



Cereal Seeds
Science. Support. Success



Cereal Seed Guide 2023/24



The Cereal Seeds Team.



Science

Science is at the core of the extensive cultivar research and development programmes we undertake. These science-based programmes deliver plants with genetic traits identified to produce yield gains, quality improvements and disease resistance. The development of a new cultivar with the traits sought by growers and end-users does not end with the cultivar R&D programme. Product performance enhancements and developments continue through agronomic research and the continual evaluation of seed production and seed treatment options and processes that support the ultimate performance of the product.

Our investment in R&D includes experienced and skilled people and the facilities that support their work to develop our product range of milling and feed wheats, malting and feed barleys, triticale, specialty grains and linseed.

Support

Cereal Seeds cultivars are supported by agronomy research programmes that extend over several years for each product. These trials include fertiliser, agrichemical, planting date and sowing rate studies. These studies produce product management recommendations that enable growers to maximise crop performance outcomes. Retailers and distributors of our products receive training to provide field support to growers. In turn, these field staff are supported by our Product Development staff with up to date cultivar information and management recommendations. Our Product Development staff are also available by phone and email to support queries about products and their in-field management.

Success

We measure the success of our cultivars by their performance in in-house trials, CPT trials and by the commercial performance feedback we receive from growers and end-users. Cereal Seeds products have a track record of success extending over many years. Growers can be assured that new Cereal Seeds products or cultivars are released to the market following an extensive Quality Assurance programme, which ensures high quality certified seed is produced and marketed each year.

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CEREAL SEED RATES

Use of the seed rate formula below in conjunction with a target established plant population (see table below) allows greater control over the final number of plants established per square metre. The use of the formula also factors in variations in Thousand Grain Weight (TGW) as well as germination and establishment. All these factors vary greatly and make a significant difference to the final seed rate. Over-thick crops may lodge, give lower test weights and have higher disease pressure; thin crops will not have maximum yield potential and are not as competitive with weeds.

Seed rate in kg per ha (all cereal crops) =

$\frac{\text{Target established plants per m}^2 \times \text{Thousand Grain Weight (TGW) in grams (g)} \times 100}{\% \text{ germination} \times \% \text{ establishment}}$

Example: $\frac{100 \text{ (Target plants)} \times 52\text{g (TGW)} \times 100 \text{ (conversion factor)}}{95\% \text{ (germination)} \times 90\% \text{ (establishment)}}$
= 61 kg/ha seed rate

Cereal Plant Establishment

The table below provides an estimate of the expected plant establishment percentage for different drilling dates of cereals which should be included in the above calculation to determine the seed rate.

Month	Plant Establishment %	
April	early	95
	late	90
May	early	90
	late	85
June	early	80
	late	75
July	early	70
	late	70
August	early	80
	late	85
September	early	90
	late	90

WHEAT

The table below provides the recommended established plant numbers for different drilling dates of wheat. Please note the important comment below the table relating to when you may need to vary the target plant number. The table also gives some example seed rates at TGWs of 45, 50 and 55, assuming in all cases a germination of 95% and an establishment of 90%.

Drilling Month	Target Plant Population (plants/m ²)	TGW (g) Seed rate in kg/ha		
		45	50	55
April	100 – 125	53 – 66	59 – 73	64 – 80
May	125 – 175	66 – 92	73 – 102	80 – 113
June	175 – 200	92 – 105	102 – 117	113 – 129
July	200	105	117	129
August	200 – 250	105 – 132	117 – 146	129 – 161
September	250 – 300	132 – 158	146 – 175	161 – 193

*Manawatu winter wheat growers – use 20 plants/m² less than the lowest figure above for April, May and June.

TRITICALE (EMPERO and RISTRETTO)

Due to the excellent tillering capacity of EMPERO and RISTRETTO, seed rates need to be reduced as per the table below.

Drilling Date	Target Plant Population (plants/m ²)
1-15 April	100 – 120
16-30 April	120 – 140
1-15 May	150
16-31 May	150
1-30 June	150 – 200

RYECORN (AMILO)

AMILO tillers extremely well from an autumn sowing but will inherently produce fewer tillers from a winter drilling.

Drilling Date	Target Plant Population (plants/m ²)
Late April to 15 May	125
16-31 May	150
1 June to 15 July	150 – 200

BARLEY

Drilling Month	Target Plant Population (plants/m ²)
Early – Mid April	150
Mid April & May	175 – 200
June	200 – 225
Early spring	225 – 250
Late spring	250 – 300

GENERAL NOTES FOR ALL CEREALS:

- Estimate or measure the germination of your seed; this will be a high percentage figure for all good seed, i.e. >90%. Germination figures are available on request for all PGG Wrightson Grain (PGW Grain) cultivars.
- The TGW is available on all seed supplied by PGW Grain; obtain the TGW for other seed.
- The establishment percentage needs to be adjusted to allow for field conditions, including soil type, seed bed quality as well as slug and other pest issues.
- Adjusting the target plant number downwards, below the recommended ranges, should be considered for paddocks with a history of high fertility and/or lodging problems and especially in areas where growth may continue all winter e.g. the Manawatu.
- Adjusting the target plant number upwards, beyond the recommended range, should be considered for dry conditions, low fertility or grass weed competition. If this is a regular issue, a review of your grass weed control strategy is recommended.
- Barley is generally more take-all tolerant than wheat as a second-year cereal, and although yields are usually lower than a first-year barley crop, the risk of take-all seriously affecting yield is lower than wheat.
- An appropriate plant growth regulator (PGR) programme needs to be assessed for individual crops and will be influenced by sowing date, seed rate, nitrogen use, crop thickness and yield potential. Some spring crops, may not need a PGR programme, and as with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



CULTIVAR DRILLING WINDOWS

Cultivar	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Feed Wheat										
<i>KFW2102</i>		█	█	█	█	█				
<i>Firelight</i>		█	█	█	█	█				
<i>Graham</i>		█	█	█	█	█				
<i>Starfire</i>		█	█	█	█	█				
Milling Wheat										
<i>Ignite</i>		█	█	█	█	█	█			
<i>Voltron</i>		█	█	█	█	█	█	█		
<i>Discovery</i>		█	█	█	█	█	█	█	█	
<i>Sensas</i>						█	█	█	█	
Purple Wheat										
<i>Tanzanite</i>		█	█	█	█	█	█	█		
Milling Ryecorn										
<i>Amilo</i>		█	█	█	█	█				
Feed Triticale										
<i>Ristretto</i>		█	█	█	█	█	█	█		
<i>Empero</i>		█	█	█	█	█				
Feed Barley										
<i>RGT Planet</i>		█	█	█	█	█	█	█	█	█
<i>SY Transformer</i>		█	█	█	█	█	█	█	█	█
<i>Laureate</i>		█	█	█	█	█	█	█	█	█
<i>Tavern</i>		█	█	█	█	█	█	█	█	█
Winter Barley										
<i>Surge</i>	█	█	█	█	█					

█ Possible █ Optimum drilling window



KFW2102

- **High yielding winter feed wheat**
- **Has performed well in all regions tested (Canterbury, Southland and lower North Island)**
- **Good all round disease resistance profile, especially stripe rust and powdery mildew**
- **Large grain and high test weights**



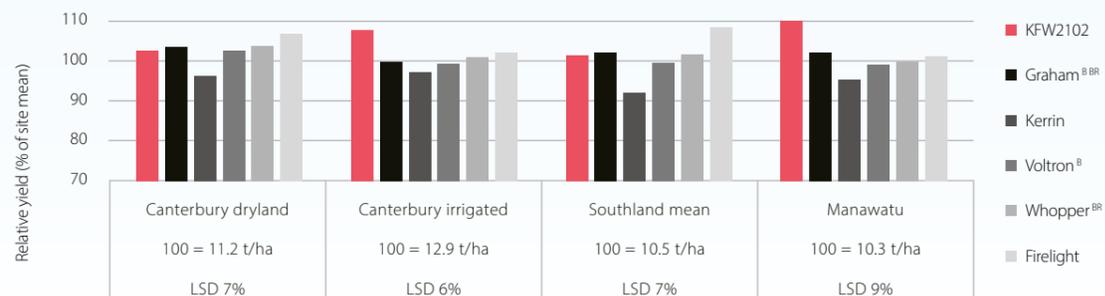
Description

KFW2102 is an exciting new winter feed wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain). In the past four seasons in internal and FAR CPT trials, KFW2102 has produced consistently high yields across all grain growing environments. In CPT 2 trials for the first time this year, it was a top performer in Canterbury, Southland and the lower North Island. It has a good disease package and produces an intermediate hard/soft grain with high kernel weights and good test weights.

Yield

KFW2102 has consistently produced high yields across a wide range of sites, with adjusted 4-year mean yields of 102% - 109% across all South Island regions. In the lower North Island, the adjusted 4-year mean yield was 111%, making it the highest yielding cultivar in that region.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



CPT KFW2102 grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	46	53	51
Test Weight (kg/hl)	70	77	75
Protein content (%) (N% x 5.7)	10.0	10.1	9.0
Screenings (%)	0.7	0.5	0.7

Time of drilling

Due to its strong vernalisation requirement, the full yield potential of KFW2102 is most likely to be achieved from an early drilling window of early April to late May. A PGW Grain sowing date (and rate) trial is being conducted at Kimihia on this cultivar for the 2023/24 season and should provide further information.

Speed of development

Month planted	Typical heading dates for KFW2102 in Canterbury
Late March	Early November
Late May	Mid – Late November
Late June	Early – Mid December

From autumn plantings, KFW2102 is an intermediate maturing cultivar. However, it should not be planted after the end of June in areas with mild winters as its high vernalisation requirement may result in excessively delayed heading. A PGW Grain sowing date and rate trial is being conducted at Kimihia on this cultivar for the 2023/24 season.

Seed rate and tillering characteristics

KFW2102 has moderate tillering capacity and a tight V-shaped tillering habit. Target plant populations should be at the higher end of the ranges. A PGW Grain sowing date and rate trial is being conducted at Kimihia on this cultivar for the 2023/24 season and should provide further information.

Soil type, rotation and geography

KFW2102 has shown that it can perform well under a wide range of different soil types and environments in Canterbury, Southland and the lower North Island.

Disease resistance

KFW2102 has good resistance to most cereal diseases in New Zealand, especially stripe rust and powdery mildew. Considering this disease profile and fungicide trials conducted at Mt Hutt last year by PGW Grain, a low to moderate fungicide programme is recommended. KFW2102 produced the highest treated yields of over 14 t/ha. It has also been entered into the PGW Grain agronomy trials (2022/23-2023/24), so more information will be available next year. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9
Leaf rust	8
Septoria leaf blotch	7
Powdery mildew	9
Fusarium head blight	7

Straw strength and height

KFW2102 is a medium height cultivar with stiff straw. The use of plant growth regulators (PGRs) is generally recommended, with the actual programme determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. A PGW Grain PGR trial is being conducted on this cultivar for the 2023/24 season. Please contact your local PGW Representative for site specific recommendations.



Firelight

- High yielding winter feed wheat
- High yield potential under a wide sowing window – April until June (medium vernalisation requirement)
- Well suited to Canterbury and Southland including dryland sites
- Excellent disease resistance profile, especially for Septoria leaf blotch



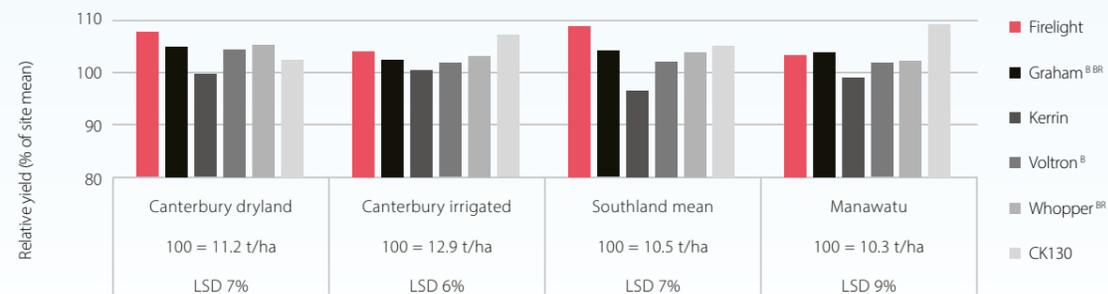
Description

FIRELIGHT is an exciting winter feed wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain). It has a unique rich green leaf and ear colour, a spreading plant habit, medium height and moderate straw stiffness. FIRELIGHT produces a hard endosperm grain with acceptable grain quality characteristics for feed use.

Yield

FIRELIGHT has consistently demonstrated very high stable yields across a range of trial sites throughout Canterbury and Southland with potential to establish itself as one of the preferred feed wheat cultivars by growers. It is one of the leading cultivars under irrigation and excels in dryland Canterbury conditions.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



CPT FIRELIGHT grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	45	49	49
Test Weight (kg/hl)	68	72	69
Protein content (%) (N% x 5.7)	10.2	10.0	9.1
Screenings (%)	1.1	1.1	0.7

Time of drilling

The full yield potential of FIRELIGHT is most likely to be achieved from an early drilling window of late March to late April. Due to its medium vernalisation requirement, it will also produce good yields from May and June plantings.

Speed of development

Month planted	Typical heading dates for FIRELIGHT in Canterbury
Late March	Early November
Late May	Late November
Late June	Early December

FIRELIGHT is an intermediate maturing cultivar.

Seed rate and tillering characteristics

FIRELIGHT has good tillering capacity, and target plant populations should be in the mid-range appropriate for differing sowing dates.

Soil type, rotation and geography

FIRELIGHT has shown that it can perform well under a range of different soil types and environments, especially in Canterbury and Southland. FIRELIGHT, in trials to date, has yielded very well under irrigation and topped the rainfed/dryland locations.

Disease resistance

FIRELIGHT has good resistance to *Septoria* leaf blotch and stripe rust and intermediate resistance to leaf rust and mildew. In PGW Grain agronomy trials (2019/20-2021/22), FIRELIGHT has produced the highest untreated yields and fungicide responses of 0.5-2.8 t/ha. Please contact your local PGW Representative for site specific recommendations. In 2022/23 trials, under higher leaf rust pressure, FIRELIGHT produced a fungicide response of 2.8-7.2 t/ha. Considering this disease profile, a low to moderate fungicide programme is recommended with a focus on leaf rust and fusarium head blight control. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9
Leaf rust	4
<i>Septoria</i> leaf blotch	8
Powdery mildew	7
<i>Fusarium</i> head blight	6

Straw strength and height

FIRELIGHT is a medium height cultivar with moderate standing power. In PGW Grain agronomy trials (2021/22), in the absence of lodging, FIRELIGHT displayed a moderate response to a range of plant growth regulator (PGR) programmes with a high input programme (Cycocel + Moddus Evo at GS 30 and GS 32) providing the greatest height reduction. The use of PGRs is recommended, with the actual programme determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Graham

- High yielding winter feed wheat
- High yield potential under a wide sowing window – Early April until late June
- Good disease resistance profile but responds well to fungicides
- Heavy grain and high test weights, plus low sprouting risk



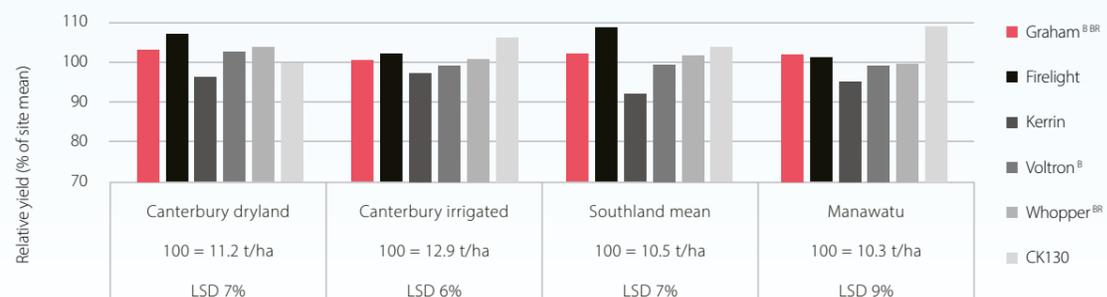
Description

GRAHAM winter wheat is a high yielding feed wheat cultivar bred by Syngenta in France and developed in New Zealand in conjunction with Cropmark Seeds Ltd as head licensee and PGG Wrightson Grain (PGW Grain). In the past four seasons in FAR CPT trials, GRAHAM has produced consistently high yields across all environments. It has a good disease package and produces an intermediate hard/soft grain with high kernel weights, good test weights and high falling numbers.

Yield

GRAHAM has consistently produced high yields across a wide range of sites, with adjusted 4-year mean yields of 99% -108% across all South Island regions. In the lower North Island it has been a leading cultivar in the past three seasons with the exception of last year.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



CPT GRAHAM grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	47	51	51
Test Weight (kg/hl)	71	75	73
Protein content (%) (N% x 5.7)	10.7	10.1	9.0
Screenings (%)	1.0	0.7	0.7
Falling number (sec)	315	331	332

Time of drilling

Due to its strong vernalisation requirement, the full yield potential of GRAHAM is most likely to be achieved from an early drilling window of early April to late June.

Speed of development

Month planted	Typical heading dates for GRAHAM in Canterbury
Late March	Early November
Late May	Mid – Late November
Late June	Early – Mid December

From autumn plantings, GRAHAM is an early-medium maturing cultivar. However, it should not be planted after the end of June in areas with mild winters as its high vernalisation requirement may result in excessively delayed heading.

Seed rate and tillering characteristics

GRAHAM has a high tillering capacity and a broad U-shaped tillering habit making it excellent at compensating for poor establishment and suited to lighter seeding rates, especially from earlier plantings. Target plant populations should be at the low to medium end of the range for autumn cereals.

Soil type, rotation and geography

GRAHAM has shown that it can perform well under a wide range of different soil types and environments in Canterbury, Southland and the lower North Island.

Disease resistance

GRAHAM has good resistance to most cereal diseases in New Zealand, especially stripe rust and *Fusarium* head blight but monitor for tan spot and leaf rust. Considering this disease profile and previous work conducted by Cropmark Seeds Ltd, a moderate to high fungicide programme is recommended. In PGW Grain agronomy trials (2019/20-2022/23), GRAHAM has produced one of the lowest untreated yields and high fungicide responses of 2.7-6.2 t/ha. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9
Leaf rust	5
Septoria leaf blotch	6
Powdery mildew	7
<i>Fusarium</i> head blight	7

Straw strength and height

GRAHAM is a medium height cultivar with stiff straw. Use of plant growth regulators (PGRs) is generally recommended, with the actual programme determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Starfire

- A consistently high yielding winter feed wheat
- High yield potential under early sowing and irrigation
- Well suited to Canterbury and Southland regions
- Wide planting window due to low vernalisation requirement



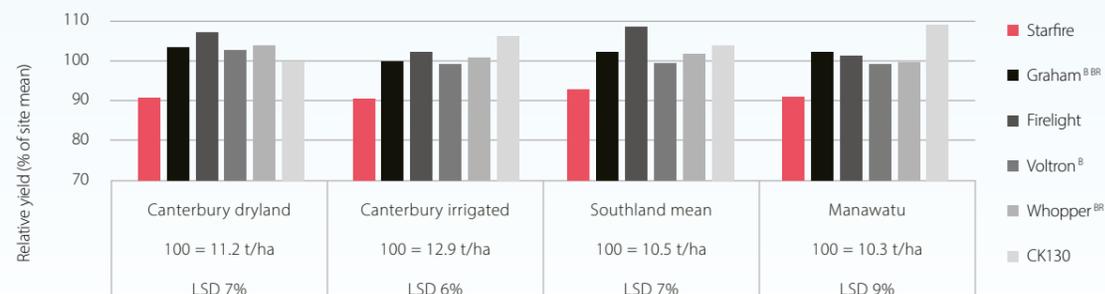
Description

STARFIRE is an established, consistently performing feed wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain). It has a compact efficient plant type with stiff short-medium straw. STARFIRE produces a plump, soft endosperm grain with excellent grain quality characteristics.

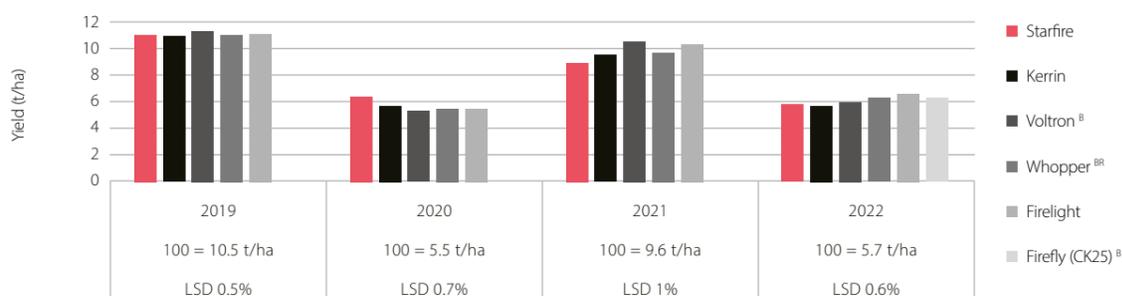
Yield

STARFIRE has been a consistent performer in FAR CPT trials since 2012 across a range of sites throughout Canterbury and Southland. Although it is no longer topping as many trials as it was six years ago, it remains a cultivar that will deliver top yields given appropriate management i.e. good, even plant establishment and disease control with appropriate fungicides. It has also been the overall highest yielding second year wheat in FAR trials and again given good establishment and foliar disease management should be the first choice in this situation.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



FAR Autumn Sown 2nd Year Trials, South Canterbury, 2019-2022



CPT STARFIRE grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	38	45	43
Test Weight (kg/hl)	68	75	72
Protein content (%) (N% x 5.7)	10.9	10.8	9.7
Screenings (%)	1.5	1.1	0.9

Time of drilling

The full yield potential of STARFIRE is most likely to be achieved from an early drilling window of early to late April. It will also produce good yields from May and early June plantings due to its low vernalisation requirement and plant growth characteristics.

Speed of development

Month planted	Typical heading dates for STARFIRE in Canterbury
Late March	Early November
Late May	Late November
Late June	Early December

STARFIRE is an intermediate maturing cultivar. It is notable for its rapid development and grain fill after ear emergence.

Seed rate and tillering characteristics

STARFIRE has moderate tillering capacity and a tight V-shaped tillering habit. Target plant populations should be at the higher end of the ranges. A good guideline is to increase your sowing rate by 25% above the standard PGW Grain wheat seed rate guidelines (pg 5).

Soil type, rotation and geography

STARFIRE has shown that it can perform well under a range of different soil types and environments in Canterbury, Southland and the lower North Island. STARFIRE has yielded extremely well under irrigation as well as many rainfed/dryland situations. It has also been the top yielding cultivar in the FAR second-year wheat trials for many years.

Disease resistance

STARFIRE has good resistance to stripe rust but is moderately susceptible to most other foliar diseases, especially *Septoria* leaf blotch and one powdery mildew race. Considering this disease profile, a robust fungicide programme (T0, T1, T2 and T3) is recommended. In PGW Grain agronomy trials (2021-2022/23), STARFIRE has produced one of the lowest untreated yields and high fungicide responses of 3.6-6.1 t/ha. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	8
Leaf rust	5
<i>Septoria</i> leaf blotch	4
Powdery mildew	5
<i>Fusarium</i> head blight	5

Straw strength and height

STARFIRE is a medium height cultivar with good standing power. It responds well to moderate plant growth regulator (PGR) programmes. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Ignite

- High yielding biscuit wheat
- Consistent yields across trial sites
- Well suited to all cereal growing regions
- Good disease resistance, especially to *Septoria* leaf blotch
- Good biscuit flour qualities



Description

IGNITE is a biscuit and feed wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain). It has a compact, efficient plant type with stiff short-medium straw. IGNITE produces soft endosperm grain with good quality characteristics that are suitable for both biscuit and feed markets.

Yield

IGNITE has performed extremely well in PGW Grain and CPT trials, consistently out-yielding Empress across Canterbury over a number of years. Voltron is now setting the yield bar for biscuit wheat in most trials.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



CPT IGNITE grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	41	48	47
Test Weight (kg/hl)	68	74	72
Protein content (%) (N% x 5.7)	10.7	10.6	9.7
Screenings (%)	1.1	0.7	0.5
Falling number (sec)	366	330	352

IGNITE is moderately resistant to pre-harvest sprouting. To protect falling number and marketability IGNITE crops intended for milling should be given harvest priority over feed wheat and most bread wheat milling wheat cultivars.

Time of drilling

For a winter wheat, IGNITE has a low vernalisation requirement and a very wide sowing window. Although the full potential of IGNITE is most likely to be achieved from an early drilling window of late March to late April. It has produced trial-topping yields from later plantings well into July.

Speed of development

Month planted	Typical heading dates for IGNITE in Canterbury
Mid April	Early – Mid November
Late May	Mid – Late November

IGNITE has intermediate maturity.

Seed rate and tillering characteristics

IGNITE has a moderate tillering capacity and a V-shaped tillering habit. It has similar characteristics to Starfire, with a slightly stronger ground covering ability. Therefore, target plant populations should be at the higher end of the ranges in the standard PGW Grain wheat seed rate guide (pg 5).

Soil type, rotation and geography

IGNITE has shown that it can perform well under a range of different soil types and environments including, the lower North Island. FAR trial results suggest it can be grown as a second-year wheat. However, it is a higher risk option than Starfire.

Disease resistance

IGNITE has a good disease resistance profile, being moderately resistant to stripe rust and powdery mildew. However, it is moderately susceptible to leaf rust and *Septoria* leaf blotch. Considering this disease profile, a moderate to high fungicide programme (T1, T2 and T3) is recommended. In PGW Grain agronomy trials (2019/20-2022/23), IGNITE has produced moderate untreated yields and fungicide responses of 3.3-4.2 t/ha. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	8
Leaf rust	6
<i>Septoria</i> leaf blotch	6
Powdery mildew	7
<i>Fusarium</i> head blight	6

Straw strength and height

IGNITE is a short to medium height cultivar with good standing power. In most situations, this cultivar will require a moderate plant growth regulator (PGR) programme. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Voltron

- A high yielding facultative feed and biscuit wheat
- High yield potential under a wide sowing window – April until late August (no vernalisation requirement)
- Well suited to Canterbury and Southland regions including dryland sites
- Good all-round disease resistance profile and high tillering ability



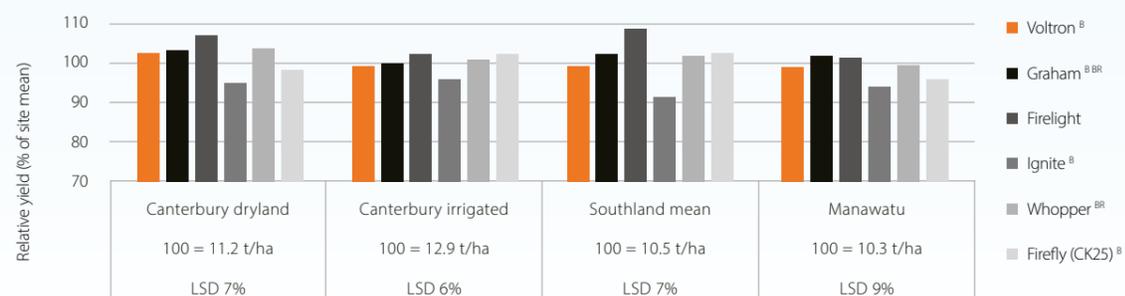
Description

VOLTRON wheat (KWW78) is an exciting feed and biscuit wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain). It is a mid-long season alternative type with a very wide sowing window, has a high level of leaf and ear waxiness, high tillering ability and good straw strength. VOLTRON produces soft endosperm grain that is suitable for both milling industry and feed uses.

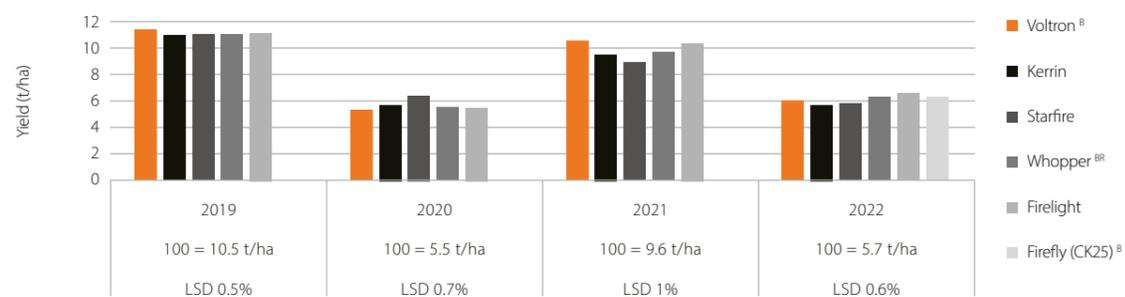
Yield

VOLTRON has consistently demonstrated very high stable yields across a range of trial sites throughout Canterbury and Southland with potential to establish itself as a preferred feed/biscuit wheat cultivar by growers. It is one of the leading cultivars for yield in FAR CPT Southland and Canterbury trials. In the absence of sharp eyespot, VOLTRON has also been one of the highest yielding second year wheat options.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



FAR Autumn Sown 2nd Year Wheat Trials, South Canterbury, 2019-2022



CPT VOLTRON grain quality (4 year mean)	Lower North Island	Canterbury	Southland
Kernel weight (1000 seed weight)	41	47	47
Test Weight (kg/hl)	70	76	74
Protein content (%) (N% x 5.7)	10.1	10.2	9.2
Screenings (%)	1.5	0.8	0.8
Falling number (sec)	339	334	346

Grain quality

VOLTRON produces a medium sized grain which readily achieves the low proteins desirable for biscuit making and has a high level of sprouting resistance, making it less likely to deteriorate in quality with post-maturity rainfall. This, combined with low-moderate late maturity alpha amylase susceptibility, means that it consistently achieves acceptable milling industry falling numbers.

Time of drilling

The full yield potential of VOLTRON is most likely to be achieved from an autumn drilling window of April to late May. In addition, it is a top yielding variety compared to other options throughout winter and into early spring.

Speed of development

Month planted	Typical heading dates for VOLTRON in Canterbury
Late March	Early November
Late May	Mid November
Late June	Late November

Seed rate and tillering characteristics

VOLTRON has excellent tillering capacity, and target plant populations should be at the low to medium end of the range for autumn wheat.

Soil type, rotation and geography

VOLTRON has shown that it can perform well under a range of different soil types and environments, especially in Canterbury and Southland. VOLTRON, in trials to date, has yielded very well under irrigation and rainfed/dryland locations. It has only been an average performer in the North Island based on FAR CPT trial data to date so is not recommended for this region.

Disease resistance

VOLTRON has good resistance to *Septoria* leaf blotch and stripe rust and intermediate resistance to leaf rust and powdery mildew. In PGW Grain agronomy trials (2020/21-2022/23), VOLTRON produced moderate to high untreated yields and fungicide responses of 1.5-4.1 t/ha. Considering the disease profile, a low to moderate fungicide programme is recommended. However, in areas prone to sharp eyespot, a robust T0 (Bolide or Kestrel) and plant growth regulator (PGR) programme is required. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9
Leaf rust	6
<i>Septoria</i> leaf blotch	7
Powdery mildew	6
<i>Fusarium</i> head blight	7

Straw strength and height

VOLTRON is a medium height cultivar with good standing power. In the 2020/21 agronomy trial, in the absence of lodging, the greatest height reductions were observed under moderate to high input programmes (Cycocel + Moddus Evo at GS 31 or split applications at GS 30 and GS 32). The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Discovery

- Milling wheat quality with feed wheat yield potential
- Proven high yields across sites and years
- Alternative type for sowing from early May to September
- Tall, stiff-strawed, awnless cultivar with good standing ability



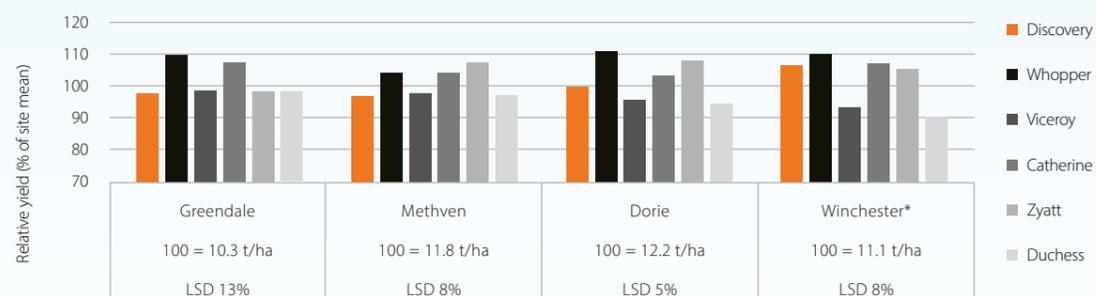
Description

DISCOVERY is a high yielding alternative (spring) wheat cultivar bred by Limagrain UK and further developed by PGG Wrightson Grain (PGW Grain) in New Zealand. It is a mid-season, tall awnless wheat with stiff straw and moderate resistance to pre-harvest sprouting. It produces large grain with low screenings, medium test weights and medium to high falling numbers.

Yield

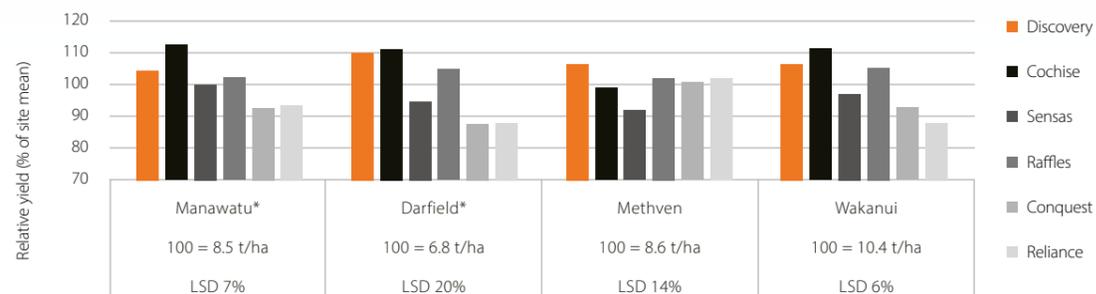
DISCOVERY is currently the highest yielding spring milling wheat option commercially available in New Zealand, performing exceptionally well in Canterbury with yields between 104% -110% of site mean. DISCOVERY also performs well under an autumn sowing window with yields similar to Catherine.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



*Winchester is only a 3 year mean (no data from 2021-22)

FAR (CPT) Spring Sown Trials (4 Year Mean)



*Manawatu and Darfield are only 3 year-means (no data from 2019-20)

CPT DISCOVERY grain quality (4 year mean)	Lower North Island (Spring)	Canterbury (Autumn)	Canterbury (Spring)
Kernel weight (1000 seed weight)	55	47	49
Test Weight (kg/hl)	79	71	73
Protein content (%) (N% x 5.7)	11.6	10.8	12.3
Screenings (%)	0.3	0.5	0.8
Falling number (sec)	371	328	333

DISCOVERY is a very high yielding milling wheat. Therefore, particular attention to nitrogen management is required to ensure protein milling specifications are met.

Time of drilling

DISCOVERY is an alternative or spring wheat cultivar with a wide drilling window. Recommended drilling time is from early May through to late September.

Speed of development

Month planted	Typical heading dates for DISCOVERY in Canterbury
Late May	Mid – Late November
Late June	Late November
September	Mid December

DISCOVERY is an intermediate maturing cultivar at harvest.

Seed rate and tillering characteristics

DISCOVERY has good tillering capacity, although it is initially slow to develop. For maximum yield, autumn sowing rates should be increased according to the chart below.

Month planted	Typical plant populations for DISCOVERY in Canterbury
April	125-150
May	150-200
June & July	200
August	200-250
September	250-300

Soil type, rotation and geography

DISCOVERY has performed well across all Canterbury regions and the lower North Island. It has a free-threshing grain, so may not be the best choice at locations with extreme winds around maturity. It is not recommended as a second-year wheat.

Disease resistance

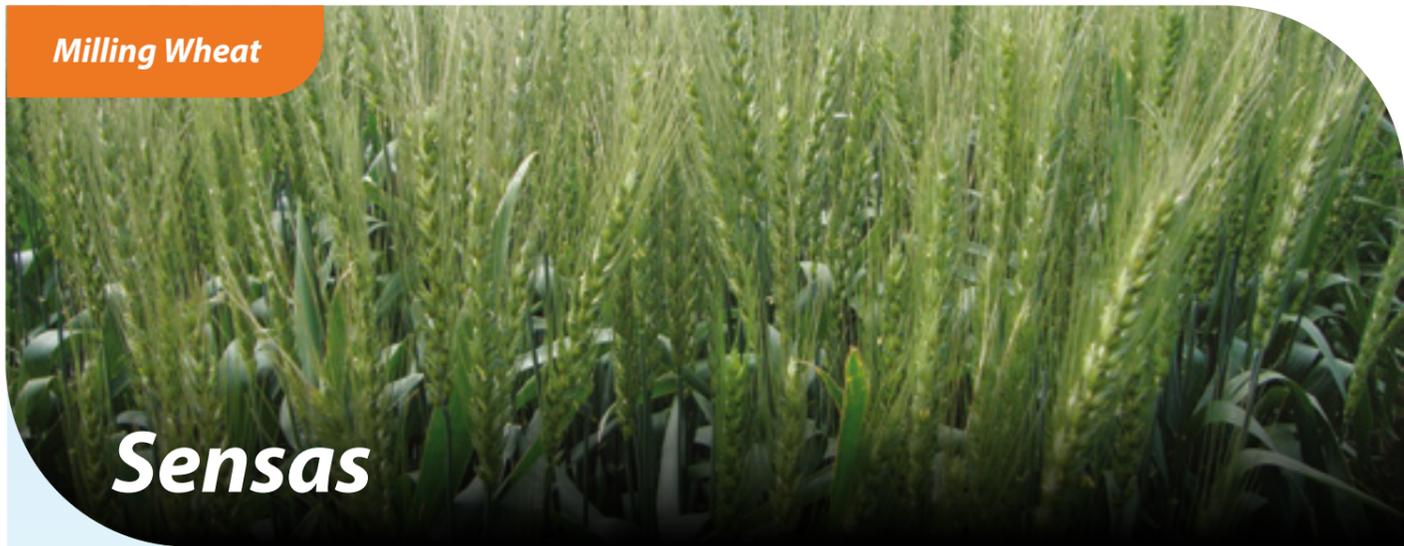
DISCOVERY has a good disease resistance profile, mostly resistant to leaf rust and powdery mildew with intermediate adult plant resistance to stripe rust and *Septoria* leaf blotch. However, it is moderately susceptible to seedling stripe rust. Considering this disease profile, fungicide programmes should be tailored to target seedling stripe rust early on if present. This approach should protect against *Septoria* leaf blotch also, especially from early plantings. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	6
Leaf rust	9
<i>Septoria</i> leaf blotch	5
Powdery mildew	8
<i>Fusarium</i> head blight	6

Straw strength and height

DISCOVERY is a tall cultivar with good standing power. A robust plant growth regulator (PGR) programme is recommended for this cultivar especially for early sowings. Spring sowings of DISCOVERY will generally not require as high rates of PGRs. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Sensas

- Spring milling wheat with fast development, suitable for drilling from July onwards
- Consistently high grain quality and milling characteristics
- Good overall disease resistance
- Fully awned cultivar with good straw strength
- Only true spring wheat available on the market



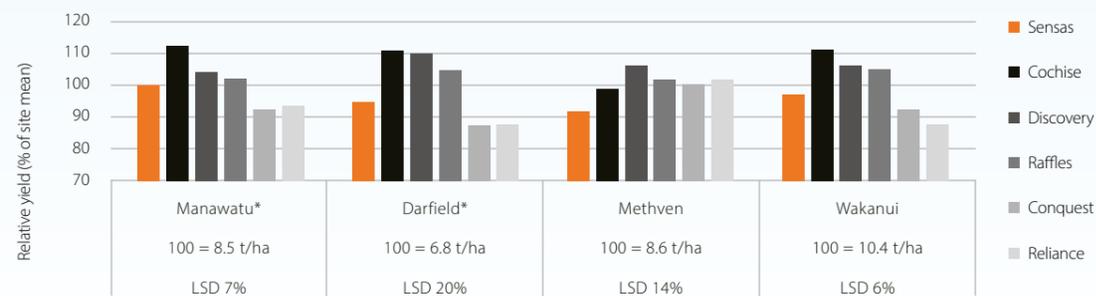
Description

SENSAS is a French bread wheat from RAGT (formerly Serasem) in France and has been developed in New Zealand by PGG Wrightson Grain (PGW Grain). SENSAS wheat develops quicker than any other wheat cultivar on the market, making it the ideal choice for later spring plantings and plantings from late July where the availability of late season moisture is unreliable (e.g. limited or no irrigation). It reaches maturity earlier than any other of the spring wheat options, and it has excellent sprouting resistance. Together these qualities allow for greater flexibility with drilling and harvesting. It is preferred by millers as it has plump grain with high protein, high test weights and falling number that readily meets milling specifications.

Yield

SENSAS yields competitively to Reliance and Conquest and remains the only true spring wheat cultivar in the market.

FAR (CPT) Spring Sown Trials (4 Year Mean)



*Manawatu and Darfield are only 3 year-means (no data from 2019-20)

CPT SENSAS spring grain quality (4 year mean)	Lower NI (Spring)	Canterbury (Spring)
Kernel weight (1000 seed weight)	44	44
Test Weight (kg/hl)	79	78
Protein content (%) (N% x 5.7)	11.3	12.7
Screenings (%)	0.4	0.6
Falling number (sec)	359	400

SENSAS has excellent kernel characteristics, especially high test weights and low screenings. It has a high falling number and low pre-harvest sprouting susceptibility. These traits, along with its disease profile, make it an easy care, low risk cultivar.

Time of drilling

SENSAS is a fast developing cultivar which must be drilled in the appropriate drilling window to minimise the risk of frost damage during the flowering phase and also bird damage during the later stages of maturity. It has a recommended drilling window from August through to mid October. It can be drilled later than this since its fast development helps to shorten the interval to harvest, although, as with any cultivar, yield may be reduced from late planting.

Speed of development

Month planted	Typical heading dates for SENSAS in Canterbury
Early August	Late November
Mid-September	Early December
Mid-October	Mid December

SENSAS is rated as an early maturing cultivar at harvest.

Seed rate and tillering characteristics

SENSAS has moderate tillering ability, and seed rate trials have shown that target plant populations should be within the standard seed rate guidelines published by PGW Grain (pg 5).

Soil type, rotation and geography

SENSAS is suitable for all New Zealand spring wheat growing regions, although drilling date needs to be planned carefully in areas which are prone to late season frosts. Optimum yield and grain quality performance is most likely to be achieved with irrigation or regular rainfall.

Disease resistance

SENSAS has a good disease resistance profile, being moderately resistant to stripe rust and powdery mildew, with intermediate resistance to leaf rust. Considering this disease profile as a spring wheat, SENSAS can be grown with a reduced fungicide programme. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	7
Leaf rust	7
Powdery mildew	8
Fusarium head blight	7

Straw strength and height

SENSAS is a medium height cultivar with good standing power. A plant growth regulator (PGR) programme should be considered for high yielding crops when under irrigation. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.

Tanzanite

- A new purple wheat with up to 10% yield advantage over Tyrian from an autumn sowing and up to 15% over Amethyst from later plantings
- Niche market wheat with appreciably higher value than other wheat types
- A facultative wheat cultivar with a wide sowing window, May through to August



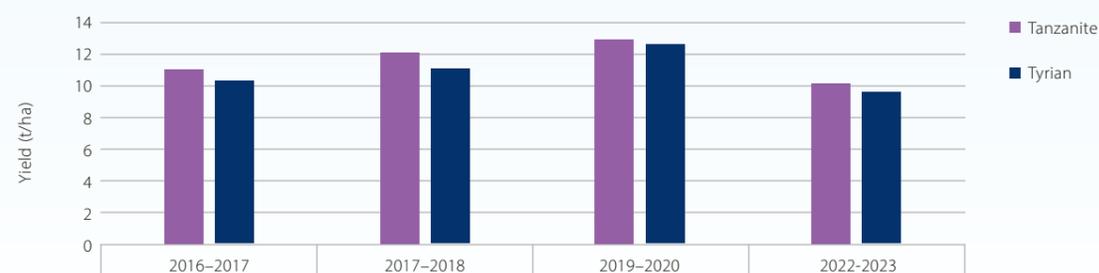
Description

TANZANITE is a high yielding purple winter wheat, bred in New Zealand by Plant & Food Research and assessed for release by PGG Wrightson Grain (PGW Grain). TANZANITE has higher yield potential than Tyrian and Amethyst and better disease resistance. TANZANITE is accepted by flour mills, due to its consistent purple colour and uniform grain size, making it suitable for use in kibbling. Purple wheat is a niche market for which contracts are strongly advised.

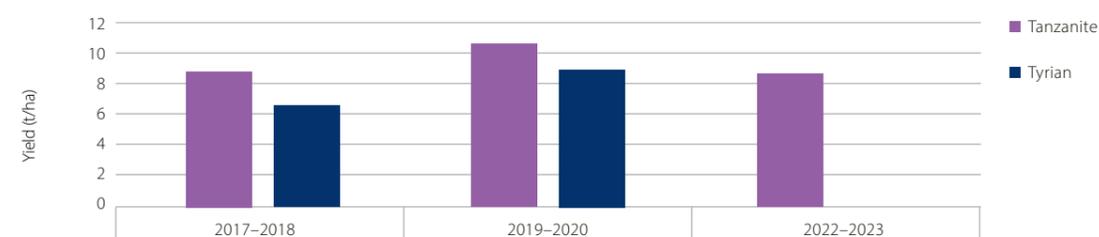
Yield

TANZANITE is a facultative wheat giving it a much wider sowing window than Tyrian. May sowings will generally yield the greatest, but good yields have been achieved from sowings as late as early September. In PGW trials, TANZANITE has given up to 10% higher yields than Tyrian from autumn sowings. From late winter to spring plantings, it yielded up to 15% above Amethyst with the advantage reducing if sown later than early September.

Purple Wheat Autumn Trials at Lincoln 2017-2023



Purple Wheat Spring Trials at Lincoln 2018-2023



New Zealand Flour Millers Association, Plant and Food Research and PGG Wrightson Grain collaborative trials.

TANZANITE grain quality (4 year mean)	Autumn	Spring
Kernel weight (1000 seed weight)	48	52
Test weight (kg/hl)	76	77
Protein content (%) (N% x 6.25)	11.0	10.4
Screenings (%)	1.0	1.7
Falling number (sec)	363	383

TANZANITE should be given priority at harvest to preserve the colour intensity and to protect falling number.

Time of drilling

TANZANITE is a facultative wheat that can be sown from May through to early September. Earlier sowing dates (May - August) will achieve maximum yield potential. PGW trials have shown TANZANITE can still achieve high yields when sown in early September. Well prepared seedbeds will result in even emergence and sets up the crop to achieve high yields.

Speed of development

TANZANITE is quicker to develop than Tyrian and typically heads out a week earlier when planted between May and mid-July. TANZANITE has a weak temperature response making it suitable for planting through to mid-September.

Month planted	Typical heading dates for TANZANITE in Canterbury
May	Mid November
Early September	Mid - Late December

TANZANITE is a medium maturing cultivar at harvest, similar to most of the current bread wheats.

Seed rate and tillering characteristics

TANZANITE tillers well (similar to most bread wheats). Care needs to be taken with plant populations when sowing mid-winter/spring. Seeding rates may need to be increased to achieve maximum yields (see PGW Grain wheat sowing guidelines on pg 4).

Soil type, rotation and geography

TANZANITE is suitable for all New Zealand wheat growing regions where good grain quality, especially high kernel weight, can be achieved. It is not recommended as a second-year cereal option. As well as the usual risks from take-all, contamination from non-purple wheat volunteers could compromise end-user quality.

Disease resistance

TANZANITE has a good general disease resistance profile but is moderately susceptible to *Septoria* leaf blotch. Considering this disease profile, fungicide programmes should be tailored to target *Septoria* leaf blotch early, especially at T0 and T1 timings for autumn sown crops. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9
Leaf rust	7
<i>Septoria</i> leaf blotch	5
Powdery mildew	9

Straw strength and height

TANZANITE is a medium height cultivar with moderate standing power. In most situations, it will require a robust plant growth regulator (PGR) programme to prevent lodging. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.

Amilo

- Preferred ryecorn variety of the milling industry
- A great second-year cereal option due to resistance to take-all infection
- High value grain that should be a priority at harvest



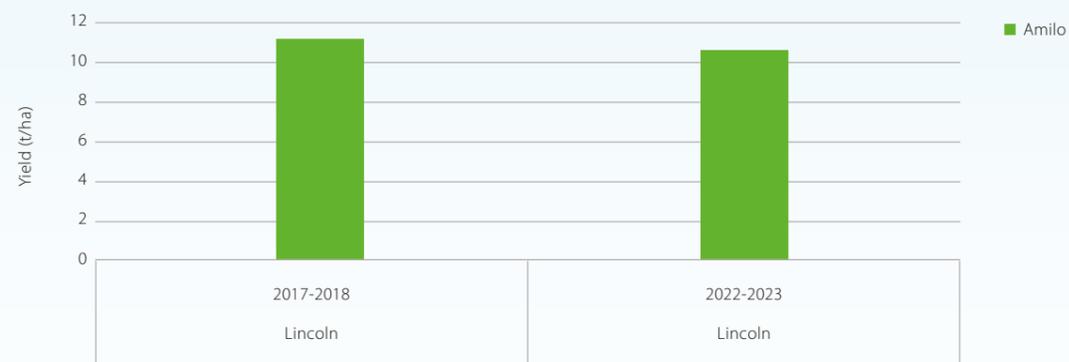
Description

AMILO is a superior quality milling ryecorn, which has been developed and sold by PGG Wrightson Grain (PGW Grain) since 1990.

Yield

AMILO has consistently been one of the highest yielding ryecorn varieties in trials, with excellent grain quality. Commercial crop yields are generally between 6.0 to 9.0 t/ha.

PGW Ryecorn Trials in Canterbury (2 years)



PGW AMILO Canterbury grain quality (2 year mean)	Canterbury
Kernel weight (1000 seed weight)	41
Test weight (kg/hl)	72
Protein content (%) (N% x 6.25)	12.1
Screenings (%)	1.3
Falling number (sec)	300

Ryecorn is more susceptible to sprouting than wheat. Therefore, AMILO's harvest should be prioritised over all other cereals to protect falling number. AMILO can also be susceptible to seed shattering if the weather during ripening is hot, dry and windy. In high wind risk areas, ryecorn can be windrowed before harvest to reduce shattering losses.

Time of drilling

AMILO is a true winter ryecorn requiring vernalisation, with an optimum drilling window of May to June. Sowing should be completed by mid-July, as sowing later than this date puts the crop at risk of not heading out.

Speed of development

Month planted	Typical heading dates for AMILO in Canterbury
Mid May	Early – Mid November
Early July	Late November

AMILO is an early to intermediate maturing cultivar at harvest.

Seed rate and tillering characteristics

AMILO tillers extremely well, and care needs to be taken with plant populations to reduce the chance of lodging and to protect grain quality characteristics. Current seed rate recommendations are based on previous PGW Grain trials. Target plant populations should be within the standard PGW Grain ryecorn guidelines (pg 5).

Soil type, rotation and geography

AMILO can be grown on a wide range of soil types and on dryland or under irrigation. Ryecorn is regarded as resistant to take-all, therefore making AMILO a good second-year cereal option.

Disease resistance

AMILO has a good general disease resistance profile, however, it is susceptible to rusts, especially leaf rust. Considering this disease profile and late planting, fungicide programmes should be tailored to target seedling stripe rust and late infections of leaf rust. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	6
Leaf rust	4
Septoria leaf blotch	5
Powdery mildew	9

Straw strength and height

AMILO is a tall cultivar that requires a robust plant growth regulator (PGR) programme to reduce height and therefore the likelihood of lodging and shedding. In particular the programme should focus on the prevention of neck break. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Ristretto

- **Very high yielding, slow maturing feed triticale**
- **Consistent second-year cereal performance due to excellent take-all tolerance**
- **Mid-tall variety with good standing power**
- **Market leading disease resistance for triticale**



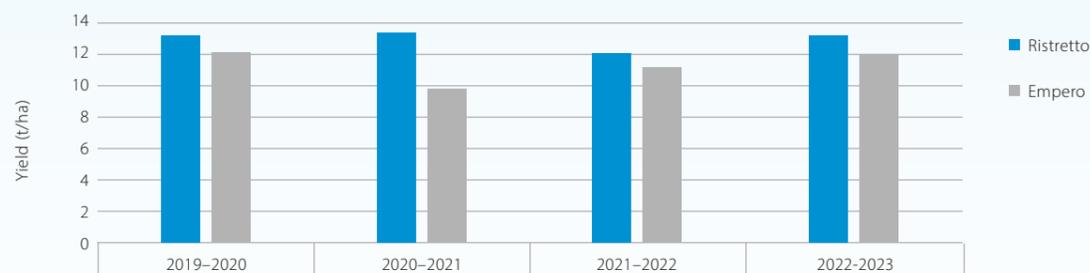
Description

RISTRETTO was bred by Lantmännen SW Seed AB in Sweden and further developed in New Zealand by PGW Wrightson Grain (PGW Grain). Triticale is a cross between wheat (triticum) and rye (secale) that combines the robustness and hardiness of rye with the yielding ability of wheat.

Yield

In PGW Grain trials, RISTRETTO has consistently shown very high yields as a first and second-year cereal in irrigated trials. In a previous (2020/21) PGW Grain trial, adjacent to FAR second-year wheat trials, RISTRETTO was the standout performer. The RISTRETTO average yields were 11.6 t/ha versus wheat ranging from 8.8 t/ha to 10.5 t/ha.

PGW Triticale Lincoln Trials 2020-2023



PGW RISTRETTO Canterbury grain quality (2022-23 season)	Canterbury
Kernel weight (1000 seed weight)	62
Test weight (kg/hl)	72
Protein content (%) (N% x 5.7)	8.0*
Screenings (%)	0.6

*Trial didn't have adequate nitrogen applied hence low proteins. In a different agronomy trial (2022/23 Triticale PGR), RISTRETTO achieved a 11.7% protein when adequate nitrogen applied.

RISTRETTO is more susceptible to sprouting than wheat. Therefore, RISTRETTO should be prioritised over other cereals at harvest.

Market

RISTRETTO is a feed triticale which mainly supplies the pig feed market within New Zealand. Protein levels tend to sit between 9% and 11%. Contracts are advised when growing feed triticale in order to guarantee a market for the crop.

Time of drilling

RISTRETTO has an optimum drilling window between early May and late July but has the ability to be drilled through to mid-August and still generate impressive yields. RISTRETTO can be planted earlier, but this may result in excessively bulky crops and a higher risk of frost damage. A PGW Grain sowing date (and rate) trial is being conducted at Kimihia on this cultivar for the 2023/24 season and should provide further information.

Speed of development

Month planted	Typical heading dates for RISTRETTO in Canterbury
Mid May	Early-mid November

RISTRETTO is an early mid-season grain cultivar with intermediate maturity.

Seed rate and tillering characteristics

RISTRETTO tillers profusely, so seed rates need to be reduced especially, when sowing early. Please refer to the triticale seed rate guidelines provided by PGW Grain (pg 5). A PGW Grain sowing date and rate trial is being conducted at Kimihia on this cultivar for the 2023/24 season and should provide further information.

Soil type, rotation and geography

RISTRETTO is suitable for all New Zealand winter cereal growing regions, including dryland and irrigated sites. RISTRETTO has a very high yield potential and often outperforms feed wheat, especially as a second-year cereal. This is due to its disease resistance genes from the rye parentage.

Disease resistance

RISTRETTO has a good disease resistance profile, being mostly resistant to foliar diseases, with the exception of seedling stripe rust. Considering this disease profile, RISTRETTO can be grown with a reduced fungicide programme as long as the crop is monitored regularly for disease changes. A PGW Grain agronomy trial is being conducted at Kimihia on this cultivar for the 2023/24 season and should provide further information. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	9/7*
Leaf rust	9
Septoria leaf blotch	9
Powdery mildew	9

Note: * 9 is resistance as an adult; 7 seedling rating

Straw strength and height

RISTRETTO is a mid-tall cultivar with strong standing power. However, the use of plant growth regulators (PGRs) is generally recommended with RISTRETTO responding well, especially to a split application (PGW Grain PGR 2022/23 trial). The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Empero

- Very high yielding, slow maturing feed triticale
- Consistent second-year cereal performance due to excellent take-all tolerance
- Good dryland yield performance
- Semi-dwarf variety with good standing power
- Market leading disease resistance for triticale



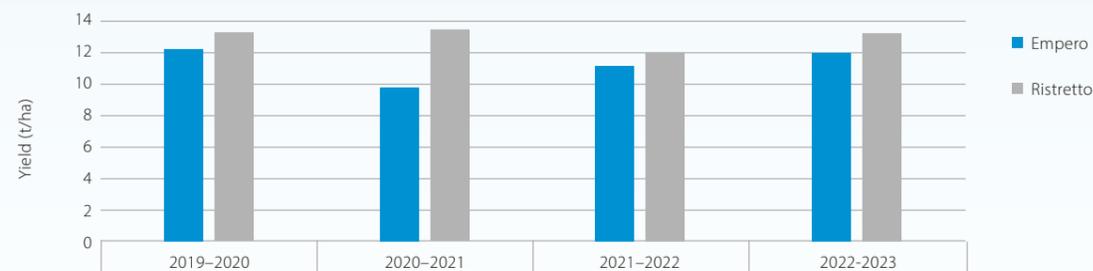
Description

EMPERO was bred by Lantmännen SW Seed AB in Sweden and further developed in New Zealand by PGG Wrightson Grain (PGW Grain). Triticale is a cross between wheat (triticum) and rye (secale) that combines the robustness and hardiness of rye with the yielding ability of wheat.

Yield

In PGW Grain trials, EMPERO has consistently shown very high yields as a first and second-year cereal in both irrigated trials and dryland commercial crops. However, in more recent (2020/21) PGW Grain trials adjacent to the FAR second-year wheat trials, EMPERO yielded 9.6 t/ha versus wheat ranging from 8.8 t/ha to 10.5 t/ha.

PGW Triticale Lincoln Trials 2020-2023



PGW EMPERO Canterbury grain quality (2017-2018 season)	Canterbury
Kernel weight (1000 seed weight)	54
Test weight (kg/hl)	71
Protein content (%) (N% x 5.7)	7.5*
Screenings (%)	0.3

*Trial didn't have adequate nitrogen applied hence low proteins. In a different agronomy trial (2022/23 Triticale PGR), EMPERO achieved a 11.5% protein when adequate nitrogen applied.

EMPERO is more susceptible to sprouting than wheat. Therefore, EMPERO should be prioritised over other cereals at harvest.

Market

EMPERO is a feed triticale which mainly supplies the pig feed market within New Zealand. Protein levels tend to sit between 9% and 11%. Contracts are advised when growing feed triticale in order to guarantee a market for the crop.

Time of drilling

EMPERO has an optimum drilling window between mid-April to late May but has the ability to be drilled through to the end of June. EMPERO can be planted earlier, but this can result in excessively bulky crops.

Speed of development

Month planted	Typical heading dates for EMPERO in Canterbury
Mid May	Late November

EMPERO is a long season grain cultivar with intermediate to late maturity.

Seed rate and tillering characteristics

EMPERO tillers profusely so seed rates need to be reduced, especially when sowing early. Please refer to the triticale seed rate guidelines provided by PGW Grain (pg 5).

Soil type, rotation and geography

EMPERO is suitable for all New Zealand winter cereal growing regions including, dryland and irrigated sites. EMPERO has a very high yield potential and often outperforms feed wheat, especially as a second-year cereal. This is due to its disease resistance genes from the rye parentage.

Disease resistance

EMPERO has a good disease resistance profile, being mostly resistant to foliar diseases with the exception of seedling stripe rust. Considering this disease profile, EMPERO can be grown with a reduced fungicide programme as long as the crop is monitored regularly for disease changes. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Stripe rust	7/5*
Leaf rust	9
Septoria leaf blotch	9
Powdery mildew	9

Note: * 7 is resistance as an adult; 5 seedling rating

Straw strength and height

EMPERO is a medium height cultivar with strong standing power. However, the use of plant growth regulators (PGRs) is generally recommended. The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.

RGT Planet

- **Reliable yielding spring barley**
- **Dual-purpose feed and malting barley**
- **Consistent yield performance across all growing regions, especially the lower North Island**
- **Good straw strength compared to other cultivars**



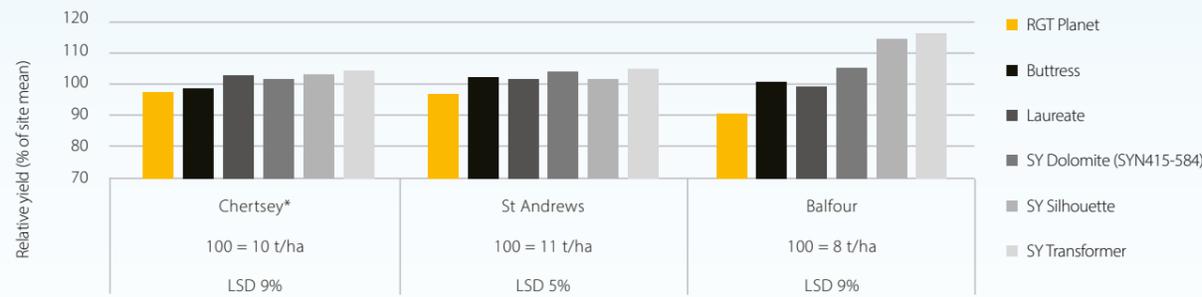
Description

RGT PLANET is a high yielding feed barley variety, bred in France by RAGT and developed in New Zealand in conjunction with Seed Force Ltd as head licensee and PGG Wrightson Grain (PGW Grain).

Yield

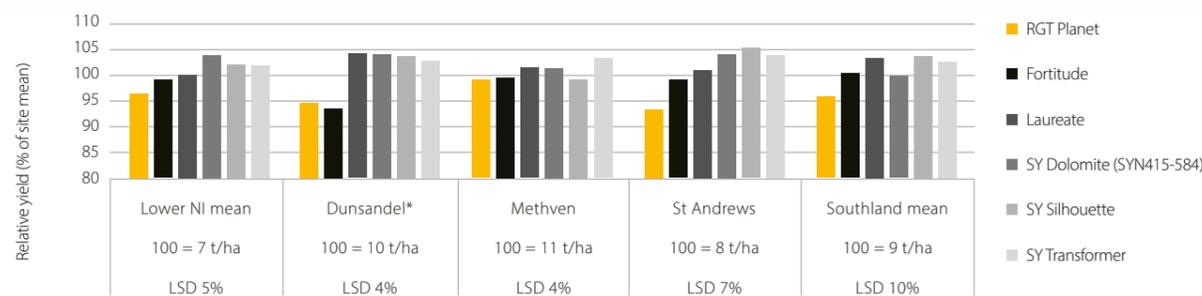
RGT PLANET has yielded consistently over the past eight years in CPT spring trials. While not the top performer at all sites, RGT PLANET is a reliable cultivar across multiple autumn and spring locations.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



*Chertsey is only 3 years of data. No data for 2019-20

FAR (CPT) Spring Sown Trials (4 Year Mean)



*Dunsandel is only a 3 year mean (no data from 2021-22)

CPT RGT PLANET grain quality (4 year mean)	Canterbury (Autumn)	Southland (Autumn)	Lower NI (Spring)	Canterbury (Spring)	Southland (Spring)
Kernel weight (1000 seed weight)	51	50	58	55	57
Test Weight (kg/hl)	63	63	63	64	64
Protein content (%) (N% x 5.7)	11.3	12.7	11.9	11.8	12.9
Screenings (%)	4.5	6.3	2.1	3.2	4.2

RGT PLANET produces a rare combination of yield and excellent grain quality.

Time of drilling

RGT PLANET is an established autumn drilled barley, although drilling is not recommended until early May owing to the risk of frost damage during flowering. It can be drilled through the winter into the spring, although sowing through the coldest weeks of June and July is not recommended, especially in heavy soils prone to waterlogging. Spring sowing is typically from early August to late September, except in the lower North Island, where drilling can be as late as November.

Speed of development

Month planted	Typical heading dates for RGT PLANET in Canterbury
Mid May	Late October – Early November
Mid August	Mid November
Mid September	Late November

RGT PLANET has early to intermediate maturity at harvest.

Seed rate and tillering characteristics

RGT PLANET is a medium to high tillering variety, and target plant populations should be within the standard PGW Grain barley seed rate guidelines (pg 5).

Soil type, rotation and geography

RGT PLANET can be planted on all soil types where barley is already grown and can be grown as a first or second-year cereal. As a second-year cereal, barley is generally more take-all tolerant than wheat, however, yield will be lower than a first-year barley crop.

Disease resistance

RGT PLANET is mostly resistant to powdery mildew, and moderately resistant to scald. However, it is moderately susceptible to net blotch and leaf rust. Considering this disease profile, RGT PLANET will need a moderate to robust fungicide programme where there is pressure for leaf rust and net blotch. In PGW Grain agronomy trials (2022/23), RGT PLANET produced a moderate untreated yield and fungicide responses of 2.0-3.8 t/ha from an autumn sowing. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Scald	6
Net blotch	5
Leaf rust	4
Powdery mildew	8

Straw strength and height

RGT PLANET is a medium to tall, stiff-strawed cultivar. In Europe, it rates high for brackling resistance, and the New Zealand experience is similar. Autumn sowings will typically require plant growth regulator (PGR) investment, especially under irrigation. Some spring crops may not need a PGR programme. The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



SY Transformer

- Highest yielding commercially available spring barley in FAR CPT trials
- Suited to all sowing times and conditions in both the spring and autumn
- Good all-round disease resistance profile especially to mildew and net blotch
- Large grain, average test weights and very low screenings



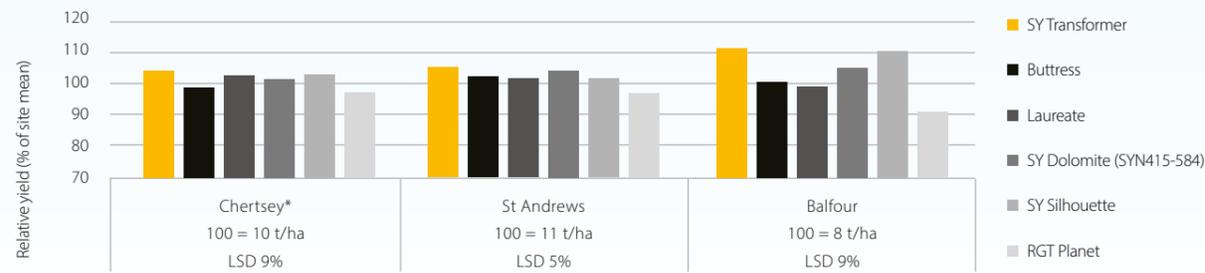
Description

From the proven Syngenta spring barley breeding programme, SY TRANSFORMER has been developed in New Zealand in conjunction with Cropmark Seeds Ltd as head licensee and PGG Wrightson Grain (PGW Grain). SY TRANSFORMER is a spring barley with very high yield potential that is suitable for feed. Malting and distilling end uses are unknown and currently being investigated. It has an intermediate maturity and can be planted late or under dryland but has high yield potential with irrigation and appropriate inputs.

Yield

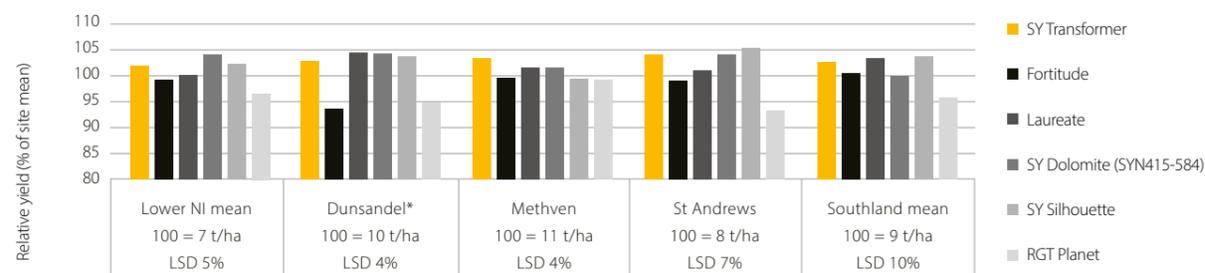
SY TRANSFORMER has high yield potential under all grain growing environments but has excelled under 'normal' conditions where it yields more than other barleys. It is one of the highest yielding varieties in both the FAR autumn and spring sown trials when looking at the 4 year means, showing consistency across years and environments.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



*Chertsey is only 3 years of data. No data for 2019-20

FAR (CPT) Spring Sown Trials (4 Year Mean)



*Dunsandel is only a 3 year mean (no data from 2021-22)

CPT SY TRANSFORMER grain quality (4 year mean)	Canterbury (Autumn)	Southland (Autumn)	Lower NI (Spring)	Canterbury (Spring)	Southland (Spring)
Kernel weight (1000 seed weight)	49	50	57	57	58
Test Weight (kg/hl)	61	60	62	63	63
Protein content (%) (N% x 5.7)	11.3	12.2	11.7	11.5	12.4
Screenings (%)	5.3	5.2	1.8	2.5	3.8

Time of drilling

SY TRANSFORMER has proven itself in autumn and spring conditions so has a wide sowing window from May right through to late October and beyond. Growing conditions and yield potential always dictate PGR requirements, and even though SY TRANSFORMER has a stiff straw it will benefit from a moderate PGR programme especially in the autumn and in very high growth environments.

Speed of development

Month planted	Typical heading dates for SY TRANSFORMER in Canterbury
May	Late October
September	Late November

SY TRANSFORMER has an intermediate development rate for harvest maturity.

Seed rate and tillering characteristics

SY TRANSFORMER is a medium to high tillering variety, and target plant populations should be within the standard PGW Grain barley seed rate guidelines (pg 5). Work done by Cropmark Seeds Ltd has shown yields are maximised by targeting 175-200 plants/m² in the autumn.

Soil type, rotation and geography

SY TRANSFORMER can be planted on all soil types where barley is already grown and can be grown as a first or second-year cereal. As a second-year cereal, barley is generally more take-all tolerant than wheat, however, yield will be lower than a first year barley crop.

Disease resistance

SY TRANSFORMER has intermediate resistance to scald and leaf rust, and is mostly resistant to net blotch and powdery mildew. Considering this disease profile, SY TRANSFORMER will need a moderate fungicide programme to focus on scald, leaf rust and *Ramularia* from autumn sowings, and leaf rust from late spring sowings. In PGW Grain agronomy trials (2022/23), SY TRANSFORMER produced a moderate untreated yield and fungicide responses of 2.4–5.6 t/ha and 2.1–2.8 t/ha from an autumn and spring sowing, respectively. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Scald	6
Net blotch	9
Leaf rust	5
Powdery mildew	8

Straw strength and height

SY TRANSFORMER is a medium height cultivar with moderate to stiff straw. Autumn sowings will require a robust PGR investment, especially under irrigation. In spring, this cultivar will still require a moderate to high PGR programme to prevent brackling and maintain high yields. The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply PGR if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Laureate

- High yielding, multipurpose spring barley
- Bred as a dual distilling / malting barley but with high grain yields
- Good disease profile with good disease resistance to net blotch and powdery mildew
- Large grain, average test weights and very low screenings with low proteins



Description

From the proven Syngenta spring barley breeding programme, LAUREATE has been developed in New Zealand in conjunction with Cropmark Seeds Ltd as head licensee and PGG Wrightson Grain (PGW Grain). LAUREATE is a spring barley with high yield potential that is suitable for all end uses: malting, distilling and feed. It has an intermediate-late maturity and can be planted late or under dryland but has high yield potential with irrigation and appropriate inputs.

Yield

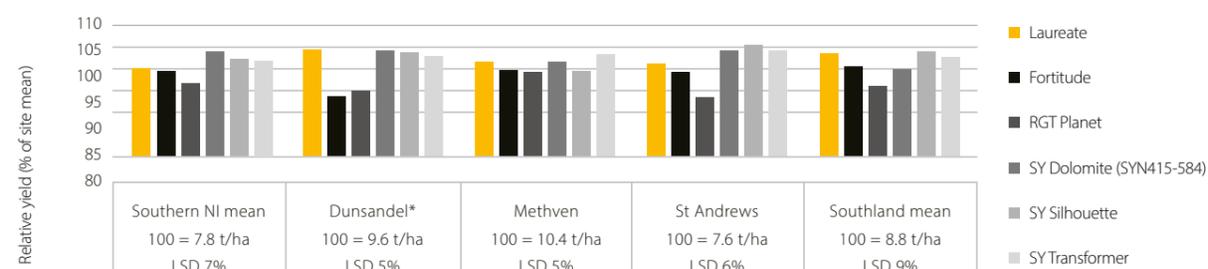
LAUREATE has high yield potential under all environments but has excelled when conditions turn dry. Under irrigation or high rainfall, it requires appropriate straw management to prevent brackling so as to maintain its high yield potential across all South Island regions. In the lower North Island, it has been a leading cultivar in previous seasons.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



*Chertsey is only 3 years of data. No data for 2019-20

FAR (CPT) Spring Sown Trials (4 Year Mean)



*Dunsandel is only a 3 year mean (no data from 2021-22)

CPT LAUREATE grain quality (4 year mean)	Canterbury (Autumn)	Southland (Autumn)	Lower NI (Spring)	Canterbury (Spring)	Southland (Spring)
Kernel weight (1000 seed weight)	49	50	56	56	58
Test Weight (kg/hl)	62	61	61	62	64
Protein content (%) (N% x 5.7)	11.6	11.9	11.9	11.7	12.6
Screenings (%)	5.5	6.1	1.7	2.8	3.2

Time of drilling

LAUREATE has proven itself in autumn trials, but due to its moderate straw strength and high plant growth regulator (PGR) requirement, it is recommended for spring sowing only. Spring sowing is typically from early August to late September, except in the lower North Island, where drilling can be as late as November.

Speed of development

Month planted	Typical heading dates for LAUREATE in Canterbury
May	Late October
September	Late November

LAUREATE has an intermediate-late maturity at harvest.

Seed rate and tillering characteristics

LAUREATE is a medium to high tillering variety, and target plant populations should be within the standard PGW Grain barley seed rate guidelines (pg 5).

Soil type, rotation and geography

LAUREATE can be planted on all soil types where barley is already grown and can be grown as a first or second-year cereal. As a second-year cereal, barley is generally more take-all tolerant than wheat, however, yield will be lower than a first-year barley crop.

Disease resistance

LAUREATE is moderately resistant to net blotch and powdery mildew. It has intermediate resistance to scald and leaf rust. Considering this disease profile, LAUREATE will need a moderate fungicide programme in most instances but may need more where there is high pressure for scald and leaf rust. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Scald	6
Net blotch	8
Leaf rust	6
Powdery mildew	8

Straw strength and height

LAUREATE is a medium height cultivar with moderate straw. Autumn sowings, although not advised, will require a robust PGR investment, especially under irrigation. In the spring, this cultivar will still require a moderate to high PGR programme to prevent brackling and maintain high yields. The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply PGR if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Tavern

- Easy care, historical industry standard feed barley
- Consistent, well proven autumn performer on farm
- Awn characteristics may help to protect against bird damage near harvest when autumn sown
- Best in class for straw standing power making it ideally suited for autumn planting



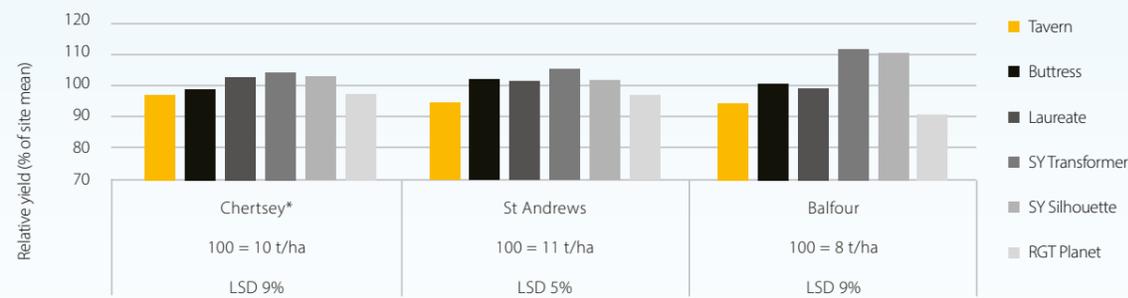
Description

TAVERN is a consistent and reliable performing feed barley variety, bred in the UK by Syngenta and developed in New Zealand in conjunction with Cropmark Seeds Ltd as head licensee and PGG Wrightson Grain (PGW Grain).

Yield

TAVERN remains a tried and true reliable yielding variety that farmers trust and turn to year after year. TAVERN performs well from both autumn and spring sowings and produces reliable grain characteristics.

FAR (CPT) Autumn Sown Trials (4 Year Mean)



*Chertsey is only 3 years of data. No data for 2019-20

Note: For spring CPT trial data please refer to the 2017/18 FAR CPT booklet, as TAVERN was not included in the most recent spring trials.

CPT TAVERN autumn grain quality (4 year mean)	Canterbury	Southland
Kernel weight (1000 seed weight)	47	47
Test weight (kg/hl)	63	63
Protein content (%) (N% x 6.25)	11.5	12.9
Screenings (%)	5.9	7.6

TAVERN produces grains with high test weights and low screenings. It consistently produces good grain quality compared to many other cultivars.

Time of drilling

TAVERN is well established as an autumn drilled barley, although drilling is not recommended until early May owing to the risk of frost damage during flowering. It can then be drilled through the winter into the spring, although sowing through the coldest weeks of June and July is not recommended especially on heavy soils prone to waterlogging. It performs consistently in the spring, although on dryland TAVERN performs most reliably from an autumn drilling.

Speed of development

Month planted	Typical heading dates for TAVERN in Canterbury
May	Early November
September	Early December

TAVERN has intermediate to late maturity at harvest.

Seed rate and tillering characteristics

TAVERN tillers profusely from both autumn and spring drilling timings and target plant populations should be within the standard PGW Grain barley seed rate guidelines (pg 5).

Soil type, rotation and geography

TAVERN can be planted on all soil types where barley is already grown and can be a first or second-year cereal. As a second-year cereal, barley is generally more take-all tolerant than wheat, however, yield will be lower than a first-year barley crop.

Disease resistance

TAVERN shows some susceptibility to all foliar diseases. Considering this disease profile, TAVERN will need a robust fungicide programme in most circumstances. Please contact your local PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Scald	6
Net blotch	6
Leaf rust	6
Powdery mildew	6

Straw strength and height

TAVERN is a stiff-strawed variety with short to medium height and moderate to good neck strength. Autumn sowings will typically require a plant growth regulator (PGR) investment, especially under irrigation. The actual programme is determined by a combination of local conditions, management and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.



Surge

- A very high yielding winter barley
- Medium height, stiff-strawed
- Excellent disease resistance
- Earlier harvest benefits



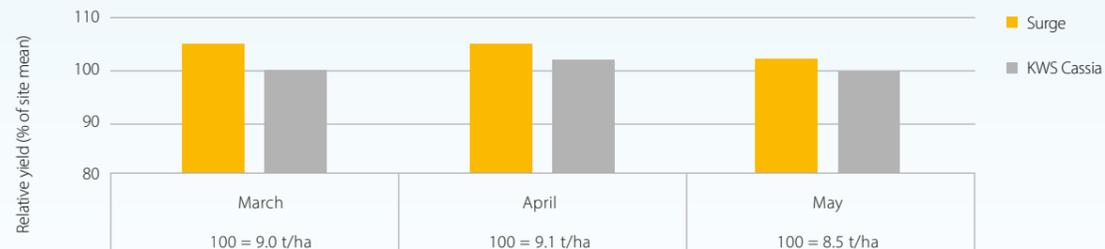
Description

SURGE is a true winter barley bred in the UK by Syngenta. It requires vernalisation and time for tiller development therefore is only suitable for autumn sowings. It performs best from earlier sowings in late March and April to take advantage of its high tillering habit and disease resistance, especially to scald.

Yield

In FAR and Cropmark Seeds Ltd trials in previous seasons, SURGE was the overall highest yielding winter barley on the market.

FAR Chertsey Dryland Time of Sowing Trial (3 year mean)



SURGE grain quality (7 trial mean)	Canterbury
Kernel weight (1000 seed weight)	51
Test weight (kg/hl)	64
Screenings (%)	2.7

SURGE produces a medium size grain of good test weight with low to moderate screenings.

Time of drilling

The optimum drilling time for SURGE is late March to late April. There may be some reduction in yield in early May, more so on dryland, lighter country and higher altitude areas. From early May sowings, yields will tend to decrease but will be similar to spring barley planted at this time. However, its superior disease resistance makes it an alternative to spring barley for early May planting. By mid-May the grower should switch to a spring barley like RGT Planet, SY Transformer or Tavern. On drier country where summer moisture stress is expected, this cut off can come in late April or the first week of May.

Speed of development

Month planted	Typical heading dates for SURGE in Canterbury
Late March	Late October
Mid April	Early November
Early May	Mid November

SURGE is a cultivar with early to mid-maturity at harvest.

Seed rate and tillering characteristics

SURGE winter barley is able to produce a large number of tillers. It will produce around 25 tillers per plant by the end of tillering but reduce to 7-10 per plant at harvest. In comparison to other varieties, it will produce more tillers than Cassia and Padura, but less than Sanette or Tavern. Based on limited trial data, the optimal sowing rates are as follows.

Month planted	Establishment rates for SURGE (plants/m ²)
March – Early April	120 – 150
Mid April	150
Late April – Mid May	175

Soil type, rotation and geography

SURGE can be planted on all soil types where barley is already grown and can be grown as a first- or second-year cereal. As a second-year cereal, barley is generally more take-all tolerant than wheat, however, yield will be lower than a first-year barley crop.

Disease resistance

SURGE has an excellent disease resistance profile and is mostly resistant to scald, net blotch and powdery mildew. It is moderately resistant to leaf rust. Some diseases may be present in late winter on older leaves, but this will disappear with new spring growth. Considering this disease profile, fungicide programmes should be tailored for the control of *Ramularia*. Please contact your PGW Representative for site specific recommendations.

Disease resistance results:

Disease	PGW disease nursery ratings (9 highly resistant, 1 highly susceptible)
Scald	9
Net blotch	7
Leaf rust	6
Powdery mildew	8

Straw strength and height

SURGE is a medium to tall cultivar with good straw strength and stand-ability, however, it can brackle on ripening. Due to its high yield potential, it will require a moderate plant growth regulator (PGR) programme focussing on early season stem strength and late season height reduction to prevent lodging or brackling. The actual programme is determined by a combination of sowing date, seed rate, nitrogen use, crop thickness and yield potential. As with any cultivar, do not apply if the crop is under any form of stress. Please contact your local PGW Representative for site specific recommendations.

TERMS OF TRADE – CEREAL SEEDS 2023/24

(In addition to the standard PGG Wrightson Seeds Limited Terms of Trade)

- Pricing** All prices quoted are exclusive of GST per tonne. Prices are subject to change without prior notice.
- Payment Terms** Payment is due 20th of month following invoice.
- Orders** E-mail orders only will be accepted, verbal orders will not be processed.
- Orders must be accompanied by an order number if applicable and full details. An order form is attached for your convenience.
- Any order not collected within two weeks of the advised Dispatch Date will be automatically cancelled without advice to the purchaser.**
- Returns** Any stock to be returned must meet the following criteria before a credit will be processed:
- **No seed with Systiva seed treatment or any other special seed treatments will be accepted.**
 - **No seed will be accepted after 30 days from date of delivery.**
 - Unopened bags only – part bags will not be accepted.
 - Bags must be in a good, clean condition.
 - All labels/tickets must be attached to bags.
 - All bulk bag sales are non-returnable.
 - PGG Wrightson Grain will not accept responsibility for any contamination issues when clients provide their own bulk bags.
 - Original Order Number or Invoice Number to accompany returned goods.
 - All seed to be returned to the closest PGG Wrightson Grain Dispatch Point.
 - Freight back to the PGG Wrightson Grain Dispatch Point is at the cost of the purchaser.
- Freight** All freight costs are at the cost of the purchaser (customer).
- Delivery will be made from the closest distribution centre holding stock.
 - **Stock damaged in transit** – claims must be in writing and received by PGG Wrightson Grain within 3 days of receipt of goods.
 - **Short delivered stock** - claims must be in writing and received by PGG Wrightson Grain within 3 days of receipt of goods.
- Pallets**
- Pallets branded with either PGG Wrightson Seeds or Seedtrac™ remain the property of PGG Wrightson Seeds.
 - Pallets will be invoiced at nil cost, however, we request that these be returned to the closest PGG Wrightson Grain Dispatch Point.

Contact Details

For seed orders and enquiries:

Melanie Morris/Justine Johnson

P: (03) 966 9302

Free phone: 0508 GRAINS (0508 472 467)

Email orders: cerealseeds@pggwrightsongrain.co.nz

For more information visit our website:

www.pggwrightsongrain.co.nz

  PGG Wrightson Grain

For cultivar and planting information:

CEREAL SEEDS MANAGER

Ian Ormandy

M 027 593 9536

E iormandy@pggwrightsongrain.co.nz

PRODUCT DEVELOPMENT MANAGER

Nick Brooks

M 027 596 3972

E nbrooks@pggwrightsongrain.co.nz

CEREAL AGRONOMIST

Ashley Harrison

M 027 247 3634

E aharrison@pggwrightsongrain.co.nz



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This information has been generated by the Cereal Performance Trial (CPT) committee. CPT represents the collaboration of New Zealand Flour Millers Association, Foundation for Arable Research, Plant & Food Research, the New Zealand Plant Breeding & Research Association and individual seed and/or processing companies.