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# FAR HYBRID EVALUATION



FOUNDATION FOR ARABLE RESEARCH



## maize hybrids 2019/2020

## page

introduction and welcome	2
guiding principles	3
participating seed companies	4
trial site map	6
trial site details	6
multi-year adjusted mean	7
glossary	7
silage multi-year data	8
grain multi-year data	11
<b>individual trial results 2019/20 - silage</b>	
Waikato, Tamahere	13
Bay of Plenty, Whakatane	14
Manawatu, Ohakea	15
<b>individual trial results 2019/20 - grain</b>	
Waikato, Tamahere	16
Waikato, Gordonton	18
Waikato, Ruakura	20
Bay of Plenty, Whakatane	21
Manawatu, Ohakea	22
Manawatu, Opiki	23
acknowledgements	24

Welcome to the sixth and final edition of the Maize Hybrid Performance Trials results booklet. For the 2019/20 season we continued with eight trial sites, with one of the maize seed companies in the programme hosting, managing and harvesting MPT trials. Unfortunately, due to the COVID-19 Level 4 lockdown from we were unable to undertake the silage harvest at the Waikato Ruakura, Waikato Peat, Manawatu Opiki and Canterbury Kimihia sites.

This is the third edition to include results from multiple sites and multiple years. This means that some hybrid results are given as averages from six different seasons, and from up to nineteen separate trials. Data from multiple seasons for a maize hybrid's performance is more valuable than results from a single season, as they show the hybrid's ability to perform over seasons with different weather patterns. Ultimately the most consistent performers will rise to the top of

### MESSAGE FROM FAR CEO

At the end of 2019, FAR conducted both an on-line survey and a phone survey of maize growers, seeking their feedback on FAR's involvement in the Maize Hybrid Performance trial programme (MPT). We decided to do this because we had been getting feedback from ARG groups and individual growers questioning the value of the MPT programme and whether FAR's investment could be better allocated to other maize research activities.

We received approximately 180 responses to the survey, which were split almost equally in favour of and against ongoing involvement in the MPT. Some of the commentary included with growers' responses suggested that many wanted to retain the MPT programme to "keep the seed companies honest" rather than because they used the information to inform hybrid selection.

The FAR board did not think that this was a good enough justification to warrant our continued investment. They also had reservations about the

multiple year results. The more trials a cultivar has been in, the more confidence can be taken from its reported performance.

The MPT system relies on companies collaborating and including their cultivars for the overall good of the industry. We encourage you to use the information in this booklet to help you make sound hybrid selection decisions.

Also, it is important to be aware that the yields obtained in the MPT trials, and other maize hybrid trials are higher than will be achieved in commercial crops.

David Green  
President  
New Zealand Plant Breeders Association

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lack of involvement of one of the major industry players and the robustness of the programme given the relatively small number of trials. As a result, in March, the FAR board approved the organisation's withdrawal from the MPT programme effective 30 June 2020. Members of the MPT governance and technical groups and the remaining members are currently deciding what the future role and format of the MPT programme will be.

FAR recognises that this will be disappointing to some maize growers, but rest assured that we did not take this decision lightly. We genuinely believe that FAR can provide greater benefit to maize growers by allocating our resources to other activities such as environmental and farm systems research. In the 2020/21 year we will recruit a senior maize researcher and develop a maize research strategy to inform the direction of our future maize research portfolio.

Alison Stewart, CEO, FAR

### MPT GUIDING PRINCIPLES

The purpose of the MPT programme is to:

- Provide objective measurement of the agronomic and quality performance of commercial maize hybrids available to the New Zealand arable industry across appropriate production regions.
- Foster industry adoption of proven hybrids to maximise industry efficiency and profitability.

The Maize Performance Trials (MPT) are organised and funded through the Maize Hybrid Performance Trial Committee with representatives from the FAR, NZ Plant Breeding & Research Association (NZPBRA), independent researchers and the participating seed companies. Secretarial services were provided by NZPBRA.

### METHODOLOGY

The MPT comprises a single stage of hybrid testing and is administered through a single management committee. The committee recognises the purpose of the hybrid testing, and will not compromise the stakeholder requirements of the programme.

The trial programme focuses on the agronomic and quality characteristics of close-to-market pre-commercial and commercial maize hybrids. It is not intended to provide extra evaluation data for commercialisation decisions; the seed companies must make these decisions independently, before the hybrids are entered into the MPT programme. The trial programme evaluates silage and grain hybrids.

Harvest assessments are made at an agreed maturity value for the individual hybrids entered into the programme. These maturity values are determined on a year-by-year basis by the Committee and an agreed harvest schedule is developed at the start of the season.

At each trial site, plots consist of four rows, approximately 5 metres long, planted at 76 cm spacing. Each hybrid is replicated four times within a randomized complete block design. All

data is collected from the middle two rows of the plot. Participating companies supply relative maturity data for placement in trials. The plots are planted from pre-counted packets of seed using an air plot planter and harvested by hand.

The maize seed is provided directly by the seed companies. While the individual seed treatments used by each company may vary, all were commercially available at time of planting, and contained at least an insecticide and a fungicide.

In-season trial assessments included plant count, lodging and disease score; and harvest assessments included an assessment of ear rots, bird damage and yield. At silage harvest, a sample was taken from each plot to determine dry matter content. For grain hybrids, grain moisture and test weights were measured using a Dickey John GAC 2100 Agri moisture meter.

All information published by any party from the MPT programme must be clearly acknowledged as MPT data. The following statement must accompany any such publication.

This information has been generated by the Maize Performance Trial (MPT) operating procedures.

MPT represents the collaboration of the Foundation for Arable Research, the New Zealand Plant Breeding & Research Association and individual seed companies.

## COMMERCIAL HYBRIDS

HYBRID	Seed supplier	Silage CRM*	Grain CRM*	Website
Afinity	Corson	97	100	corsonmaize.co.nz
Asterix	Nutritech	85	85	nutritech.co.nz
Axis	Corson	92	92	corsonmaize.co.nz
Booster	Corson	81	88	corsonmaize.co.nz
Brutus	Nutritech	105	105	nutritech.co.nz
C29-A1	Corson	96	96	corsonmaize.co.nz
Maximus	Nutritech	102	102	nutritech.co.nz
N39-Q1	Corson	97	100	corsonmaize.co.nz
N51-N4	Corson	102	104	corsonmaize.co.nz
Obelix	Nutritech	94	94	nutritech.co.nz
Olympiad	Nutritech	112	112	nutritech.co.nz
PAC050	Corson	85	88	corsonmaize.co.nz
PAC249	Corson	95	97	corsonmaize.co.nz
PAC314	Corson	101	101	corsonmaize.co.nz
PAC343	Corson	105	104	corsonmaize.co.nz
PAC344	Corson	102	102	corsonmaize.co.nz
PAC430	Corson	108	108	corsonmaize.co.nz
PAC432	Corson	105	107	corsonmaize.co.nz
PAC456	Corson	109	109	corsonmaize.co.nz
PAC564	Corson	113	115	corsonmaize.co.nz
Pelota	Corson	107	107	corsonmaize.co.nz
Plenitude	Corson	107	107	corsonmaize.co.nz
Titus	Nutritech	82	82	nutritech.co.nz
Velocity	Corson	95	98	corsonmaize.co.nz
Z71-F1	Corson	111	Silage only	corsonmaize.co.nz

\* CRM = Comparative relative maturity

## PRECOMMERCIAL HYBRIDS

HYBRID	Seed supplier	Silage CRM*	Grain CRM*	Website
Gerzi	Corson	102	102	corsonmaize.co.nz
PAC 119	Corson	91	91	corsonmaize.co.nz
RGT DIREXXION	Seed Force	82	82	seedforce.co.nz
RGT FARANDOLE	Seed Force	92	92	seedforce.co.nz
RGT FARAONIXX	Seed Force	110	110	seedforce.co.nz
RGT HAUXXTIN	Seed Force	80	80	seedforce.co.nz
RGT LUXXIDA	Seed Force	93	93	seedforce.co.nz
RGT OXXFORD	Seed Force	78	78	seedforce.co.nz

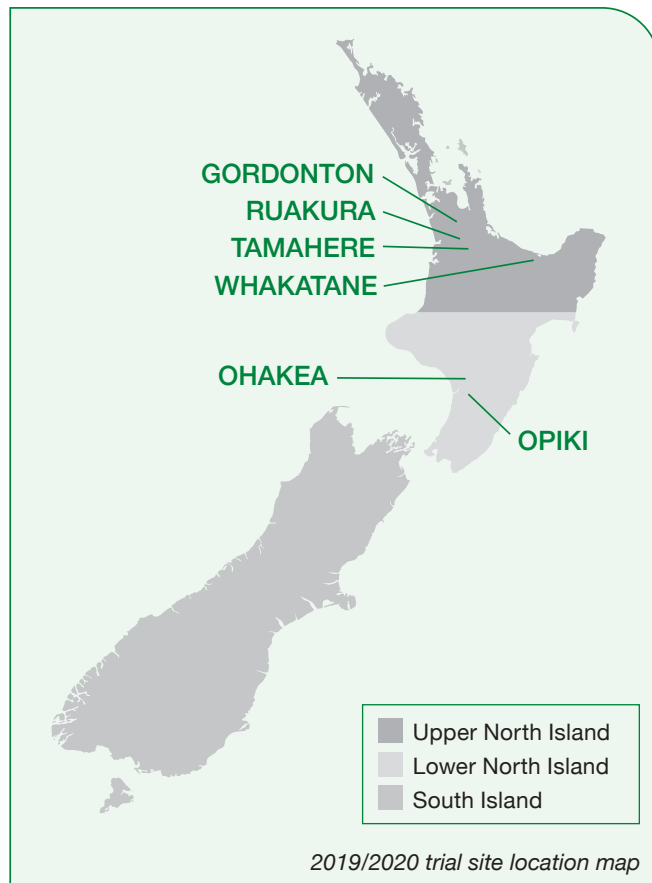
\* CRM = Comparative relative maturity

## CHECK HYBRIDS

Up to five industry standard hybrids may be included in each MPT trial. These are required to provide data linkages among trials, and across multiple seasons. The expected life of the standard entries is around 5 years, and after that they are changed out for newer hybrids gradually, reflecting their stable performance, popularity, and their continued commercial availability, while providing a baseline of performance against which genetic gain can be judged. The standard hybrids used in the trials reported here are:

HYBRID	Silage CRM*	Grain CRM*
P0021	100	100
P0362	103	105
P0547	Grain only	105
P0640	106	106
P0725	107	Silage only
P0791	106	Silage only
P0891	107	107
P0937	109	Silage only
P1253	109	109
P1636	112	Silage only
P7524	75	Silage only
P8000	80	80
P8805	88	88
P9127	91	91
P9400	94	94
P9721	97	97
P9911	99	Silage only

\* CRM = Comparative relative maturity



Trial site	Soil type	Host farmer	Planting date	Altitude
Tangimoana Road, Ohakea, Manawatu	Manawatu fine sandy loam	David Dempsey	8 October 2019	41 metres
NCRS, Oaklea Lane, Tamahere, Waikato	Otorohonga deep loam over clay	FAR	18 October 2019	49 metres
Powdrell Road, Whakatane, Bay of Plenty	Awakaponga deep loam	Power Grain Limited	24 October 2019	0 metres
Opiki Road, Opiki, Manawatu	Opiki peat loam	Adrian Noaro	14 November 2019	6 metres
Ruakura, Waikato	Utuhina deep loam	Corson Maize Seed	21 November 2019	41 metres
Telephone Road, Gordonton, Waikato	Andrews loamy peat	Gavins Limited	25 November 2019	42 metres

The multi-year adjusted mean is the most important result in the MPT Results Booklet. This is the third year we have presented multi-year, multi-site data. This was a big step forward for the MPT programme because it shows how the hybrids perform over multiple different seasons, and across multiple different locations.

To analyse this data, the trials have been separated into three zones:

- Upper North Island includes Waikato and Bay of Plenty
- Lower North Island includes Manawatu and Rangitikei
- South Island

The combined trial analysis was undertaken in a way to avoid an advantage to an entry being in a high yielding trial versus another being in a low yielding trial. The variations from the trial means were then averaged using a weighted average, where more weight is given to trials with higher precision (less variability).

For example, if Trial A had twice the precision of Trial B, the weighted average would be  $(2 \times \text{Trial A result} + \text{Trial B result})/3$ , and so the result would be closer to the Trial A mean than the Trial B mean.

Data from multiple seasons for a maize hybrids performance is more valuable than results from a single season as they show the hybrids ability to perform over season with different weather patterns. Ultimately, the most consistent performers will rise to the top of multiple year results. The more trials a cultivar has been in, the more confidence can be taken from its reported performance.

## GLOSSARY

### COEFFICIENT OF VARIATION

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.

### LEAST SIGNIFICANT DIFFERENCE

The Least Significant Difference (LSD) listed at the bottom of each table for each column of data should be used to determine if the difference between hybrids is due to differences in performance or random chance.

This booklet presents data with an LSD of 5%. If the difference between two hybrids was equal to or greater than the LSD, the difference would be attributable to hybrid differences in 95% of instances when the two hybrids are evaluated under conditions like those of the test.

Hybrids with the same letter beside them are not significantly different for the characteristic listed. When no significant difference for a given parameter is found among hybrids, "ns" (non-significant) replaces an LSD value. A difference which is less than the LSD is likely due to chance.

For example, on page 22 the hybrids PAC344 (a), PAC314 (ab), P0021 (abc), P9721 (abcd), N39-Q1 (abcde) and Afinity (abcde) all include the letter 'a' beside them in the yield column. This indicates that while their yields in this trial varied, this variation was not statistically significant. Likewise, any hybrid with another letter beside it, will not be significantly different from any other hybrid which includes that same letter.

### TEST WEIGHT

Measured in kilograms per hectolitre (kg/hl), test weight is an indication of grain density. Test weight is reported at standard grain moisture of 14%.

## Upper North Island

HYBRID	CRM	Number of trials	Number of years	Relative silage yield (%)
33M54	113	5	2	108.9
34P88	109	5	2	104.7
37Y12	95	5	2	95.6
Afinity	100	14	5	98.2
Brutus	105	14	4	96.7
C29-A1	96	14	6	100.9
C56-C4	106	13	4	102.3
G49-T9	104	5	2	91.9
Maximus	102	17	5	96.3
N39-Q1	97	14	6	97.4
N51-N4	104	18	6	101.2
Obelix	93	6	2	88.2
Olympiad	112	17	5	101.2
P0021	100	7	3	96.5
P0640	106	7	3	98.9
P0791	106	19	6	106.0
P1253	109	10	3	102.2
P1636	112	11	3	108.5
P9721	97	8	3	100.4
P9911	99	8	3	99.8
PAC249	95	9	3	89.5
PAC314	101	10	3	98.2
PAC343	104	19	6	102.8
PAC344	102	6	2	105.4
PAC430	108	6	2	98.5
PAC432	105	18	6	105.4
PAC456	108	18	6	105.9
PAC564	113	11	3	107.9
Pelota	107	11	3	101.8
Plenitude	107	17	5	102.4
Velocity	98	8	3	96.1
Z71-F1	111	18	6	105.6
Mean				100.0
LSD (5%)				8.0
CV (%)				7.0

100% Relative silage yield equals 25.1 t DM/ha.

## Lower North Island

HYBRID	CRM	Number of trials	Number of years	Relative silage yield (%)
37Y12	95	4	2	103.8
38V12	91	4	2	103.9
Afinity	100	9	5	105.4
Asterix	85	2	2	90.3
Booster	85	5	3	96.3
C29-A1	96	7	4	109.2
CMS Comet	92	8	4	104.0
Delitop	78	8	4	86.3
Maximus	102	8	5	103.5
N23-K3	87	6	3	94.8
N39-Q1	97	9	5	106.3
Obelix	93	4	3	93.6
P0021	100	5	3	103.9
P8805	88	5	3	90.8
P9400	94	9	5	100.4
P9721	97	5	3	101.7
P9911	99	5	3	111.0
PAC050	86	3	2	92.0
PAC249	95	8	4	102.2
PAC314	101	5	3	109.5
PAC343	104	6	3	110.8
PAC344	102	3	2	109.3
Titus	82	8	5	86.4
Velocity	98	5	3	106.3
Z71-F1	111	18	6	105.6
Mean				100.0
LSD (5%)				9.5
CV (%)				5.9

100% Relative silage yield equals 23 t DM/ha.

## South Island

HYBRID	CRM	Number of trials	Number of years	Relative silage yield (%)
38V12	91	5	5	104.3
39G12	78	5	5	92.7
39V43	72	3	3	79.1
Booster	85	2	2	106.7
CMS Comet	92	4	4	112.1
Delitop	78	5	5	97.1
N23-K3	87	4	4	98.6
P9400	94	3	3	107.1
Titus	82	4	4	92.7
<b>Mean</b>				<b>100.0</b>
<b>LSD (5%)</b>				<b>13.9</b>
<b>CV (%)</b>				<b>6.2</b>

100% Relative silage yield equals 21.5 t DM/ha.

## Upper North Island

HYBRID	CRM	Number of trials	Number of years	Harvest moisture (%)	Relative grain yield (%)
34P88	109	5	2	23.3	101.6
37Y12	95	5	2	19.3	101.8
Afinity	100	14	5	20.3	100.5
Brutus	105	14	4	24.7	90.7
C29-A1	96	14	6	20.0	101.2
Maximus	102	17	5	22.9	88.5
N39-Q1	97	14	6	20.3	94.1
N51-N4	104	19	6	21.2	102.7
Obelix	93	8	2	18.5	92.6
Olympiad	112	17	5	23.7	94.4
P0021	100	9	3	20.5	101.5
P0640	106	9	3	22.2	100.8
P1253	109	11	3	23.3	104.3
P9721	97	9	3	20.3	100.5
PAC249	95	7	3	19.7	96.7
PAC314	101	12	3	20.8	108.0
PAC343	104	19	6	21.2	106.8
PAC344	102	8	2	20.9	106.9
PAC430	108	8	2	22.2	110.0
PAC432	107	19	6	22.3	107.3
PAC456	108	16	5	22.8	100.8
PAC564	113	12	3	27.2	114.7
Pelota	107	12	3	21.6	97.2
Plenitude	107	17	5	21.5	98.8
Velocity	98	9	3	20.4	93.8
<b>Mean</b>				<b>21.9</b>	<b>100.0</b>
<b>LSD (5%)</b>				<b>1.2</b>	<b>9.5</b>
<b>CV (%)</b>				<b>5.3</b>	<b>8.2</b>

100% Relative grain yield equals 14.1 t/ha @ 14% moisture.

## Lower North Island

HYBRID	CRM	Number of trials	Number of years	Harvest moisture (%)	Relative grain yield (%)
37Y12	95	4	2	19.9	109.6
39G12	78	8	4	18.3	86.1
Afinity	100	10	5	21.4	112.6
Asterix	85	3	2	21.1	83.2
Booster	85	6	3	19.7	90.1
C29-A1	96	8	4	21.9	100.9
CMS Comet	92	8	4	19.5	103.8
Delitop	78	8	4	18.7	91.5
Maximus	102	9	5	25.5	94.6
N39-Q1	97	10	5	21.1	102.2
Obelix	93	5	3	19.6	95.5
P0021	100	6	3	21.7	110.8
P8805	88	6	3	18.8	99.7
P9400	94	10	5	19.3	100.1
P9721	97	6	3	20.3	107.0
PAC050	86	4	2	21.0	94.9
PAC249	95	8	4	20.0	109.5
PAC314	101	5	3	22.7	111.7
PAC343	104	6	3	23.4	114.2
PAC344	102	4	2	23.5	114.2
Titus	82	9	5	19.7	82.0
Velocity	98	6	3	21.5	101.9
Mean				20.9	100.0
LSD (5%)				1.2	9.7
CV (%)				4.7	6.8

100% Relative grain yield equals 13.5 t/ha @ 14% moisture.

## Waikato (Tamahere) Planted 18 October 2019

HYBRID	CRM	Plants per hectare		Days to harvest	Harvest dry matter (%)		Yield (t DM/ha)		
		Result	Significance		Result	Significance	Result	Significance	
Afinity	97	90112	bcdef	123	bcdefg	39.5	bcdefg	16.7	abcdef
Brutus	105	85106	fghi	126	efghijkl	35.9	efghijkl	16.5	bcdef
C29-A1	96	87379	efgh	123	abc	41.3	abc	17.8	abcdef
Gerzi	102	79613	ij	123	bcdefgh	38.0	bcdefgh	16.7	abcdef
Maximus	102	94004	ab	123	defghij	36.5	defghij	17.3	abcdef
N39-Q1	97	88077	cdefgh	123	ab	42.1	ab	17.9	abcdef
N51-N4	102	73883	j	126	bcdefghi	37.5	bcdefghi	18.0	abcdef
Obelix	94	94647	ab	123	ab	43.3	ab	16.1	cdef
Olympiad	112	98269	a	130	hijkl	33.7	hijkl	16.6	bcdef
P0021	100	94411	ab	123	bcdef	39.7	bcdef	17.1	abcdef
P0362	103	93438	abcd	126	ghijkl	34.8	ghijkl	18.5	abcd
P0640	106	92383	bcde	126	hijkl	32.2	hijkl	16.5	bcdef
P0725	107	93235	abcd	126	hijkl	33.3	hijkl	17.4	abcdef
P0791	106	89103	bcdefg	126	bcdefgh	38.0	bcdefgh	17.8	abcdef
P0891	107	85737	fghi	126	defghijk	36.3	defghijk	16.9	abcdef
P0937	109	89603	bcdefg	129	fghijkl	35.5	fghijkl	15.5	ef
P1253	109	89440	bcdefg	129	abcd	40.9	abcd	17.6	abcdef
P1636	112	94243	ab	130	hijkl	32.5	hijkl	14.6	f
P9721	97	93373	abcd	123	bcdefg	38.8	bcdefg	19.1	ab
P9911	99	93353	abcd	123	defghi	36.8	defghi	17.5	abcdef
PAC343	105	90509	bcdef	126	bcdefgh	37.6	bcdefgh	16.9	abcdef
PAC344	102	92434	bcde	123	hijkl	33.8	hijkl	17.2	abcdef
PAC430	108	75521	j	129	cdefghi	37.0	cdefghi	17.7	abcdef
PAC432	105	92896	abcde	126	efghijk	36.2	efghijk	18.1	abcde
PAC456	109	92552	bcde	129	ijkl	32.0	ijkl	16.2	bcdef
PAC564	113	86054	fghi	130	jkl	31.7	jkl	16.0	cdef
Pelota	107	88779	bcdefg	129	efghijk	36.3	efghijk	15.7	def
Plenitude	107	83450	ghi	129	hijkl	33.3	hijkl	17.6	abcdef
RGF FARAONIXX	110	92400	bcde	130	kl	31.4	kl	15.7	def
Velocity	95	87479	defgh	123	a	44.6	a	19.1	ab
Z71-F1	111	82702	hi	130	i	31.1	i	14.5	f
Mean		89125		126		36.5		17.2	
LSD (5%)		5914				4.9		3.1	
CV (%)		4.4				8.2		7.1	



## Bay of Plenty (Whakatane) Planted 24 October 2019

HYBRID	CRM	Plants per hectare		Days to harvest	Harvest dry matter (%)		Yield (t DM/ha)	
		Result	Significance		Result	Significance	Result	Significance
Afinity	97	95755	ab	127	41.4	gh	25.0	efgh
Brutus	105	90118	abcdef	140	45.5	cde	27.1	bcdefg
Gerzi	102	87349	ef	127	41.7	fgh	25.3	defgh
Maximus	102	89682	abcdef	133	44.7	defg	26.2	bcdefgh
N51-N4	102	91115	abcdef	133	47.2	bcd	28.5	abcdef
Obelix	94	88318	def	127	45.0	defg	22.4	h
Olympiad	112	90114	abcdef	133	35.2	i	23.5	gh
P0021	100	96116	a	127	41.3	gh	25.2	efgh
P0362	103	93812	abcde	133	40.9	h	28.4	abcdef
P0640	106	93571	abcde	133	39.3	h	28.5	abcdef
P0725	107	94433	abcd	140	42.8	efgh	29.0	abcde
P0791	106	88681	cdef	140	45.9	cde	28.7	abcdef
P0891	107	92715	abcdef	140	44.8	defg	28.2	abcdef
P0937	109	94054	abcd	147	51.8	a	30.5	ab
P1253	109	93107	abcde	147	48.0	abcd	27.6	abcdef
P1636	112	93437	abcde	147	44.7	defg	28.4	abcdef
PAC314	101	89210	bcdef	133	40.7	h	25.4	defgh
PAC343	105	91400	abcdef	145	49.9	ab	30.0	abc
PAC344	102	94090	abcd	133	39.4	h	29.9	abc
PAC430	108	86320	f	140	45.3	def	28.7	abcdef
PAC432	105	95134	abc	133	41.3	gh	29.3	abcd
PAC456	109	92761	abcdef	147	46.1	cde	30.4	ab
PAC564	113	92899	abcdef	147	45.3	def	30.5	ab
Pelota	107	90707	abcdef	140	39.6	h	25.9	cdefgh
Plentitude	107	93582	abcde	142	45.8	cde	28.8	abcdef
RGT FARAONIXX	110	94319	abcd	147	48.1	abcd	31.3	a
Z71-F1	111	92535	abcdef	147	40.9	gh	28.8	abcde
Mean		92050		138.0	44.0		27.7	
LSD (5%)		6659			3.8		4.1	
CV (%)		5.2			5.2		10.3	

## Manawatu (Ohakea) Planted 8 October 2019

HYBRID	CRM	Plants per hectare		Days to harvest	Harvest dry matter (%)		Yield (t DM/ha)	
		Result	Significance		Result	Significance	Result	Significance
Afinity	97	104517	a	154	38.6	fghi	23.1	bcdef
Asterix	85	89372	cde	141	37.3	hi	21.2	efg
Axis	92	94292	bcde	147	40.0	cdefghi	25.1	abc
Booster	81	97187	abc	143	37.4	hi	21.2	efg
C29-A1	96	97652	abc	160	37.8	ghi	25.4	ab
Gerzi	102	95993	bcd	154	38.0	ghi	24.4	abcd
Maximus	102	95551	bcd	160	41.1	bcdef	24.2	abcde
N39-Q1	97	94740	bcde	154	39.1	efghi	22.2	cdefg
Obelix	94	88958	de	147	42.3	abcd	23.8	abcde
P0021	100	97910	abc	154	39.6	defghi	25.1	abc
P8000	80	95838	bcd	142	40.7	bcdefg	21.9	defg
P8805	88	96488	bcd	143	39.0	efghi	23.5	bode
P9127	91	101650	ab	162	40.4	bcdefgh	24.3	abcde
P9400	94	99219	ab	154	37.6	hi	23.9	abcde
P9721	97	98750	ab	159	42.7	abc	22.8	bcdef
P9911	99	96252	bcd	160	41.8	bcde	25.6	ab
PAC050	85	87230	e	164	40.0	cdefghi	20.4	fg
PAC119	91	99301	ab	147	38.4	fghi	23.5	bode
PAC314	101	86981	e	160	39.2	efghi	24.5	abcd
PAC344	102	94942	bcde	160	36.8	i	26.4	a
RGT DIREXXION	82	95889	bcd	147	43.3	ab	23.9	abcde
RGT FARANDOLE	92	98081	ab	149	38.7	fghi	23.9	abcde
RGT HAUXXTIN	80	99830	ab	164	44.8	a	23.9	abcde
RGT LUXXIDA	93	95395	bcd	149	38.9	efghi	24.7	abcd
Titus	82	97826	abc	142	41.1	bcdef	19.4	g
Velocity	95	95807	bcd	149	38.7	fghi	24.9	abc
Mean		95987		153	39.7		23.6	
LSD (5%)		8042			3.0		2.9	
CV (%)		5.9			4.9		12.1	

## Waikato (Tamahere) Planted 18 October 2019

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha)		Stem lodging (%)	
		Result	Significance	Result	Significance	Result	Significance	Result	Significance	Result	Significance
Afinity	100	94079	ab	17.2	kl	70.7	ijkl	6.8	abcde	0.8	efg
Brutus	105	88545	abcd	24.1	ab	75.2	abc	5.9	bcdef	0.3	fg
C29-A1	96	89148	abc	17.3	kl	69.7	klm	7.0	abcde	0.8	efg
Gerzi	102	74777	e	17.4	jkl	73.3	bcdefghi	8.5	ab	1.0	defg
Maximus	102	92292	ab	20.0	ef	68.0	m	5.3	cdef	1.0	defg
N39-Q1	100	86769	bcd	17.3	kl	69.1	lm	7.5	abc	0.8	efg
N51-N4	104	82654	cde	18.6	fghijk	74.6	abcdef	8.8	ab	0.9	defg
Obelix	94	83635	cde	16.6	l	69.2	lm	8.6	ab	0.5	efg
Olympiad	112	91010	abc	21.0	de	70.3	jklm	4.7	def	4.3	b
P0021	100	94551	a	18.0	ijkl	73.5	bcdefg	7.5	abc	2.3	bcdefg
P0362	105	92611	ab	18.4	ghijk	74.6	abcde	9.5	a	0.0	g
P0547	105	94084	ab	17.6	ijkl	72.9	cdefghij	8.9	ab	0.9	defg
P0640	106	93197	ab	19.9	efg	72.2	efghij	6.3	bcdef	0.3	fg
P0725	Silage only	93369	ab	19.1	fghij	73.5	bcdefgh	6.4	bcdef	0.0	fg
P0791	Silage only	87059	bcd	18.2	ijk	71.8	fghijk	8.2	ab	0.3	fg
P0891	107	93694	ab	18.9	fghij	75.9	ab	6.8	bcdef	0.3	fg
P0937	Silage only	89347	abc	18.1	ijkl	72.2	efghij	7.2	abcd	1.8	cdefg
P1253	109	88853	abc	18.5	ghijk	76.4	a	7.2	abcd	0.0	fg
P1636	Silage only	91515	abc	22.3	cd	73.7	bcdefg	4.2	f	2.8	bcdef
P9721	97	93700	ab	16.9	kl	70.2	jklm	6.6	bcdef	1.0	defg
P9911	Silage only	93435	ab	17.6	ijkl	70.3	jklm	6.6	bcdef	4.0	bc
PAC314	101	76780	e	17.9	ijkl	73.3	bcdefghi	8.5	ab	0.0	fg
PAC343	104	92834	ab	17.9	ijkl	71.1	hijkl	7.0	abcd	0.8	efg
PAC344	102	86494	bcd	18.2	ijk	72.1	efghijk	6.9	abcde	0.5	fg
PAC430	108	77451	e	18.4	hijk	72.5	defghij	8.4	ab	0.1	fg
PAC432	107	88141	abcd	19.8	efgh	71.3	ghijkl	7.3	abc	1.0	defg
PAC456	109	91320	abc	21.0	de	72.5	defghij	5.3	cdef	3.3	bcd
PAC564	115	92797	ab	25.2	a	67.9	m	7.8	ab	1.2	defg
Pelota	107	86500	bcd	18.3	ijk	72.7	defghij	4.2	f	7.0	a
Plenitude	107	80706	de	19.2	fghi	70.9	ijkl	6.8	abcdef	0.2	fg
RGT FARAONIXX	110	92976	ab	20.9	e	72.7	defghij	4.6	ef	3.0	bcde
Velocity	98	83233	cde	17.0	kl	72.5	efghij	6.8	abcde	0.0	fg
Z71-F1	Silage only	83690	cde	22.8	bc	74.9	abcd	4.5	ef	1.3	defg
Mean		88523		19.1		72.2		6.9		1.3	
LSD (5%)		7960		1.5		2.6		2.6		2.5	
CV (%)		6.0		5.1		2.4		38.8		133.2	

## Waikato (Gordonton) Planted 25 November 2019

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha @14% moisture)	
		Result	Significance	Result	Significance	Result	Significance	Result	Significance
Afinity	100	93646	abcde	27.8	n	68.3	ijklmn	15.26	hijklm
Brutus	105	95141	abcd	34.5	de	70.4	defg	14.16	mnop
C29-A1	96	90604	bcdefg	26.0	p	68.9	hijk	14.23	mnop
Gerzi	102	93662	abcde	28.4	n	71.5	bcd	14.99	ijklm
Maximus	102	92534	abcdef	32.3	ghi	68.7	ijkl	13.13	p
N39-Q1	100	88029	efg	28.0	n	68.6	ijklm	14.59	lmno
N51-N4	104	90888	bcdefg	30.2	kl	69.3	fghijk	15.75	defghijkl
Obelix	94	92950	abcdef	23.8	q	70.6	de	13.50	op
Olympiad	112	91912	abcdef	35.5	cd	68.2	klmn	15.08	ijklm
P0021	100	93961	abcd	26.2	p	68.8	hijk	14.81	klmn
P0362	105	92695	abcdef	29.5	lm	69.6	efghi	16.38	bcdefg
P0547	105	89611	cdefg	27.8	n	68.9	hijk	14.93	klmn
P0640	106	89958	cdefg	31.3	ijk	68.1	klmn	16.31	bcdefgh
P0725	Silage only	93075	abcdef	31.3	ijk	70.3	defg	17.35	ab
P0791	Silage only	93816	abcd	32.5	fgh	69.2	ghijk	15.49	fghijkl
P0891	107	89499	defg	31.4	hij	72.7	b	15.83	defghijk
P0937	Silage only	96972	a	32.7	fg	68.3	klmn	17.02	abc
P1253	109	90566	bcdefg	34.7	d	74.4	a	16.16	cdefghij
P1636	Silage only	92322	abcdef	36.6	bc	74.3	a	16.83	abcd
P9721	97	95258	abc	27.6	no	67.3	mn	15.29	ghijklm
P9911	Silage only	92691	abcdef	27.7	n	67.5	lmn	15.03	ijklm
PAC314	101	91271	bcdefg	28.7	mn	69.5	efghij	16.71	abcde
PAC343	104	91437	bcdefg	28.2	n	69.6	efghi	15.92	cdefghijk
PAC344	102	93696	abcde	29.6	lm	69.6	efghi	16.63	abcdef
PAC430	108	85926	g	31.8	ghij	70.2	defg	15.89	cdefghijk
PAC432	107	94213	abcd	33.5	ef	69.5	efghi	16.18	cdefghi
PAC456	109	95074	abcd	32.7	fg	70.5	def	16.36	bcdefgh
PAC564	115	95668	ab	37.4	b	71.3	cd	17.62	a
Pelota	107	87491	fg	30.8	jk	70.0	efgh	15.44	fghijkl
Plenitude	107	90215	bcdefg	31.9	ghij	67.3	n	15.62	efghijkl
RGT FARAONIXX	110	93960	abcd	35.0	d	71.9	bc	14.93	klmn
Velocity	98	92346	abcdef	26.5	op	70.7	de	13.87	nop
Z71-F1	Silage only	90888	bcdefg	38.9	a	74.5	a	14.20	mnop
Mean		92181		30.9		70.0		15.50	
LSD (5%)		5682		1.1		1.2		1.16	
CV (%)		4.4		2.6		1.3		2.7	

## grain 2019/20 data

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha)	
		Result	Signif.	Result	Signif.	Result	Signif.	Result	Signif.
Afinity	100	89494	abcd	21.8	l	69.9	klmn	14.95	ghij
Brutus	105	90703	abc	30.4	c	73.0	cde	13.12	m
C29-A1	96	88933	abcd	20.3	m	71.9	defgh	16.19	bcdef
Gerzi	102	86736	abcde	23.6	ij	72.8	cdef	15.88	cdefgh
Maximus	102	87917	abcde	25.3	fg	69.6	lmn	13.30	klm
N39-Q1	100	82575	def	21.1	l	70.6	hijkl	13.50	klm
N51-N4	104	86151	abcde	26.1	e	71.8	defghi	14.79	hij
Obelix	94	85827	bcde	19.2	n	72.8	defgh	13.70	ijklm
Olympiad	112	88690	abcde	32.4	b	70.9	ghijkl	14.90	ghij
P0021	100	90233	abc	21.7	l	72.0	cdefg	15.26	fghi
P0362	105	90999	abc	23.3	jk	71.7	defghi	15.53	efghi
P0547	105	91922	ab	23.0	jk	71.0	ghijk	15.77	cdefgh
P0640	106	89448	abcd	24.2	hi	68.6	n	15.60	efghi
P0725	Silage only	89058	abcd	23.6	ij	71.5	ghij	16.49	abcde
P0791	Silage only	90001	abc	25.2	fg	71.0	ghijk	16.27	bcdef
P0891	107	88726	abcde	24.2	hi	74.8	a	15.33	efghi
P0937	Silage only	89138	abcd	28.5	d	70.2	ijklm	16.46	abcdef
P1253	109	89801	abc	26.3	e	75.1	a	16.44	abcdef
P1636	Silage only	91308	abc	30.9	c	74.6	ab	15.56	efghi
P9721	97	92356	ab	21.1	l	70.5	ijkl	15.85	cdefgh
P9911	Silage only	89799	abc	22.8	jk	71.5	fghi	16.49	abcdef
PAC314	101	87801	abcde	22.9	jk	71.4	ghij	16.14	bcdefg
PAC343	104	88562	abcde	23.5	j	71.4	ghij	17.16	ab
PAC344	102	93086	a	22.7	k	71.1	ghijk	17.66	a
PAC430	108	87933	abcde	25.9	ef	71.6	efghi	16.90	abc
PAC432	107	93086	a	26.2	e	70.0	klmn	17.19	ab
PAC456	109	91850	ab	26.3	e	71.4	ghij	15.61	defghi
PAC564	115	92424	ab	33.3	a	71.1	ghijk	16.85	abcd
Pelota	107	81726	ef	25.1	g	71.0	ghijk	14.50	ijk
Plenitude	107	84527	cdef	24.5	gh	68.9	mn	14.01	ijklm
RGT FARAONIXX	110	78699	f	29.0	d	73.0	cd	14.42	ijkl
Velocity	98	87488	abcde	21.1	l	73.3	bc	14.47	ijk
Z71-F1	Silage only	89929	abc	33.9	a	75.2	a	13.22	lm
Mean		88695		25.1		71.7		15.44	
LSD (5%)		6992		0.8		1.3		1.24	
CV (%)		3.0		2.2		1.3		5.3	

## Bay of Plenty (Whakatane) Planted 24 October 2019

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha)		Root lodging (%)	
		Result	Signif.	Result	Signif.	Result	Signif.	Result	Signif.	Result	Signif.
Afinity	100	91628	abcdef	17.5	lm	71.8	hij	14.98	fghi	1.8	bcd
Brutus	105	85633	fg	20.3	d	75.2	bcd	14.96	fghi	1.0	bcd
Gerzi	102	87920	defg	17.8	kl	75.8	bc	14.64	ghi	0.3	cd
Maximus	102	92495	abcde	19.3	ef	72.1	ghij	14.32	hi	0.3	cd
N51-N4	104	91849	abcdef	18.1	ijkl	73.6	defgh	15.19	efghi	1.8	bcd
Obelix	94	88714	cdefg	16.8	m	72.0	ghij	13.54	i	0.0	d
Olympiad	112	97874	a	18.8	efghij	69.1	k	15.31	efghi	4.0	bc
P0021	100	90530	bcdef	17.9	kl	72.7	efghij	16.02	defgh	0.0	d
P0362	105	92655	abcde	18.4	ghijk	74.7	bcde	18.55	ab	2.3	bcd
P0547	105	94031	abcd	18.0	kl	74.0	cdefg	16.66	bcdefg	0.8	bcd
P0640	106	94123	abcd	17.9	kl	71.7	hij	17.25	abcde	0.8	bcd
P0725	Silage only	93687	abcd	18.4	ghijk	72.1	ghij	16.57	bcdefg	0.5	bcd
P0791	Silage only	88322	defg	18.5	ghijk	71.1	j	17.64	abcd	0.3	cd
P0891	107	90165	bcdefg	19.0	efgh	78.6	a	16.82	bcdef	0.3	cd
P0937	Silage only	95232	abc	18.6	efghijk	73.2	defghi	19.01	a	1.8	bcd
P1253	109	86207	efg	19.1	efg	78.8	a	16.25	cdefgh	0.5	bcd
P1636	Silage only	94027	abcd	22.3	c	75.2	bcd	17.90	abcd	3.3	bcd
PAC314	101	92567	abcde	17.9	kl	72.7	efghij	18.28	abc	0.3	cd
PAC343	104	92430	abcdef	18.0	ijkl	72.2	fghij	18.45	abc	0.8	bcd
PAC344	102	94761	abcd	18.2	ijkl	73.8	cdefgh	16.92	bcdef	0.3	cd
PAC430	108	83648	g	18.5	fghijk	74.7	bcde	18.09	abcd	0.0	d
PAC432	107	93043	abcde	18.5	fghijk	71.9	ghij	17.40	abcd	0.3	cd
PAC456	109	96000	ab	18.9	efghi	74.3	bcdef	17.76	abcd	4.3	b
PAC564	115	96037	ab	23.5	b	71.4	ij	17.07	abcde	2.8	bcd
Pelota	107	93930	abcd	18.2	hijkl	73.3	defghi	16.78	bcdef	3.0	bcd
Plenitude	107	91003	bcdef	18.4	ghijk	72.4	fghij	17.24	abcde	0.3	cd
RGT FARAONIXX	110	91823	abcdef	19.4	e	76.3	b	16.33	cdefgh	0.3	cd
Z71-F1	Silage only	95766	ab	25.7	a	71.9	hij	15.06	efghi	10.8	a
Mean		92004		19.0		73.5		16.61		1.5	
LSD (5%)		6890		0.8		2.1		2.11		3.8	
CV (%)		5.3		3.0		2.2		8.5		181.8	

# grain 2019/20 data

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha)	
		Result	Signif.	Result	Signif.	Result	Signif.	Result	Signif.
Afinity	100	106412	a	18.4	bcdef	74.2	ij	15.2	ab
Asterix	85	79308	g	17.7	fghi	78.8	ab	10.3	jk
Axis	92	88736	f	18.4	bcd	77.6	cde	11.2	hijk
Booster	88	100991	abc	17.4	hij	77.8	bcd	11.3	ghijk
C29-A1	96	94955	cdef	17.8	defgh	72.4	k	13.0	cdefgh
Gerzi	102	88717	f	18.2	cdef	76.7	ef	13.6	abcde
Maximus	102	95437	cdef	20.9	a	69.6	l	11.4	fghijk
N39-Q1	100	93803	cdef	17.8	efgh	72.5	k	13.3	cde
Obelix	94	92534	def	17.5	ghij	75.3	gh	13.3	bcde
P0021	100	96260	bcdef	18.4	bcdef	75.7	fg	14.4	abc
P8000	80	95184	cdef	16.5	lm	75.5	gh	12.2	efghij
P8805	88	96396	bcdef	17.0	ijklm	74.0	ij	14.2	abcd
P9127	91	98730	abcd	17.1	jkl	73.2	jk	13.2	cdef
P9400	94	90431	ef	17.3	hijk	76.7	ef	13.1	cdefg
P9721	97	103798	ab	17.3	hijk	73.7	ij	14.5	abc
P9911	Silage only		cdef	18.9	b	73.7	ij	13.3	cde
PAC050	88	97436	bcde	18.0	defg	77.2	cde	12.5	defghi
PAC119	91	98396	bcd	16.4	m	74.5	hi	13.8	abcde
PAC314	101	79911	g	18.9	b	74.1	ij	12.7	cdefghi
PAC344	102	90444	ef	18.8	bc	74.1	ij	15.3	a
RGT DIREXXION	82	93325	cdef	17.7	bc	77.0	de	11.0	ijk
RGT FARANDOLE	92	88625	f	17.1	ijk	78.2	abc	12.8	cdefghi
RGT HAUXXTIN	80	95463	cdef	17.3	hij	79.2	a	12.3	efghij
RGT LUXXIDA	93	94390	cdef	18.4	bcde	75.9	fg	13.5	abcde
Titus	82	92984	def	16.7	klm	79.2	a	10.1	k
Velocity	98	95582	cdef	17.8	fgh	75.9	fg	14.4	abc
Mean		93919		17.8		75.5		12.9	
LSD (5%)		7835		0.6		1.1		1.8	
CV (%)		5.9		2.2		1.0		10.1	

HYBRID	CRM	Plants per hectare		Harvest moisture (%)		Test weight (kg/hl)		Yield (t/ha)	
		Result	Signif.	Result	Signif.	Result	Signif.	Result	Signif.
Afinity	100	89861	abcde	30.1	bc	67.9	hi	14.8	abcde
Asterix	85	83092	bcdef	26.0	gh	74.2	b	11.4	mn
Axis	92	89036	abcde	27.9	def	71.5	cd	12.6	kl
Booster	88	91263	abcde	25.9	ghi	71.5	cd	10.9	n
C29-A1	96	85692	bcde	29.7	c	68.1	hi	12.9	jkl
Gerzi	102	85362	bcde	32.9	a	70.9	cde	13.7	fghijk
Maximus	102	88670	abcde	34.1	a	68.1	hi	13.1	hijkl
N39-Q1	100	86655	bcde	29.1	cde	68.6	gh	14.9	abcde
Obelix	94	81465	def	24.7	hij	70.5	def	12.3	lm
P0021	100	89187	abcde	29.5	c	69.5	fg	15.2	abc
P8000	80	93870	abc	23.0	k	71.9	c	12.3	lm
P8805	88	94086	ab	24.5	ij	69.7	efg	14.0	defghi
P9127	91	91605	abcde	27.2	fg	67.1	i	14.3	cdefg
P9400	94	88978	abcde	25.0	hij	72.0	c	13.8	efghij
P9721	97	99937	a	27.5	f	68.6	gh	15.0	abcd
P9911	Silage only		bcde	31.2	b	68.1	hi	13.6	fghijk
PAC050	88	81917	cdef	28.0	def	71.7	cd	12.8	jkl
PAC119	91	90553	abcde	24.9	hij	68.6	gh	14.2	cdefgh
PAC314	101	87396	bcde	32.8	a	70.5	def	15.5	ab
PAC344	102	92062	abcde	33.2	a	69.9	efg	15.7	a
RGT DIREXXION	82	85788	bcde	26.9	fg	70.8	cdef	12.9	ijkl
RGT FARANDOLE	92	80749	ef	27.8	ef	70.5	def	13.7	fghijk
RGT HAUXXTIN	80	92516	abcde	26.9	fg	71.6	cd	14.1	cdefghi
RGT LUXXIDA	93	92998	abcd	29.3	cd	69.9	efg	14.6	bcdef
Titus	82	72073	f	24.3	jk	75.9	a	10.8	n
Velocity	98	87799	bcde	29.9	bc	70.5	def	13.2	ghijkl
Mean		88023		28.2		70.3		13.5	
LSD (5%)		11977		1.5		1.3		1.1	
CV (%)		9.8		3.5		1.4		5.7	

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