4	4	2	16	4	4	8	
101	99	99	100	95	92	94	8
99	98	99	98	101	102	101	9
97	95	103	96	96	92	94	6
96	101	93	97	96	102	99	20
91	93	94	93	-	-	-	13
101	99	98	99	96	96	96	6
101	92	94	97	-	-	-	9
100	100	100	99	102	97	100	4
95	98	101	99	96	102	98	5
98	98	98	98	96	95	96	3
102	103	104	103	104	105	105	2
97	96	99	97	95	93	94	10
104	101	107	103	105	105	105	2
103	104	101	104	104	103	104	4
103	103	108	104	104	107	105	3
100	105	102	104	102	101	102	3
100	99	98	99	94	99	96	8
99	101	102	100	98	99	99	6
101	97	96	98	95	96	95	15
109	101	105	102	103	98	101	2
96	103	-	100	103	100	102	1
100	105	-	102	107	102	105	1
106	101	-	104	107	104	106	1
102	108	-	105	102	112	106	1
10.4	10.1	10.4	9.7	10.0	7.6	8.8	
5.2	4.7	6.3	4.9	4.8	7.2	6.3	
8.2	7.4	7.7	7.7	7.6	11.3	10.0	

LSD (new vs estab.) is for comparing a "new" (first year) cultivar with an "established" cultivar. These 4-year adjusted mean relative yields are also presented in graphical form on the following pages for each individual cultivar.

# <sup>24</sup> **barley** cultivar descriptions

# BOOMA

YEAR 8

Booma has produced yields that range from below average in Southland to mostly average at other sites. This cultivar has shown moderate susceptibility to leaf rust and scald but moderate resistance to BYDV, net blotch and powdery mildew. Low thousand grain weights but good test weights. Booma is a medium to tall variety with moderate straw strength.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



**DISEASE RESISTANCE** 

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Modera Moderatel Modera Moderately Modera	tely res y susce tely res susce tely res	sistant eptible sistant otible* sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Moo Mediu interm	derate m-tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	46 65 9.7 4.2	45 64 10.1 3.4	46 63 11.8 4.6
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet search Seeds

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

## **BUMPA**

YEAR 9

Bumpa is a feed cultivar which is mostly average to below average yielding. A better performer in Southland. Shows levels of resistance to powdery mildew, leaf rust, and BYDV, but is moderately susceptible to scald and net blotch. Early to intermediate maturity and above average protein content.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately resistant Moderately susceptible Moderately susceptible Moderately resistant Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Moo Mediu interm	derate m-tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	48 64 9.6 2.8	50 64 10.5 2.2	54 64 12.0 2.0
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet earch Seeds

<sup>page</sup>

# 

YEAR 6

Early to intermediate maturing feed cultivar has produced mostly below average yields. Shows some resistance to net blotch and mildew but is susceptible to most other diseases. Calibre is a medium to tall variety with moderate straw strength.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderatel Mosti Modera Moderatel Moderatel	y susce y susce tely res y susce tely res	eptible eptible sistant eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Moo Mediu interm	derate m-tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	48 62 9.5 3.4	48 63 10.0 2.3	50 61 11.7 3.7
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo Can	ood Res terbury	Sejet search / Seed

Note: Woodend and St Andrews are two year means.

## DASH

YEAR 20

Early maturing feed cultivar with mostly below average yields. It has susceptibility to scald and net blotch but moderate resistance to BYDV and leaf rust. Produces low grain weights with above average proteins. A short stiff strawed cultivar with early maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderate Mostly Moderately Moderately Moderately	ely resi susce susce tely res y susce	istant* ptible* ptible* sistant eptible
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity			Stiff Short Early
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	47 64 9.7 2.5	44 63 10.6 3.5	45 61 11.8 4.0
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Cro PGG Wri	Syr pmark ghtsor	ngenta Seeds n Grain

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

# barley cultivar descriptions

# FAIRVIEW

YEAR 13

A below average yielding malting cultivar in Canterbury and southern North Island. Fairview is quite susceptible to mildew and scald and to a lesser extent BYDV and leaf rust. Moderately resistant to net blotch. Fairview has moderate straw strength and crop height.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately Mostly Moderately Highly	y susce y susce tely res susce y susce	eptible eptible sistant otible* eptible
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Mo M interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	49 65 9.8 2.4	47 65 10.5 2.2	- - - -
END USE		N	lalting
BACKGROUND			
Breeder Head Licensee Agent		Mali Mali Mali	teurop teurop teurop

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

## GARNER

YEAR 6

A feed cultivar producing mostly average yields in Canterbury and southern North Island, but below average in Southland. Moderately susceptible to BYDV, scald and leaf rust. Moderately resistant to net blotch and powdery mildew. A medium to tall, stiff strawed variety with intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderatel Moderately Modera Moderatel Moderatel	y susce susce tely res y susce tely res	eptible otible* sistant eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Mediu Interm	Stiff m-tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	50 64 9.5 3.1	48 63 9.8 2.4	49 61 11 3.1
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Cro PGG Wr	Syr pmark ightson	igenta Seeds Grain

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

# JIMPY

YEAR 9

Malting cultivar with mostly below average yields. Jimpy has out yielded Fairview by 3% in Canterbury. Has moderate resistance to BYDV, scald and net blotch but moderate susceptibility to leaf rust and powdery mildew. Medium height and intermediate to late maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Modera Modera Modera Moderately Moderately	tely res tely res tely res y susce y susce	istant istant istant ptible ptible
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	M Inter	oderat M mediat	e-stiff edium e-late
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	50 64 10.1 2.5	48 64 10.4 1.8	- - -
END USE		M	lalting
BACKGROUND			
Breeder Head Licensee Agent		Malt Malt Malt	europ europ europ

Note: Woodend and St Andrews are two year means.

## KELIM

YEAR 4

Kelim is a feed variety producing mostly average yields. Shows good resistance to powdery mildew, BYDV and net blotch but moderately susceptible to scald and leaf rust. A tall, stiff strawed variety with intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately resistant Moderately susceptible Moderately resistant Moderately susceptible Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Interm	Stiff Tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	51 63 9.4 2.2	50 63 10.0 1.7	51 62 11.4 2.1
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds Not yet assigned		

# barley cultivar descriptions

# LIBERATOR

YEAR 5

A feed cultivar generally producing average yields. Moderately resistant to BYDV, scald and powdery mildew but moderately susceptible to leaf rust and net blotch. Liberator is a medium height crop with intermediate maturity and higher screenings.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately resistant Moderately resistant Moderately susceptible Moderately susceptible Moderately resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Moo M Interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	48 61 9.0 5.2	47 62 9.4 2.7	48 60 11 4.0
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet search Seeds

Note: Woodend and St Andrews are two year means.

## MILFORD

YEAR 3

Milford is a feed cultivar producing mostly below average yields. Moderately susceptible to net blotch and scald but shows good levels of resistance to most other diseases. A stiff short strawed variety with intermediate maturity and higher screenings.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately resistant Moderately susceptible Moderately susceptible Moderately resistant Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Interm	Stiff Short ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	52 64 9.6 2.4	48 62 10.1 3.5	50 61 11.5 3.1
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Breun, Germany Canterbury Seed Canterbury Seed		

## PIPER (SYN411-287)

YEAR 2

Mostly above average to high yielding feed cultivar performing well in all regions, especially in southern North Island. Monitor for disease as Piper is moderately susceptible to most diseases with the exception of powdery mildew. This cultivar is of medium height with a stiff straw and above average grain weights.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately susceptible Moderately susceptible Moderately susceptible Moderately susceptible Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		M Interm	Stiff edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	54 63 9.0 1.1	52 63 9.9 1.7	54 60 11.4 1.8
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds Not vet assigned		

Note: Woodend and St Andrews are two year means.

## QUENCH

YEAR 10

Quench produces average yields in the southern North Island, but mostly below average performance in other regions. Good resistance to mildew but the disease profile is weak against other foliar diseases especially leaf rust and mildew. Above average proteins. Excellent standing power combined with intermediate-late maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately Moderately Moderately Mostly Mostly	y susce suscep y susce y susce y susce stly res	eptible otible* eptible eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Inter	M mediat	Stiff edium e-late
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	50 65 9.7 1.9	48 63 10.3 2.0	49 62 12.0 2.4
END USE	Feed, mal	ting pot	tential
BACKGROUND			
Breeder Head Licensee Agent PGG Wrightson Grain, Ri	Cro Japehu Farm	Syn pmark : Suppli	igenta Seeds es (NI)

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

# **barley** cultivar descriptions

## RGT PLANET (SFR85-014)

YEAR 2

An above average to high yielding feed cultivar with malting potential. Excellent performer in the southern North Island. Shows resistance to scald and powdery mildew but moderately susceptible to most other diseases. Above average grain weights and low screenings with early to intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately susceptible Moderately resistant Moderately susceptible Moderately susceptible Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Moo M interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	54 63 9.1 1.4	51 63 10 1.6	53 60 11 1.8
END USE	Feed, malt	ting pot	tential
BACKGROUND			
Breeder Head Licensee Agent	Se PGG Wri	ed For ghtson	RAGT ce Ltd Grain

Note: Woodend and St Andrews are two year means.

# SANETTE

YEAR 4

An above average yielding feed cultivar with malting potential. Moderately susceptible to leaf rust and BYDV, but has moderate resistance to net blotch and scald. An early to intermediate maturing variety with a moderate straw strength.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately Moderat Moderately Moderately	y susce tely res tely res y susce stly res	ptible istant istant ptible istant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	Moo M interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	52 63 9.2 1.8	50 62 9.9 1.6	51 60 11.4 2.2
END USE	Feed, malt	ting pot	tential
BACKGROUND			
Breeder Syngenta Head Licensee Cropmark Seeds Agent PGG Wrightson Grain, Cates Grain & Seed and Advanced Agriculture			

# SCHOLAR (SYN411-285)

YEAR 3

A mostly above average to high yielding feed cultivar. Moderately susceptible to scald and net blotch. This cultivar is of medium height with a stiff straw and intermediate to late maturity.

#### Wanganui 98 Marton 107 Woodend 104 Dunsandel 107 Methven 103 Pendarves 103 St Andrews 108 Balfour 104 Chatton 107 85 90 95 100 105 110 115 120

**RELATIVE YIELDS – 4 year adjusted mean** 

#### DISEASE RESISTANCE

(% of site mean yield)

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately susceptible Moderately susceptible Moderately susceptible Moderately resistant Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Inter	M mediat	Stiff edium te-late
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	48 63 8.9 4.3	46 63 9.9 2.3	47 62 11.2 2.9
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds PGG Wrightson Grain		

Note: Woodend and St Andrews are two year means.

## SHADA (SYN410-235)

YEAR 3

Shada is an average to high yielding feed cultivar. Performs well in the southern North Island. Moderately susceptible to most diseases with the exception of powdery mildew. Shada has moderate straw strength and produces low proteins and test weights with high screenings.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Unknown Moderately susceptible Moderately susceptible Moderately susceptible Mostly resistant		
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Moo M Interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	52 63 8.6 3.5	49 61 9.3 3.7	50 59 10.7 4.2
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds H & T Agronomics		

# barley cultivar descriptions

# SNAKEBITE

YEAR 8

Snakebite is a feed cultivar producing mostly average to below average yields. This variety is relatively susceptible to disease. Good grain weight with stiff straw and an early to intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately Moderately Mostly Moderately Moderately	/ susce / susce / susce / susce / susce / susce	eptible eptible eptible eptible eptible
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Early-	M interm	Stiff edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	54 64 9.7 1.2	52 64 10.6 1.4	52 62 11.4 2.0
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds Ravensdown		

Note: Woodend and St Andrews are two year means.

# SUMIT

YEAR 6

Sumit has produced mostly average yields. It is moderately susceptible to most diseases. This cultivar has stiff straw, short to moderate crop height and is early to intermediate maturing.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust	Moderately Moderately Moderately Moderately	y susce y susce y susce y susce y susce	eptible eptible eptible eptible
Powdery mildew	Moderately	y susce	ptible
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	Si Early-	hort-m interm	Stiff edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	50 65 9.6 2.3	48 63 10.0 2.3	49 61 11.2 2.7
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Syngenta Cropmark Seeds Canterbury Seed		

# TAVERN

#### YEAR 15

Tavern is a feed cultivar producing below average yields at most sites. Moderately susceptible to net blotch and mostly susceptible to leaf rust. Excellent straw strength, combined with short to medium crop height.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderatel Modera Moderatel Mostl Moderate	y susce tely res y susce y susce ely resi	eptible sistant eptible eptible stant*
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	s	hort-m Interm	Stiff edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	53 67 10.3 1.3	48 65 10.2 1.9	50 64 11.7 2.3
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Cro PGG Wri	Syr pmark ightson	igenta Seeds Grain

Note: Woodend and St Andrews are two year means. Scores followed by \* indicate resistance is affected by pathotype present (score is an average).

## CRBA144

YEAR 2

CRBA144 has produced high yields in the southern North Island, and mostly average to above average yields in other regions. Moderately susceptible to net blotch but shows resistance to other diseases. A cultivar with low screenings, moderate straw strength and intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Modera Modera Moderatel Intermedia Mo	tely res tely res y susce te resis stly res	sistant sistant eptible stance sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Moo M Interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	50 64 9.4 1.7	50 64 10.3 1.3	50 61 11.9 1.8
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet search Seeds

# barley cultivar descriptions

# CRBA146

YEAR 1

CRBA146 is a feed cultivar producing mostly average to above average yields in its first year of CPT2 trials. Shows good resistance to most diseases. A cultivar with moderate straw strength and intermediate maturity producing average quality characteristics.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Modera Modera Intermedia Mo	Uni tely res tely res te resis stly res	known sistant sistant stance sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Moo M Interm	derate edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	52 63 9.2 2.2	51 63 9.9 1.6	51 60 11.6 2.5
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet search Seeds

Note: Woodend and St Andrews are two year means.

## CRBA148

YEAR 1

In its first year of CPT2 trials, CRBA148 has produced mostly average to above average yields. Good performer in Southland. Moderately susceptible to scald and leaf rust but shows resistance to powdery mildew and net blotch. High test weight and low screenings. A medium to tall cultivar with moderate straw strength and intermediate maturity.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderatel Modera Moderatel Mo	Uni y susce tely res y susce stly res	known eptible sistant eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity		Moo Mediu Interm	derate m-tall ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	51 66 8.7 2.2	50 64 9.9 1.5	51 64 11.4 1.9
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Plant & Fo	ood Res uisetti	Sejet earch Seeds

## SY413-345

YEAR 1

A feed variety with mostly above average to high yields in its first year of CPT2 trials. Good performer in Southland and southern North Island. Good resistance to scald, net blotch and powdery mildew but moderately susceptible to leaf rust. This early maturing cultivar has a moderate to stiff straw strength.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### DISEASE RESISTANCE

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderat Moderat Moderately Moderately	Uni tely res tely res y susce stly res	known sistant sistant eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	M SI	oderat hort-m	e-stiff edium Early
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	51 62 8.9 2.1	50 62 9.8 1.9	52 61 10.8 2.3
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Croj Not	Syn pmark yet ass	igenta Seeds signed

Note: Woodend and St Andrews are two year means.

## SY413-347

YEAR 1

In its first year of CPT2 trials SY413-347 has produced mostly above average to high yields. Shows resistance to net blotch and powdery mildew but moderately susceptible to leaf rust and scald. This short to medium height cultivar produces good grain weights with low protein content.

# RELATIVE YIELDS – 4 year adjusted mean (% of site mean yield)



#### **DISEASE RESISTANCE**

BYDV Scald Net form of net blotch Leaf rust Powdery mildew	Moderately Intermedia Moderately Moderately	Unk y susce te resis y susce stly res	known eptible stance eptible sistant
FIELD CHARACTERISTICS			
Straw strength Crop height Maturity	M Si Early-	oderat hort-m interm	e-stiff edium ediate
GRAIN QUALITY (4 year means)	Sth Nth Is	Cant	Sthld
TGW (g) Test weight (kg/hl) Protein (%) (N% x 6.25) Screenings (%)	55 63 8.4 2.3	53 62 9.8 2.0	56 60 10.9 2.5
END USE			Feed
BACKGROUND			
Breeder Head Licensee Agent	Cro Not	Syn pmark yet ass	igenta Seeds signed

#### Spring sown wheat and barley - Sowing date guidelines 2016

These guidelines have been constructed from FAR sowing date trial data combined with agronomic experience and in the case of some new cultivars, UK information is also used.



Note: Less information available for new cultivars.

Barley cultivars at the late sowing window are more suited to irrigated, higher fertility sites.

This calculation uses several variables to give an accurate answer for suggested sowing rates.

To use the calculation you will need to know the following:

- the plant population you want to establish for your crop,
- the thousand grain weight of the seed,
- the germination percentage (%) of the seed,
- the expected crop emergence this is determined by time of sowing, seed quality and management factors (e.g. seed treatment, sowing depth, seed-bed quality).

The steps to follow are:

#### THOUSAND GRAIN WEIGHT

If using certified seed, the value for thousand grain weight (TGW) should be available on the seed bag or on request. If you need to calculate it for yourself, the number of seeds you will need to count will depend on the accuracy of your scales. Make sure your seed sample is representative of the whole line.

- i. If you have scales that will weigh to 0.1g, count 200 seeds, weigh them and multiply the weight by 5 to get 1000 seed weight
- ii. If not, count and weigh 1000 seeds.

#### **GERMINATION PERCENTAGE (%)**

This should also be on the bag label or on request. A purity & germination (P&G) test figure is usually quoted. Germination tests determine the maximum germination potential of a given seed line. Under certain conditions in the field it is often noted by producers that the laboratory germination result overestimates seedling emergence. Although there are many factors that may influence the final plant population, the observed differences are also a result of the physiological quality of a particular seed line and its tolerance to stress. Caution is advised as the germination figure does not equate to the percentage of seeds expected to emerge in the field.

#### **EMERGENCE PERCENTAGE (%)**

Emergence percentage is an estimate based on actual emergence in the field. Further information can be gained from 'stress tests' and 'vigour tests'. These test results are not usually available but should hopefully be on request. Experience certainly helps when deciding on this figure.

Examples of emergence % could be:

- June sown: 80% emergence.
- July sown: 75% emergence (assumes maybe poorer quality seedbed, sown too deep, cold soil conditions).
- August October sown: 80–90% emergence (assumes soil moisture availability and increasing soil temperatures).

SOWING		target plant population (p/m <sup>2</sup> )
RATE	=	x TGW (g) x 100
(kg/ha)		% germination x % emergence

Examples:

#### SPRING WHEAT

- A wheat sample TGW = 45g
- B % germination = 90%
- C % emergence = 90%
- D target plant population = 250pl/m<sup>2</sup>
- E required sowing rate is 139 kg/ha

#### SPRING BARLEY

- A barley sample TGW = 40g
- B % germination = 90%
- C % emergence = 85%
- D target plant population = 225pl/m<sup>2</sup>
- E required sowing rate is 118 kg/ha

The calculation can be transformed to determine the actual emergence % achieved (useful if poor establishment):

%	actual plant population (p/m <sup>2</sup> )
EMERGENCE =	x TGW (g) x 100
	sowing rate (kg/ha)
	x % germination

The actual plant population needs to be counted in the field (rod or quadrat methods) for the above calculation, whilst TGW, sowing rate and germination % are figures that were known at drilling.

#### ISSUES FOR SUCCESSFUL ESTABLISHMENT

NUTRITION AND MOISTURE: Plant roots follow the easiest path for growth, so nutrition should be placed near the roots. Some fertilisers will, however, "burn" seedlings, so they must be placed out of direct contact with the seed. Moisture is essential for seed germination. Once germinated, the young seedling is also very fragile and may dry out rapidly if there is insufficient moisture in the root zone. Too much moisture (waterlogging) will mean oxygen starvation, which will lead to germination failure or seedling death.

SEEDBED: A trashy seedbed may reduce seed/ soil contact, thereby reducing germination, while a compacted seedbed may restrict emergence. A seedbed with large clods may also force emerging seedlings to become deformed (and therefore weakened) in their attempt to emerge.

**SOWING DEPTH:** Sown too shallow, seed may be subject to bird damage and susceptible to drying out. If sown too deep, young plants will struggle to emerge and may be weak and therefore prone to disease or may become deformed. Check that your drill is placing seed at its optimum depth. This is also important when considering residual herbicides since some products require a minimum planting depth.

WEEDS, DISEASES AND PESTS: Weeds will compete with the crop for light, moisture and nutrients. Weeds may potentially be more of a problem in thinly sown (or poorly established) crops. The main disease problem for emerging seedlings is fungi affecting the new roots but these are more likely to occur in a cool, damp environment, when seedlings are less vigorous and therefore more prone to attack. Seed treatment with fungicides may be beneficial if seed-borne diseases are a concern, but these treatments may also delay crop emergence. A wide range of pests can cause problems slugs, weevils, grass grubs, etc. If these are present, control options need to be evaluated.

# SOWING RATES IN GENERAL FOR WINTER/SPRING SOWINGS

Note: for most recent trial results relating to sowing rates for autumn sown wheat, see FAR Arable Updates Cereals Nos. 129, 130, 135, 153.

Generally establishment targets are:

- June 200 plants/m<sup>2</sup>
- July 200 plants/m<sup>2</sup>
- August 200 plants/m<sup>2</sup>
- September 250 plants/m<sup>2</sup>
- October 300 plants/m<sup>2</sup>

For further reading see FAR Arable Update Cereals No's.15, 65, 66, and 81.

#### SEED QUALITY

High quality seed has:

- < 10% Fusarium/Microdochium;
- > 95% germination;
- > 40g TSW;
- low abnormals and;
- good vigour.

		UNTREATED					TRE/	ATED	
Line	Germ	Abnorm	Remain	Fusari	Vigour	Germ	Abnorm	Remain	Fusari
А	80.2	13.8	6.0	36.0	3.2	76.6	18.0	5.4	2.8
В	73.6	17.0	9.4	31.0	2.8	69.4	21.4	9.2	0.6
С	72.0	14.6	13.4	71.2	3.6	71.4	4.4	6.4	3.6
D	79.6	13.8	6.6	5.0	3.8	71.6	22.0	6.4	0.0
E	83.8	9.2	7.0	21.0	4.4	79.4	11.8	8.8	0.2
F	76.6	17.6	5.8	62.6	3.8	71.4	23.4	5.2	6.2

Table: Attributes of example lines from the 2001/2002 harvest

Vigour 1 = poor, 5 = excellent

- A Reasonable line, fusarium mostly controlled with treatment, abnormals increased slightly after treatment indicating some seed damage.
- B Reject, abnormals increased after treatment indicating some seed damage, vigour not sufficient, treated germination not sufficient.
- C Reject, fusarium extremely high even though mostly controlled with treatment.
- D Reject, abnormals increased after treatment indicating some seed damage.
- E Reasonable line with good vigour.
- F Reject, fusarium extremely high even though mostly controlled with treatment, however abnormals increased after treatment indicating some seed damage.

NOTE:

- It is suggested that 60% of abnormals will emerge. However be aware that these plants have low tillering capacity.
- · Remainders are seeds which don't germinate.

#### PATHOGEN THRESHOLDS

Guidelines for seed-borne disease thresholds based on NIAB (UK) and NZ experiences:

- If < 10% Fusarium/Microdochium or 5% Drechslera infection sow untreated seed before 1 May or after 1 October.
- Treat if sowing after 1 May or before 1 October.
- All seed should be treated if the cereal follows maize as *Fusarium* risk is higher.
- Zero threshold exists for loose smut and barley seed-borne mosaic virus. Seedlines with loose smut will be rejected from certification and uncertified seed must be treated.

Seed treatments may not be needed on high quality seed (seed quality details should be freely available from seed merchant) and if the seedline is not repeatedly sown without treatment.

#### SEED TREATMENT STRATEGIES

#### **CONSIDERATIONS:**

- In damaged (e.g. cracked) seed all products have the potential to reduce establishment and, in severe cases, yield. Raxil then Vitaflo are the least likely to delay emergence of damaged seed. Delayed emergence may be critical for late autumn sowings.
- Vitaflo or Raxil control low *Fusarium* levels but MBC is needed for higher levels.
- Ideally, reject seedlines which test over 20–25% Fusarium and/or with a P&G germination of < 85%. However, seasonal conditions will impact on availability of seed with these levels.
- Seed treatments do not reduce the incidence of *Fusarium* head blight in the crop.

#### INSECTICIDE

Gaucho and Poncho are the only registered insecticide seed treatments, providing some control of aphids and grass grub. They should provide control of aphids up until the plant reaches GS13/21 or as the first tiller is appearing. Poncho is also registered for use in wheat for control of grass grub and argentine stem weevil.

Reminder: in spring sown cereals, aphicides do not give the same length of protection as autumn treatments due to the accelerated growth rates of the crop and thus increased rates of product breakdown.

Additionally, pressure on crops from flying aphids is also greater in spring crops, thereby increasing the importance of pest management.

# glossary of terms

Fus

4 year adjusted mean	A '4 year adjusted mean' is a mean over trials in the last 4 years. This mean has been adjusted statistically to take account of the absence of some cultivars in some trials. For example, if a cultivar was missing from an especially high yielding trial, it would otherwise be unfairly disadvantaged. This adjustment enables fair comparisons between cultivars within each site and region.
CV%	The "Coefficient of Variation", or CV%, is another measure of the variability in a trial. If the differences between cultivars are similar across all replicates, the trial CV% is low (<10%) and the LSD is low (both desirable). If the trial CV% is high (>10%), there is a high level of unexplained variation, and the trial results are less accurate.
Falling number	An indicator of sprouting if scores are low, falling number (FN) is an indirect measure of alpha-amylase levels in the grain with low FN indicating high alpha-amylase activity. FAR do not test falling number on feed wheat, only milling wheats.
Limited data	For newer cultivars which we have only evaluated for one or two years, we may not have sufficient disease or agronomic observations to feel confident about the data presented. In this case the data is given in brackets ().
LSD	The "Least Significant Difference", or LSD, is used to compare the mean yields of two cultivars. The difference in yield between two cultivars must be greater than the LSD for those two cultivars to be proven different (statistically at $P=0.05$ ). For example, if the LSD is 0.8, a difference between two cultivars of 0.5 is not 'proven', while a difference of 1.2 is proven.
Protein %	The protein content is obtained by measuring the nitrogen (N) content and using a conversion factor to calculate the protein $\%$ . The conversion factors in this booklet are N x 5.7 for all wheat and N x 6.25 for all barley. Some feed wheat users choose to use N x 6.25. To convert the wheat protein from 5.7 to 6.25 use a conversion factor of 1.096 x protein $\%$ .
Relative yield	Yields relative to a base 100 are given where 100 is the average yield across all cultivars. These relative yields make it easier to compare sites which may differ widely in mean yields.
Screenings %	Percentage of small grains, weed seeds and foreign matter which pass through a 2.0 mm rotoscreen.
Test weight	Measured in kilograms per hectolitre (kg/hl), test weight is an indication of grain density. Test weight is reported at standard grain moisture of 14%.
TGW	Thousand grain (seed) weight, reported in grams (g). Grain size is needed both as a measure of grain quality and for calculating sowing rates.
arium head scab	Disease caused by Fusarium spp.
Leaf rust	Disease caused by Puccinia recondite f.sp. tritici.
Powdery mildew	Disease caused by Erysiphe graminis f.sp. tritici.
Septoria tritici blotch	Disease caused by Zymoseptoria tritici, (perfect stage Mycosphaerella graminicola).
Stripe rust	Disease caused by Puccinia striiformis f.sp. tritici.

# <sup>42</sup> paddock sowing record

The table below is for you to record your cultivar choice and other useful information for your paddock history.

An example is provided.

Paddock	Cultivar name	Sowing rate (kg/ha)	Seed treatment	Area sown (ha)	Fertiliser (kg/ha)	Sowing date
Bluegum	Doyen	96 kg/ha	Raxil	10 ha	DAP 200	3 May

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## ADDING VALUE TO THE BUSINESS OF CROPPING

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