



# PACIFIC SEEDS

2017 - 2018 Product Manual



**Carrfields**

Grain & Seed



# Carrfields Grain & Seed

## Our reputation is growing



Now it's often said that the weather is one of the biggest challenges in farming.

Globalisation, market dynamics and the volatility these impart on farm gate prices also creates a lot of uncertainty for farmers.

The last few years have seen regular negative interactions between both of these factors for a majority of New Zealand's maize growers and dairy farmers.

The fundamental and seemingly eternal problem for producers is to manage risk, maximise profit and to do it sustainably.

The reality is that all farmers and growers must constantly strive to build as much resilience into their operations as they can afford. For many farmers this will mean strategically growing crops to fill feed shortages and/or as a profitable intermediary towards pasture renovation. For those that grow crops this will mean selecting the right species and cultivars/hybrids, and managing them in such a way that they provide near-optimal yields in the good years and optimal yields in the tougher years.

To this end Carrfields Grain & Seed, exclusive licensee of Pacific Seeds brand products here in New Zealand, is introducing a number of key initiatives to assist you to achieve your goals by helping you build resilience into your cropping operations including:

The C4 plan (pg 7), providing you with reduced seed treatment costs, insurance against crop emergence problems in the form of a full replant guarantee, in-field nutritional problem-solving support/services and a complementary aerial crop inspection on request; as well as a free copy of our brand-new Maize Crop Scouting Guide.

New Zealand's first comprehensive Maize Crop Scouting Guide (pg 17), a descriptive full colour book providing you with up-to-date information at your fingertips to help you make decisions and problem-solve in the field.

An agronomic advice package aimed at ensuring that you plant no more seed than you need, to ensure standing crops with near-optimal yields in the good years, and optimal yields in the tougher years. Don't gamble on failure : plan for profit!

Finally, we hope you take some time to have a read through some of the articles included in this seed guide. Our goal is to get you thinking critically.

Scott Shaw

Pacific Seeds brand product manager



# Contents

ARiDapt - drought ready maize	2	PAC 230	26
Fresh thinking for an old industry	4	PAC 343	27
Carrfields Comprehensive Crop Care C4 plan	7	PAC 432	28
Building brilliance through resilience	8-10	PAC 456	29
Nitrogen application strategies	12-14	PAC 624	30
Optimising maize silage quality	15-17	Seed treatment	31
Introducing: Carrfields crop scouting guide	17	Summer forages	32-35
Pacific Seeds maize hybrids	18-31	BMR Rocket	34
Traits to consider	19	Sprint	35
Decision making tools	20-21	Mt Cook Chicory	36
PAC 040	22	Sunbird 7	37
PAC 062	23	Magnum Oats	39
PAC 123	24	Rose Pea Silage	39
PAC249	25	Herbage	39
		Carrfields cereal seed	40-41

DISCLAIMER: Pacific Seeds, Canterbury Seed Limited and all its officers, employees, agents and licensors of intellectual property provide no assurances, guarantees or warranties in relation to any advice, information, variety or product referred to or recommended, except those that by law must be provided. To the extent permitted by law, Canterbury Seed Limited excludes all liability and has no liability to anyone, from or in relation to any advice, information, variety or product. If Canterbury Seed Limited has any liability then the total liability in relation to the advice, information, variety or product is limited to the greatest extent permitted by law, and to the extent permitted by law, not include any liability for loss, income, profits, savings, goodwill or for any indirect or consequential loss or special or exemplary damages or exceed the total monetary payment received by Canterbury Seed Limited in relation to the advice, information, variety or product in respect of which the liability arises.



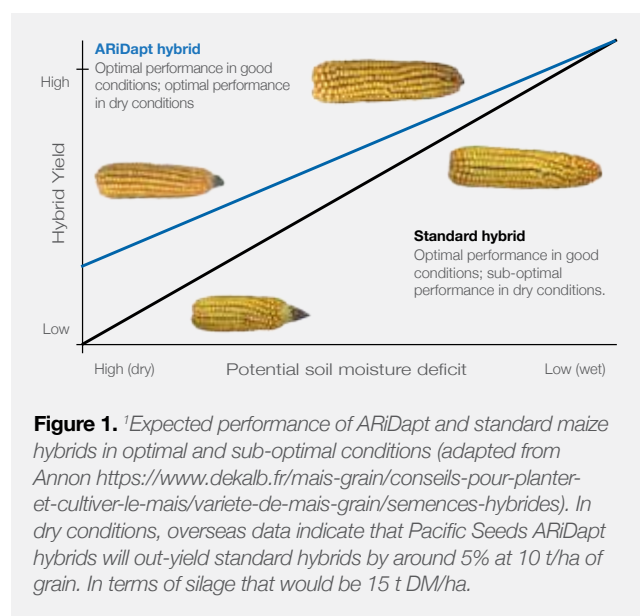
- ✓ **Triple A rated**  
hybrids with an Adaptive-Aptitude towards Arid-ability
- ✓ **Proven**  
to out-perform other hybrids in hot dry conditions, with a competitive edge in optimal-environments
- ✓ **Global technology**  
developed in the hot-dry, semi-Arid regions of southern Europe
- ✓ **Build resilience**  
into your system with Pacific Seeds ARiDapt maize hybrids



## Challenging the uncertainty of a changing climate

With extreme climate variability now the norm, farmers and growers are faced with the urgent challenge of having to build resilience into their systems.

When it comes to maize there is only a handful of options to do this. Apart from lowering plant population density, one of the simplest and most effective ways is through hybrid selection. Pacific Seeds ARiDapt from Carrfields is a new brand utilising existing technology developed in the semi-arid regions of southern Europe. Developed during the early-mid 2000's using advanced conventional-breeding methods from one of the world's largest maize germplasm bases these elite, drought-ready maize hybrids have been marketed globally under a number of brands including "HD" (Heat and Drought) and "Optimeau" (French for "Optimum water").



<sup>1</sup>[www.dekalb.fr/mais-grain/conseils-pour-planter-et-cultiver-le-mais/variete-de-mais-grain/semences-hybrides](https://www.dekalb.fr/mais-grain/conseils-pour-planter-et-cultiver-le-mais/variete-de-mais-grain/semences-hybrides) (accessed 4th May 2017)

## So how does it work?

Pacific Seeds ARiDapt hybrids are the same hybrids that have proven themselves superior to other hybrids in the hot, dry, unirrigated fields of southern Europe, whilst remaining extremely competitive in higher rainfall areas and irrigated fields.

Developed during the early-mid 2000's following an amalgamation of two of the world's leading maize breeding companies **Dekalb and Cargills**, ARiDapt maize hybrids are produced from elite inbred-lines that have been repeatedly crossed and inbred for specific characteristics that enable their offspring to perform exceptionally well in hot, dry conditions - namely:

- **Strong deep roots with resistance to [dry] rot**
- **Precocious silking and extended anthesis period**
- **Superior heat and drought tolerance in the form of kernel set and stay green**

Successive generations of inbred-lines with these and a plethora of other characteristics has produced a large and ever-expanding portfolio of elite inbred-lines that reliably produce hybrids with the following characteristics and capabilities:

- **Strong deep roots that resist rot and premature plant death**
- **High water-use efficiency**
- **Well balanced canopies, not excessively leafy**
- **Strong thick stalks and low ear placement**
- **Precocious silking and extended anthesis period**
- **Optimal husk length to ensure timely silk emergence**
- **Excellent green leaf-area retention (stay-green)**
- **High grain harvest-index and total-biomass (dry matter yield)**

Now just having this elite gene-profile isn't enough. Hybrids have to prove themselves statistically superior in hot, dry, arid-conditions but also perform equally well in more optimal and irrigated conditions. Hybrids that are agronomically strong but do not show the required level of yield-stability across environments are not branded [ARiDapt]. At present around 40% of the new material options coming through our main suppliers breeding programmes have the equivalent of our ARiDapt brand. This provides Pacific Seeds and the New Zealand market with an exceptionally strong pipeline of non-GMO arid-adapted maize hybrids that will undoubtedly build more resilience into your maize production systems over the years and decades to come.



Cobs from 3 different hybrids showing the difference in kernel-set between ARiDapt and standard hybrids in dry conditions. The cobs on the left and right are from ARiDapt hybrids whereas the centre cob is not.

## Putting it all together

To capitalise on the benefits of ARiDapt hybrids and build resilience into your crops we need to take a deeper look at some of the main characteristics of ARiDapt hybrids and how to get the most out of them.

The foundation of healthy and resilient crops starts with a strong deep root system. As upper soil layers dry out desiccation of the root system allows soil pathogens to take hold leading to latent disease and premature plant death later in the season. Have you ever wondered why plants or even whole crops suddenly start to die 2 or 3 weeks earlier than they should? ARiDapt maize hybrids have shown themselves to resist the effects of dry soil conditions throughout the season better than other hybrids; maintaining more green leaf area and better overall plant health during the latter stages of growth, right up to black layer. It doesn't matter how healthy or big a crop looks, if it can't maintain late-season plant health, particularly the roots, it will not be as resilient or high yielding as one that does.

A few facts to consider. A tall leafy crop is not high yielding by default. Taller crops often have weaker stalks and smaller cobs. Leaves only make up around 10% of the total dry weight of a mature maize crop, so an extra 10% leaf equates to a mere 1% extra total yield. Theoretically 20% more leaf would equate to 2% more yield, but it's not that simple. The fact is that this extra leaf area can be counterproductive resulting in higher respiratory (carbon) and transpiration (water) losses. ARiDapt hybrids are bred for a moderate amount of leaf to minimise respiratory and transpiration losses, and maximise light penetration into the deeper canopy layers so that more leaves are operating at maximum efficiency. By default, this means the whole crop operates more efficiently using less water to assimilate more carbon. Nature has determined and proven that arid-adapted plants cannot be overly leafy.

Cobs make up over 50% of the total dry matter (DM) of a mature maize crop, so 5% more cob equates to 10% more DM yield. Strong thick stalks provide a large stored-carbohydrate source throughout the grain-fill period providing a buffer for low photosynthetic rates caused by cloudy days; which otherwise results in poor tip-fill (tipping). Low ear placement provides plenty of leaves above the cobs to ensure plenty of carbohydrates for the developing kernels. Optimal husk length that is not too long or tight so as to impede silk emergence, combined with precocious silking (short anthesis-silking interval) mitigates the risk of poor pollination caused by dry conditions.

Putting this all together, Pacific Seeds ARiDapt maize hybrids will provide growers with higher and more consistent grain and dry-matter yields in a wider range of conditions than other "conventional" hybrids. In fact, PAC 249 and more recently PAC 230 are two existing Pacific Seeds hybrids that have the ARiDapt technology. Both of these hybrids have proven themselves to perform consistently-well in some of the best- and worst-conditions across the length and width of the North Island. We knew we had the technology, but we also knew we needed to thoroughly test it to confirm the results being realised overseas were applicable to NZ conditions. We've done this and now we introduce them to you as Pacific Seeds ARiDapt drought-ready maize hybrids.

Build resilience into your system by growing Pacific Seeds ARiDapt maize hybrids.



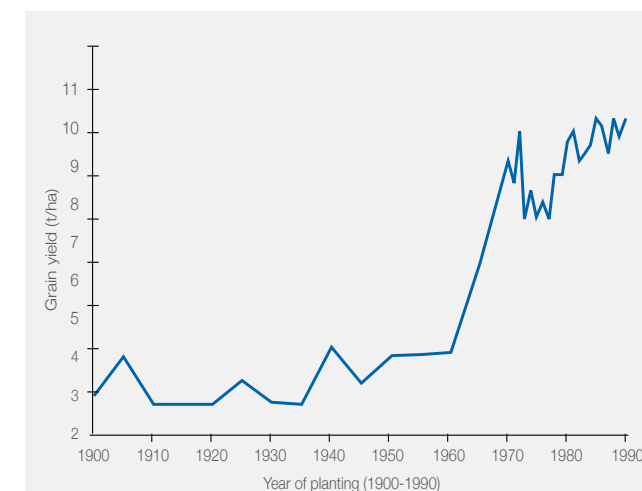
# Fresh thinking for an old industry

Whether for stock feed or human consumption maize has been grown in New Zealand since the late 1800's.

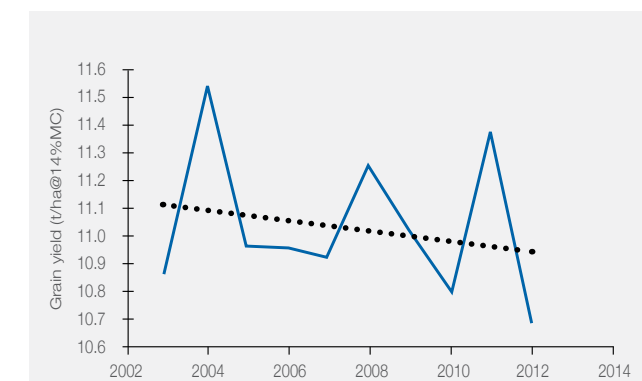
But why is it that over the last few decades' national average maize yields have plateaued?

Prior to the 1940s grain yields were stable at a modest 3 to 4 t/ha.

When double-cross hybrids were first introduced in the early 1940s there was a significant increase in average yields. And then, in the early 1960s to the early 1990s there was a strong and steady increase in yields resulting from the combined advances in agronomy, agrichemicals and genetics.



**Figure 2.** Long term NZ national average maize-grain yields from 1900 to 1990. From Hardacre et al. (1991)<sup>3</sup>.



**Figure 3.** New Zealand national average maize grain yields over the 2003 to 2012 period (adapted from Millner and Roskrige 2013)<sup>6</sup>.

It's worth asking the question: Why have NZ's "average" maize yields remained relatively constant over the last few decades? Even though A) "potential" yield has increased, B) today's hybrids are more resilient than ever, and C) the agronomy-systems and technology we are using has also improved tremendously. And why is it that New Zealand's national average wheat and barley yields have been increasing at a steady rate over the last 2 decades (wheat at 180 kg/ha/yr and barley at 80 kg/ha/yr)<sup>2</sup>, but our national-average maize yields haven't followed suit?

According to the long-term data (Figure 2)<sup>3</sup> national-average maize grain yields have been rising steadily since the late 1960s, at a rate of around 100 kg/ha/yr. But this trend seems to have leveled off over the last decade or so (Figure 3)<sup>4</sup>. In fact, many long term maize-growers tell the same story, that maize yields today are no better now than they were 10 or 15 years ago. A recent article in the NZ Grasslands journal<sup>5</sup> presented grain and silage yield data from seed company strip trials from the mid 1990s to 2015 that suggested yields were still increasing over this period. However, this is at odds with the industry data<sup>3,4</sup> and may be due to the fact that many growers undertaking grain strip trials place the trials on their best paddocks. Similarly, many of the silage trials are hand harvested, and by default, the worst parts of any plots or trials tend to be avoided.

So what's going on? Fertiliser technology and application strategies are better than they've ever been, and the range, specificity and efficacy of chemistry for controlling pests and diseases has also improved dramatically over the last 20 years. Perhaps our understanding of how to apply this technology is not being taken up as well as it could have. Weed challenges now are just as strong as they were 10 years ago with several noxious weeds now becoming endemic in some areas, so perhaps these are cancelling out some of the advances in chemistry. Have increases in specificity resulted in an over-all decrease in efficacy? Are we getting the best bang for our buck in terms of fertilisers? Should we be using fungicides to help control diseases and maintain plant health during the latter part of the season? The truth is there will be as many answers to these questions as there are those answering them. So let's look at this another way.

To plan for the future, it helps to have a good understanding of what has happened in the past. It also helps to understand how things are done elsewhere and why. This is why it's a great opportunity for young people to get out and explore the world at an early age.

Yes, we've come a long way in the last 20 years, with auto-steer tractors; drones to scout crops; harvesters collecting



data on yield variability across the paddock; variable rate planters and irrigators do their bit...and the data trail goes on. Again, why haven't our maize yields been keeping up with all the advances in other technologies?

Carrfields took on the Pacific Seeds brand to introduce a bunch of fresh ideas and perspectives that will run counter to some of those ingrained over the last decade or so. Some of these ideas may be a bit challenging, so the challenge is for you to assess these ideas on their own merits, the information provided, the rationale and principles behind them, and how they may (or may not) apply to your situation. Some of the ideas will be revolutionary in the truest sense of the word whereas others will be more novel.

The question is, are you ready to challenge your thinking?

Pacific Seeds maize from Carrfields – the thinking man's maize.

At Carrfields our goal is to help you make the right decisions to achieve maximum results. If that includes growing maize, that's great. If not, we have a variety of options ranging from chicory, brassicas, grasses, legumes – pretty much anything you want, we can get. So when it comes to helping you make the right decision, we're not going to try to convince you to grow something that's not right for you. We realise that our business will grow through loyalty which will grow from us supporting you to make the right decisions and by backing that up with good old fashion integrity, honesty and friendship. Essentially, we stand behind what we do. Our reps are rewarded based on the strength of their relationships and getting the job done right. When we build and maintain strong-positive relationships and get it right 99% of the time, we all win.

Quite simple really. In fact, you could say it's quite refreshing!



<sup>2</sup> Millner JP, Roskruege NR 2013. The New Zealand arable industry. In Dymond JR ed. Ecosystem services in New Zealand – conditions and trends. Manaaki - Whenua Press, Lincoln, New Zealand.

<sup>3</sup> A. K. Hardacre, K. I. Sinclair and M. P. van Tilberg, 1991. Commercial Maize Production in NZ, Proceedings Agronomy Society of N.Z. (21).

<sup>4</sup> Millner JP, Roskruege NR, 2013. The New Zealand arable industry. In

Dymond JR ed. Ecosystem services in New Zealand – conditions and trends. Manaaki Whenua Press, Lincoln, New Zealand.

<sup>5</sup> N.J. Morris, T.D. Hurley and R.J. Densley, 2016. Journal of New Zealand Grasslands (78): 157-162

<sup>6</sup> Millner JP, Roskruege NR 2013. The New Zealand arable industry. In Dymond JR ed. Ecosystem services in New Zealand – conditions and trends. Manaaki Whenua Press, Lincoln, New Zealand.



# Carrfields Comprehensive Crop Care

Despite being relatively simple to grow, growers of C4 plants like maize and sorghum deserve a C4 support package. Carrfields Comprehensive Crop Care package is a new initiative geared towards providing growers with a best-practice agronomic-advice and crop-monitoring service to ensure growers get a great deal and achieve optimum return on investments.

To qualify for the C4 pack, growers need to order and confirm their orders on or before the **1st of September** using our official order form which can only be obtained through your Carrfields Grain & Seed area manager (details on the back cover) or your seed merchant. Carrfields Grain & Seed area managers are experts in the areas of crop establishment and protection and will work with you and your merchant to tailor a comprehensive crop care package for your crops.

You can't go wrong with a Carrfields C4 plan.

## The C4 plan includes the following benefits:

- ✓ Discounts of all Bayer® seed treatments (*through selected retailers*)
- ✓ Full replant guarantee (*conditions apply*)\*
- ✓ A complementary aerial and ground crop inspection
- ✓ A complementary foliar-tissue nutrient sample (*conditions apply*)\*
- ✓ Harvest scheduling inspection (*on request*)



<sup>7</sup>In order for a claim on your Replant Guarantee to be successful you must ensure all reasonable steps were taken to ensure successful crop establishment. This includes adequately protecting the seed from pests and diseases based on the advice from you Carrfields Grain & Seed representative, as well as ensuring adequate soil preparation and consideration of forecast adverse-weather events immediately prior to planting. If in doubt, contact your Carrfields Grain & Seed representative early as possible for assessment.

<sup>8</sup>The need for a foliage tissue sample will be determined by your Carrfields Grain & Seed representative following a field inspection. Limited to one sample per field. Minimum field size 5 hectares.

\*For full terms and conditions please go to [www.pacificseeds.co.nz](http://www.pacificseeds.co.nz)



# Building brilliance through resilience



Dairy farmers and maize growers are all facing a real and urgent challenge of coping with more variable and extreme climate patterns year on year. From a prolonged major to biblical flooding in a matter of hours in Northland earlier this year, to a predicted El niño that provided ample rainfall in traditionally dry areas last year, our climate certainly appears to be getting more volatile and unpredictable.

So what can farmers and growers do to manage this uncertainty in climate patterns? In the 2015/16 season hundreds of farmers went through a destocking process to manage an expected feed shortage due to a forecast El Niño (drought), which at the time was said to be one of the strongest on record. As the season progressed, and the rain kept falling and the grass kept growing, many of these farmers were rueing the decision to destock whilst trying to deal with a surplus of feed in a market that was well and truly over-supplied. Maize growers fared somewhat better despite poor prices, as they watched their crops make the most of the regular rain.

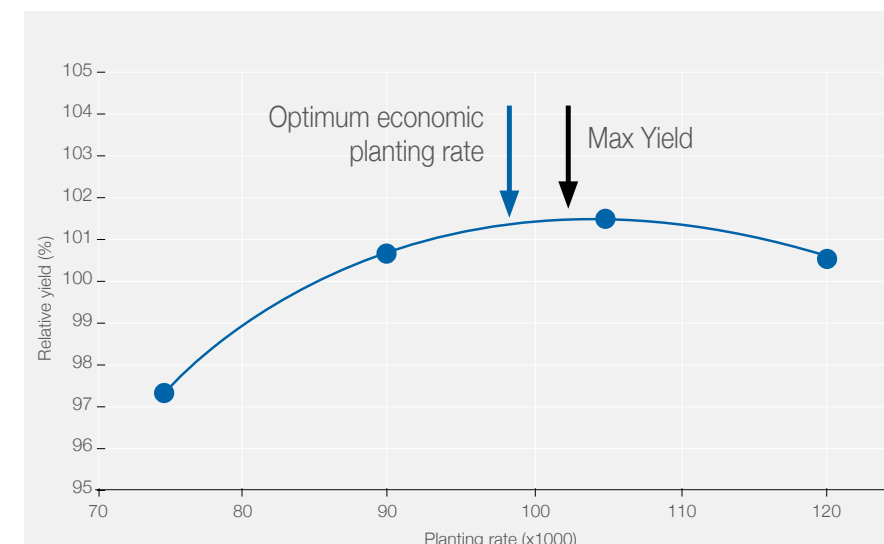
But what if the rain didn't fall? How many of those maize growers had lowered their planting rates to account for the predicted dry summer? Undoubtedly, many growers opted to use hybrids with higher drought tolerance ratings, but a system with good drought tolerance requires more than a drought-tolerant hybrid. Australian growers know this better than any. Crops perform better and are more resilient if the individual plants that make up the crop are stronger and healthier, and one of the best ways to achieve this is by managing inter-plant competition.

## Why plant more seed than you need?

Excessive inter-plant competition can lead to drier soils, wetter canopies, stressed plants, more disease, increased lodging (falling-over) etc, which all compromise crop resilience. Our goal is to help farmers and growers build resilient systems to produce brilliant results. We're not in the game to sell you what you don't need. You don't need 110,000 seeds/ha to maximise yields when 98,000 seeds will do the job (Figure 4). In a good year those 90 to 95,000 plants that establish can easily produce 22t/ha, and in a tough (dry/cool/wet) year will still produce the 20t/ha you've budgeted on. Why gamble on the "promise" of higher yields when you risk flopping if the season turns pear shaped? As it increasingly seems to do.

Let's take a look overseas to put this into perspective. In the USA, a large number of maize growers compete in the national maize growing competition. Maize growers enter 5 acre blocks of maize into the competition which is coordinated and run by the National Corn Growers Association. In the irrigated category growers are allowed to use any inputs they wish. For the last two seasons, the highest grain yields entered have been 33 t/ha dry. That's right, 33 t/ha of grain, dry! In terms of silage yield this would equate to 50 t/ha of dry matter. To make the picture more complete, these crops are only 10- to 12-foot-tall (typical of the Waikato) and are almost completely green at the time of grain harvest (around 28% grain moisture).

So what planting rates do they use to achieve these kinds of yields? 118,000 to 135,000 seeds/ha. That's right, planting at 120,000 seeds/ha can produce a 50t/ha silage crop. This planting rate is similar to those advocated by some in the NZ maize industry, for crops that yield a fraction of this. So how is it that the elite maize growers in the USA are achieving yields



**Figure 4.** The typical effects of maize planting rate on relative yield. This is actual data from a high yielding Pacific Seeds planting rate trial in the Waikato region during the 2016/17 season. Data are the averages of 8 hybrids ranging in maturity from 100 to 108 CRM. Maximum yield (black arrow) was achieved a fraction over 100K seeds/ha but optimum economic seeding rate (blue arrow) is around 98K seeds/ha. Note, established plant population density is often 5% to 10% lower than the planting rate.



almost twice those of New Zealand's elite growers, with only fractionally higher planting rates? Through inputs - that's how. Strategic and tailored fertiliser applications, fungicides, growth stimulants, irrigation, and probably a few "snake oils." The point we're trying to get across is that you don't need 110,000 seeds/ha to achieve a modest yield of 20 to 30t/ha. And yes, a good number of growers in the upper North Island are regularly achieving 30t/ha silage yields, and some of these crops are planted at less than 90,000 seeds/ha. We must understand that it is not the number of seeds planted that is limiting our yields at present. More seeds do not necessarily equal more yield. Sometimes it does, but just as often it doesn't, and in some situations it reduces yield. To move our production forward NZ maize growers should be focussing on building resilience into their systems by moderating planting rates and identifying the key factors that are limiting the production of their fields. Once a limiting factor is overcome, another has already taken its place. And that is the challenge that all growers face. We're not saying you can grow a 50t/ha crop using the modest inputs us Kiwis use, but we sure are saying that our good soils should be able to reliably grow 25 to 30t/ha, and to achieve this you don't need to plant at high rates. At least not with our products.

Here's a few facts to consider: high planting rates usually result in poor tip fill, weaker stalks and roots, and premature plant death. Maize is a predictable and easy crop to grow well. If grown well, maize shouldn't crash and burn towards the end of the season, but should go through a well-defined and predictable maturity process. Unless your soils are very sandy/light, maize should not all of a sudden turn from being lush-green to near-dead in less than a few weeks unless frosted, flooded or infected with some disease that it is highly susceptible to. Neither should plants start to randomly

or progressively die-off whilst neighbouring plants remain perfectly healthy. These are all symptoms of a stressed crop. The most common stressor of maize crops in NZ under direct control of growers is excessive competition.

For every trial that we have conducted showing that plant-populations over 100K seeds/ha provide higher-yields there is a trial that shows the opposite. What about the negative effects on plant agronomics such as lodging (which can't be accurately assessed in small plot or strip trials due to neighbouring plot effects), plant health, or feed quality? How often are these factors presented or discussed? Also, just because an effect can't be measured doesn't mean there isn't one. It is just as plausible that the sampling protocol or testing equipment used wasn't accurate, precise or sensitive enough. So instead, sometimes we need to take indirect measurements and use logic to draw conclusions. For example, higher plant populations reduce stalk diameter (fact) and increase ear height (fact) which by inference predisposes crops to lodging.

The take away message is for you to start thinking critically for yourself.

Farming sustainably is a simple philosophy with many complexities. If farmers can make the decision to destock in a predicted drought year and then be blind-sided by a seemingly bullet-proof climate El niño (2015/2016) forecast, then it has to make you wonder. What's better...short term profits or long-term resilience?

## Effects of planting rates

on crop solar, water and nutrient utilisation and agronomic characteristics.

Characteristic	Planting rate		
	Low	Medium	High
Solar utilisation	Sub optimal	Optimal /resilient	Excessive/fragile
Moisture utilisation	Sub optimal	Optimal /resilient	Excessive/fragile
Nutrient utilisation	Sub optimal	Optimal /resilient	Excessive/fragile
Weed control	Sub optimal	Adequate	Optimal
Standability	Optimal	Adequate/resilient	Sub optimal/fragile
Yield	Sub optimal	Optimal /resilient	Optimal /fragile



# A great team of talented people.

Carrfields is rolling out a new initiative to bring a bit of fun to the serious business of growing maize. Join us in our quest to build the strongest team of maize enthusiasts in the country. There is no doubt that Carrfields and Pacific Seeds have the talent with some of the best maize hybrids in the world, as well as unparalleled energy, drive, attitude and the commitment to get the job done. We want the best growers, the smallest growers, young and experienced growers – to build depth into our team. It doesn't matter who you are, once you join the Black Cobs and see "the light" your crops will improve as will your understanding of maize. You never know what the future may bring.

Starting this 2017/18 season, all growers who grow more than 20 hectares or 50% of their maize (whichever is larger)

will become a season member of the Black Cobs. In doing so you will receive a complementary rugby polo with the Black Cobs emblem on the front, and your name and a number of your choice on the back. Wear it with pride!

In the years to come, with continued support, we expect that long term Black Cobs will be eligible for special offers, trips and support packages. Spot prizes will be on offer for those seen wearing their Black Cobs jersey during industry events etc. Let's build the team and have some fun doing it.





# Nitrogen application strategies

The timing for nitrogen application in maize crops is often thought to be critical. Get it on too early and the common perception is that much of it will be at risk of leaching.

However, it is unlikely that nitrogen will be leached beyond the root zone of a maize crop within the season of application.



Photo courtesy of Thian planting and drilling (Thian.co.nz)

In a study conducted by Crop and Food Research, using long term weather data, the AmaizeN calculator and another more detailed soil water/N uptake model, of the four main maize growing areas in New Zealand only the Eastern Bay of Plenty had any significant risk of in-season N leaching over the previous 30-year period (*Reid et al. 2006 FAR project m4-o5*). In all other major maize growing areas of New Zealand, there was little or no risk of N leaching beyond the root zone of maize crops. That's not to say that leaching wouldn't occur in maize crops grown on the West Coast for example, where they receive over 1000 mm of rain every other growing season, and where they regularly apply N in 4 or 5 doses each season.

That's also not to say that N can't be lost in other ways, through the effects of denitrification (gaseous losses) for example. Research from the USA suggests that denitrification losses of up to 5% per day can occur in soils that are saturated. The warmer the soil, the faster the rate.

What we are suggesting is that holding off applying N until just before canopy closure, when more damage can occur (through leaf scorching from aerial applications or tyre damage for side dressed or spun-on applications), may be counterproductive and will likely be costing yield compared to if it was applied earlier.

If the top-soil is dry and the bulk of the N is present in the drier upper layers then plants will become N deficient.

Another study undertaken by Crop and food Research, again, commissioned by FAR (*S. Shaw & J. Reid, 2007. Deep nitrogen uptake by maize. Crop and Food Research report 1914; 31pp*), showed that in dry conditions (maize) crops preferentially take up water (and therefore N) from the different parts of the soil profile in a systematic and logical way, and if the soil zone is dry where most of the N is then plants will become deficient in N. If this deficiency occurs early enough or severely enough it stands to reason that yield will be affected.

So what is this systematic preference for water and N uptake from the soil profile?

Because root length density is usually highest in the top-soil, crops use water and nutrients from the upper soil layers first. The study showed that if the top-soil is dry and the bulk of the N is present in the drier upper layers then plants will become N deficient. If the top soil dries out but sufficient N is present in the middle soil layers, then the crop is unlikely to experience any N deficiency. If the full soil profile is moist but most of the N is present in the lower part of the soil profile where there are few roots, the crop will also likely begin showing signs of N deficiency. This makes perfect sense.

On this logic, delaying N application until after the V6 stage



A Te Puke maize crop at the ideal time for side-dressing.

when the upper profile is likely to be relatively dry and the chance of rain significantly less than it was two weeks earlier, only increases the risk of your crop experiencing some degree of N deficiency.

It makes good sense, unless you're in the eastern BOP or other high rainfall areas (e.g. Taranaki) to get side-dress N applications on early, at the V3 to V4 stage, when the crop will experience less damage (via scorching and/or tyres), and increase the chance for that N to diffuse down into the middle profile, to give the crop the best opportunity to make use of that N.

So why is it that so many growers leave their N applications so late? Again, there will likely be as many answers to this question as there is people answering it. But our suggestion is for growers to work closely with their contractors, inform them regularly on the stages of crop development and soil conditions, and to try and get that N on early, well before the crop enters that critical stem elongation phase, around the time of V6. If you're concerned, consider putting all of your N on up front, either as a base dressing applied just before planting, or as an inter-row application at planting.

Don't want to be caught with your N down, below where it needs to be.

So how much N is enough? The answer to that is "it depends." Fertiliser recommendations should always be based on a recent soil test result, soil type, climate and paddock history. If the paddock has come out of long-term pasture or lucerne (5 or more years) or had several recent effluent applications, it is likely that no base or side-dress N will need to be applied. However it is always recommended



that a starter fertiliser containing some N and P be applied at planting, down beside the seed. Usually around 20 to 30 kg/ha of each nutrient will suffice (i.e. DAP, 12:10:10 etc). In these situations, soil N levels can be re-assessed at V3-V4 growth stage to decide whether additional fertiliser N is required.

But what about paddocks that have had a recent history of cropping, be it maize or other crops? In these situations, it is likely that maize crops will respond to fertiliser N. Again, the amount will depend on the soil test results and the soil type etc, but this time also on the yield potential of the site. Yield potential is important here because there is a narrow optimum economic application rate band and this depends on delivering just the right amount of N to meet the demands of the crop.

The following formula can be used for determining the amount of each particular nutrient to apply:

**Fertiliser required =**  
$$\frac{(\text{Crop requirements} + \text{losses}) - (\text{nutrient available} + \text{released})}{\text{Uptake efficiency \%}}$$

As a general rule maize crops take up around 10 kg N for each tonne of DM, or 20 kg for each 1 tonne of grain yield. Losses (ammonification, denitrification and leaching) could range from 1 to 30 kg N/ha, and uptake efficiency could also vary considerably depending on method of application, environmental conditions and type of product used (e.g. enzymatic inhibitors, coatings etc) but could easily range from <50% to >90%.

So let's put some solid numbers behind this as an example:

Crop requirements = 300 kg N/ha (30 t DM/ha crop)

N losses = 30 kg N/ha

Nutrient available = 100 kg N/ha

Nutrient released = 50

Uptake efficiency = 90%

Fertiliser required =  $((300 + 30) - (100 + 50)) / 0.9 = 200 \text{ kg N/ha}$

Now, to be useful this calculation should be done before any fertiliser base dressings are applied. A common practice is to split the total nitrogen requirements into three applications, one as a base dressing, some (the smallest amount) as a starter fertiliser and the other as a side dressing, bearing in mind that side-dressed N may have a lower uptake efficiency. Another common practice is to skip the base dressing and use the N present in the starter-fertiliser to transition the crop from seed to soil N, and then apply all of the N at side-dressing. Again, keep the possibility of reduced uptake efficiency of side-dressed N in mind. Both of these systems rely on a timely application of the side-dressing application, as well as some degree of soil moisture to dissolve and diffuse the N from the fertiliser into the soil solution. The latter system being more time-critical than the former simply because as time progresses, areas of the paddock where native soil N levels were low often start to experience significant N deficiency symptoms.

A lesser used, but highly effective and lower-risk approach, is

to apply all of this N up front as a base dressing, and monitor the crop for signs of N deficiency during the early stages of growth. In the very rare cases where N deficiency symptoms do start to appear, this is confirmed using a tissue test and a side-dress application is scheduled based on a deep soil mineral N test.

## Always be mindful of local environmental bylaws restricting total N applications and timings.

The benefits of this last (all up front) approach are threefold:

1. The N is applied worked into the soil eliminating most of the risk of ammonification losses which often occur at side-dressing,
2. N is made available throughout the topsoil and early enough to undergo some diffusion (and leaching) to the medium (30cm to 60cm) soil layers where it will be more available later in the season as the top soil dries out,
3. Costs are minimised as there is no need to side-dress, which always results in some degree of otherwise unnecessary crop damage.

Some of the country's most respected maize growers have been using this N application strategy successfully for many years, and some of these in the BOP region. If you think it's worth doing your own trial to see the benefits, Carrfields can help you do this.



Carrfields Grain & Seed area manager Mike Turner with Chris Reymer (Reymer Contracting) Pirongia, Waikato.





Over the last 20 years maize silage has become one of the most important supplementary feeds for dairy cows, and not just in New Zealand. As a result, optimising maize silage utilisation in dairy systems has received a huge amount of attention from the global research fraternity as well as national and international dairy industries and governments.

The three prevailing themes underpinning the benefits of maize silage for dairy systems from these organisations are:

- 1. Starch and fibre quality,
- 2. Harvest maturity,
- 3. Successful ensilation

The great thing about maize silage is that points 1 and 3 are optimised simply by getting point 2 right. So what is the right time to harvest maize silage? Optimal timing for silage harvest is a great topic for debate, but the global research tells us that the quality of maize silage is optimised if the crop is harvested anywhere between 28% to 35% dry matter. Now 28% does seem awfully low but it is a well-researched and common theme globally. In NZ the only point harvesting a crop at 28% DM is to avoid an adverse weather event or because the crop simply needed to come off, for re-planting for example. The reality is, we have a very wide range of maturity groups available to us here in NZ, so growers can simply choose something a little quicker than usual if they are planting significantly later than normal or pushing the boundaries in terms of altitude or latitude.

Clearly, as DM% increases up to around 35% so does yield. Yield is undoubtedly sacrificed by harvesting too early. As a crop approaches 35% DM however total biomass (DM yield) accumulation has slowed down significantly. What this means is that the perceived benefits (e.g. higher yield) of letting the grain go through to black layer, will likely be more than offset by the loss in quality of the silage that will be produced. Again, the science and global dairy industries are all in consensus on this one. All except ours it seems. Here in New Zealand it is not uncommon to see crops almost completely brown with silage choppers in them. Is “yield king” or is your production better off when there is a happy marriage between yield and quality?

Anyone who believes that harvesting a maize crop over 40% DM will produce silage as good as it would if the same crop was harvested at 35% DM is either ill-informed or in-denial. There is no doubt that the weather dictates a lot of what we do on the farm, but perhaps it’s time we started being a little more conservative when it comes to deciding the optimal time to harvest our crops. So instead of aiming for 38% DM like most of us seem to, often getting caught out by the weather, a delayed contractor, or a crop that is under stress (e.g. high planting rates), why not aim for 35% and be prepared to go a little earlier, say 32%, if the weather or the plant health looks like it may take a turn for the worse during the week ahead? Surely your production will be better off.

Keeping track of maturity

Ok, so this all sounds reasonable. But how does one estimate total plant DM% accurately when the rate of plant maturation has so many variables? Here’s a decision-framework or a thought-process to help schedule maize silage harvests:

- Husk colour. One of the key things to pay attention to. If the plant is healthy but the outer few layers of husk-leaves are still green, the crop won’t be ready for at least another week. You can check the milk line, but even if it’s at 50% or more there will still be too much moisture in the plant and DM% would likely still be in the low to mid-twenties. If the bulk of the plant is green but the outer husks have changed to a straw colour, whole plant DM% will be in the low thirties and most crops could be harvested without any problems.
- Leaf health. Keep an eye out for rapid changes in leaf quality. If leaf quality is stable, the change in husk colour is a much better guide. If leaf quality starts to change quickly, or before the husks change colour, you need to start monitoring stalk health/moisture and milk-line.
- Stalk health. This is another good indicator of total plant DM%, particularly useful if leaf quality is deteriorating rapidly. If leaves are dying rapidly the stalks will be next to go. Root rot and/or blight can kill plants literally overnight so if a crop is looking stressed, keep a good eye on it. DM% changes very rapidly once the stalks start to deteriorate.
- Milk-line. This is the definitive guide to harvest maturity in NZ but the rate of change in milk-line depends on the hybrid's grain-fill characteristics and slows as autumn progresses, so it can be deceiving, which is why it’s listed last here. The first three points above can be thought of as the guide to harvest timing (the map) but the milk-line is the key (the compass). Some hybrids have very slow grain-fill once they reach 50% milk-line. If you are unfamiliar with the grain-fill characteristics of your hybrid(s) ask your seed merchant for advice. In general, if the milk-line is sitting at more or less 50% for any longer than a week without changing, you either have a hybrid with very slow grain-fill or environmental conditions (cool temperature, low solar radiation) are slowing down the grain-fill process. In these situations, if leaf quality is excellent and husks are brown you should probably take it off. It'll be somewhere between 30% and 35% DM. You could wait another week or two to see if it will mature a bit more but you’ll get little out of it and lose valuable time.

Remember, there is nothing special about the number 38. Nothing miraculous happens if you’re lucky or good enough to be able to predict, organise and harvest a crop at precisely 38% DM. There are no penalties for being several % under this, but there sure as hell is for being several points over. Aim for 32% to 35% DM and the chances are you’ll hit 38% a lot more frequently than if you aim for 38%. And you might even get it off at 35%, when quality and yield are at their peak.

The ensilation process

Now this is when the miracle really can happen. Well-made silage can last in a well-sealed bunker for years. Harvest too dry or too wet and silage quality will be reduced proportionately. Get it right and the ensilation process will be rapid and complete. Without going into too much detail, [lactic] acid-producing bacteria which occur naturally in the environment, in the absence of oxygen, ferment sugars present in the corn plant (mainly in the kernels and stalks) into lactic acid which preserves the plant material from degradation by moulds and bacteria. If the bunker is well sealed and well compacted so that oxygen is excluded, the silage will remain stable indefinitely, or until the seal’s broken. Insufficient or incomplete compaction leaves too much oxygen in the matrix, which gives unwanted-mould a destructive-advantage from the start, and allows ongoing transfer of oxygen into the stack through the effects of partial pressure. Now this is very important, but a little bit technical, so we’ll try and keep it simple. Oxygen makes up around 21% of the air so its partial-pressure is effectively 21% of 1

atmosphere, or 160 mmHg (3.1 psi). What this means is, as oxygen is removed by moulds etc growing in a silage stack, unless the stack is very tightly sealed (which most aren’t), or very tightly packed (some are, but many aren’t), oxygen will literally flow into the stack like water into a leaky boat. The less compacted and/or the higher the DM% the leakier the boat. The mould acts like a bilge pump where oxygen (clean water) flows in and carbon dioxide (dirty water) spills out through the law of partial pressure. So what “we see” as a large lump of feed covered in plastic and tyres, actually behaves more like a living, breathing organism. Our job when making the stack is to help put the stack to sleep so that its metabolic rate slows right down, so it’s in hibernation. The scientific literature<sup>9</sup> tells us that even the best silage inoculants applied at the correct rates only help the ensilation process in some situations, and they will not make up for suboptimal stack compaction or management. The best course of action to ensure a well preserved stack of maize-silage is to harvest the crop at the right time (aim for 32% to 35% DM) and make sure that it is thoroughly compacted and quickly covered and compressed (e.g. tyres).



Pacific Seeds product manager Scott Shaw inspects a large maize silage bunker before and after ensilation. Ideal harvest timing (32% DM) and thorough compaction ensures grower and dairy farmer James Cawte is always satisfied with the yield and quality of his maize silage.

<sup>9</sup>Silage Science and Technology, 2003. Ed D.R Buxton, R.E Muck and J.H Harrison. ISBN: 0-89118-151-2.

Carrfields crop scouting guide:

# Maize edition

This season Carrfields will be releasing the first in a series of crop scouting guides aimed at providing growers and industry personnel concise and up to date information on the intricacies involved in establishing and growing crops.

This 1st edition covers a wide variety of problems New Zealand maize growers may encounter from seedling emergence, or lack thereof, to cob-drop at harvest. The content is laid out simply, in chronological order with plenty of pictures for visual comparisons/examples:

- VE to V6 (establishment)
- V6 to VT (vegetative)
- VT to R6 (reproductive)
- R6 to grain harvest (dry-down)

Each section contains a large number of field observations ranging from those most commonly seen to some rarely found in the field. It also provides a list of all the likely causal agents or factors, as well as a brief discussion to aid in creating the shortlist and/or identifying the most likely cause.

The guide will be made available online in due course but if you are interested in receiving a hard copy please contact your Carrfields area manager.



# ■ Pacific Seeds maize hybrids

## Traits information

The 2017/18 season for Pacific Seeds is all about consolidating our portfolio and building traction in the market with the 3 new hybrids we launched last season and through organic growth within the rest of the portfolio.

Support will be our primary focus going forward and we intend to continue to demonstrate to the industry that high silage yields can be reliably achieved with much more conservative planting rates, and in doing so, your crops will be more resilient and better able to cope with the vagaries and extremes of the seasons. Why grow a 18 t/ha crop using 110,000 seeds/ha when you can grow a 20t/ha crop using 90,000 seeds/ha on the same farm? We see this time and time again, particularly on tougher country.

### Relative maturity (CRM)

Provocative rating system that ranks all hybrids relative to the length of time (or more precisely accumulated thermal time) it takes to reach key milestones (growth stages) during their lifecycles. Not to be confused with calendar days.

### Leaf diseases

Disease ratings A score of 1 = highly susceptible; 2 to 3 = susceptible; 4 to 5 = moderately susceptible; 6 to 7 = moderately resistant; and 8 to 9 = highly resistant. Note all scores are bench marked against other leading hybrids in the market.

### Husks cover

Scored on the relative length and tightness of the husk leaves extending beyond the tip of the cob. A score of at least 6 is required to adequately protect the grain from pests, disease, moisture and sprouting etc during growth and dry-down.

### Dry-down

The relative rate of grain dry-down once physiological maturity (black layer) is reached.

### Test weight

Bulk density (weight per volume) of the grain standardised to 14% moisture content; with a value of 3 relating to an average test weight of between 66 and 68 kg/hL; 5 between 70 and 72 kg/hL; 7 between 74 and 76 kg/hL; and 9 between 78 and 80 kg/hL.

### Cob rots

Cob rots tend to be more prevalent in wet conditions. These are important for grain growers and buyers due to the risk of mycotoxins that some rots can impart. Timing, temperature and moisture all play a key role in determining what fungi (if any) are likely cause problems. Poor or very tight husk cover, slow grain dry-down and upright cobs all predispose cobs to rot. Hybrids with lower ratings may be at risk developing cob rots in cool wet conditions.

### Blemishes

Caused by insects, fungi, or genetics (e.g. silk splits, poor husk cover etc). Moderate to high ratings for blemishes mean that a crop can be taken through for grain with a high degree of confidence that the grain will be in top condition come harvest, even in challenging/wet conditions.

### TKW

Thousand kernel weight is an indicator of kernel size. Large kernels tend to have high TKW's but smaller, harder kernels can be just heavy. Grain yield can be estimated by counting and multiplying together the kernels around and along a cob and factoring in the TKW and plant population density.

### Early vigour

An indicator of the vigour, hardness and growth rate of the hybrid during the early stages of growth, up to V4.

### Drought tolerance

No maize hybrid is drought resistant. However, there are significant differences between hybrids in their ability to tolerate drought conditions. Hybrids with high drought tolerance ratings should provide growers with the confidence to position them on land that maize has a history of struggling on. For the most reliable results in dry conditions choose a hybrid with a high drought tolerance rating (8 or 9) and plant at a conservative sowing rate (85,000 to 95,000 seeds/ha).

### Adaptability

A measure of the ability of a hybrid to adapt and perform in replicated yield trials across a wide range of environments. Scores between 5 and 6 indicate an acceptable level of variation in performance, and an 8 or 9 indicates exceptionally stable performance relative to other hybrids.

### Soil

Some hybrids simply don't like some soil types. If they are weak on drought tolerance they shouldn't be planted on light soils, unless irrigation can be supplied or regular rainfall during the growing season is normal. Some hybrids don't tend to perform well on raw peat soils and so these hybrids should be avoided in these situations.

### Staygreen

Persistence of the photosynthetic capacity of the plant (greenness) during latter stages of growth.

Hybrids with ratings of 8 and 9 will often reach black layer (physiological maturity) with canopies that are still quite green. Such crops may be harvested at black layer and still be less than 40% dry matter. However, to reduce risk and avoid wasting valuable time monitor the milk line and once it goes beyond 70% it should be harvested with confidence of optimal quality and yield.

Conversely, hybrids with lower staygreen ratings should be monitored much more closely, paying special attention to overall plant health, leaf quality and stalk condition (moisture) as well as the kernel milk line. Once a maize crop has reached 70% milk line around 98% of its total yield has been achieved. Letting a crop go to black layer by choice is risky. Silage in the stack is as good as milk in the vat and you'll get your grass in earlier too before it rains.

### Ear flex

Ear flex is the ability of a hybrid to compensate for low planting rates or planter skips or gaps along the row. Yields of hybrids with low ear-flex ratings tend to drop off quickly below their optimal plant population density. But this does not mean that population should be pushed up excessively. Instead, factor in an extra 5% more seed than your target population to act as a buffer against insects and other factors that can affect establishment.

### Plant and ear height

Most silage growers like a nice tall crop, but height has very little influence on yield. High yielding maize crops (>22t DM/ha) can range anywhere from 2.0m to 3.5m or even taller. A high yielding grain crop much taller than 3.0m is a liability and at risk of falling over. High ear height is a critical factor for grain crops, but not so much for silage crops. In our rating system an ear height above 7 is considered too high for grain. Although hybrids with cob height ratings of 8 or 9 can have quite acceptable cob height in some situations (e.g. lower planting rates, early plantings, exposed locations), they do have a reputation to throw very high cobs in converse situations.

### Kernels around and long

Often used in the field as an indicator of potential yield. An average maize crop (say 20 t DM/ha) may have cobs containing anywhere from 450 to 600 kernels. At the lower end of this spectrum the crop would need to have good plant numbers, good grain-fill and low plant mortality; whereas a crop at the upper end of this spectrum would get away with some stress during grain fill and some premature plant death and still achieve the same modest yield. However, it is easy to achieve high kernel numbers per plant and large kernels at modest planting rates (e.g. 90,000 to 95,000 seeds/ha) and this will reliably get you over the 20t DM/ha threshold which most farmers/growers rely on to make a buck.

### Roots and stalks

An indication of the relative resistance to root and stalk lodging. Most hybrids standability starts to deteriorate as the crops reaches the end of its cycle. Monitor the stalks and/or roots of hybrids with low standability ratings as the crop reaches the end of its cycle. Also keep an eye on the weather forecast if things are looking a little sketchy. If in doubt call your Carrfields Grain & Seed area manager.



# Decision making tools



## Traits at a glance

Note: All hybrid trait ratings are benchmarked using a range of competitor hybrids in the same maturity group. 1 = very poor, short or highly susceptible; 5 = average; 9 = excellent, tall or highly tolerant. See Trait rating notes for more detail.

Variety	End use	Relative maturity (CRM)			Disease resistance			Grain traits						General agronomics												
		NBL	Flowering	Silage (32% DM)	Grain (22% moisture)	NLB	Rust	Eyespot	Husks	Dry-down	Test weight	TKW	Cob rots	Blemishes	Early vigour	Drought tolerance	Adapt-ability	Soils <sup>10</sup>	Ear-flex	Stay green	Plant height	Ear height	Kernels around	Kernels long	Roots	Stalks
PAC 040	Silage		81	80	94	5	7	5	6	3	8	9	8	8	7	7	8	M,H,P	6	9	8	6	14-16	25-30	5	8
PAC 062	Dual		85	85	90	7	7	6	7	5	8	8	8	9	7	7	7	L,M,H	6	7	8	6	14-16	30-35	6	8
PAC 123	Dual		90	91	90	7	7	8	8	8	7	7	7	7	7	7	8	L,M,H,P	7	8	8	5	16-18	35-40	7	7
PAC 249	Dual		95	95	97	6	6	6	7	6	6	8	7	7	7	9	7	L,M,H,P	9	7	7	6	16-18	35-40	5	7
PAC 230	Grain		98	98	96	7	5	7	6	9	6	8	6	6	7	9	9	L,M,H,P	9	6	6	5	16-20	35-40	7	5
PAC 343	Dual		104	104	105	7	6	6	8	7	5	7	8	8	7	8	8	L,M,H,P	9	7	7	7	18-20	35-40	8	7
PAC 432	Dual		106	105	107	8	6	7	8	6	6	8	7	7	6	8	9	L,M,H,P	8	7	8	6	18-20	35-40	6	8
PAC 456	Silage		108	108	108	6	7	7	8	6	6	7	7	7	7	6	7	M,H,P	8	8	9	8	16-18	38-42	7	8
PAC 624	Silage		116	115	118	6	6	7	9	3	5	8	8	6	7	7	6	M,H,P	9	8	8	8	18-20	40-45	7	7

<sup>10</sup> Soils: L = Light; M = Medium; H = Heavy; P = Peat

## Regional adaptation

Maturity	Northland & Auckland			Northern/Central Waikato			BOP, East Coast, Northern Hawke's Bay			Lower North Island			Upper and Central South Island		
	Full	Mid	Short	Full	Mid	Short	Full	Mid	Short	Full	Mid	Short	Full	Mid	Short
CRM range	110+	100 - 110	90 - 100	105+	100 - 110	90 - 100	105+	100 - 110	90 - 100	95 - 105	90 - 95	80 - 90	90 - 95	80 - 90	<80
Days to maturity	140 - 170	130 - 150	120 - 140	140 - 170	130 - 150	120 - 140	140 - 170	130 - 150	120 - 140	150 - 170	140 - 160	130 - 150	160 - 180	150 - 170	140 - 160
Silage Hybrids	PAC 624	PAC 456 PAC 432 PAC 343	PAC 230 PAC 249	PAC 624 PAC 456	PAC 432 PAC 343	PAC 230 PAC 249	PAC 624	PAC 432 PAC 343	PAC 230 PAC 249	PAC 343 PAC 230	PAC 249 PAC 123	PAC 062 PAC 040	PAC 249	PAC 062	PAC 040
Grain Hybrids	PAC 432	PAC 343	PAC 230 PAC 249	PAC 432	PAC 343	PAC 230 PAC 249	PAC 456	PAC 343	PAC 230	PAC 230	PAC 123	PAC 062	PAC 123	-	-

\* Full season hybrids should only be grown in Northern regions such as Tasman and Nelson districts.

## Planting guide

		Calendar Dates															
		September				October				November				December			
		12	17	22	27	2	7	12	17	22	27	1	6	11	16	21	26
Harvest dates	February	6	147	142	137	132	127	122	117	112	107	102					
		11	152	147	142	137	132	127	122	117	112	107	102				
		16	157	152	147	142	137	132	127	122	117	112	107	102			
		21	162	157	152	147	142	137	132	127	122	117	112	107	102		
		26	167	162	157	152	147	142	137	132	127	122	117	112	107	102	
	March	3	172	167	162	157	152	147	142	137	132	127	122	117	112	107	102
		8	177	172	167	162	157	152	147	142	137	132	127	122	117	112	107
		13		177	172	167	162	157	152	147	142	137	132	127	122	117	112
		18			177	172	167	162	157	152	147	142	137	132	127	122	117
		23				177	172	167	162	157	152	147	142	137	132	127	112
	April	28					177	172	167	162	157	152	147	142	137	132	127
		2						177	172	167	162	157	152	147	142	137	127
		7							177	172	167	162	157	152	147	142	112
		12								177	172	167	162	157	152	147	117
		17									177	172	167	162	157	152	122
May	22											177	172	167	162	157	127
	27												177	172	167	162	132
	2													177	172	167	137
	7														177	172	142
	12															177	147

Table 1. Calendar days from planting (top) to harvest (left hand side). For example, if you intend to grow a mid-maturity silage crop (100 to 110 CRM) in the Waikato, from the regional adaption chart above you can expect that the crop will reach maturity somewhere between 130 to 150 days after planting depending on your location (altitude, shelter etc) and the season. Quick/short-season hybrids planted in the warmer regions like Northland and coastal BOP will reach maturity very quickly (<120 days) so yields will usually be significantly lower than if a longer-maturity hybrid was grown. If in doubt, ask your seed merchant or Carrfields Grain & Seed area manager.



# PAC 040

Silage CRM = 80

## A quick silage hybrid for cool and warm climates.

### Key attributes

- Tall plant with good bulk
- Large girthy cobs and broad leaves
- Excellent stalk strength and leaf integrity
- Very good rust resistance and stay green
- Quick with a uniquely long harvest window
- Adaptable across a wide range of environments and soil types
- High grain and silage yields
- European purpose-bred animal nutrition variety

### About the hybrid

PAC 040 is a purpose bred animal nutrition variety that is perfectly adapted to the cooler environments prevalent in Canterbury and higher altitude/inland parts of the central North Island. It is also very adaptable and regularly outperforms all other varieties in the 75 to 85 CRM maturity group in regions as far north as Waikato. Tolerant of windy conditions, PAC 040 maintains healthy leaf area when the leaves of most other hybrids get shredded.

Cobs are very girthy and grain yields are exceptionally high often out yielding hybrids up to 10 CRMs longer. This guarantees silage rich in grain and starch.

Stay green is excellent. This hybrid reaches 32% DM very quickly and then slows down for a uniquely long harvest window. There should be no concerns that your crop may go too far before your contractor can get there. PAC 040 provides peace of mind at the business end of the season.

### Areas of adaptation

**Early season:** South Waikato, central Hawke's Bay, Taranaki, Wanganui, Rangitikei, Manawatu, Horowhenua and Wairarapa.

**Mid season:** Southern Hawke's Bay and Canterbury.

### Soils

Medium, heavy and peat.

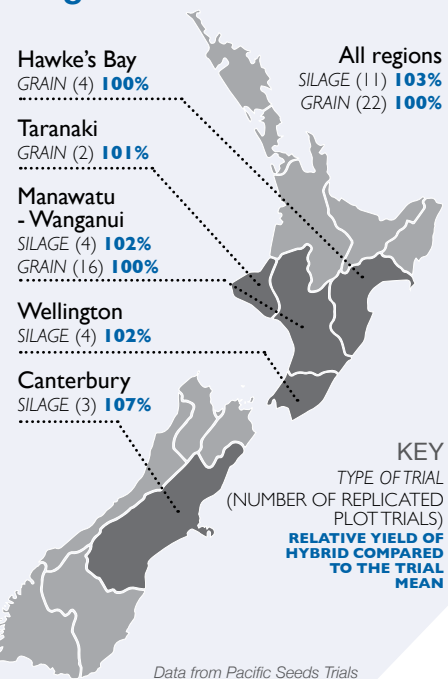
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	95,000	105,000	110,000

### Regional trials



# PAC 062

Silage CRM = 85  
Grain CRM = 90

## A quick dual-purpose hybrid for southern and central regions.

### Key attributes

- Tall attractive plant with strong stalks
- Reliable high yields of grain and silage
- Above average stay green
- Slow grain fill
- Long harvest window
- Outstanding grain quality

### About the hybrid

PAC 062 is a tall dual-purpose hybrid with plenty of leaf area and a large cob packed with some of the best quality grain on the market. Similar to PAC 040 in that it reaches 32% DM very quickly followed by a lengthy maturing period during which time starch deposition occurs. Stay green is very good and combined with the slow grain fill period provides a nice long harvest window.

Grain quality is outstanding, with a deep golden colour, high test weight and very low incidence of kernel rots, blemishes and cracks.

A proven performer in challenging and ideal conditions.

### Areas of adaptation

**Early season:** Central Waikato, East Coast, northern and central Hawke's Bay.

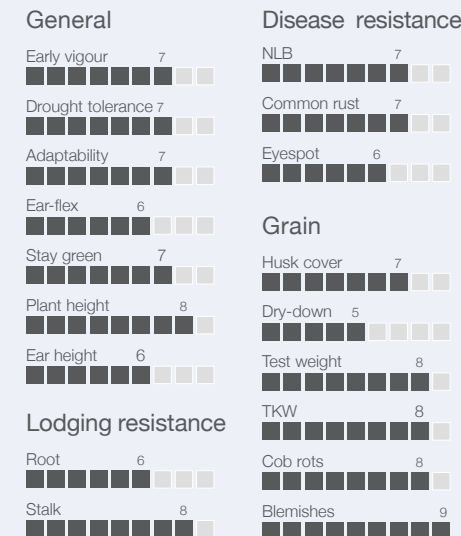
**Early/mid season:** South Waikato, Taranaki, Wanganui, Manawatu, southern Hawke's Bay, Wairarapa and Horowhenua.

**Mid/full season:** Canterbury.

### Soils

Light, medium and heavy.

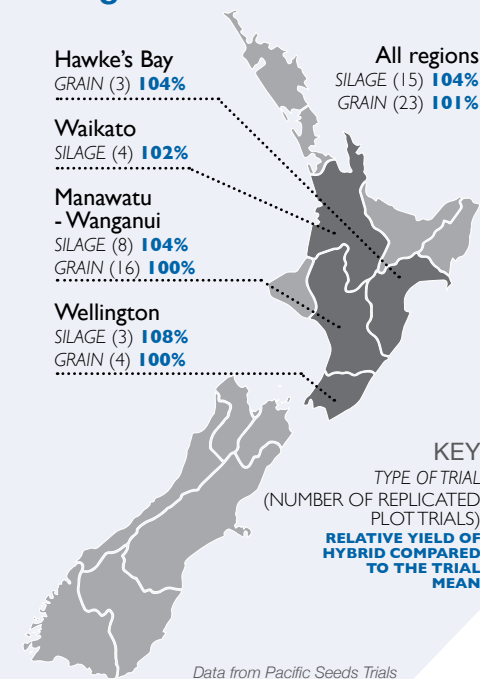
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	95,000	105,000	110,000
Grain	90,000	100,000	105,000

### Regional trials



“PAC 040 is one of the most impressive varieties I have seen grown on the West Coast in 10 years of growing maize, a far superior cob size in comparison to similar maturity length varieties make it a fantastic choice. The relative gold to green ratio ensures the high starch and M.E. levels we desire to maximise performance out of our dairy herd, as well as the long stay green which allows a good harvest window in an area where weather can be variable.”

“It's the first time I have seen PAC varieties grown on the West Coast and from first impressions I am very impressed. PAC 040 and PAC 062 were the top yielding varieties in the trial containing similar maturity length varieties from various companies. The slightly longer maturity of PAC 062 really shows when you see the cob at the end of the season. You know that if these varieties are impressive in tough coastal conditions they will be impressive anywhere.”



# PAC 123

Silage CRM = 91  
Grain CRM = 91

## A medium/quick dual-purpose hybrid for southern and central regions.

### Key attributes

- Tall plant with good bulk
- Uniform cobs with large kernels
- Very high grain yield and quality
- Strong stalks and roots
- Excellent husk cover
- Above average rust and NLB resistance
- Very good stay green
- Good stress and drought tolerance
- Adapted to a wide range of soils
- Does equally well in cool and warm climates

### About the hybrid

With a maturity and agronomic package suitable from south Canterbury to Northland, PAC 123 has to be one of the most widely adapted maize hybrids on the market. Ticking all of the boxes for a quality dual-purpose maize hybrid, this is a dependable, tall, bulky variety with good consistent sized cobs. The large kernels with high test weight deliver reliable and high grain yields. Standability is very good and will resist lodging even in very wet conditions.

Growers will appreciate the high level of resistance to common rust and NLB as well as its excellent stay green and adaptability which enables this variety to be grown successfully in all of the major maize growing regions of NZ.

### Areas of adaptation

**Early season:** Bay of Plenty, northern/central Waikato, East Coast and northern Hawke's Bay.

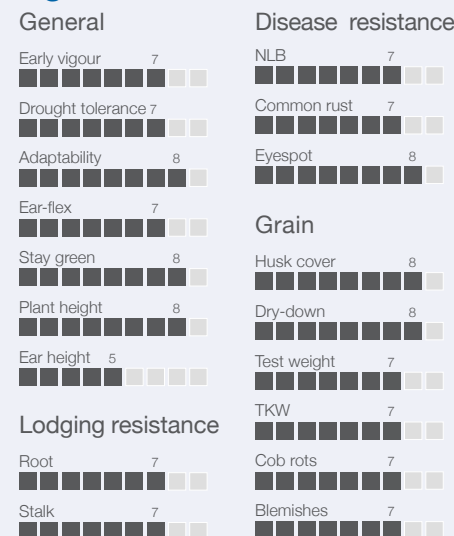
**Early/mid season:** South Waikato, central Hawke's Bay, Taranaki, Wanganui, Rangitikei, Manawatu, Horowhenua and Wairarapa.

**Mid/full season:** Southern Hawke's Bay and Canterbury

### Soils

Medium, heavy and peat.

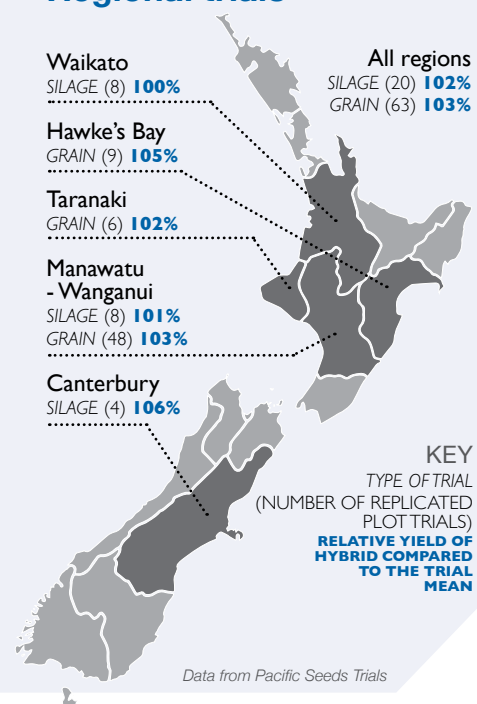
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	95,000	105,000	110,000
Grain	90,000	95,000	100,000

### Regional trials



# PAC 249

Silage CRM = 95  
Grain CRM = 97

## Mid season dual-purpose hybrid for central regions.



### Key attributes

- Reliable high yields across a wide range of soil types and climates
- Proven drought tolerance with AriDapt technology
- Well established market leader in France
- Dual-purpose (silage and grain)
- Excellent feed grain quality accepted by Tegel
- Very good late season plant health and stay green
- Performs well at lower planting rates

### About the hybrid

PAC 249 is a reliable top performing dual-purpose hybrid that delivers optimal yields of silage and grain across a wide range of environments and soil types. It is a medium/tall hybrid with good stay green and plant bulk. Cobs are large and well filled with good sized kernels producing silage rich in grain. Performs particularly well on light soils, recognised as a hardy work horse capable of outperforming hybrids in the 100-104 CRM maturity bracket, adapted to all regions except Bay of Plenty.

Excellent results can be achieved at significantly reduced planting rates.

### Areas of adaptation

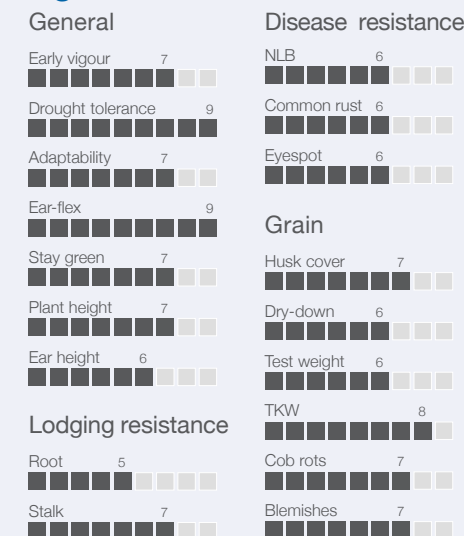
**Early season:** Northland, northern/central Waikato, East Coast and northern Hawke's Bay.

**Mid season:** South Waikato, Taranaki, Rangitikei, Manawatu, central Hawke's Bay, Wairarapa and Horowhenua.

### Soils

Light, medium, heavy and peat.

### Agronomics

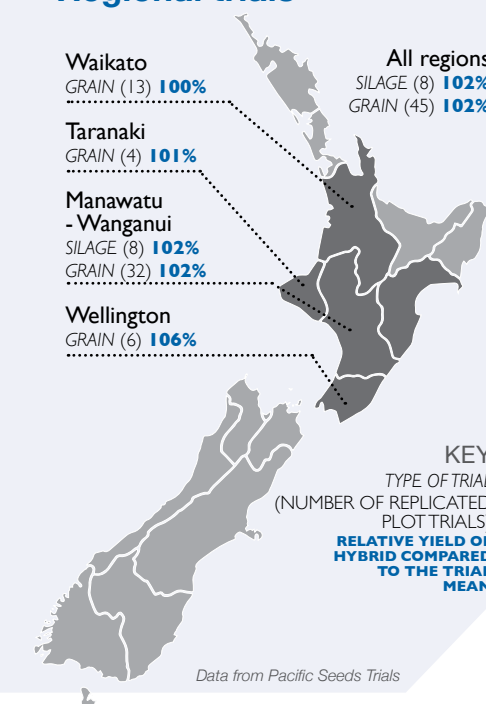


### Established plant population guide

Use	Low	Mid	High
Silage	95,000	100,000	105,000
Grain	90,000	95,000	100,000

For first time growers of this hybrid it is recommended to use the medium planting rate to get a feel for how the hybrid responds to your environment.

### Regional trials



**Richard Baxter**  
Dairy farmer and PAC grower  
Manawatu

“We've been growing Pacific Seeds hybrids for 5 years now and have always been happy with the results. Two seasons ago we planted 30 hectares of PAC 123 and in that very dry year we achieved our best ever yields at just over 20 t DM/ha. Last season was the total opposite, wet from start to finish. Once again PAC 123 performed extremely well proving to us that this is one very resilient hybrid.”

“We planted 7 ha of PAC 249 on some ex market garden soil with low-fertility and poor structure due to over-cultivation. The crop was planted mid-November in marginal conditions, cold and windy at the start followed by a lengthy dry-spell. With the average cob being 16 round and 40+ long with nice plump kernels, I am very impressed with how PAC 249 has performed. There have been several dodgy weather events this season and PAC 249 has stood up to them all.”

Light, medium, heavy and peat.



# PAC 230

Silage CRM = 98  
Grain CRM = 96

## Mid season dual-purpose hybrid adapted to most North Island environments.



### Key attributes

- Leafy medium height plant with decent bulk
- Very high yield potential and consistency
- Large, consistent, girthy ears
- Good early vigour
- Rapid grain dry down
- Very good drought tolerance with AriDapt™ technology
- Competes strongly with the very best hybrids in the 95-105 CRM maturity group
- Provisional new hybrid on Tegel maize hybrid list

### About the hybrid

Over the last four seasons PAC 230 has proven itself to be a consistent top end performer ranking highly in the majority of the silage and grain trials. A very high yield potential and excellent adaptability drives this hybrid's superior performance. Ears are consistently large and well filled. Grain quality and dry down is also outstanding. Grain content in the silage is exceptionally high. Well suited to earlage and alkagrain owing to its rapid dry down characteristics. Ensure timely harvest once grain reaches 20% MC.

### Areas of adaptation

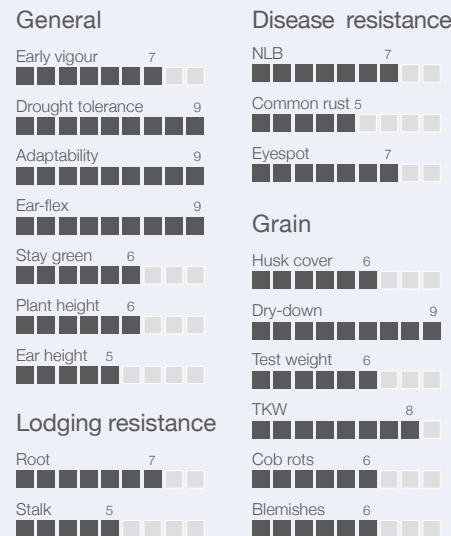
**Early/Mid-season:** Northland, northern/central Waikato, East Coast and Northern Hawke's Bay.

**Full season:** South Waikato, central Hawke's Bay, Taranaki, Wanganui, Rangitikei, Manawatu, Horowhenua and Wairarapa.

### Soils

Light, medium, heavy and peat.

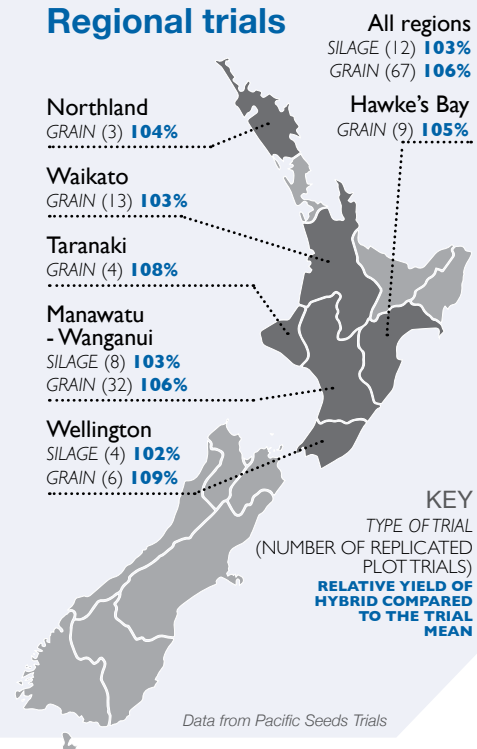
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	95,000	100,000	105,000
Grain	90,000	95,000	100,000

### Regional trials



# PAC 343

Silage CRM = 104  
Grain CRM = 104

## Mid full season dual-purpose hybrid for all North Island regions.

### Key attributes

- Attractive medium/tall plant
- Well balanced canopy with thick stalks
- Large uniform ears typically 18 kernels around
- Reliable high yields of soft dent type grain
- Large kernels and excellent grain quality
- Capable of delivering exceptional silage yields
- Good stay green, drought tolerance and standability
- Finishes strongly owing to its excellent stress tolerance and late season plant health

### About the hybrid

PAC343 has an exceptionally strong agronomic package and has proven itself to be a resilient top end performer over the last four seasons ranking equally well in high and lower yield environments for both silage and grain. Ears are of a good consistent size and tightly packed with starchy light-coloured grain. Drought and general stress tolerance is excellent. In stressed situations, plant size may be reduced but grain yield will be much less affected providing good silage yields with a very high grain content.

A top performer in light and heavy soils and seems to be quite tolerant of wet feet.

This is a reliable hybrid that promises to deliver excellent results for silage and grain growers, whatever the season may bring.

### Areas of adaptation

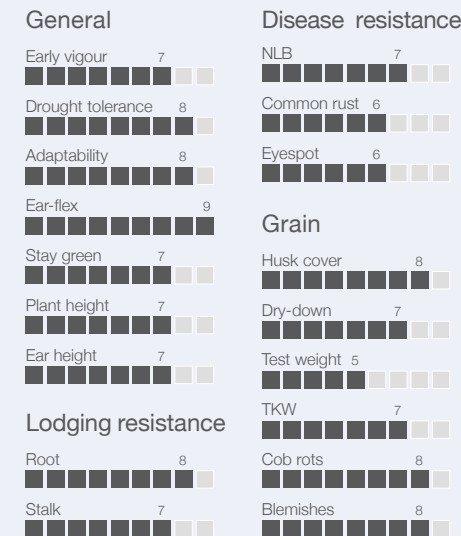
**Mid season:** Northland, BOP, northern/central Waikato, East Coast, northern Hawke's Bay.

**Full season:** South Waikato, central Hawke's Bay, Taranaki, Wanganui, Rangitikei, Manawatu, Wairarapa.

### Soils

Light, medium, heavy and peat.

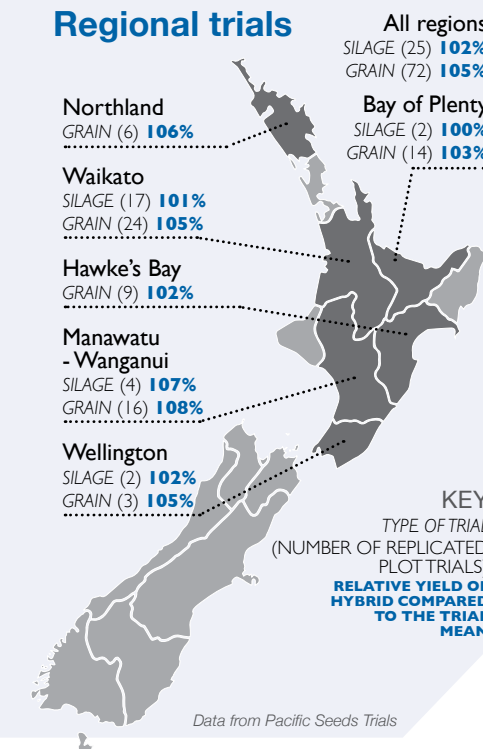
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	95,000	100,000	105,000
Grain	90,000	95,000	100,000

### Regional trials



**Peter Lewis**  
Contractor and PAC grower  
Franklin

“Last season we grew 6 ha of PAC 230 as a bit of a “look-see.” We'd heard good things about it and the FAR trial results backed this up. We planted the crop late-November and pulled the population back to 90K to ensure good cob development. The crop was quite short with the tough start it had and the drought but even the small plants in the compacted areas had cobs that were 16 to 18 kernels around with good length. We'll be growing some more next year that's for sure!”

**Gavin and Mike Litchfield**  
Litchfield Ag services  
Te Puke

“As always Pacific Seeds maize hybrids have been a big part of our hybrid mix last season, not only for us but for our clients as well. Over the last few of seasons we've been growing and recommending PAC 343 and more recently PAC 432. Once again, both of these hybrids have produced yields right up there with the highest yields that we harvested in the district. Grain quality is always very good as is ease of harvesting. These are definitely two of the best grain hybrids on the market.”



# PAC 432

Silage CRM = 105  
Grain CRM = 107

## A medium/quick dual-purpose hybrid for southern and central regions.

### Key attributes

- Tall but well balanced plant type
- Moderately leafy
- Large uniform ears typically 18 kernels around, with large kernels
- Good drought and stress tolerance
- Excellent stalk strength and NLB resistance
- Very good stay green and late season plant health
- Slow starter but strong finisher
- Competes well with the very highest yielding silage and grain hybrids on the market

### About the hybrid

A tall but well balanced plant with large consistent ears set at a low to medium height. Average early vigour provides a slow start but vigour increases during the vegetative period resulting in a very strong and robust plant. Grain type is medium-soft (semi dent) and kernel size is above average. Drought/stress tolerance, stalk strength, stay green and plant integrity are also very good creating a solid platform for both silage and grain growers. Trial results to date put this hybrid reliably among the top performers in this very competitive maturity group.

### Areas of adaptation

**Mid/full season:** Northland, BOP, northern/central Waikato and East Coast.

**Full season:** Central Hawke's Bay and coastal Taranaki.

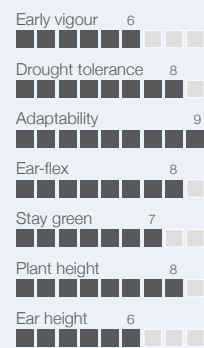
### Soils

Light, medium, heavy and peat.

### Agronomics

Max 9

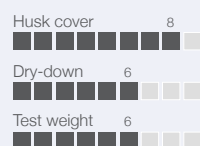
#### General



#### Disease resistance



#### Grain



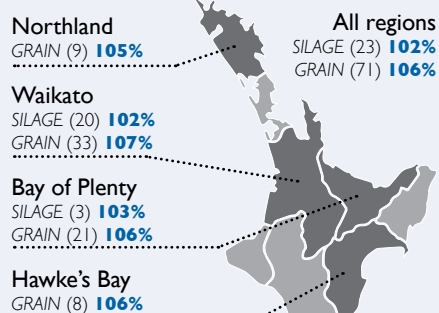
#### Lodging resistance



### Established plant population guide

Use	Low	Mid	High
Silage	90,000	100,000	105,000
Grain	85,000	95,000	100,000

### Regional trials



KEY  
TYPE OF TRIAL  
(NUMBER OF REPLICATED  
PLOT TRIALS)  
RELATIVE YIELD OF  
HYBRID COMPARED  
TO THE TRIAL  
MEAN

Data from Pacific Seeds Trials

# PAC 456

Silage CRM = 108

## Full season dual purpose hybrid for northern and central regions.

### Key attributes

- Very tall, large bulky plant
- Leafy with thick stalks
- Large ears typically 18 kernels around, with large kernels
- Awesome ear flex, yields very well at lower populations
- Silage has very high grain content
- Very good stay green and a lengthy grain fill period provides a long harvest window
- Good rust resistance and late season plant health
- Good stalk and root strength

### About the hybrid

PAC 456 is a tall, high yielding dual purpose hybrid with a large bulky canopy and long harvest window. Purpose bred in Europe for DM and energy production this hybrid is a serious DM and grain production machine.

PAC 456 can have a high ear placement particularly if planted at high rates means that planting rates should not go above 90,000 seeds/ha for grain crops. However, good grain quality, yields and dry down, as well as standability and plant integrity during grain dry down make this hybrid a top performer for both grain and silage. Husk cover is very good, and ears are large and packed with large deep kernels ensuring silage of high grain content and energy.

### Areas of adaptation

**Mid/full season:** Northland, BOP, northern Waikato, East Coast, northern Hawke's Bay.

**Full season:** Central Waikato, central Hawke's Bay.

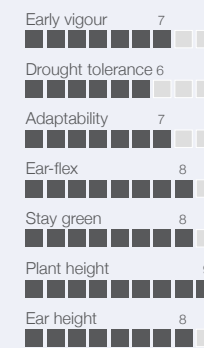
### Soils

Medium, heavy and peat.

### Agronomics

Max 9

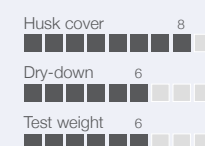
#### General



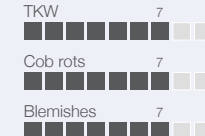
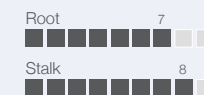
#### Disease resistance



#### Grain



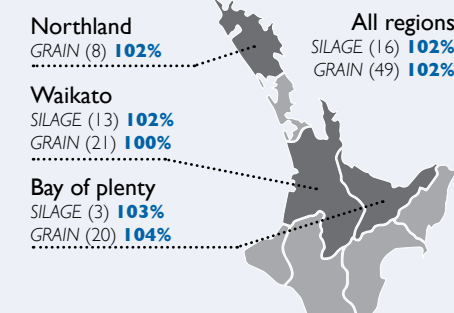
#### Lodging resistance



### Established plant population guide

Use	Low	Mid	High
Silage	85,000	95,000	100,000

### Regional trials



KEY  
TYPE OF TRIAL  
(NUMBER OF REPLICATED  
PLOT TRIALS)  
RELATIVE YIELD OF  
HYBRID COMPARED  
TO THE TRIAL  
MEAN

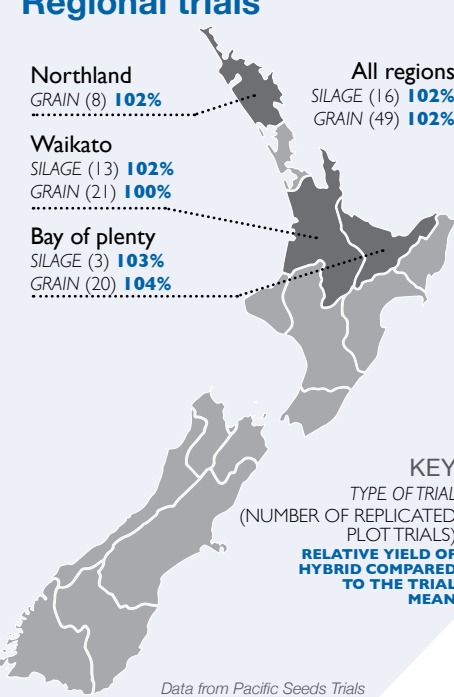
Data from Pacific Seeds Trials

**Glenn and Kim Bartz**  
Dairy farmers and PAC growers  
Waipa

“We milk 700 cows on a Rolling Farm in the hills of Honokiki – West Waikato. We grew 9ha of PAC 432 and were really impressed with its performance. Despite a cold, wet start followed by a summer that never really happened, PAC 432 piled on the dry matter and looked healthy and strong all season. The grain content provided an ME of 11.3 in the stack. We were also impressed at how long the crop held on while other hybrids in the area were losing plant health almost overnight.”

**Greg Muller**  
G&H Agri  
Waipa

“We grow around 40ha of maize to sell to local farmers. We started out with a small area of PAC 456 several years ago but every year we have increased its area due its excellent yield stability, DM yield and quality. PAC 456 has excellent stay green and a very long harvest window which was a great benefit to us this season and my customers were rapt with the quality.”





# PAC 624

Silage CRM = 115

## Ultra-full season silage hybrid for Northland, Waikato and the Bay of Plenty.

### Key attributes

- Impressive stature
- Leafy with very thick stalks
- Huge cobs typically 20 kernels around with large kernels
- High yields of soft starchy grain
- Good standability
- Excellent stay green with a long grain fill period
- Long harvest window
- High yields at low planting rates

### About the hybrid

Firmly positioned as a market leader in this ultra-long maturity group, PAC 624 has earned a reputation for being able to produce true (weighed) 30 tonne crops from Northland to eastern Bay of Plenty. This is a giant of a plant that will produce very high yields at low planting rates.

PAC 624 is a purpose-bred silage hybrid for early plant situations in the warmer northern regions. Large girthy cobs packed with soft, starchy grain combined with good digestibility ensures silage of excellent quality is produced. This hybrid has good standability, however the sheer size of the plants means that it can become overcrowded at high planting rates increasing cob height and reducing standability and cob tip fill. For this reason we recommend lower than usual planting rates.

A lengthy grain fill period and excellent stay green provide a long harvest window giving growers maximum opportunity to harvest at ideal maturity levels for optimal silage quality. This hybrid performs best in higher yielding situations and only in warm environments when planted before late October. Consider PAC 456 if planting is to be in November.

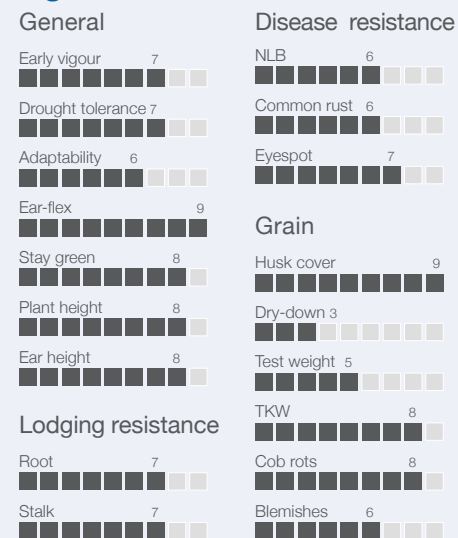
### Areas of adaptation

**Full season:** Northland, northern Waikato and coastal Bay of Plenty.

### Soils

Medium, heavy and peat.

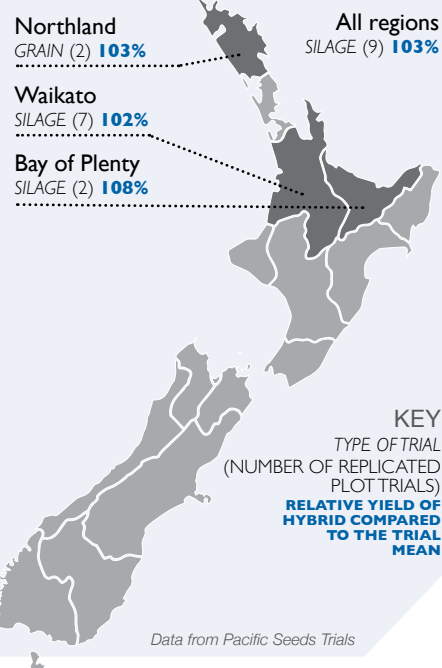
### Agronomics



### Established plant population guide

Use	Low	Mid	High
Silage	80,000	85,000	90,000

### Regional trials



**George Kung**  
Kung Ag Ltd  
Hauraki

“Being a dairy farmer as well as a maize contractor, I use and recommend products that fit well into both systems. With its excellent stay-green and long harvest window, PAC 624 allows us to toggle between our own and our client's crops. I know that we are able to push our 624 just that little bit longer if required and harvest our clients blocks before our own. The silage that we get from this hybrid is more gold than green, which is reflected in our feed quality tests, cow condition and milk production.”

# Seed treatment



**Poncho®**  
*The essential seed treatment for maize*

Since its introduction Poncho has established itself as the seed treatment of choice to protect maize against attack from the key insect pests – Argentine Stem Weevil (ASW), black beetle and greasy cutworm.

ASW is a major pest of maize and sweetcorn. If not controlled it can be responsible for serious losses in plant stand and therefore profitability. By controlling ASW so effectively Poncho allows the fallow period prior to sowing maize, which used to be quite long, to be significantly reduced.

Request Poncho to be applied to your seed and it gets to work as soon as the seed is planted. This leads to better crop emergence and helps to maximise production.

Poncho is released from the seed immediately after sowing, forming a protective halo around the seed. As the seed germinates and grows Poncho is taken up from the protective halo and then it is transported in the sap flow throughout the plant to provide root to tip protection.



**Poncho VOTiVO™**  
*A revolution in maize seed treatment*

A very limited quantity of Poncho VOTiVO treated seed is being offered in New Zealand this season. Poncho VOTiVO is a revolutionary new maize seed treatment that adds the benefits of Bacillus firmus to the power of Poncho.

VOTiVO is a unique strain of the bacteria, Bacillus firmus. Once the seed is planted the bacteria grows and coats the developing roots with a protective living barrier. This barrier repels attack by nematodes, microscopic wormlike organisms that can be expected to be present in virtually every paddock. Nematodes feed on the roots of maize impacting plant growth by reducing nutrient and water uptake.

Containing a full dose of clothianidin, Poncho VOTiVO brings you all the benefits of Poncho, maintaining control of ASW, black beetle and greasy cutworm but with the added benefit of nematode protection.

In addition to guarding against nematode attack Poncho VOTiVO has been shown to bring plant health benefits such as enhanced rooting.



**Gaucho®**  
*The proven, highly effective seed treatment*

Gaucho is a proven, highly effective seed treatment insecticide providing broad spectrum control of above and below ground pests, in a range of important New Zealand crops. Once treated seed is planted, the active ingredient in Gaucho is released and forms a protective halo around the seed. As the plant grows, systemic action transports Gaucho throughout the developing stem and leaves, ensuring long lasting insect control, and maximising crop yield potential and profitability.



**Mesuro!®**  
*Deter birds from seeking and eating planted seed*

Mesuro!® is a moderately affective seed treatment used to deter birds from seeking and eating planted seeds. Use in fields where there is a history of seed/crop damage caused by birds during the establishment phase. Particularly useful around headlands and in crops adjacent to dense vegetation, streams, gullies or drains. Can be used on it's own or co-applied with Gaucho® or Poncho®. When applied with either of these Bayer® insecticides Mesuro!® is referred to as either Gaucho®-Plus or Poncho®-Plus. Ask for them by name.



Carrfields Grain & Seed is proud to be a member of the Bayer SeedGrowth group. Membership gives us access to Bayer's global expertise in seed treatment technology and quality assurance.

We also receive Bayer's world class seed treatments and Peridiam film coatings. When you invest in treated seed bearing the Bayer SeedGrowth logo, you can be confident that you're buying the best in seed, treatment and application.

Poncho®, Gaucho® and Mesuro!® are registered trademarks of the Bayer Group. VOTiVO™ and Bayer SeedGrowth™ are trademarks of the Bayer Group.



# Summer forages



Pacific Seeds is a market leader in summer forages. In environments or situations where you need a summer feed option we have a range of alternatives to fill any shortfalls you may have. Tried and tested across New Zealand’s variable climatic conditions, they’re exactly what you can rely on for flexibility and stock performance.

## Forages at a glance

Forage	Suitability of use (5 = high suitability, 1 = low suitability)								
	Sheep	Milk production	Finishing cattle	Round bale silage	Pit silage	Hay	Carrying capacity	Easy to manage	Quick spring feed
Sprint	5	4	4	5	2	5	5	3	5
BMR Rocket	4	5	5	5	4	5	4	4	3
Mt Cook Chicory	5	5	5	-	-	-	5	5	4

Forage	Plant type and planting information				Feed quality and management		
	Genetic type	Time to flower	Soil temp for sowing	Planting rate (kg/ha)	Ideal grazing height	Protein %	Digestibility
Sprint	sudan x sudan	quick	above 16°C	20-30	1m	12-18	56-62
BMR Rocket	BMR sorghum x sudan	late	above 16°C	20-35	1m	12-24	59-65
Mt Cook Chicory	-	late	12°C	8-10	30cm	10.5-11.6	76-83

Planting and fertiliser rates will be dependent on both soil and climatic conditions.

Under certain conditions forage crops, including sorghums, can contain compounds which may have an adverse effect on stock health and performance. The two most common toxic compounds are prussic acid and nitrate. Under normal conditions these do not represent a danger to stock and simple precautions can be taken to avoid the risk of poisoning. Please refer to [www.pacificseeds.co.nz](http://www.pacificseeds.co.nz) for further information. If in doubt, always check with your animal health adviser before grazing.



# PAC BMR ROCKET

Sorghum x Sudan forage hybrid  
Mid-flowering

Launching on-platform production to new heights. A mid-flowering, highly versatile and nutritious summer feed for warm regions.

## About BMR Rocket

Owing to its high water use efficiency and rapid regrowth capacity and BMR technology, BMR Rocket should, if established properly, make better use of, and produce more high-quality feed in warm, limited-summer-rain environments than any other type of forage.

Brown mid-rib technology ensures soft highly digestible stems and leaves, and high stem sugar-concentrations especially as stems thicken, provide a tasty reason for cows to continue grazing before moving off.

Analysis of BMR Rocket digestibility shows a 3% to 6% advantage over non-BMR sorghum x sudan hybrids driving higher DM intake and production responses. The later the grazing or cutting the bigger the advantage over non-BMR hybrids taken at the same growth stage. In effect, BMR technology provides a more versatile and flexible option compared to non-BMR sorghum.

## Crop use

- ✓ Dairy
- ✓ Beef
- ✓ Sheep
- ✓ Hay
- ✓ Balage
- ✓ Silage

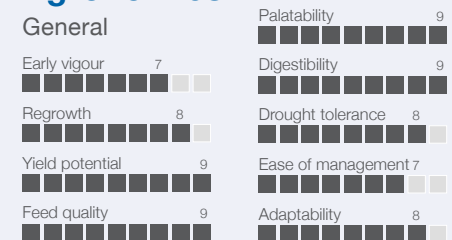
## Key attributes

- Fast out of the ground with good vigour
- Quick regrowth following grazing
- Highly palatable (BMR technology)
- Medium time-to-flowering
- Perfect for grazing, silage and hay; for dairy, beef and sheep
- Graze/cut between 80cm and 100cm
- Do not graze if crop is stressed, or within 10 days after stress recovery
- Refer to Carrfields forage-sorghum agronomy guide for management of stressed crops

## Optimum growing regions

Northland, Waikato, BOP, East Coast, Hawke's Bay, Taranaki, Manawatu/Wanganui, Wairarapa

## Agronomics



## Sowing Rates

Low (fertility/dry)	Mid (fertility/dry)	High (fertility/humid)
15-20 kg/ha	20-25 kg/ha	25-30 kg/ha

**Mel Singh**  
Dairy farmer  
Hauraki

“As a dairy farmer, maintaining a strong feed supply through the summer months is key to achieving our production targets. BMR Rocket has shown itself to be a very reliable source of high quality feed for us.

The ability of BMR Rocket to produce high quality forage means that our cows have a stable feed source through the dry summers. It maintains its palatability even when it has gone passed the ideal grazing height, giving us great flexibility with our grazing programme. Even when it was as high as the tractor the cows cleaned up every last bit.

BMR Rocket has exceeded our expectations, making us as happy and productive as our cows.”

# PAC SPRINT

Sorghum x Sudan forage hybrid  
Early-flowering

Sprint offers growers a versatile and extremely rapid growing summer feed option. Performs in the tough, excels in the tougher.

## About Sprint

Produces high yields of quality forage that can be available for grazing or cutting under ideal conditions in less than 50 days. Combined with thin stems, Sprint is extremely palatable.

Suitable for all stocks types, hay and baleage.

Ideally suited to a shorter growing season, or in situations where it can be well managed, i.e. cutting or intensive grazing.

Yield of the second cut/graze will be enhanced through the tillering mechanism and can be available in approximately 30 days after the first cut/graze.

## Key attributes

- Quick to medium flowering
- Rapid growth and regrowth
- Fine stems with prolific tillering
- Suitable for hay and baleage
- Sheep, cattle and dairy
- Tolerant of heavy grazing
- Watch prussic acid levels if stressed
- Suitable for direct drilling
- Greater flexibility than summer brassicas

## Crop use

- ✓ Dairy
- ✓ Beef
- ✓ Sheep
- ✓ Hay
- ✓ Balage
- ✗ Silage

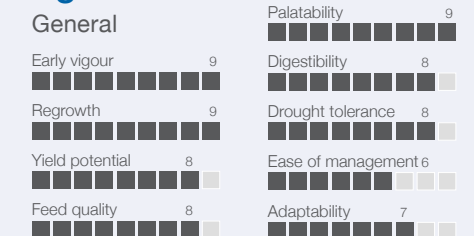
## Best management practice

Soil	Temperature at planting 16°C minimum
Fertility	Conduct Soil Test. Do not exceed 110 kg/ha. Nitrogen fertility to avoid nitrate accumulation. Ensure Potassium is adequate in acidic soils.
Cutting/ grazing height	Do not graze/cut below 15cm on first application. First grazing at 60cm to 80cm to increase biomass productivity.
Planting Depth	Shallow into moisture. Best return from quick conventional forage

## Optimum growing regions

Northland, Waikato, BOP, East Coast, Hawke's Bay, Taranaki, Manawatu/Wanganui, Wairarapa

## Agronomics



## Sowing Rates

Low Dryland	Mid Irrigated	High Marginal dryland
5-10 kg/ha	15-20 kg/ha	3-5 kg/ha

“We direct drilled Sprint at 30 kg/ha into a failed turnip crop in late December. The early growth and establishment was excellent and with the odd shower of rain passing through to help, Sprint really showed us what it could do. We took the first cut off when it reached fence height, which produced 22 round bales/ha of high quality baleage. After an application of Urea, the second cut was taken 25 days later producing the same amount. The crop was finished off with a grazing before re-grassing the area in early April. Given the challenging environment and late start Sprint showed its qualities as a late season DM machine, and we will be recommending it to our clients again!”

**George Kung**  
Kung Ag Ltd  
Ngatea



# MT COOK CHICORY

Watch your production climb with Mt Cook Chicory.

A true perennial chicory adapted to all parts of New Zealand from Northland to Otago.

## About Mt Cook Chicory

Mt Cook is a high-yielding broadleaf perennial chicory cultivar developed in the USA. Produced and proven right here in New Zealand by Carrfields Grain & Seed it offers growers exceptional summer and autumn production in its first season, with 15-20 day return periods throughout the North Island. It is super quick to resume growth the following spring but like all perennial chicories will require regular grazing combined with follow-up topping to help keep flowering in check in its second year.

Mt Cook also offers excellent sclerotinia resistance and drought tolerance and can be grown as a pure stand or as a mixture with grass and clover.

## Key attributes

- Perennial cultivar
- Large upright leaves
- Rapid regrowth
- Deep taproot
- Drought tolerant
- Resistant to sclerotinia

## Crop use

- ✓ Dairy
- ✓ Beef
- ✓ Sheep
- ✓ Hay
- ✓ Balage
- ✓ Silage

## Establishing the crop

Best suited to moderately- to well-drained soils with medium to good fertility and a pH of 5.5 to 6.5. Apply base dressing fertiliser to correct any nutrient deficiencies and adjust soil pH if needed as per soil test recommendations.

Plant at 0.5cm to 1cm deep into a firm moist seedbed. Do not sow deeper than 1.5cm and only to get to moisture. Seed can be direct drilled into tightly-grazed, and thoroughly desiccated pasture or ex cropping land. Tilled soils should be rolled prior to sowing.

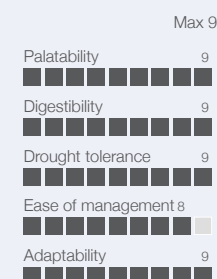
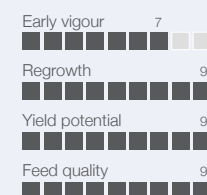
Use slug bait if there is a history or risk of slugs. The presence of large clods or direct drilling into recently desiccated pastures will be most at risk of slug damage, as will areas around fence lines etc. Rolling prior to planting will help.

Plant at 8 to 10 kg/ha as a pure stand or 2 to 3 kg/ha as a mixture. On light or drier soils consider rolling immediately after planting.

If emergence is slow or patchy to start with, consider using a Cambridge roller on an angle across the planter rows. Crops that look very patchy to start with often end up looking perfect in a few short weeks following a roll or some light rain. If in doubt, contact your seed merchant or Carrfields Grain & Seed area manager.

## Agronomics

### General



Max 9

# GREY STRIPE SUNFLOWER SUNBIRD 7

The birdseed specialist medium maturity grey stripe sunflower.

Sunbird 7 produces a large, attractive, grey striped seed is much sought after by the birdseed market.

## High yield potential

Sunbird 7 has a high yield potential which will ensure maximum returns.

## Good stress tolerance

The ability to handle a drier season or a tough finish is ensured with the good stress tolerance of Sunbird 7.

## Ideal medium maturity

Medium maturity of Sunbird 7 means that it can capitalise on the season and produce top yields.

## Very good disease protection

Sunbird 7 has very good tolerance to alternaria and other major diseases of sunflower, which means it is suitable to all recommended planting times in all districts.

## Key attributes

- Attractive bright stripe sought after by the birdseed market
- Proven high yielder
- Very good disease tolerance
- Reliable under stress
- Pendulous heads

## Agronomics



Max 9

## Sowing Rates

Marginal (dryland)	Favourable (dryland)	Irrigation
45,000	65,000	75,000

Established planting populations (plants/ha)

Murlyn Farms  
Waipa

“We direct drilled a total of 15ha of Chicory on our dairy platform, 9ha of this was Mt Cook Chicory.

We got 9 grazings off the Mt Cook Chicory, and only 5 off the other variety.

There was no preference between cultivars from the cows but there was a significant improvement on cow production with the Mt Cook purely because we got 4 extra grazings.”





# Carrfields

## Grain & Seed

**Carrfields  
Grain & Seed,  
the fresh  
new face to  
the company  
formerly  
known as  
Canterbury  
Seed.**

On top of their Pacific Seeds branded products Carrfields Grain & Seed provides a comprehensive range of pasture species including short and long-rotation grasses, clovers, herbs as well as some of this country's best winter and spring small grain cereals.

Our contract seed producers include some of the country's leading growers producing the finest quality seed found anywhere in the world. Complementing this our grain traders are constantly scanning the market for the best deals which we pass on directly to you through our trusted reseller network.

Do yourself a favour and talk to your Carrfields Grain & Seed area manager about our range of licensed, certified and small-seeds. We've got something for everyone, and every one of our products has been tried and tested in the areas we promote them - so we know they'll deliver on our promise.

## Magnum

### Silage/green feed oats



Silage and grazing oats have long been an efficient form of producing fast, high quality feed for livestock. With rapid establishment for wholecrop silage, grazing or baleage, Magnum meets all these needs.

Low disease levels make Magnum oats a cost effective high dry matter feed option.

#### KEY AGRONOMIC POINTS

- Low sow rate, low cost rate per ha.
- Ideal for oat silage.
- Early grazing, ready for green feed, extremely rapid growth.
- Can be sown as a mix with peas or alone.
- Massive dry matter production.
- Very high tillering ability.
- Sowing rate 75-85 kg/ha.
- Very palatable and nutritious.
- Ready for grazing ahead of many oat varieties.
- Ideal as a spring silage option.
- May be used in autumn as a grazing option.

## Rose

### Silage pea



#### KEY AGRONOMIC POINTS

A high yielding variety that can be sown alone or as a companion to barley or oats for wholecrop silage. Rose silage peas are a very stiff stemmed semi-leafless variety. Early to ripen with a very high protein percentage.

#### SOWING RATE

**Wholecrop silage mix** - 120 kg/ha Rose peas, 80 kg/ha barley

#### ON-FARM RESULTS

"We have been using a Rose pea and barley mix for silage both in pit and baleage situations. The resulting crops are giving consistent high yields, the quality is amazing with high ME and very happy end users."

*Johnny Doyle, Carrfields Grain & Seed*

#### ATTRIBUTES

Cultivar:	Rose
Crude Protein:	16.1%
Acid Detergent Fibre:	25.8%DM
Neutral Detergent Fibre:	30.9%DM
Digestibility:	70.6%
Metabolisable Energy:	11.3%
Soluble Sugars:	16.1%DM
End Use:	Silage
Breeder:	Toft, Europe

#### BARLEY ROSE PEA MIX

Combination	Yield (kgDM/ha)	Yield (% of trial mean)
Rose/Barley	16,095	119%
Provider/Barley	14,442	106%
Santana/Barley	11,610	86%

*Independent trial conducted by Pasture First Research, Jan 2013 - Mid Canterbury.*

#### PLANTING WINDOW

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
							Optimal	Optimal	Optimal	Marginal	

## Herbage

### Various



Talk to your Carrfields Grain & Seed area manager to discuss our range of forage options including:

- Tetraploid short rotation ryegrass
- Diploid annual ryegrass
- Long rotation ryegrass
- Turbo Persian Clover
- Plantain



# Cereal seed

With a long history in cereal seed production and marketing dating back to the 1970s Carrfields Grain & Seed supplies the New Zealand market with some of the world's best cereal seed cultivars, covering a full range of winter and spring wheats and barleys.

## Gator

Feed wheat

Feed wheat with real bite



An above average yielding feed wheat with good resistance to stripe rust and fusarium. An outstanding second wheat option and a top performer in dryland situations. Medium height and strong straw. Sowing dates range from late March through to July. Gator has intermediate maturity and is a tough wheat that can handle many challenging conditions and still perform well.

### PLANTING WINDOW



### ATTRIBUTES

Breeder: KWS, UK  
Tillering: High Yield: High Height: Medium  
Maturity: Intermediate Straw Strength: Strong

### DISEASE TOLERANCE Poor to excellent



## Conqueror

Feed wheat

High yield in dryland



With average leaf rust resistance an early spray programme is still recommended for the control of septoria. The medium/early maturing provides a flexible planting window. Conqueror has shown a high yield response to fungicide treatments.

### PLANTING WINDOW



### ATTRIBUTES

Breeder: KWS, UK  
Maturity: Medium/early Straw Strength: Strong  
Tillering: Intermediate Yield: High Height: Moderate

### DISEASE TOLERANCE Poor to excellent



## Oakley

Feed wheat

Proven variety that's hard to beat



Oakley has moderate resistance to leaf rust and eyespot. Where fusarium is likely to be a problem, an appropriate spray programme should be undertaken. With modern fungicides Oakley is an attractive option. A very high yielding variety comparable to many new cultivars.

### PLANTING WINDOW



### ATTRIBUTES

Breeder: KWS, UK  
Maturity: Late Straw Strength: Strong  
Tillering: Medium Yield: Very high Height: Moderate

### DISEASE TOLERANCE Poor to excellent



## Raffles

Milling/feed wheat

Our most flexible wheat variety



Raffles has an above average disease resistance to septoria, but should be monitored for fusarium, head blight, leaf and stripe rust. Raffles is an extremely reliable autumn and spring option that performs well every year. Craig Harrison's favourite variety of wheat.

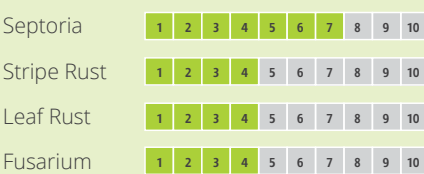
### PLANTING WINDOW



### ATTRIBUTES

Breeder: KWS, UK  
Maturity: Medium Straw Strength: Medium  
Tillering: High Yield: High Height: Tall

### DISEASE TOLERANCE Poor to excellent



## Cassia

Winter feed barley

Top autumn variety, superior grain weight



Cassia has outstanding grain weights and low screenings. Medium/tall height with stiff straw. Cassia requires a plant growth regulator programme for the best results. It has excellent disease resistance resulting in a very simple fungicide programme. An easy care variety.

### PLANTING WINDOW



### ATTRIBUTES

Breeder: KWS, UK  
Maturity: Moderate Straw Strength: Strong  
Tillering: High Yield: High Height: Medium/tall

### DISEASE TOLERANCE Poor to excellent



## Milford

Spring feed barley

Latest spring variety



High yielding in most situations with very strong, short, stiff straw. Almost totally resistant to lodging and neck break. A PGR programme is not required in most situations. Good resistance to leaf rust and mildew. True spring type to be sown from late July onwards. Over the 2017 harvest, lodging became a major issue in many barley varieties. Milford barley without any plant growth regulator applied proved its straw strength and was unsurpassed in all our trials.

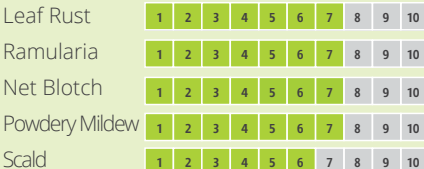
### PLANTING WINDOW



### ATTRIBUTES

Breeder: Breun, Germany  
Maturity: Intermediate Straw Strength: Very Strong  
Tillering: Medium Yield: High Height: Moderate

### DISEASE TOLERANCE Poor to excellent





# Call your local rep.



**Mike Turner**

Northland, Waikato.

Mobile 027 406 6228

michael.turner@carrfields.co.nz



**Rob Shannon**

BOP, Gisborne, Hawke's Bay,  
Manawatu

Mobile 027 4436 912

rob.shannon@carrfields.co.nz



**Scott Shaw**

Taranaki, Rangitikei,  
Manawatu, Wairarapa

Mobile 027 563 6700

scott.shaw@carrfields.co.nz

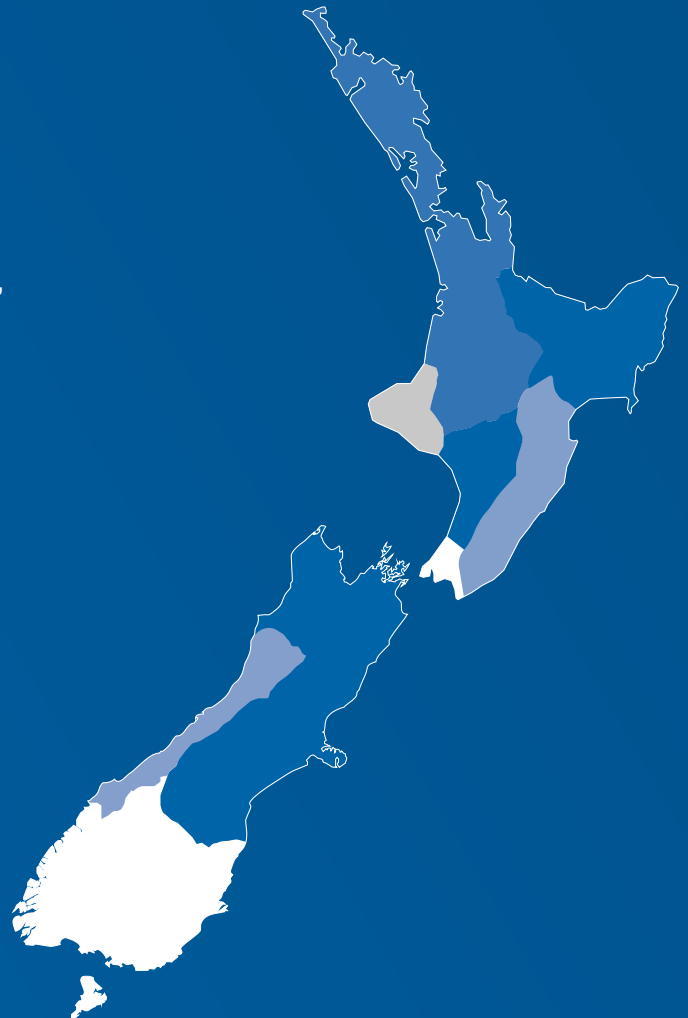


**James Bowker**

South Island

Mobile 027 839 2535

james.bowker@carrfields.co.nz



## CUSTOMER SERVICE AND DISTRIBUTION

Phone (03) 307 6979 Fax (03) 307 6960

Email [grainandseed@carrfields.co.nz](mailto:grainandseed@carrfields.co.nz)

[www.carrfields.co.nz](http://www.carrfields.co.nz)

ORDER ONLINE @ [www.pacificseeds.co.nz](http://www.pacificseeds.co.nz)



[facebook.com/carrfieldsnz](https://facebook.com/carrfieldsnz)