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FAR Cultivar Evaluation

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FAR CULTIVAR EVALUATION

FOUNDATION FOR ARABLE RESEARCH

FAR

autumn sown wheat and barley 2019/2020

contents

Yields for the 2019-20 season were up in the CPT trials when compared with last season, with the exception of some dryland sites. The season was off to a good start in many regions as autumn conditions were good for establishing crops. Mild weather continued through winter into spring and rainfall was below average in many areas. By the start of summer, soil moisture was below average in much of the upper and eastern North Island, along with parts of Tasman, Marlborough and Canterbury. Ongoing drought conditions in many of these regions, as well as a severe drought across Northland and Waikato over summer, ultimately affected yield of dryland crops.

In contrast, the lower west coast of the North Island and parts of Otago and Southland experienced frequent rain, resulting in above average soil moisture and water-logging, which hampered management in some crops. Otago and Southland also experienced above average rainfall during both December and February, with many crops affected by flooding at harvest.

In Canterbury, particularly South Canterbury, hail damaged some early maturing crops. However, good solar radiation over the grain fill period boosted yields of irrigated crops and many growers commented on record yield and quality, coupled with good harvest conditions.

Joanne Drummond
Cereals Manager

Tabitha Armour
CPT Manager

wheat - trial site details

2019/2020 trial site location map.

BALFOUR (Feed Wheat)

Crookston loam, Dryland
Trial operator: Stewart Armstrong, Plant & Food Research
Host farmer: Collins Farming Company Ltd

This dryland site was established in a surrounding crop of cv. Graham on 1 April 2019, following oil-seed rape. Ammo 36™, Cropzeal® 15P and two applications of SustaiN® provided 331 kg N/ha. The trial received three herbicides, a PGR and three fungicide applications. The trial was harvested over two days, on 28 and 29 February 2020.

CHERTSEY (Feed Wheat)

Chertsey shallow silt loam, Dryland and Irrigated
Trial operator: NZ Arable
Host farmer: FAR Arable Site

These trials were drilled at the FAR Arable Site on 26 April 2019 following ryegrass pasture. Each trial received two applications of urea plus ammonium sulphate totalling 220 kg N/ha. Both trials received three herbicide and fungicide applications. A PGR mix and three foliar insecticide applications were made during the season. The irrigated trial received 295 mm of water over 10 passes. The dryland trial was harvested on 27 January and the irrigated trial on 17 February 2020.

DORIE (Milling Wheat)

Templeton silt loam, Irrigated
Trial operator: Luke Visser, Plant & Food Research
Host farmer: Geoff Maw

Following ryegrass pasture, this trial was sown on 12 May 2019 into a surrounding crop of cv. Reliance. Four side dressings of urea provided 276 kg N/ha. Three applications of fungicide, two foliar insecticides, a PGR and two herbicides were applied during the growing season. A total of 120 mm irrigation was applied in three passes. The trial was harvested on 3 February 2020.

FAIRLIE (Feed Wheat)

Claremont silt loam, Dryland
Trial operator: NZ Arable
Host farmer: Ashley Biggs

This dryland site was sown on 2 April 2019 into a surrounding crop of Ignite wheat, following rape. Three applications of urea, plus DAP and ammonium sulphate provided 248 kg N/ha. Four fungicide applications, two herbicides, two foliar insecticides and a PGR were applied during the growing season. The trial was harvested on 10 February 2020.

GREENDALE (Milling Wheat)

Lismore shallow silt loam, Irrigated
Trial operator: John van den Bosch, Seed Force Ltd
Host farmer: Syd and Earl Worsfold

The trial was sown in a crop of cv. Viceroy on 2 May 2019, following white clover. Liquid fertiliser was applied in the spring followed by 168 kg N/ha of granular fertiliser over three applications. The trial received two herbicide and insecticide applications, a PGR and three fungicide applications. Irrigation totalling 240 mm was applied over six passes. Harvest took place on 10 February 2020.

HALCOMBE (Feed Wheat)

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

Following fodder beet, this trial was sown into a surrounding dryland crop of cv. Graham on 23 May 2019. The trial received 210 kg N/ha, split between DAP pre-plant and two in-crop applications. The management programme consisted of a single application each of PGR and foliar insecticide, plus two herbicide and four fungicide applications. Lodging was recorded in most cultivars at harvest on 27 January 2020, but yields were good.

METHVEN (Feed Wheat)

Mayfield stony silt loam, Irrigated
Trial operator: Briar Kinney, Plant Research (NZ) Ltd
Host farmer: David and Sam Grant

The trial was sown in a crop of cv. Starfire on 1 April 2019, following radish. Four applications of urea supplied 242 kg N/ha. The trial received five herbicide and four foliar insecticide applications. Two PGRs and four fungicide applications were made during the growing season. Irrigation totalling 116 mm was applied over 10 passes. Harvest took place on 12 February 2020.

METHVEN (Milling Wheat)

Lyndhurst silt loam, Irrigated
Trial operator: Steve Shorter, PGG Wrightson Grain
Host farmer: Bevan Lill

This trial was sown on 25 April 2019, following linseed and was harvested on 11 February 2020. Management details not supplied.

ORETI (Feed Wheat)

Drummond loam, Dryland
Trial operator: Stewart Armstrong, Plant & Food Research
Host farmer: Robbie Clark

This dryland feed wheat trial was sown on 3 April 2019 into a surrounding crop of cv. Graham following ryegrass. Sulphate of ammonia and two applications of urea provided 205 kg N/ha during the growing season. The trial received a PGR, one herbicide and three fungicide applications. A wet season meant the soil was frequently saturated. The trial was harvested on 2 March 2020.

ST ANDREWS (Feed Wheat)

Claremont silt loam, Dryland
Trial operator: Luke Visser, Plant & Food Research
Host farmer: Nick Porter

This dryland trial was established in a crop of cv. Ignite following peas on 10 April 2019. DAP, ammonium sulphate and three applications of urea provided 217 kg N/ha. In-crop management consisted of two herbicide and two insecticide applications, along with three fungicide applications. The trial was harvested on 6 March 2020.

TEMUKA (Feed Wheat)

Waimakariri silt loam, Irrigated
Trial operator: Matt Hicks, Cropmark Seeds
Host farmer: Nick Ward

This trial was abandoned due to hail damage.

WAKANUI (Feed Wheat)

Wakanui silt loam, Irrigated
Trial operator: Steve Shorter,
PGG Wrightson Grain
Host farmer: Eric Watson

This trial was sown on 18 April 2019, following red beet. The trial received liquid N totalling 295 kg/ha. Four fungicide applications, two herbicides, two PGR and four insecticide applications were made during the growing season. Four passes applied a total of 160 mm irrigation. The trial was harvested on 27 February 2020.

WINCHESTER (Milling Wheat)

Temuka silt loam, Irrigated
Trial operator: Luke Visser,
Plant & Food Research
Host farmer: Turley Farms Ltd

The trial was sown on 10 May 2019 into a surrounding crop of cv. Siskin, following a Swiss chard seed crop. Six applications of N totalling 363 kg/ha were applied, followed by two liquid applications. The trial received four herbicide, four insecticide and five fungicide applications, along with two PGRs and 25 mm irrigation during the growing season. The trial was harvested on 25 February 2020.

Autumn Sown Wheat Agronomic Comment 2019/2020 Season

CULTIVAR	Years in FAR trials	Septoria leaf blotch	Stripe rust	Leaf rust	Powdery mildew		Fusarium head blight	Straw strength	Crop height	Maturity	Sprouting susceptibility
Catherine (CRWT235)	3	MSS*	MRR	MSS	MR		(MRMS)	Moderate	Tall	Intermediate	Low
Conquest	15	MS	MR	MSS*	MS		MS	Moderate-stiff	Medium	Early-int	Low
Discovery	7	MR	MRMS	(MR*)	MRR		MSS	Stiff	Tall	Intermediate	Low-moderate
Duchess	6	MRMS	MR	MSS	MS		MRMS	Stiff	Medium	Intermediate	Low
Firelight (KWW72)	3	MRR	MRR	MRR	MRMS		(MR)	Moderate	Medium	Intermediate	Moderate
Gator	7	MS	MR	MSS	MRR		MR	Stiff	Short	Intermediate	Low
Graham	4	MR	MRR	MRMS*	MR		(MR)	Stiff	Medium	Early	Low
Griffin	5	MS	MR	MS	MSS		(MRMS)	Stiff	Tall	Intermediate	Low-moderate
Hanson	6	MRMS	MR	MRMS	MS		S	Stiff	Medium-tall	Intermediate	Low-moderate
Ignite	5	MR	MR	MS	MRMS*		(MRMS)	Stiff	Medium	Late	Low-moderate
Kerrin (CK121)	1	(MRR)	Unknown	(MRR)	(R)		(MRMS)	Moderate-stiff	Medium	Intermediate	Moderate
Raffles	16	MRMS	MSS	MSS	MR		MSS	Moderate	Tall	Intermediate	Low
Reflection	4	MR	MSS*	MR	MR		(MRMS)	Stiff	Short	Early	Low-moderate
Reliance	8	MS	MR	S	MS		MS	Moderate-stiff	Short-medium	Early-int	Low
RGT Skyfall (SFR86-073)	3	MR	MRMS	MR	MRR		MR	Stiff	Short	Early-int	Low-moderate
Ruapuna	5	MS	MR	MS	MR		(MRMS)	Stiff	Medium	Late	Low-moderate
Starfire	9	MRMS*	MR	MS	MR		MR	Stiff	Medium	Intermediate	Moderate
Torch	7	MRMS*	MRR	MS*	MR		(MS)	Stiff	Medium	Late	Low
Viceroy	10	MS	MR	MS	MS		MSS	Stiff	Medium-tall	Intermediate	Low
Wakanui	12	MRMS	MRR	MS	MS		(MRMS)	Stiff	Tall	Late	Moderate
CRWT233	4	MRMS	MRR	MRR	MRMS		(MRMS)	Moderate	Medium-tall	Intermediate	Low
CRWT245	1	MRMS*	MRR	MSS	MRR		(MRR)	Stiff	Medium	Late	Low-moderate
CRWT247	1	(MRMS*)	MRR	MRMS	MRR		(MS)	Stiff	Medium	Intermediate	Very low
KWW78	3	(MR)	(MRR)	(MRMS)	MS		(MRR)	Moderate-stiff	Medium	Early-int	Low
KWW83	1	MRR	MRR	MRR	(MR)		(MRMS)	Moderate	Medium	Late	Low-moderate
KMW84	1	MR	MRR	MRMS	MRR		(MRMS)	Stiff	Short	Intermediate	Low
KMW89	1	(MRMS*)	MRR	MSS*	MRR		(MRMS)	Moderate	Medium-tall	Intermediate	Low-moderate
SY114257	2	MRMS*)	MRR	MSS*	MRR		MRMS	Moderate-stiff	Medium-tall	Early	Low

Scores followed by * indicate resistance is affected by pathotypes present (score is an average).
(brackets) indicate there is limited NZ trial data to assess resistance (i.e. the cultivar has either been in trials for less than three years and/or disease pressure has been low).
"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 scores are an indication of susceptibility to preharvest sprouting.
Data sourced from FAR funded Sprouting Nurseries (assessments carried out by Plant & Food Research).

Key S = susceptible
MSS = mostly susceptible
MS = moderately susceptible
MRMS = intermediate resistance
MR = moderately resistant
MRR = mostly resistant
R = resistant

Autumn Sown FEED/BISCUIT Wheat Cultivar Evaluation 2019/2020 Season - yield, t/ha - Canterbury

CULTIVAR	Methven	Chertsey	Chertsey	Wakanui	St Andrews	Fairlie	Cant mean yield	Seasons in FAR trials (Autumn sown)
Region	Mid Cant	Mid Cant	Mid Cant	Mid Cant	South Cant	South Cant		
Soil type	Mayfield stony silt loam	Chertsey shallow silt loam	Chertsey shallow silt loam	Wakanui silt loam	Claremont silt loam	Claremont silt loam		
Previous crop	Radish	Pasture	Pasture	Red beet	Peas	Rape		
Sow date	1 Apr	26 Apr	26 Apr	18 Apr	10 Apr	2 Apr		
Harvest date	12 Feb	27 Jan	17 Feb	27 Feb	6 Mar	10 Feb		
Dryland/Irrigated	Irrigated	Dryland	Irrigated	Irrigated	Dryland	Dryland		
Firelight (KWW72)	18.7	7.6	13.7	15.5	15.5	13.3	**14.0**	3
Gator	18.0	7.1	12.7	15.4	12.2	12.9	**13.0**	7
Graham	18.5	7.3	13.5	15.7	14.9	13.5	**13.9**	4
Ignite [B]	18.5	6.8	13.1	16.4	13.5	13.6	**13.6**	5
Kerrin (CK121)	18.5	7.2	14.3	16.1	13.0	13.4	**13.8**	1
Reflection	17.9	6.9	12.9	15.0	13.6	12.5	**13.1**	4
Ruapuna	17.6	7.1	13.3	16.0	13.5	13.5	**13.5**	5
Starfire	18.1	7.2	12.9	15.4	11.9	12.6	**13.0**	9
Torch	17.9	6.5	13.2	15.3	12.6	12.8	**13.0**	7
Wakanui	17.8	7.8	13.4	16.0	13.9	12.9	**13.6**	12
CRWT233	18.3	8.2	14.1	15.4	13.2	13.5	**13.8**	4
CRWT245 [BR]	18.4	7.8	13.4	15.7	14.8	13.5	**13.9**	1
KWW78 [B]	18.2	7.6	13.4	15.4	14.2	14.2	**13.8**	3
KWW83	18.7	7.0	13.4	15.7	13.4	13.3	**13.6**	1
SY114257	19.4	7.2	13.5	16.8	14.8	13.2	**14.2**	2
Site mean yield	**18.1**	**7.2**	**13.3**	**15.6**	**13.7**	**13.1**	**13.5**	
LSD (5%)	0.6	0.3	0.4	0.5	0.5	0.4	0.6	
CV (%)	2.5	2.7	1.9	2.5	2.8	2.3	3.8	

Temuka trial abandoned due to hail damage.
[B] Biscuit wheat, [BR] Bread wheat.

Autumn Sown FEED/BISCUIT Wheat
Cultivar Evaluation 2019/2020 Season - yield, t/ha - Southland and Southern North Island

CULTIVAR	Balfour	Oreti	Southland mean yield	Halcombe	Seasons in FAR trials (Autumn sown)
Region	Northern Southland	Central Southland		Manawatu	
Soil type	Crookston loam	Drummond loam		Marton clay loam	
Previous crop	Oilseed rape	Ryegrass		Fodder beet	
Sow date	1 Apr	3 Apr		23 May	
Harvest date	28 Feb	2 Mar		27 Jan	
Dryland/Irrigated	Dryland	Dryland		Dryland	
Firelight (KWW72)	13.2	9.8	11.5	13.7	3
Gator	11.2	7.7	9.5	13.8	7
Graham	11.9	9.5	10.7	14.1	4
Ignite [B]	11.1	7.6	9.4	14.1	5
Kerrin (CK121)	11.5	7.6	9.5	14.1	1
Reflection	12.3	8.3	10.3	13.6	4
Ruapuna	11.0	8.8	9.9	13.6	5
Starfire	11.3	7.9	9.6	12.6	9
Torch	11.7	7.5	9.6	13.5	7
Wakanui	11.0	8.5	9.7	14.6	12
CRWT233	10.7	8.5	9.6	13.3	4
CRWT245 [BR]	11.7	8.8	10.3	14.1	1
KWW78 [B]	11.8	9.3	10.5	14.0	3
KWW83	12.0	8.1	10.0	14.0	1
SY114257	12.3	8.4	10.3	14.1	2
Site mean yield	**11.6**	**8.4**	**10.0**	**13.8**	
LSD (5%)	0.6	0.3	1.1	0.5	
CV (%)	3.8	2.7	5.1	2.6	

[B] Biscuit wheat, [BR] Bread wheat.

Autumn Sown MILLING Wheat

Cultivar Evaluation 2019/2020 Season - yield, t/ha - Canterbury

CULTIVAR	Grade	Greendale	Methven	Dorie	Winchester	Cant mean yield	Seasons in FAR trials (Autumn sown)
Region		Central Cant	Mid Cant	Mid Cant	South Cant		
Soil type		Lismore shallow silt loam	Lyndhurst silt loam	Templeton silt loam	Temuka silt loam		
Previous crop		White clover	Linseed	Ryegrass pasture	Swiss chard		
Sow date		2 May	25 Apr	12 May	10 May		
Harvest date		10 Feb	11 Feb	3 Feb	25 Feb		
Dryland/Irrigated		Irrigated	Irrigated	Irrigated	Irrigated		
Hanson	Gris	12.8	13.2	12.8	13.4	13.1	6
KMW84	Gris	13.5	14.7	14.3	14.1	14.1	1
Raffles	Gris	13.7	13.0	12.4	15.2	13.6	16
RGT Skyfall (SFR86-073)	Gris	14.5	14.3	13.4	14.3	14.1	3
Catherine (CRWT235)	Med	13.2	12.3	12.8	14.9	13.3	3
Discovery	Med	12.8	12.9	12.7	13.9	13.1	7
KMW89	Med	13.8	13.2	12.8	14.3	13.5	1
Viceroy	Med	12.7	12.5	12.2	12.5	12.5	10
Conquest	Prem	10.9	11.2	11.5	12.2	11.4	15
CRWT247	Prem	13.4	13.0	13.4	12.9	13.2	1
Duchess	Prem	11.9	11.7	11.6	11.6	11.7	6
Griffin	Prem	12.5	12.2	12.7	13.2	12.6	5
Reliance	Prem	11.4	11.9	11.2	12.7	11.8	8
Site mean yield		12.9	12.8	12.6	13.5	12.9	
LSD (5%)		0.6	0.5	0.4	0.4	0.7	
CV (%)		3.2	2.7	2.3	1.8	4.0	

Gris - Gristing, Med - Medium, Prem - Premium.

Southern North Island FEED/BISCUIT wheat trials

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No. (seconds)+
Firelight (KWW72)	52	76	10.6	0.8	-
Gator	55	76	10.5	0.6	-
Graham	55	78	10.9	0.7	-
Ignite	50	77	11.0	0.7	370
Kerrin (CK121)	54	78	9.4	0.8	-
Reflection	48	76	11.0	1.0	-
Ruapuna	52	76	10.8	0.7	-
Starfire	49	77	11.0	1.1	-
Torch	49	75	10.8	0.9	-
Wakanui	52	81	10.7	0.3	-
CRWT233	51	77	11.5	0.5	-
CRWT245	52	79	11.0	0.5	362
KWW78	49	78	10.3	0.7	367
KWW83	56	76	10.7	0.3	-
SY114257	55	77	10.3	0.7	-
Mean	52	77	10.7	0.6	366
LSD	-	-	-	-	-

Single trial - no LSD available.

+ Feed wheats not tested for falling number.

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

wheat - 2019/2020 grain quality

Canterbury FEED/BISCUIT wheat trials

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No.+ (seconds)
Firelight (KWW72)	54	75	9.9	0.9	-
Gator	59	78	9.8	0.4	-
Graham	55	77	9.9	0.4	-
Ignite	53	77	10.4	0.6	358
Kerrin (CK121)	55	77	9.4	0.9	-
Reflection	53	77	9.9	1.0	-
Ruapuna	55	76	10.3	0.7	-
Starfire	53	78	10.6	0.7	-
Torch	51	76	10.3	1.3	-
Wakanui	54	80	10.2	0.3	-
CRWT233	55	79	10.0	0.3	-
CRWT245	54	79	9.9	0.4	392
KWW78	52	78	10.0	0.7	349
KWW83	59	76	10.3	0.4	-
SY114257	60	78	9.7	0.5	-
Mean	55	77	10.1	0.6	367
LSD	2	1	0.4	0.5	41

Averaged over six trials.
+Feed wheats not tested for falling number.

Canterbury MILLING wheat trials

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No. (seconds)
Catherine (CRWT235)	56	80	11.0	0.7	371
Conquest	51	82	12.1	0.4	407
Discovery	60	81	10.5	0.3	385
Duchess	51	82	11.4	0.9	377
Griffin	53	81	10.7	0.3	408
Hanson	53	79	10.1	0.6	341
Raffles	60	81	9.8	0.7	426
Reliance	54	82	11.8	0.4	383
RGT Skyfall (SFR86-073)	61	81	9.8	0.4	373
Viceroy	53	85	11.4	0.6	439
CRWT247	56	81	11.1	0.4	377
KMW84	50	80	10.2	0.7	362
KMW89	58	80	10.7	0.5	394
Mean	55	81	10.8	0.5	388
LSD	2	1	0.4	0.2	27

Averaged over four trials.

Southland FEED/BISCUIT wheat trials

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 5.7)	Screenings (%)	Falling No. (seconds)+
Firelight (KWW72)	51	74	9.2	0.9	-
Gator	52	76	9.2	1.3	-
Graham	53	76	9.3	1.2	-
Ignite	50	76	10.1	0.6	356
Kerrin (CK121)	50	76	8.6	1.7	-
Reflection	51	76	8.8	1.8	-
Ruapuna	51	74	9.8	0.7	-
Starfire	47	77	9.8	1.2	-
Torch	49	77	9.5	1.2	-
Wakanui	52	79	9.6	1.7	-
CRWT233	51	77	9.8	0.7	-
CRWT245	53	77	9.0	0.7	388
KWW78	52	78	9.3	0.7	337
KWW83	55	75	9.9	0.7	-
SY114257	56	74	9.1	0.9	-
Mean	51	76	9.4	1.0	360
LSD	4	3	0.9	1.5	125

Averaged over two trials.
+ Feed wheats not tested for falling number.
The quality data for each region is also presented as a 4-year mean on the individual cultivar description pages.

Autumn Sown FEED/BISCUIT Wheat - 4-year adjusted mean - relative yield by site

CULTIVAR	Methven	Chertsey	Chertsey	Wakanui	Temuka	St Andrews	Fairlie[1]		Canterbury dryland relative yield	Canterbury irrigated relative yield	Canterbury relative mean yield	Balfour	Oreti	Southland relative mean yield	Feilding	Seasons in FAR trials (Autumn sown)
Region	Mid Cant	Mid Cant	Mid Cant	Mid Cant	South Cant	South Cant	South Cant					Nth Sthland	Central Sthland		Manawatu	
Dryland/Irrigated	Irrigated	Dryland	Irrigated	Irrigated	Irrigated	Dryland	Dryland					Dryland	Dryland		Dryland	
No. of trials	4	4	4	4	3	4	4		12	15	27	4	4	8	3	
Firelight (KWW72)	103	105	105	102	100	113	102		**107**	**102**	**104**	110	108	**109**	102	3
Gator	97	98	97	99	97	88	97		**94**	**97**	**96**	95	96	**96**	92	7
Graham	103	103	104	103	107	109	101		**104**	**104**	**104**	105	107	**106**	108	4
Ignite [B]	101	99	100	101	104	99	100		**99**	**101**	**100**	98	94	**96**	99	5
Kerrin (CK121)	(103)	(100)	(108)	(104)	-	(94)	(102)		**(99)**	**(105)**	**(102)**	(99)	(92)	**(96)**	(103)	1
Reflection	100	98	98	100	103	100	97		**98**	**100**	**99**	97	99	**98**	105	4
Ruapuna	94	99	100	98	97	100	97		**99**	**97**	**98**	99	102	**100**	99	5
Starfire	101	98	97	96	97	87	99		**95**	**98**	**97**	97	97	**97**	95	9
Torch	99	95	100	97	98	92	97		95	98	97	98	96	97	92	7
Wakanui	100	99	99	101	102	101	100		**100**	**100**	**100**	96	99	**97**	104	12
CRWT233	99	107	102	100	95	90	101		**99**	**99**	**99**	100	104	**102**	93	4
CRWT245 [BR]	(102)	(107)	(101)	(100)	-	(111)	(103)		**(107)**	**(101)**	**(104)**	(102)	(104)	**(103)**	(103)	1
KWW78 [B]	103	104	100	100	109	104	104		**104**	**103**	**103**	107	107	**107**	99	3
KWW83	(104)	(98)	(102)	(101)	-	(97)	(101)		**(99)**	**(102)**	**(101)**	(104)	(97)	**(101)**	(102)	1
SY114257	105	104	103	110	101	106	102		**104**	**105**	**104**	106	100	**104**	105	2
Site mean yield (t/ha)	**14.4**	**8.8**	**12.7**	**14.3**	**11.4**	**11.0**	**12.5**		**10.8**	**13.3**	**12.2**	**11.3**	**10.3**	**10.8**	**11.2**	
LSD (estab. cv) (5%)	**6**	**6**	**3**	**4**	**7**	**9**	**5**		**7**	**5**	**4**	**6**	**5**	**5**	**13**	
LSD (new vs estab.) (5%)	**10**	**9**	**5**	**7**	**10**	**14**	**7**		**11**	**7**	**6**	**9**	**9**	**8**	**18**	

[1] Fairlie site received 70 mm irrigation in the 2017-18 season.
No trial results from Manawatu in 2017-18 and Temuka in 2018-19 (hail damage), so data is a 3-year mean.
- Cultivar has not been in trials at this location.
[B] Biscuit wheat, [BR] Bread wheat.
Figures in brackets are less robust as they are only based on one year of data.
LSD (estab. cv) is for comparing two “established” cultivars (that have both been in all trials).
LSD (new vs estab.) is for comparing a “new” (first year) cultivar with an “established” cultivar.

Autumn Sown MILLING Wheat Canterbury - 4-year adjusted mean - relative yield by site

CULTIVAR	Grade	Aylesbury	Methven	Dorie	Winchester	Canterbury irrigated mean yield	Seasons in FAR trials (Autumn sown)
Region		Central Canterbury	Mid Canterbury	Mid Canterbury	South Canterbury		
Dryland/Irrigated		Irrigated	Irrigated	Irrigated	Irrigated		
No. of trials		3	4	4	4	15	
Hanson	Gris	100	99	102	97	**100**	6
KMW84	Gris	(106)	(117)	(115)	(105)	**(111)**	1
Raffles	Gris	104	97	101	112	**103**	16
RGT Skyfall (SFR86-073)	Gris	109	106	104	102	**105**	3
Catherine (CRWT235)	Med	103	102	105	112	**105**	3
Discovery	Med	102	100	100	103	**101**	7
KMW89	Med	(109)	(104)	(102)	(107)	**(105)**	1
Viceroy	Med	97	94	95	97	**96**	10
Conquest	Prem	84	91	86	90	**88**	16
CRWT247	Prem	(105)	(104)	(107)	(95)	**(103)**	1
Duchess	Prem	90	96	93	90	**93**	6
Griffin	Prem	102	95	100	94	**97**	5
Reliance	Prem	89	95	88	95	**92**	8
Site mean yield (t/ha)		**10.6**	**12.2**	**11.3**	**11.5**	**11.4**	
LSD (estab. cv) (5%)		8	8	7	6	6	
LSD (new vs estab.) (5%)		11	12	11	10	9	

Gris - Gristing, Med - Medium, Prem - Premium.
Aylesbury is a 3-year mean (bird damage in 2018-19).
Figures in brackets are less robust as they are only based on one year of data.
LSD (estab. cv) is for comparing two "established" cultivars (that have both been in all trials).
LSD (new vs estab.) is for comparing a "new" (first year) cultivar with an "established" cultivar.

Autumn Sown Wheat - plant counts 2019/2020 season

Canterbury FEED/BISCUIT Wheat Trials
(target plant population = 125 plants/m² for April sown)

CULTIVAR	Plants/m²
Firelight (KWW72)	143
Gator	144
Graham	145
Ignite	159
Kerrin (CK121)	147
Reflection	141
Ruapuna	161
Starfire	144
Torch	139
Wakanui	159
CRWT233	141
CRWT245	151
KWW78	150
KWW83	135
SY114257	119
Mean	143
LSD (5%)	21

Mean of six sites.

Canterbury MILLING Wheat Trials
(target plant population = 125-175 plants/m² for May sown)

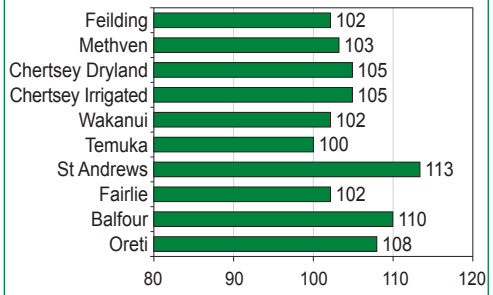
CULTIVAR	Plants/m²
Catherine (CRWT235)	197
Conquest	196
Discovery	197
Duchess	181
Griffin	202
Hanson	195
Raffles	172
Reliance	201
RGT Skyfall (SFR86-073)	203
Viceroy	182
CRWT247	181
KMW84	184
KMW89	201
Mean	192
LSD (5%)	23

Mean of four sites.

FIRELIGHT (KWW72) — YEAR 3

Cv. Firelight (KWW72) is an average to high yielding feed wheat. Good performance at dryland sites, especially in Southland. Shows good resistance to most diseases, especially Septoria leaf blotch and the rusts. A medium height cultivar with moderate straw strength and sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	107
Irrigated sites (4-year)	102

DISEASE RESISTANCE	
Septoria leaf blotch	Mostly resistant
Stripe rust	Mostly resistant
Leaf rust	Mostly resistant
Powdery mildew	Intermediate resistance
Fusarium head blight	Moderately resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Intermediate
Sprouting risk	Moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	45	47	48
Test weight (kg/hl)	71	71	71
Protein (%) (N% x 5.7)	10.2	10.2	9.3
Falling number (sec)	-	-	-
Screenings (%)	1.3	1.4	1.2

END USE	
	Feed

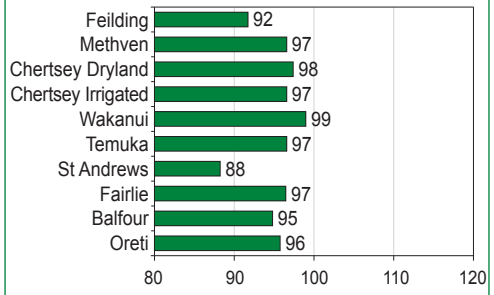
BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

Note: Yields are relative to other feed/biscuit wheats only.

GATOR — YEAR 7

Mostly below average yielding feed cultivar. Monitor for Septoria leaf blotch and leaf rust. Good resistance to powdery mildew. A short, stiff strawed variety with low sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	94
Irrigated sites (4-year)	97

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Mostly susceptible
Powdery mildew	Mostly resistant
Fusarium head blight	Moderately resistant

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Short
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	47	50	50
Test weight (kg/hl)	72	73	74
Protein (%) (N% x 5.7)	10.1	10.1	9.0
Falling number (sec)	-	-	-
Screenings (%)	1.1	1.2	1.2

END USE	
	Feed

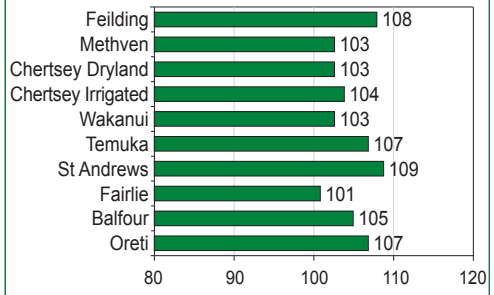
BACKGROUND	
Breeder	KWS, UK
Licensee/Agent	Carrfields Grain & Seed

Note: Yields are relative to other feed/biscuit wheats only.

GRAHAM — YEAR 4

Cv. Graham is an average to high yielding feed cultivar performing well under both irrigated and dryland conditions across all sites and regions. Good resistance to the common wheat diseases, especially stripe rust. An early maturing, stiff strawed variety with low sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	104
Irrigated sites (4-year)	104

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Mostly resistant
Leaf rust	Intermediate resistance*
Powdery mildew	Moderately resistant
Fusarium head blight	Moderately resistant

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Early
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	51	49	51
Test weight (kg/hl)	75	74	74
Protein (%) (N% x 5.7)	9.9	10.1	8.9
Falling number (sec)	-	-	-
Screenings (%)	1.0	1.0	0.9

END USE	
	Feed

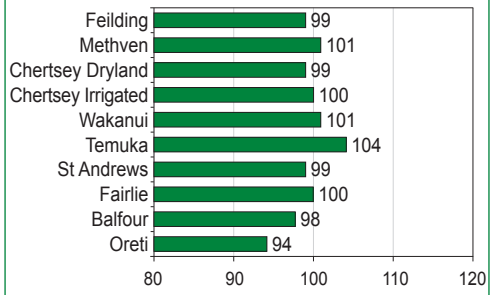
BACKGROUND	
Breeder	Syngenta
Licensee	Cropmark Seeds
Agent	Advance Agriculture, Cates Grain & Seed, PGG Wrightson Grain

* Resistance is affected by pathotypes present (score is an average). Note: Yields are relative to other feed/biscuit wheats only.

IGNITE — YEAR 5

Cv. Ignite is a feed and biscuit cultivar that produces mostly average yields in Canterbury, but below average yields in Southland. Moderately resistant to most diseases with the exception of leaf rust. A medium height plant with a stiff straw and low to moderate sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	99
Irrigated sites (4-year)	101

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Intermediate resistance*
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Late
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	45	47	47
Test weight (kg/hl)	73	73	73
Protein (%) (N% x 5.7)	10.5	10.3	9.7
Falling number (sec)	377	300	322
Screenings (%)	1.0	1.1	0.7

END USE	
	Biscuit, feed

BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

* Resistance is affected by pathotypes present (score is an average).

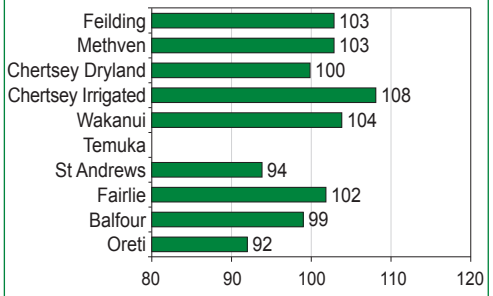
Note: Yields are relative to other feed/biscuit wheats only.

KERRIN (CK121)

YEAR 1

Cv. Kerrin is a new feed wheat, producing a range of yields, in its first year of CPT 2 trials. High yielding at irrigated sites in Canterbury. Excellent resistance to most of the common diseases. A medium height cultivar with moderate to stiff straw strength and intermediate maturity.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	99
Irrigated sites (4-year)	105

DISEASE RESISTANCE	
Septoria leaf blotch	Mostly resistant
Stripe rust	Unknown
Leaf rust	Mostly resistant
Powdery mildew	Resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Intermediate
Sprouting risk	Moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	48	48	47
Test weight (kg/hl)	73	73	74
Protein (%) (N% x 5.7)	8.8	9.4	8.4
Falling number (sec)	-	-	-
Screenings (%)	1.5	1.7	1.8

END USE	
	Feed

BACKGROUND	
Breeder	KWS, UK
Agent	Carrfields Grain & Seed

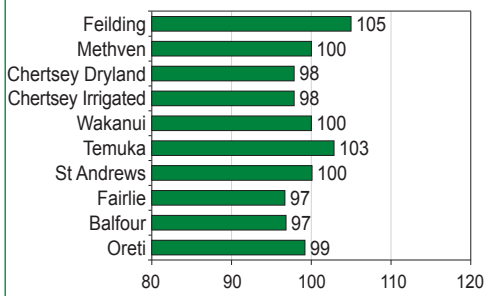
Note: Yields are relative to other feed/biscuit wheats only.

REFLECTION

YEAR 4

A feed cultivar that is high yielding in the Manawatu. Produces a range of yields at irrigated sites in Canterbury, but mostly below average at dryland sites. Varying levels of resistance to most foliar diseases except certain stripe rust pathotypes. A stiff short strawed variety with early maturity and low to moderate sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	98
Irrigated sites (4-year)	100

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Mostly susceptible*
Leaf rust	Moderately resistant
Powdery mildew	Moderately resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Short
Maturity	Early
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	43	45	46
Test weight (kg/hl)	71	74	74
Protein (%) (N% x 5.7)	10.2	10.1	8.7
Falling number (sec)	-	-	-
Screenings (%)	1.5	2.0	2.7

END USE	
	Feed

BACKGROUND	
Breeder	Syngenta
Licensee	Cropmark Seeds
Agent	Advance Agriculture, Cates Grain & Seed

Note: Yields are relative to other feed/biscuit wheats only.

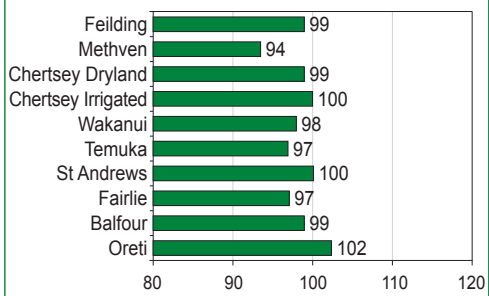
* Resistance is affected by pathotypes present (score is an average).

RUAPUNA

YEAR 5

Cv. Ruapuna is a feed wheat cultivar that produces mostly average yields. Moderately susceptible to Septoria leaf blotch and leaf rust. A medium height cultivar with a stiff straw and low to moderate sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	99
Irrigated sites (4-year)	97

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Moderately resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Late
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	46	47	48
Test weight (kg/hl)	72	72	72
Protein (%) (N% x 5.7)	10.4	10.4	9.7
Falling number (sec)	-	-	-
Screenings (%)	1.2	1.3	1.3

END USE	
	Feed

BACKGROUND	
Breeder	Sejet
Licensee	Plant & Food Research
Agent	Luisetti Seeds

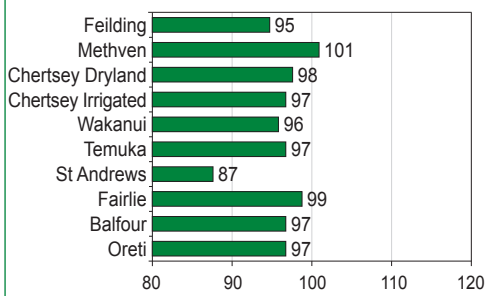
Note: Yields are relative to other feed/biscuit wheats only.

STARFIRE

YEAR 9

A mostly below average feed cultivar. Moderately susceptible to leaf rust, but shows moderate to intermediate resistance to other foliar diseases. Cv. Starfire is stiff strawed with moderate sprouting risk and intermediate maturity.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	95
Irrigated sites (4-year)	98

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Moderately resistant
Fusarium head blight	Moderately resistant

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Intermediate
Sprouting risk	Moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	42	45	45
Test weight (kg/hl)	72	74	74
Protein (%) (N% x 5.7)	10.8	10.5	9.5
Falling number (sec)	-	-	-
Screenings (%)	1.8	1.6	1.6

END USE	
	Feed

BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

Note: Yields are relative to other feed/biscuit wheats only.

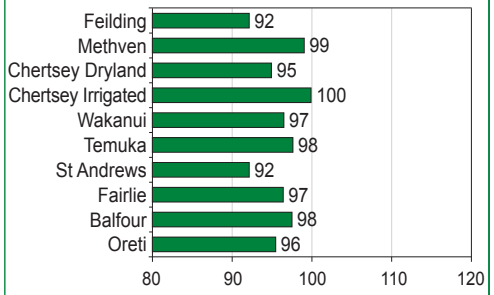
* Resistance is affected by pathotypes present (score is an average).

TORCH

YEAR 7

A feed cultivar producing mostly below average yields. Shows resistance to stripe rust and a certain degree to powdery mildew, but can be susceptible to other diseases. Good standing power coupled with late maturity and a low sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	95
Irrigated sites (4-year)	98

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Mostly resistant
Leaf rust	Moderately susceptible*
Powdery mildew	Moderately resistant
Fusarium head blight	Moderately susceptible

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Late
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	41	44	45
Test weight (kg/hl)	71	73	73
Protein (%) (N% x 5.7)	10.2	10.2	9.6
Falling number (sec)	-	-	-
Screenings (%)	2.1	2.2	1.7

END USE	
	Feed

BACKGROUND	
Breeder	RAGT, UK
Licensee	Seed Force Limited
Agent	Cates Grain & Seed, Plant Research (NZ) Ltd

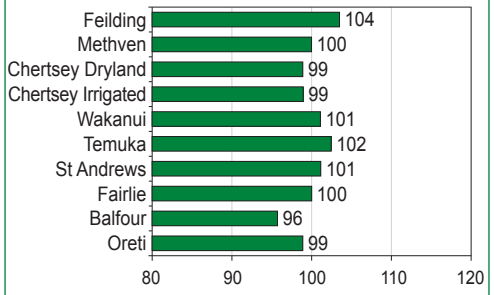
Note: Yields are relative to other feed/biscuit wheats only.

WAKANUI

YEAR 12

Mostly average yielding feed cultivar, with above average yields at the lower North Island site. Moderately susceptible to powdery mildew and leaf rust, but has varying levels of resistance to other diseases. Late maturing and tall, but with a stiff straw.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	100
Irrigated sites (4-year)	100

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance
Stripe rust	Mostly resistant
Leaf rust	Moderately susceptible
Powdery mildew	Moderately susceptible
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Tall
Maturity	Late
Sprouting risk	Moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	45	47	49
Test weight (kg/hl)	77	75	76
Protein (%) (N% x 5.7)	10.2	10.0	9.4
Falling number (sec)	-	-	-
Screenings (%)	1.1	0.9	0.7

END USE	
	Feed

BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds, Carrfields Grain & Seed

Note: Yields are relative to other feed/biscuit wheats only.

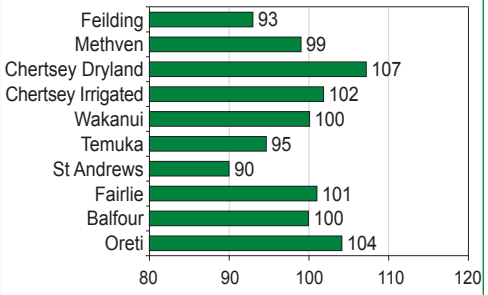
* Resistance is affected by pathotypes present (score is an average).

CRWT233

YEAR 4

Cv. CRWT233 produces a range of yields from above to below average. Mostly resistant to the rusts, with intermediate resistance to other diseases. A medium to tall cultivar with moderate straw strength and intermediate maturity.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	99
Irrigated sites (4-year)	99

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance
Stripe rust	Mostly resistant
Leaf rust	Mostly resistant
Powdery mildew	Intermediate resistance
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium-tall
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	44	47	48
Test weight (kg/hl)	72	75	75
Protein (%) (N% x 5.7)	10.9	10.6	9.6
Falling number (sec)	-	-	-
Screenings (%)	1.4	1.3	0.8

END USE	
	Feed

BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

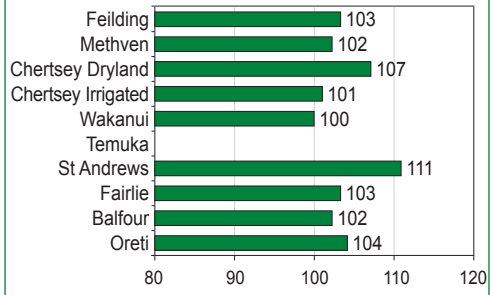
Note: Yields are relative to other feed/biscuit wheats only.

CRWT245

YEAR 1

Cv. CRWT245 is a new, early season milling wheat in its first year of CPT 2 trials. Yields range from average to high yielding, with good results at dryland sites. Has excellent resistance to most diseases, with the exception of leaf rust. A stiff strawed variety, with late maturity and low to moderate sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	107
Irrigated sites (4-year)	101

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Mostly resistant
Leaf rust	Mostly susceptible
Powdery mildew	Mostly resistant
Fusarium head blight	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Late
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	46	46	50
Test weight (kg/hl)	75	75	75
Protein (%) (N% x 5.7)	10.4	10.0	8.8
Falling number (sec)	345	346	353
Screenings (%)	1.2	1.2	0.8

END USE	
	Feed/Milling

BACKGROUND	
Breeder	Sejet
Licensee	Plant & Food Research Ltd
Agent	Luisetti Seeds

Note: Yields are relative to other feed/biscuit wheats only.

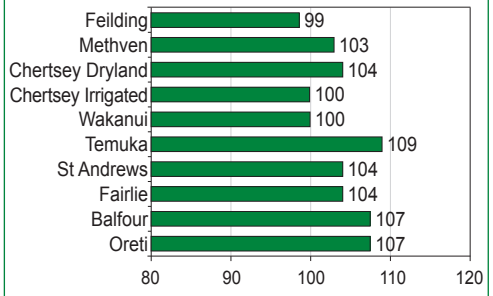
* Resistance is affected by pathotypes present (score is an average).

KWW78

YEAR 3

Cv. KWW78 is an average to high yielding feed and biscuit wheat that performs well on both dryland and irrigated sites. Excellent performer in Southland. Moderately susceptible to powdery mildew, but shows resistance to most other diseases. A medium height cultivar with a moderate to stiff straw and low sprouting risk.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	104
Irrigated sites (4-year)	103

DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Mostly resistant
Leaf rust	Intermediate resistance
Powdery mildew	Moderately susceptible
Fusarium head blight	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Early-intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	43	45	49
Test weight (kg/hl)	74	75	76
Protein (%) (N% x 5.7)	10.1	9.9	8.9
Falling number (sec)	326	315	303
Screenings (%)	1.3	1.4	0.4

END USE	
	Feed/Biscuit

BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

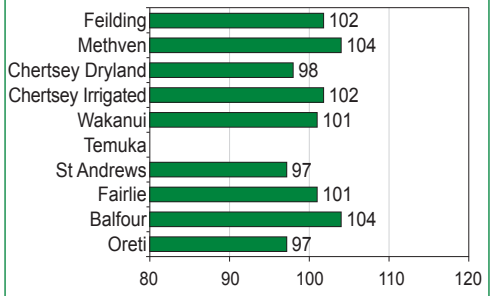
Note: Yields are relative to other feed/biscuit wheats only.

KWW83

YEAR 1

New feed cultivar cv. KWW83 has produced a range of yields from above to below average. Has performed better under irrigation in Canterbury. Has good resistance to the most common cereal diseases, especially Septoria leaf blotch and the rusts. A late maturing variety with an early sowing window, from March to mid-May.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	99
Irrigated sites (4-year)	102

DISEASE RESISTANCE	
Septoria leaf blotch	Mostly resistant
Stripe rust	Mostly resistant
Leaf rust	Mostly resistant
Powdery mildew	Moderately resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Late
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	50	51	52
Test weight (kg/hl)	72	72	73
Protein (%) (N% x 5.7)	10.1	10.4	9.7
Falling number (sec)	-	-	-
Screenings (%)	1.0	1.1	0.8

END USE	
	Feed

BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

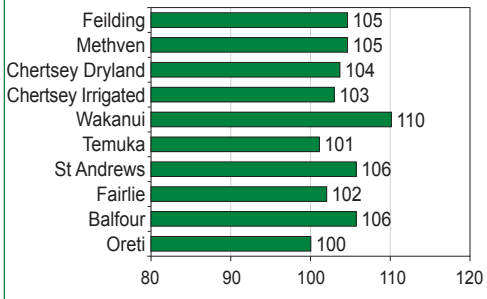
Note: Yields are relative to other feed/biscuit wheats only.

SY114257

YEAR 2

Mostly above average to high yielding feed wheat. Performs well in the Manawatu and has good results on both irrigated and dryland sites in Canterbury. Good resistance to stripe rust and powdery mildew, but susceptible to some leaf rust pathoypes. A medium to tall cultivar with early maturity and a moderate to stiff straw.

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



IRRIGATION RESPONSE (Canterbury rel yield)	
Dryland sites (4-year)	104
Irrigated sites (4-year)	105

DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Mostly resistant
Leaf rust	Mostly susceptible*
Powdery mildew	Mostly resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium-tall
Maturity	Early
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Sth Nth Is	Canty	Sthld
TGW (g)	50	52	53
Test weight (kg/hl)	74	73	73
Protein (%) (N% x 5.7)	9.5	10.0	8.6
Falling number (sec)	-	-	-
Screenings (%)	1.3	1.1	1.0

END USE	
	Feed

BACKGROUND	
Breeder	Syngenta
Agent	Cropmark Seeds

Note: Yields are relative to other feed/biscuit wheats only.

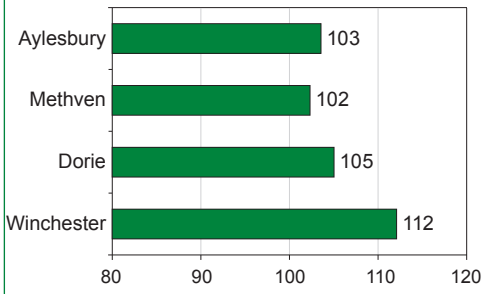
* Resistance is affected by pathotypes present (score is an average).

milling

CATHERINE (CRWT235) YEAR 3

Above average to high yielding medium grade milling wheat. Yields are on average 9% higher than cv. Viceroy, with larger grain size. Mostly susceptible to leaf rust and Septoria leaf blotch, but with some degree of resistance to other diseases. A tall cultivar with moderate straw strength and intermediate maturity.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Mostly susceptible*
Stripe rust	Mostly resistant
Leaf rust	Mostly susceptible
Powdery mildew	Moderately resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Tall
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	51
Test weight (kg/hl)	76
Protein (%) (N% x 5.7)	12.4
Falling number (sec)	320
Screenings (%)	0.9

END USE	Medium grade milling

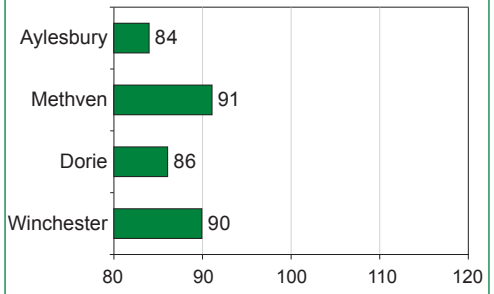
BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

Note: Yields are relative to other milling wheats only.
* Resistance is affected by pathotypes present (score is an average).

CONQUEST YEAR 15

Premium milling cultivar with high protein content. Lower yielding when compared with other premium varieties. Cv. Conquest has moderate resistance to stripe rust, but shows susceptibility to most other diseases. Early maturing with a moderate to stiff straw and excellent sprouting resistance.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Mostly susceptible*
Powdery mildew	Moderately susceptible
Fusarium head blight	Moderately susceptible

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Early-intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	45
Test weight (kg/hl)	79
Protein (%) (N% x 5.7)	13.8
Falling number (sec)	391
Screenings (%)	0.7

END USE	Premium milling

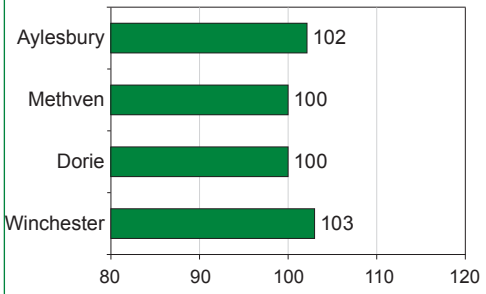
BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

Note: Yields are relative to other milling wheats only.
* Resistance is affected by pathotypes present (score is an average).

DISCOVERY YEAR 7

Average to above average medium grade milling wheat cultivar. Shows some degree of resistance to most diseases, but monitor for Fusarium head blight. Cv. Discovery is susceptible to lodging and shattering and will benefit from a strong PGR programme. Intermediate maturity with large grain size, and low to moderate sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Intermediate resistance
Leaf rust	Moderately resistant*
Powdery mildew	Mostly resistant
Fusarium head blight	Mostly susceptible

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Tall
Maturity	Intermediate
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	55
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	11.9
Falling number (sec)	361
Screenings (%)	0.6

END USE	Medium grade milling

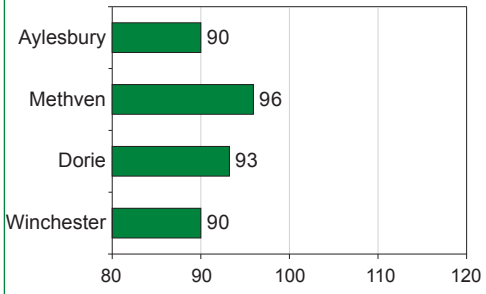
BACKGROUND	
Breeder	Limagrain Europe S.A.
Agent	PGG Wrightson Grain

Note: Yields are relative to other milling wheats only.
* Resistance is affected by pathotypes present (score is an average).

DUCHESS YEAR 6

A premium milling cultivar, with yields similar to cv. Reliance but with lower protein. Cv. Duchess is moderately resistant to stripe rust, and has lesser resistance to some other diseases. This stiff strawed cultivar has intermediate maturity with low sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance
Stripe rust	Moderately resistant
Leaf rust	Mostly susceptible
Powdery mildew	Moderately susceptible
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	45
Test weight (kg/hl)	79
Protein (%) (N% x 5.7)	12.5
Falling number (sec)	379
Screenings (%)	1.7

END USE	Premium milling

BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

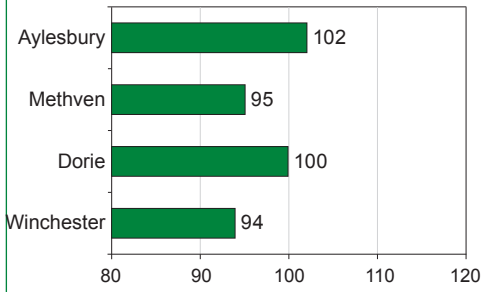
Note: Yields are relative to other milling wheats only.

GRIFFIN

YEAR 5

A premium milling wheat producing a range of yields that are, on average, 9% higher than cv. Conquest, but with lower protein. Monitor for Septoria leaf blotch, leaf rust and particularly powdery mildew. Shows some resistance to stripe rust and Fusarium head blight. 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	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Mostly susceptible
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Tall
Maturity	Intermediate
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	47
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	12.0
Falling number (sec)	394
Screenings (%)	0.9

END USE	Premium milling

BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

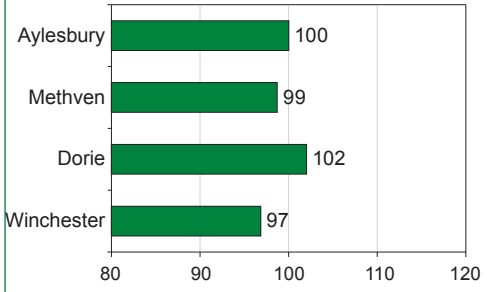
Note: Yields are relative to other milling wheats only.

HANSON

YEAR 6

Cv. Hanson is a gristing wheat producing a range of yields from above to below average. Monitor for powdery mildew and Fusarium head blight. Intermediate maturity with a stiff straw and low to moderate sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance
Stripe rust	Moderately resistant
Leaf rust	Intermediate resistance
Powdery mildew	Moderately susceptible
Fusarium head blight	Susceptible

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium-tall
Maturity	Intermediate
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	47
Test weight (kg/hl)	76
Protein (%) (N% x 5.7)	11.6
Falling number (sec)	361
Screenings (%)	1.2

END USE	Gristing

BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

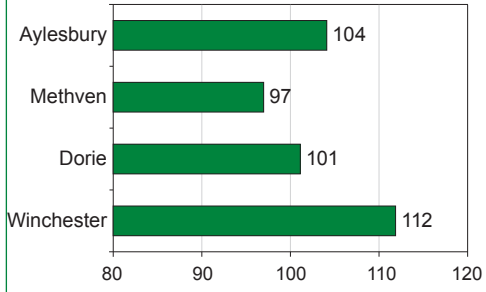
Note: Yields are relative to other milling wheats only.

RAFFLES

YEAR 16

Cv. Raffles is a feed and gristing cultivar producing a range of yields from below average to high yielding. Large grain with high falling number. Moderately resistant to powdery mildew, but susceptible to most other diseases, especially rusts and Fusarium head blight. A tall cultivar with moderate straw strength and low sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance
Stripe rust	Mostly susceptible
Leaf rust	Mostly susceptible
Powdery mildew	Moderately resistant
Fusarium head blight	Mostly susceptible

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Tall
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	53
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	11.4
Falling number (sec)	416
Screenings (%)	1.0

END USE	Gristing

BACKGROUND	
Breeder	KWS, UK
Agent	Carrfields Grain & Seed

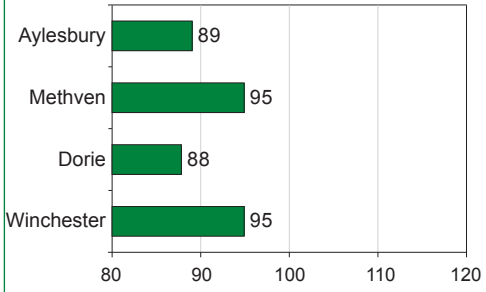
Note: Yields are relative to other milling wheats only.

RELIANCE

YEAR 8

A premium milling cultivar with yields similar to cv. Duchess but with higher protein content. Shows moderate resistance to stripe rust, but has susceptibility to most other diseases, especially leaf rust. Cv. Reliance produces high proteins, has good straw strength and a low risk of sprouting.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Susceptible
Powdery mildew	Moderately susceptible
Fusarium head blight	Moderately susceptible

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Short-medium
Maturity	Early-intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	49
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	13.3
Falling number (sec)	380
Screenings (%)	0.8

END USE	Premium milling

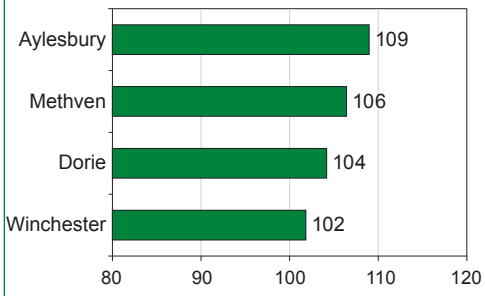
BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

Note: Yields are relative to other milling wheats only.

RGT SKYFALL (SFR86-073) YEAR 3

Cv. SFR86-073 is an above average to high yielding gristing wheat. Mostly resistant to powdery mildew with moderate resistance to other diseases. A short stiff strawed variety with low to moderate sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Intermediate resistance
Leaf rust	Moderately resistant
Powdery mildew	Mostly resistant
Fusarium head blight	Moderately resistant

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Short
Maturity	Early-intermediate
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	54
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	11.1
Falling number (sec)	366
Screenings (%)	0.8

END USE	Gristing

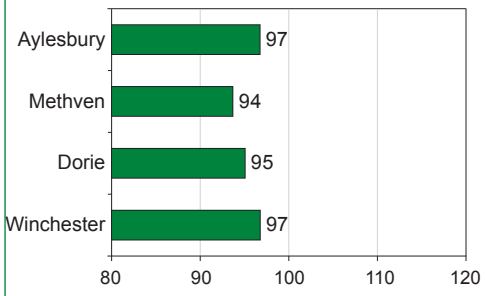
BACKGROUND	
Breeder	RAGT
Agent	Seed Force Limited

Note: Yields are relative to other milling wheats only.

VICEROY YEAR 10

Below average yielding medium grade milling cultivar with high test weights. Moderately susceptible to most foliar diseases, but shows moderate resistance to stripe rust. Cv. Viceroy is medium to tall with a stiff straw and low sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately susceptible
Stripe rust	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Moderately susceptible
Fusarium head blight	Mostly susceptible

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium-tall
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	47
Test weight (kg/hl)	82
Protein (%) (N% x 5.7)	12.5
Falling number (sec)	409
Screenings (%)	1.3

END USE	Medium grade milling

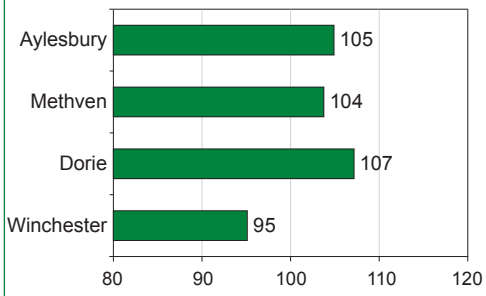
BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

Note: Yields are relative to other milling wheats only.

CRWT247 YEAR 1

Cv. CRWT247 is a new premium milling cultivar with yields on average 15% higher than cv. Conquest, but with lower grain protein. Shows resistance to most diseases, especially stripe rust and powdery mildew. A medium height cultivar with a stiff straw and very low sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Mostly resistant
Leaf rust	Intermediate resistance
Powdery mildew	Mostly resistant
Fusarium head blight	Moderately susceptible

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Medium
Maturity	Intermediate
Sprouting risk	Very low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	51
Test weight (kg/hl)	78
Protein (%) (N% x 5.7)	12.5
Falling number (sec)	364
Screenings (%)	0.9

END USE	Premium milling

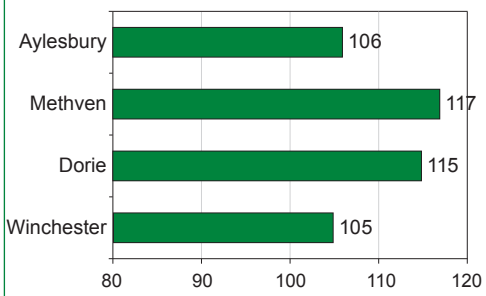
BACKGROUND	
Breeder	Plant & Food Research
Agent	Luisetti Seeds

Note: Yields are relative to other milling wheats only.
* Resistance is affected by pathotypes present (score is an average).

KWM84 YEAR 1

A new high yielding gristing variety, performing well across all sites in its first year of CPT 2 trials. Has good resistance to most diseases, especially stripe rust and powdery mildew. A stiff short strawed variety with intermediate maturity and low sprouting risk.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Moderately resistant
Stripe rust	Mostly resistant
Leaf rust	Intermediate resistance
Powdery mildew	Mostly resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Short
Maturity	Intermediate
Sprouting risk	Low

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	44
Test weight (kg/hl)	77
Protein (%) (N% x 5.7)	11.6
Falling number (sec)	348
Screenings (%)	1.2

END USE	Gristing

BACKGROUND	
Breeder	PGG Wrightson Grain
Licensee	PGG Wrightson Grain

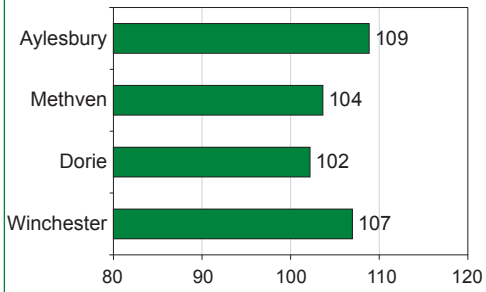
Note: Yields are relative to other milling wheats only.

KWM89

YEAR 1

A new high yielding medium grade milling variety, performing well across all sites in its first year of CPT 2 trials. Has good resistance to most diseases, especially stripe rust and powdery mildew, but monitor for leaf rust. A medium to tall cultivar with moderate straw strength and intermediate maturity.

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



DISEASE RESISTANCE	
Septoria leaf blotch	Intermediate resistance*
Stripe rust	Mostly resistant
Leaf rust	Mostly susceptible*
Powdery mildew	Mostly resistant
Fusarium head blight	Intermediate resistance

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium-tall
Maturity	Intermediate
Sprouting risk	Low-moderate

GRAIN QUALITY (4-year means)	Canterbury
TGW (g)	52
Test weight (kg/hl)	77
Protein (%) (N% x 5.7)	12.1
Falling number (sec)	381
Screenings (%)	1.0

END USE	Medium grade milling

BACKGROUND	
Breeder	PGG Wrightson Grain
Agent	PGG Wrightson Grain

Note: Yields are relative to other milling wheats only.
* Resistance is affected by pathotypes present (score is an average).

2019/2020 trial site location map.

BALFOUR, NORTHERN SOUTHLAND

Lintley loam, Dryland
Trial operator: Stewart Armstrong
Host farmer: Earl and Scott Dillon (Dillon Grain Ltd)

This trial was sown on 24 April 2019 into a crop of cv. Surge following wheat. The site received 184 kg N/ha from three applications. Two herbicide and two fungicide applications were made during the season. Harvest was delayed by a week due to heavy rains which caused widespread flooding and road closures in the region. Despite this, the trial appeared in good order at harvest on 10 February 2020, although slightly weathered and lodged.

RAKAIA, MID CANTERBURY

Lismore silt loam, Irrigated
Trial operator: Matt Hicks
Host farmer: Ross Hewson

This trial was abandoned due to hail damage.

ST ANDREWS, SOUTH CANTERBURY

Claremont silt loam, Dryland
Trial operator: Matt Hicks
Host farmer: Peter Hewson

This trial was sown on 9 May 2019 into a crop of cv. Tavern, following wheat. The site received urea and Ammo 31 which provided 198 kg N/ha. A liquid fertiliser was also applied twice. Three fungicide applications and two applications each of herbicide, insecticide and PGR were applied during the growing season. The trial was harvested on 17 January 2020.

Autumn Sown Barley Agronomic Comment 2019/2020 Season

CULTIVAR	Years in FAR trials	Scald	Net blotch (net form)	Leaf rust	Powdery mildew	Straw strength	Crop height	Maturity
Buttress (CRBA148)	1	MS	MR	MS	MRR	Moderate	Med-tall	Intermediate
Fortitude	6	MR	MR	MS*	MRR	Moderate	Medium	Intermediate
Jimpy	12	MR	MR	S	MS	Moderate-stiff	Medium	Int-late
Laureate	4	MRMS	MR	MS*	MRR	Moderate	Medium	Early-int
RGT Planet	4	MR	MS	MS	MRR	Moderate	Medium	Early-int
Sanette	8	MR	MR	MS	MR*	Moderate	Medium	Early-int
Tavern	16	MR	MS	MSS	MR*	Stiff	Short-med	Int-late
SYN415-584	2	(MR)	MR	MS	(R)	Moderate-stiff	Medium	Intermediate
SYN415-586	1	MRR	(MR)	(MS)	(R)	Moderate-stiff	Medium	Intermediate
SY Silhouette (SYN415-651)	2	MR	MR	MS	(R)	Moderate-stiff	Medium	Late
SYN416-708	1	(MR)	(MR)	MRMS	(R)	Moderate-stiff	Medium	Intermediate

Disease susceptibility sourced from FAR-funded Disease Nurseries and CPT trials (assessments carried out by Plant & Food Research).
Scores followed by * indicate resistance is affected by pathotypes present (score is an average).
(brackets) indicate there is limited NZ trial data to assess resistance (i.e. the cultivar has either been in trials for less than three years and/or disease pressure has been low).

Key
HS = highly susceptible
S = susceptible
MSS = mostly susceptible
MS = moderately susceptible
MRMS = intermediate resistance
MR = moderately resistant
MRR = mostly resistant
R = resistant

Autumn Sown Barley Cultivar Evaluation 2019/2020 Season - yield (t/ha)

CULTIVAR	St Andrews	Balfour	Seasons in FAR trials (Autumn sown)
Region	South Canterbury	Southland	
Soil Type	Claremont silt loam	Lintley loam	
Previous crop	Wheat	Wheat	
Sowing date	9 May	24 Apr	
Harvest date	17 Jan	10 Feb	
Dryland/Irrigated	Dryland	Dryland	
Buttress (CRBA148)	11.0	8.3	1
Fortitude	9.9	7.6	6
Jimpy	9.8	8.0	12
Laureate	11.0	8.1	4
RGT Planet	10.6	7.6	4
Sanette	11.0	7.5	8
Tavern	9.7	7.4	16
SYN415-584	11.3	7.9	2
SYN415-586	11.1	9.1	1
SY Silhouette (SYN415-651)	11.3	9.3	2
SYN416-708	11.7	9.2	1
Site mean yield	10.8	8.2	
LSD (5%)	0.9	0.3	
CV (%)	5.6	2.7	

Mid Canterbury trial at Rakaia abandoned due to hail damage.

Canterbury

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 6.25)	Screenings (%)
Buttress (CRBA148)	53	70	11.4	2.1
Fortitude	56	69	11.4	1.5
Jimpy	50	69	12.3	6.4
Laureate	57	67	11.8	2.9
RGT Planet	60	68	11.0	1.7
Sanette	57	69	10.7	1.9
Tavern	53	70	11.5	3.5
SYN415-584	58	67	10.3	2.6
SYN415-586	58	66	11.1	2.2
SY Silhouette (SYN415-651)	56	66	10.5	3.5
SYN416-708	59	68	10.9	1.7
Mean	56	68	11.2	2.7
LSD (5%)	-	-	-	-

Single trial - no LSD available (Rakaia trial was hail damaged).

Southland

CULTIVAR	T.G.W. (g)	Test Weight (kg/hl)	Protein (%) (N% x 6.25)	Screenings (%)
Buttress (CRBA148)	49	66	9.8	3.6
Fortitude	47	64	9.2	4.6
Jimpy	44	65	11.3	6.6
Laureate	51	63	9.7	4.4
RGT Planet	50	65	11.8	3.5
Sanette	50	63	9.2	4.1
Tavern	45	65	11.8	6.8
SYN415-584	52	63	8.9	3.9
SYN415-586	50	63	9.2	3.3
SY Silhouette (SYN415-651)	50	61	8.5	4.3
SYN416-708	49	63	11.8	4.6
Mean	49	64	10.1	4.5
LSD (5%)	-	-	-	-

Single trial - no LSD available.
Quality data are also presented as 4-year means on the individual cultivar description pages.

barley - 4-year adjusted mean

Autumn Sown Barley - 4-year adjusted mean - relative yield by site - Canterbury and Southland

CULTIVAR	Rakaia	St Andrews	Canterbury mean yield	Balfour	Seasons in FAR trials (Autumn sown)
Region	Mid Canterbury	South Canterbury		Southland	
Dryland/Irrigated	Irrigated	Dryland		Dryland	
No. of trials	3	2	5	4	
Buttress (CRBA148)	-	(103)	(104)	(101)	1
Fortitude	104	91	97	92	6
Jimpy	90	89	88	91	12
Laureate	104	99	100	102	4
RGT Planet	107	101	103	94	4
Sanette	101	98	98	96	8
Tavern	100	93	95	94	16
SYN415-584	95	106	99	98	2
SYN415-586	-	(104)	(105)	(111)	1
SY Silhouette (SYN415-651)	98	106	100	108	2
SYN416-708	-	(110)	(110)	(113)	1
Site mean yield (t/ha)	10.0	9.1	9.6	8.0	
LSD (estab. cv) (5%)	10	13	10	7	
LSD (new vs estab.) (5%)	13	15	16	10	

Rakaia is a 3-year mean (hail damage in 2019-20).
St Andrews is a 2-year mean (no trials in 2017-18 and 2018-19).
- Cultivar has not been in trials at this location.
Figures in brackets are less robust as they are only based on one year of data.
LSD (estab. cv) is for comparing two "established" cultivars (that have both been in all trials).
LSD (new vs estab.) is for comparing a "new" (first year) cultivar with an "established" cultivar.

barley cultivar descriptions

BUTTRESS (CRBA148) — YEAR 1

An average to above average yielding feed cultivar, with malting potential. Cv. Buttress (CRBA148) is new to autumn trials, but was in spring trials last season. Shows resistance to powdery mildew and net blotch, but is moderately susceptible to scald and leaf rust. A medium to tall variety with moderate straw strength.

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

DISEASE RESISTANCE	
Scald	Moderately susceptible
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium-tall
Maturity	Intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	44	50
Test weight (kg/hl)	62	64
Protein (%) (N% x 6.25)	10.9	9.2
Screenings (%)	2.2	2.0

END USE	
	Feed, malting potential

BACKGROUND	
Breeder	Sejet
Head Licensee	Plant & Food Research
Agent	Luisetti Seeds

FORTITUDE — YEAR 6

Cv. Fortitude has produced above average yields with irrigation and below average yields at dryland sites. Shows levels of resistance to most diseases with the exception of leaf rust. A medium height feed variety with moderate straw strength and intermediate maturity.

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

DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible*
Powdery mildew	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	46	47
Test weight (kg/hl)	62	63
Protein (%) (N% x 6.25)	10.7	9.4
Screenings (%)	1.1	2.7

END USE	
	Feed

BACKGROUND	
Breeder	Sejet
Head Licensee	Plant & Food Research
Agent	Luisetti Seeds

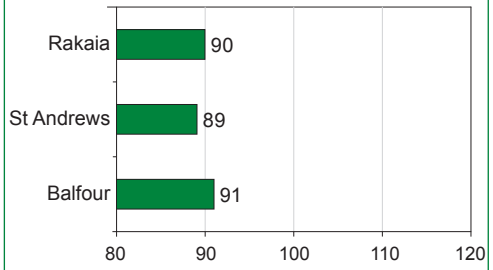
* Resistance is affected by pathotypes present (score is an average).

JIMPY

YEAR 12

A malting cultivar approved by New Zealand brewers. Cv. Jimpy produces lower yields compared to other malting varieties. Moderate resistance to scald and net blotch, but monitor for powdery mildew and especially leaf rust. A moderate to stiff strawed cultivar with intermediate to late maturity.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Susceptible
Powdery mildew	Moderately susceptible

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Intermediate-late

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	43	45
Test weight (kg/hl)	62	63
Protein (%) (N% x 6.25)	11.3	10.2
Screenings (%)	3.2	4.9

END USE	
	Malting

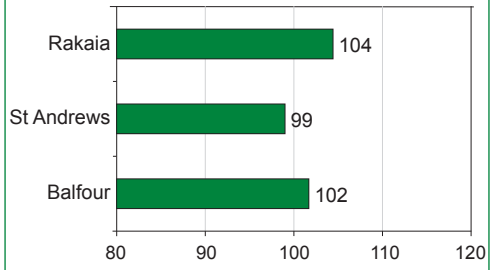
BACKGROUND	
Breeder	Malteurop
Head Licensee	Malteurop
Agent	Malteurop

LAUREATE

YEAR 4

An average to above average malting and feed variety at irrigated and dryland sites. Moderately susceptible to some leaf rust pathotypes, but has levels of resistance to other diseases. Cv. Laureate is a cultivar with medium height and moderate straw strength, which will benefit from a good PGR programme in high yielding situations.

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



DISEASE RESISTANCE	
Scald	Intermediate resistance
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible*
Powdery mildew	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Early-intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	47	49
Test weight (kg/hl)	59	61
Protein (%) (N% x 6.25)	11.1	9.7
Screenings (%)	3.4	3.4

END USE	
	Malting/Feed

BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	PGG Wrightson Grain

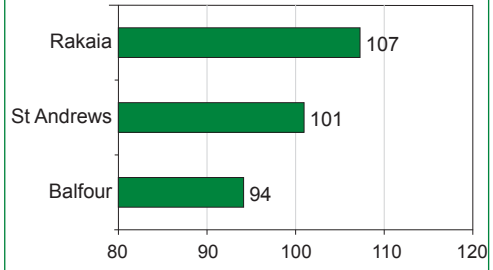
* Resistance is affected by pathotypes present (score is an average).

RGT PLANET

YEAR 4

A malting and feed variety producing a range of yields. Performs well with irrigation. Shows resistance to scald and powdery mildew, but is moderately susceptible to other diseases. A medium height variety with moderate straw strength and early to intermediate maturity.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately susceptible
Leaf rust	Moderately susceptible
Powdery mildew	Mostly resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Early-intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	49	51
Test weight (kg/hl)	61	63
Protein (%) (N% x 6.25)	10.6	10.1
Screenings (%)	2.4	2.4

END USE	
	Malting/Feed

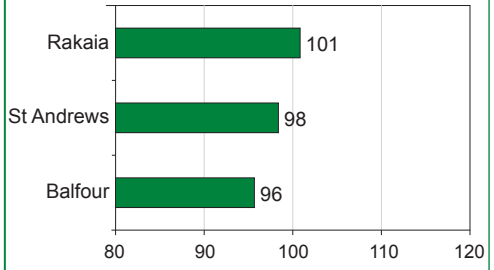
BACKGROUND	
Breeder	RAGT
Head Licensee	Seed Force Ltd
Agent	PGG Wrightson Grain

SANETTE

YEAR 8

Average to below average yielding feed cultivar in Canterbury and Southland. Moderately resistant to most diseases with the exception of leaf rust. A medium height variety with moderate straw strength.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Moderately resistant*

FIELD CHARACTERISTICS	
Straw strength	Moderate
Crop height	Medium
Maturity	Early-intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	47	49
Test weight (kg/hl)	60	61
Protein (%) (N% x 6.25)	10.5	9.2
Screenings (%)	2.4	3.1

END USE	
	Feed

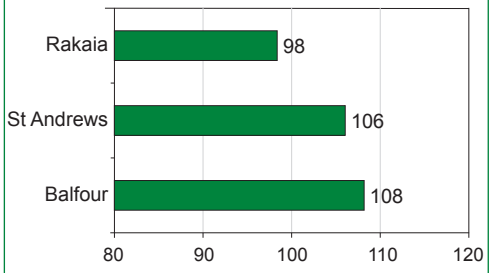
BACKGROUND	
Breeder	Syngenta
Head licensee	Cropmark Seeds
Agent	PGG Wrightson Grain, Cates Grain & Seed, Advance Agriculture

* Resistance is affected by pathotypes present (score is an average).

SY SILHOUETTE (SYN415-651) YEAR 2

Cv. SY Silhouette (SYN415-651) has been high yielding at dryland sites, but produced below average yields in Canterbury with irrigation. Moderately susceptible to leaf rust, but with good resistance to other diseases. A late maturing, medium height cultivar with a moderate to stiff straw.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Resistant
FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Late

GRAIN QUALITY (4-year means)*	Canty	Sthld
TGW (g)	46	52
Test weight (kg/hl)	57	61
Protein (%) (N% x 6.25)	10.5	8.1
Screenings (%)	6.0	1.6

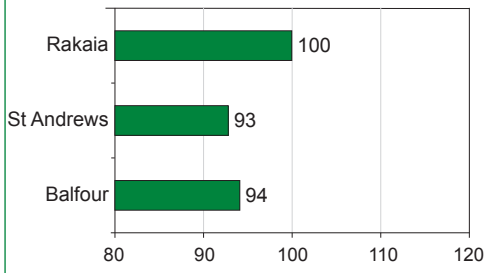
END USE	Feed
BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	Not yet assigned

*Poor quality tests due to the 2018-19 season will affect newer cultivars in the 4-year grain quality means.

TAVERN YEAR 16

A feed cultivar producing average to below average yields. Moderately resistant to scald and powdery mildew. Monitor for net blotch and leaf rust. Excellent straw strength combined with short to moderate crop height.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately susceptible
Leaf rust	Mostly susceptible
Powdery mildew	Moderately resistant*
FIELD CHARACTERISTICS	
Straw strength	Stiff
Crop height	Short-medium
Maturity	Intermediate-late

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	44	47
Test weight (kg/hl)	63	64
Protein (%) (N% x 6.25)	10.7	10.0
Screenings (%)	2.9	4.4

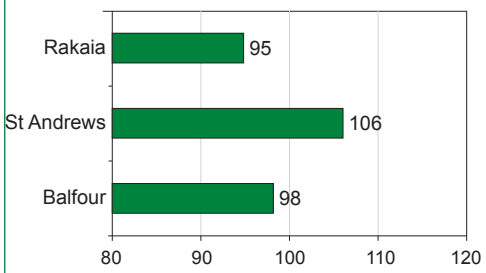
END USE	Feed
BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	PGG Wrightson Grain

* Resistance is affected by pathotypes present (score is an average).

SYN415-584 YEAR 2

A feed variety with yields ranging from below average in Southland and Rakaia to high yielding in dryland conditions in South Canterbury. Moderately susceptible to leaf rust, but shows resistance to other diseases, especially Fusarium head blight. A moderate to stiff strawed cultivar with intermediate maturity.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Resistant
FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Intermediate

GRAIN QUALITY (4-year means)*	Canty	Sthld
TGW (g)	48	51
Test weight (kg/hl)	58	60
Protein (%) (N% x 6.25)	9.7	8.7
Screenings (%)	3.5	2.8

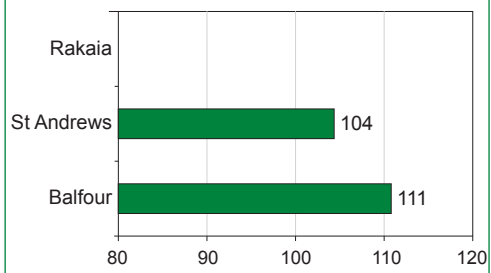
END USE	Feed
BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	Not yet assigned

*Poor quality tests due to the 2018-19 season will affect newer cultivars in the 4-year grain quality means.

SYN415-586 YEAR 1

A new feed variety with malting potential. Cv. SYN415-586 has produced above average yields in Canterbury and is high yielding in Southland. Moderately susceptible to leaf rust, but shows good resistance to other diseases. A moderate to stiff strawed cultivar with intermediate maturity.

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



DISEASE RESISTANCE	
Scald	Mostly resistant
Net blotch	Moderately resistant
Leaf rust	Moderately susceptible
Powdery mildew	Resistant
FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	49	50
Test weight (kg/hl)	58	61
Protein (%) (N% x 6.25)	10.6	8.6
Screenings (%)	2.4	1.7

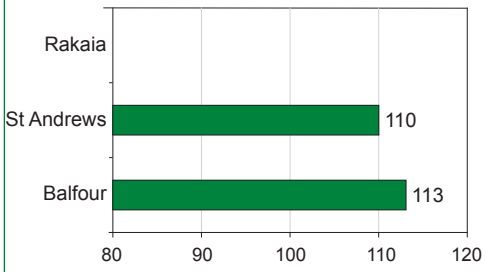
END USE	Feed, malting potential
BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	Not yet assigned

SYN416-708

YEAR 1

A new feed variety, with malting potential, that was high yielding in both Canterbury and Southland in its first year of CPT 2 trials. Shows varying levels of resistance to the most common barley diseases. A medium height cultivar with moderate to stiff straw strength.

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



DISEASE RESISTANCE	
Scald	Moderately resistant
Net blotch	Moderately resistant
Leaf rust	Intermediate resistance
Powdery mildew	Resistant

FIELD CHARACTERISTICS	
Straw strength	Moderate-stiff
Crop height	Medium
Maturity	Intermediate

GRAIN QUALITY (4-year means)	Canty	Sthld
TGW (g)	49	49
Test weight (kg/hl)	60	61
Protein (%) (N% x 6.25)	10.4	11.2
Screenings (%)	1.8	3.0

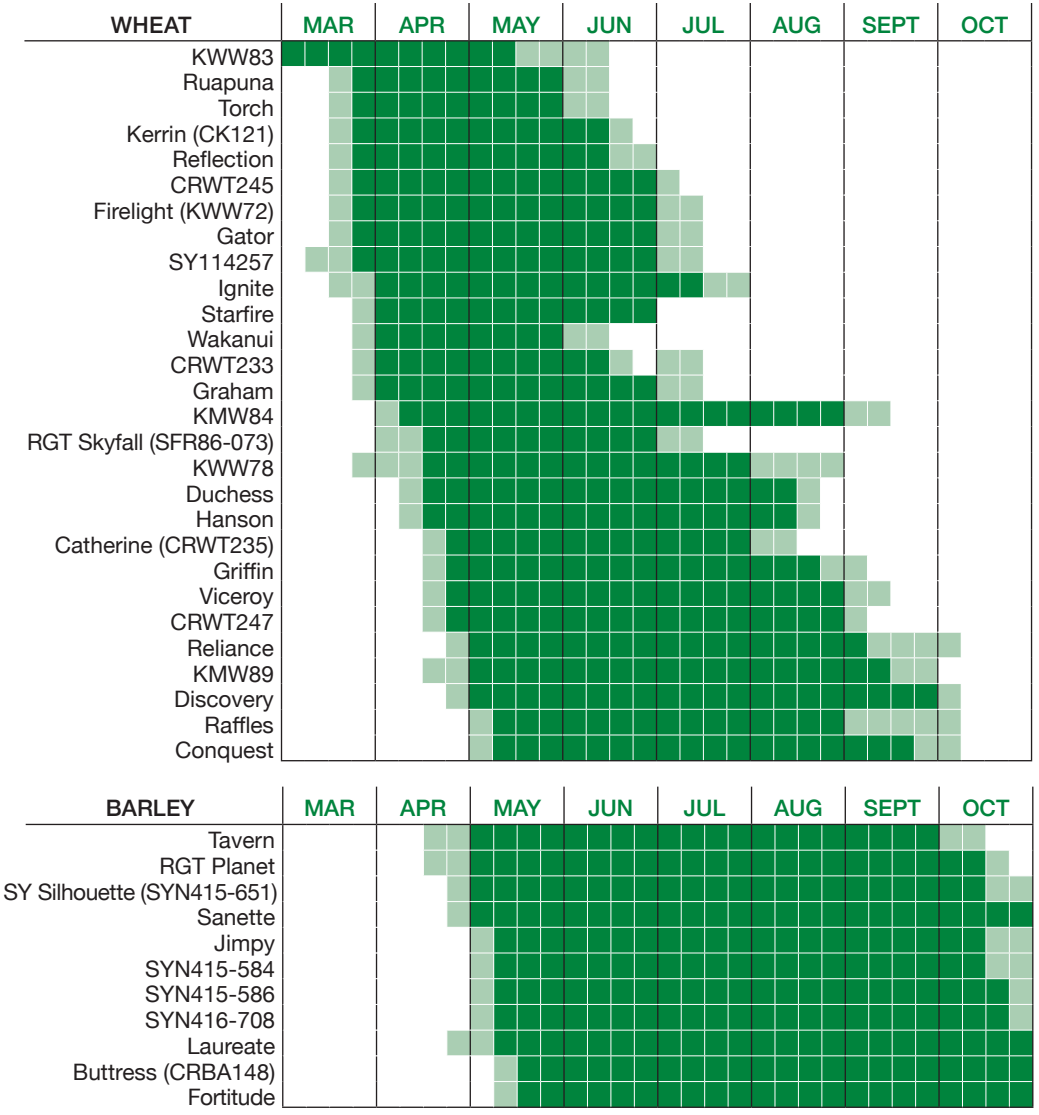
END USE	
	Feed, malting potential

BACKGROUND	
Breeder	Syngenta
Head Licensee	Cropmark Seeds
Agent	Not yet assigned

Autumn sown wheat and barley – Sowing date guidelines 2020

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.

'Optimal' sowing dates – 'Less ideal' sowing dates –



* Less information available for new cultivars.
1. The earlier part of each sowing window may be more suited to higher altitudes and southerly latitudes.
2. Barley cultivars at the late sowing window are more suited to irrigated, higher fertility sites.

sowing rate calculation

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.

1. If you have scales that will weigh to 0.1 g, count 200 seeds, weigh them and multiply the weight by 5 to get thousand grain weight
2. If not, count and weigh 1000 seeds.

GERMINATION PERCENTAGE (%)

This should also be on the bag label or available 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 provided on request. Experience certainly helps when deciding on this figure.

Examples of emergence could be:

- April sown: 90% emergence (assumes warm, moist conditions)
- May sown: 85% emergence
- June sown: 80% emergence
- July sown: 75% emergence (assumes maybe poorer quality seedbed, sown too deep, cold soil conditions).

$$\text{SOWING RATE (kg/ha)} = \frac{\text{target plant population (p/m}^2\text{)} \times \text{TGW (g)} \times 100}{\%\ \text{germination} \times \%\ \text{emergence}}$$

Examples:

AUTUMN WHEAT

A wheat sample TGW = 45 g
B % germination = 95%
C % emergence = 90%
D target plant population = 125 pl/m^2
E required sowing rate is 66 kg/ha

SPRING BARLEY

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

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

$$\text{EMERGENCE (\%)} = \frac{\text{actual plant population (p/m}^2\text{)} \times \text{TGW (g)} \times 100}{\text{sowing rate (kg/ha)} \times \%\ \text{germination}}$$

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.

establishment

ISSUES FOR SUCCESSFUL ESTABLISHMENT (in no particular order)

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.

TIME OF SOWING: Sowing crops in the early autumn or late spring, when soil temperatures are warm and moisture is (hopefully) ideal, should mean rapid germination and a high emergence rate of seedlings. The autumn sown crops will also have more opportunity to tiller, so sowing rates will need to take this into account.

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 AUTUMN SOWINGS

Note: for most recent trial results relating to sowing rates for autumn sown wheat, see FAR Arable Update Cereals numbers 60, 85 and 100.

Generally establishment targets are:

- April 125 plants/m^2
- May 125-175 plants/m^2
- June 200 plants/m^2

Usually, there is no real advantage of sowing more than 200 plants/m^2.

seed quality and seed treatments

For further reading see FAR Arable Update Cereals numbers 15, 65, 66, and 81.

SEED QUALITY

High quality seed has:
- < 10% *Fusarium/Microdochium*,
- > 95% germination (Germ + Abnorm),
- > 40g TGW,
- low abnormals.

Table: Attributes of example lines

	UNTREATED				TREATED			
Line	Germ	Abnorm	Remain	*Fusarium*	Germ	Abnorm	Remain	*Fusarium*
A	80.2	13.8	6.0	36.0	76.6	18.0	5.4	2.8
B	73.6	17.0	9.4	31.0	69.4	21.4	9.2	0.6
C	72.0	14.6	13.4	71.2	71.4	4.4	6.4	3.6
D	79.6	13.8	6.6	5.0	71.6	22.0	6.4	0.0
E	83.8	9.2	7.0	21.0	79.4	11.8	8.8	0.2
F	76.6	17.6	5.8	62.6	71.4	23.4	5.2	6.2

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, 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.

F Reject: *Fusarium* extremely high even though mostly controlled with treatment. However, abnormals increased after treatment indicating some seed damage.

Note:
- Abnormals have a squiggly zig zag pre-emergent coleoptile (shoot), which can be identified by scratching back the soil surface and examining the coleoptile during emergence.
- It is suggested that 60% of abnormals will emerge. However, be aware that these abnormal plants have low tillering capacity.
- Remainders are seeds that do not 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 due to colder/wetter soil.
- All seed should be treated if the cereal follows maize as *Fusarium* risk is higher.
- A zero threshold exists for loose smut and seed-borne barley stripe mosaic virus. Seed lines with loose smut will be rejected from certification and uncertified seed must be treated.

Seed treatments may not be needed on high quality seed if the seed line is not repeatedly sown without treatment.

Seed quality details should be freely available from a reputable seed merchant upon request.

SEED TREATMENT STRATEGIES

AUTUMN WHEAT STRATEGY:

1. No treatment is needed if sowing in April with high quality seed into a warm seedbed that is not too wet.
2. Consider using Vitaflo®, Raxil Star®, Rancona® Dimension or Kinto®Duo if sowing in April and requiring protection from soil or seed-borne diseases such as *Fusarium*.
3. Consider using Vitaflo® if sowing in May/June into a cold seedbed that has low *Fusarium* but protection from soil-borne diseases is needed.
4. Avoid high *Fusarium* loaded seed entirely.

CONSIDERATIONS:

- All products have the potential to reduce establishment of damaged (e.g. cracked) seed, resulting in yield losses in severe cases. Vitaflo® is the least likely to delay emergence of damaged seed. Delayed emergence may be critical for late autumn sowings.
- Vitaflo®, Rancona®, Kinto®Duo and Raxil Star® control small quantities of *Fusarium*.
- Ideally, reject seedlines that test over 20-25% *Fusarium* and/or have a purity and germination score of less than 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 during grainfill.

INSECTICIDE

Imidacloprid (eg Gaucho®) and clothianidin (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. At this time, the plant has grown enough that a dilution effect occurs. No matter what the sowing date, control should persist through until GS13/21 (unless heavy rain occurs). For spring sowings, Gaucho® should be used for grass grub control, but not aphids, as seedling growth occurs too rapidly.

CONSIDERATIONS FOR INSECTICIDE SEED TREATMENT USE:

- For sowings before 1 May, a foliar aphicide should follow at GS13/21. Then monitor the need for further foliar applications.
- For sowings after 1 May, the need for a foliar aphicide should be monitored after 6 weeks.
- The best use may be when both grass grub and early aphid protection are needed, when spraying is difficult or inconvenient, or to provide management flexibility.
- Growers should consider the economics of insecticide seed treatment versus foliar insecticides if only aphid control is required, especially if seed is sown in April and further foliar aphicide applications will be essential.

For conventional drilling dates, the most cost-effective autumn BYDV control is often a tank mix of insecticide with autumn herbicides (at GS13) unless the disease risk is severe before GS13 (3 true leaves), or grass grub control is also required.

glossary of terms

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 Low falling number scores are an indicator of sprouting. Falling number (FN) is an indirect measure of alpha-amylase levels in the grain with low FN indicating high alpha-amylase activity. FN is tested three weeks after harvest and only on milling wheats.

Limited data For newer cultivars that 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 a 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.

***Fusarium* head blight** 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 (STB) Disease caused by *Zymoseptoria tritici*, (perfect stage *Mycosphaerella graminicola*)

Stripe rust Disease caused by *Puccinia striiformis* f.sp. *tritici*.

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	Conquest	96 kg/ha	Raxil	10 ha	DAP 200	3 May

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