SF MOXIE™
SF HUSTLE™
perennial ryegrasses

The new breed of kiwi determination

Seed Force
the power to grow

contents

Bringing the best
from both
worlds

In 2006, Seed Force partnered with RAGT Seeds Ltd – one of Europe's leading seed businesses.

Founded by farmers whose families are still its shareholders, the core values of RAGT - echo those of Seed Force. This synergy has seen us successfully collaborate for more than a decade on plant breeding to withstand the rigours of New Zealand's challenging climate. One of RAGT's key areas of investment has always been research and development, with over 15% of its annual turnover reinvested back into its research and plant breeding programmes.

Add to this our commitment to thoroughly test and trial here in New Zealand – plus our specialist advice, and you truly have global science delivering proven local performance.

From the outset, this partnership has enabled Seed Force to leverage off their huge investment in research and development and gain access to a team of specialist breeders who would help create something special.

And that is exactly what we've done with the release of our exciting perennial ryegrasses SF Moxie™ and SF Hustle™.

Global science. Proven local performance.

Delivering the production demanded by New Zealand's world-leading farm systems requires a significant investment in research, development and real world testing.

With the resources of 17 research centres throughout Europe, 300,000 experimental plots worldwide, 40 breeding programmes across 26 species, and 760+ employees, all working to increase yields, robustness and quality, our partnership with RAGT has been a huge win for our farming partners.

Through Seed Force, New Zealand and Australian farmers are able to gain access to the comprehensive technological advancements from these efforts.

It takes years of development to create a new perennial ryegrass cultivar, but investing the time, effort and resources required helps ensure confidence in a variety once it's commercialised. The task is obviously much greater when the aim is to launch two new cultivars at once, but that's exactly what Seed Force has done with the release of its exciting perennial ryegrasses SF Moxie™ and SF Hustle™.

Seed Force knew that for its perennial ryegrass material to perform in the New Zealand market it had to be able to stand up to the pressures of our unique environment, while also delivering the production demanded by our world leading farm systems. Some key breeding parameters were required from the outset. The focus was robust genetics teamed with performance across the seasons. RAGT plant breeding is based on the fundamentals of great genetics teamed with high production and quality. It's these foundations which help ensure the material they produce performs as expected in the field. Throughout the process, selections were made with key focus not just on yield, but a range of factors which help ensure robustness and strength in the real world. They were then put under real environmental pressure to see if they could withstand the rigours of a challenging climate, in a grazing situation.

Being smart in leveraging our global strengths in plant breeding , use of new technologies and access to other global markets was a key objective. By utilising RAGT breeder experts, we could create a unique global breeding collaboration. Our perennial ryegrasses SF Moxie™ and SF Hustle™ are the result of this approach.

26
PLANT SPECIES

17
RESEARCH CENTRES

300K
EXPERIMENTAL PLOTS WORLDWIDE

40
BREEDING PROGRAMMES ACROSS 26 SPECIES

15%
OF TURNOVER INVESTED IN R&D

Breeding

objectives

From the early development and throughout the trial phase of SF Moxie™ and SF Hustle™ we knew we had some standout performers. Not only were they showing the key genetic traits of high tiller density, low aftermath heading and high quality, they were also providing excellent dry matter production which was a key feature of their breeding.

Another key aspect to their background, was selection for heading date. The heading date of cultivars (+ or - days relative to Nui) is a useful tool in selecting a variety that is suitable for the intended purpose. The basis of different heading dates relates to the timing of dry matter production for different environments and grazing systems.

A high proportion of material in the local New Zealand perennial ryegrass market is either mid or late heading. SF Moxie™ offers a heading date the same as Nui (0 days), while SF Hustle™ is + 8 days, this timing helps ensure early season production from both varieties which differentiates them from many other perennial ryegrass varieties available. Both are available with AR1™ endophyte.

In 2007, initial crosses were made. Varieties were space planted out, and the breeders then select the best types of plants within these sections to form a polycross. Seed from these polycrosses is evaluated and selections made on key attributes.

From this process, three genetic pools were created from which SF Moxie™ & SF Hustle™ were selected.

- SF Moxie™ 0 flowering date
- SF Hustle™ +8 flowering date
- Maintaining high tiller density – this attribute is coming from the R2n material used for initial selections
- High early season production
- Low aftermath heading
- Excellent quality – also an attribute from the R2n programme.

Key breeding timeline – a long term plant genesis

This is a very lengthy process which uses a lot of traits to be improved at the same time on a difficult genetic basis. Our system ensures we produce stable and complete varieties.

Process	Stage 1 Nursery	Stage 2 Polycross	Stage 3 Halfsibs progenies	Stage 4 & 5 Synthetics creation & trials		Stage 6 Commercialisation
Activity	8,000 - 10,000 plants. Individual plant observation over several years on initial material (disease tolerance, heading date). • Selections made of the best individual plants to go on with the next step of the breeding process	100-150 plants, 5-10 crossings: trials conducted over three years. • Selections made with chosen plants, arranged in several groups with similar characteristics • Crosses in isolated spaces to prevent foreign pollen • Seed harvest per plant • Halfsibs progenies obtained	Introduction of the best genetics from trials, assessment of forage yield and visual scoring in conditions simulating the real use of forage in farms. • Identification of the best progenies for use in new synthetic • Halfsib agronomy trials	5-15 types, 1-5 crossings: trials conducted over three years. • Crosses between the best elite progenies, harvest of the first bulks • Appearance of the new variety for the first time	Test of the new crosses in different environments over multiple years. Evaluation of the performance of the new variety (yield level, diseases) vs previous varieties or controls. • Final decision for variety	Commercialisation access to market. • Naming • Demonstrations • Market introduction
Time per step	2 years	2 years	2 years	3 years		1 year
Total timeline	2 years	4 years	6 years	9 years		10 years

Diploid perennial ryegrass (0 days)

SF Moxie™

SF Moxie™ is one of the latest releases from Seed Force's perennial ryegrass development programme. Bred specifically for New Zealand conditions, its features will be sure to impress on farm. SF Moxie™ is a very productive diploid perennial with high yields, including exceptional winter growth.

SF Moxie's semi upright growth and high tiller density means it will fit well into systems requiring a highly productive perennial ryegrass, while its heading date (0 days), helps ensure good early season performance. Sow SF Moxie™ as the main grass component, or mix it with SF Greenly II new generation cocksfoot for added pasture resilience.

Agronomic features:

> Latest breeding for New Zealand conditions

> Heading date of 0 days = early season growth

> High levels of winter production

> Diploid robustness

> Bred with broad disease tolerance

> Semi upright growth habit

Feed available

Features excellent performance over the key growing seasons.

Stock suitability

All stock types.

Sowing rate

15-20kg/ha

Dependant on mix, use lower rate with SF Greenly II cocksfoot.

Diploid/Tetraploid

Diploid (2n)

Endophyte

AR1

Diploid perennial ryegrass (+8 days)

SF Hustle™

SF Hustle™ is a mid maturity (+ 8 days) diploid perennial ryegrass. It is a new release from Seed Force's extensive perennial ryegrass breeding and development programme and was bred with New Zealand's high performance farms in mind. Combining excellent production with a mid heading date helps ensure its suitability to many systems nationwide.

SF Hustle™ performs well in a range of environments with exceptional cool season performance. Upright growth habit ensures compatibility with other species in the sward. Sow SF Hustle™ as the main grass component, or mix it with SF Greenly II new generation cocksfoot.

Agronomic features:

> Bred for high production New Zealand systems

> Heading date of + 8 days

> Diploid robustness

> Upright growth habit ensures compatibility with companion species

> Bred with tolerance to a broad range of diseases

> Excellent winter productivity and full season production

Feed available

Features excellent performance over the key growing seasons.

Stock suitability

All stock types.

Sowing rate

15-20kg/ha

Dependant on mix, use lower rate with SF Greenly II cocksfoot.

Diploid/Tetraploid

Diploid (2n)

Endophyte

AR1

Seed Force

research and development

Species Perennial Ryegrass
Location Kennington, Southland
Date sown 9-Dec-16
Trial status Ongoing

Yield - YEAR 1 - kgDM/ha

Variety	Establishment	Autumn	Winter	Early Spring	Late Spring	Summer	YEAR 1
One50 AR37	2925	3833	937	1796	5230	7081	21804
Rohan NEA2/6	3014	3924	1010	1969	5554	6330	21802
SF Hustle AR1	3291	4048	1020	1944	5268	6190	21760
Viscount NEA2	3312	3975	1145	1933	4899	6445	21708
Base AR37	2786	4144	954	1880	5238	6694	21696
Trojan NEA2/6	3046	3928	954	1919	5429	6232	21507
SF Moxie AR1	3115	3942	1053	2030	4939	6282	21361
AberGreen AR1	2691	4536	1047	2094	5158	5601	21127
Prospect AR37	3277	3773	930	1844	5039	5891	20753
24seven Happe	2979	3982	916	1823	5016	5976	20692
SF Stellar AR1	2710	4038	961	2016	4890	5900	20516
Expo AR37	2590	4188	819	1799	4914	5972	20282
Request AR37	2938	3828	822	1829	4718	5990	20127
Tyson AR1	2742	3842	1028	1939	4737	5810	20098
Ansa AR1	2792	3701	921	1867	4985	5725	19990
Trial Mean	2947	3979	968	1912	5068	6141	21015
LSD (5%)	NS	380	NS	NS	424	588	NS
CV%	15.3	6.7	17.3	10.3	5.9	6.7	6.0

Represents top statistical group

Species Perennial Ryegrass
Location SF Henley Research Station, Lincoln, Canterbury
Date sown 20-Apr-17
Trial status Ongoing

Yield - YEAR 1 - kgDM/ha

Variety	Establishment	Winter	Early Spring	Late Spring	Summer	Autumn	YEAR 1
Base AR37	345	513	2580	6484	9323	3781	22682
SF Hustle AR1	298	443	2644	6449	8832	3807	22176
SF Breeding Line	295	438	2393	6459	9002	3869	22161
SF Breeding Line	282	420	2637	6632	8759	3595	22043
Trojan NEA2/6	276	411	2382	6665	8510	3852	21818
SF Breeding Line	241	359	2936	6040	8655	3792	21783
SF Breeding Line	261	388	2734	5989	8990	3627	21729
SF Breeding Line	328	487	2641	6151	8584	3815	21678
Viscount NEA2	305	454	2698	6336	8345	3740	21572
Tyson AR1	346	515	3086	5509	8694	3761	21565
SF Breeding Line	306	454	2523	5944	8439	3945	21305
SF Breeding Line	288	428	2679	5858	8417	3817	21199
SF Breeding Line	303	451	2665	5704	8710	3663	21192
One50 AR1	248	369	2344	6273	8538	3634	21159
Rohan NEA2	264	393	2300	6130	8585	3716	21124
SF Breeding Line	320	475	2644	5533	8711	3742	21105
SF Moxie AR1	266	396	2728	5915	8208	3592	20838
One50 AR37	195	290	2179	6354	8415	3502	20739
SF Breeding Line	260	388	2466	6048	8398	3305	20605
SF Breeding Line	213	317	2415	5822	8298	3720	20572
SF Breeding Line	324	483	2555	6026	8180	3303	20547
SF Breeding Line	280	417	2815	5258	8243	3548	20281
SF Stellar AR1	234	349	2483	5802	8036	3576	20245
Request AR1	282	420	2666	5775	7794	3246	19901
Request AR37	207	307	2718	5487	7933	3286	19731
Trial Mean	279	415	2596	6026	8504	3649	21190
LSD (5%)	45.7	67.8	212.8	486.3	592.2	296.4	979.4
CV%	11.6	11.6	5.8	5.7	4.9	5.8	3.3

Represents top statistical group

NFVT

forage trials

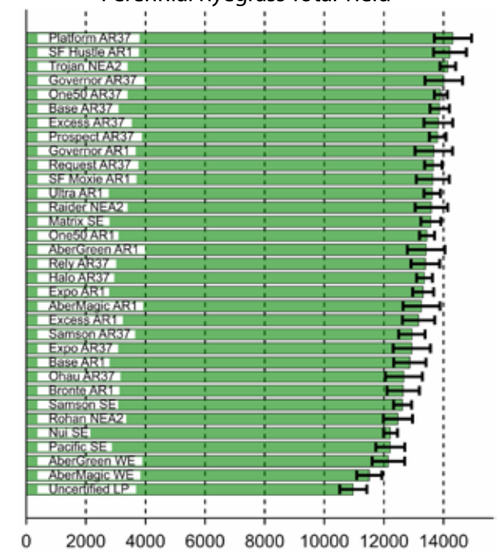
The New Zealand National Forage Variety Trial (NFVT) system was set up by the New Zealand Plant Breeding and Research Association Inc. (NZPBRA), a society established to promote plant breeding and research in New Zealand.

Trials commenced in 1991 and continue to date with approximately 40 active trials in the ground at any one time.

National Forage Variety Trials and NFVT are registered Trademarks of the NZ Plant Breeding & Research Association.

Total Yield Summaries

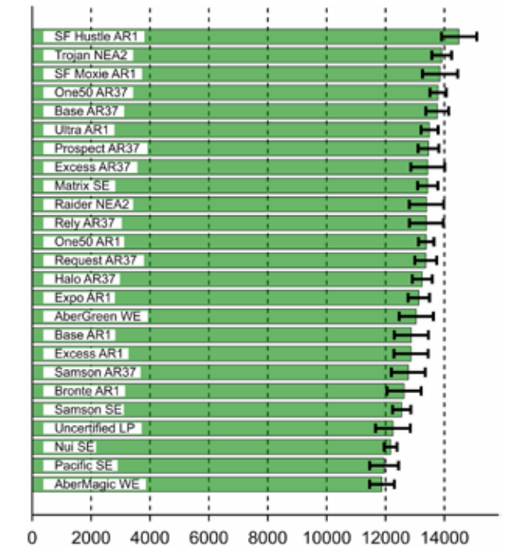
All New Zealand Trials
Perennial Ryegrass Total Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

New Zealand South of Taupo
Perennial Ryegrass Total Yield

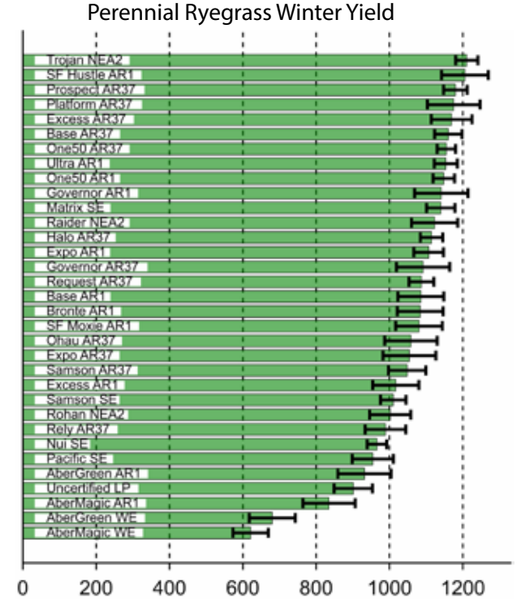


Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

Seasonal Yields

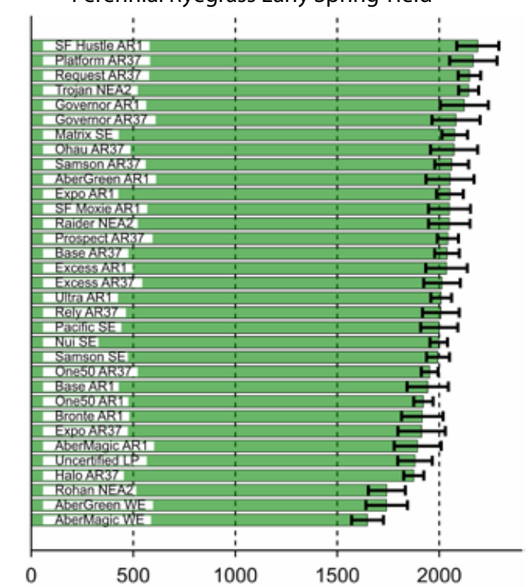
All New Zealand Trials
Perennial Ryegrass Winter Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

All New Zealand Trials
Perennial Ryegrass Early Spring Yield

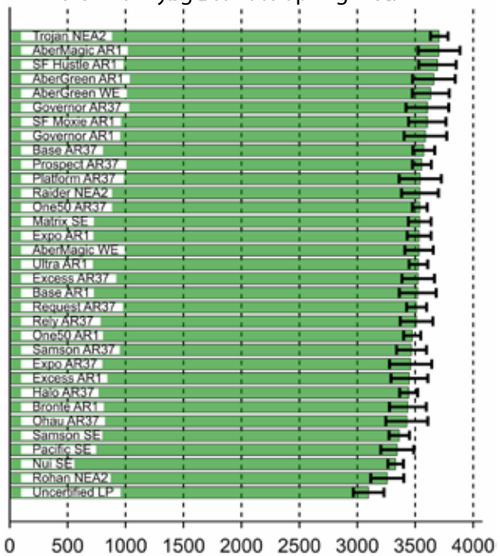


Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

Seasonal Yields continued

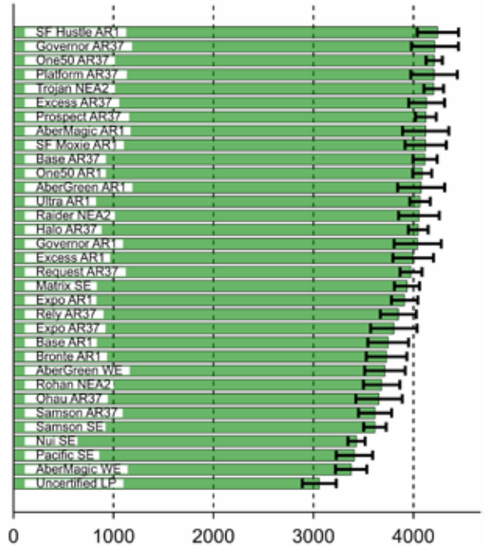
All New Zealand Trials
Perennial Ryegrass Late Spring Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

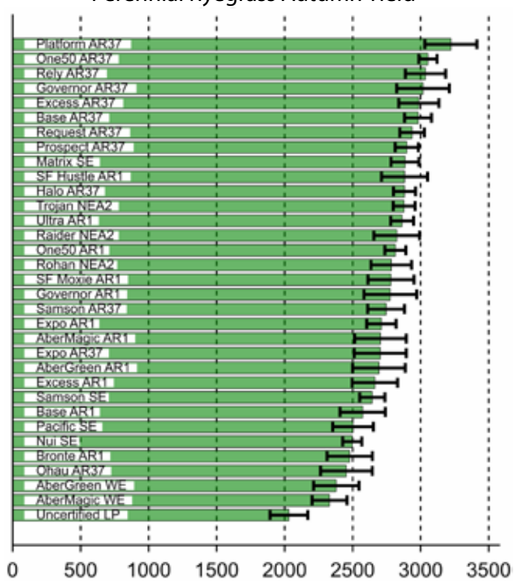
All New Zealand Trials
Perennial Ryegrass Summer Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

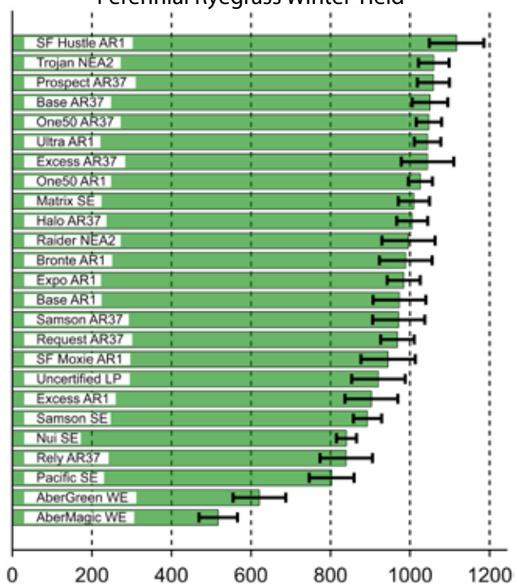
All New Zealand Trials
Perennial Ryegrass Autumn Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

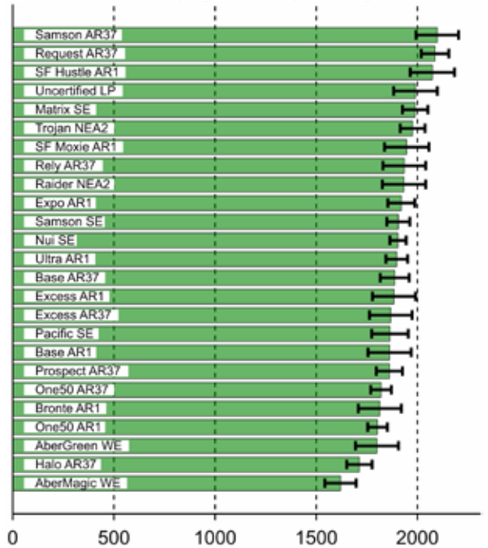
New Zealand South of Taupo
Perennial Ryegrass Winter Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

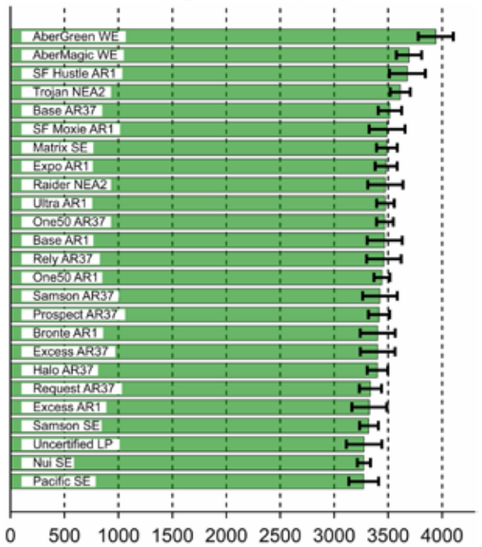
New Zealand South of Taupo
Perennial Ryegrass Early Spring Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

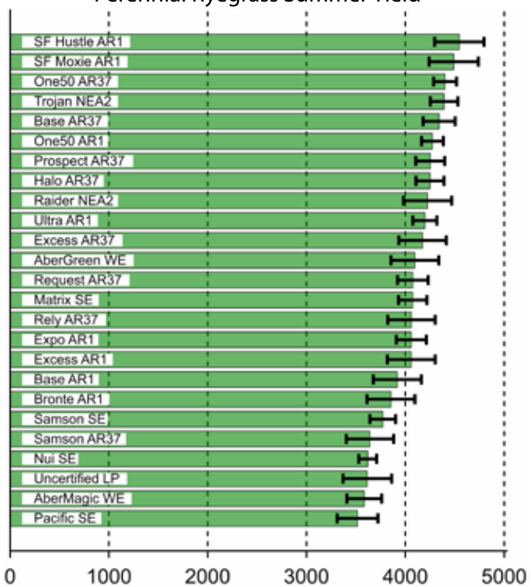
New Zealand South of Taupo
Perennial Ryegrass Late Spring Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

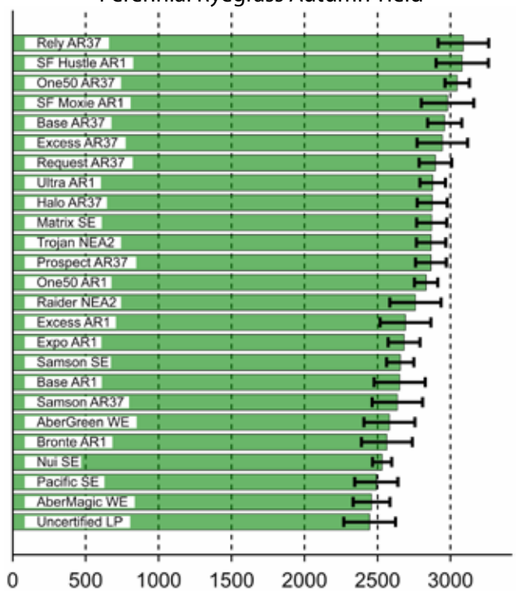
New Zealand South of Taupo
Perennial Ryegrass Summer Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

New Zealand South of Taupo
Perennial Ryegrass Autumn Yield



Ryegrass yield; kilograms of dry matter per hectare

NFVT Summary 1991 - 2018 (August 2018)

Perennial pasture

renewal

Making the best choice for long term pastures is more complex than for short term pasture, as production, persistence, feed quality and environment must be considered.

Paddock selection:

Review your existing pastures to determine which ones are suitable and most in need of a perennial renewal programme. Decide what condition your paddocks are in to determine which ones will need re-sowing. Use a simple scale of 1-3, or more complex scale up to 5 to condition score the existing pastures. The key aspects that need to be determined are which pastures are still in a good state and which are showing a decline in the original sown species, allowing weeds to enter the pasture. Even in years with adequate moisture or farms with irrigation, this should be an exercise done regularly, so when poor conditions do occur, whether that's through drought, or very wet conditions, you can sacrifice your poorest performing paddocks and look after your high performing ones. Repasturing capital needs to be spent wisely on those paddocks in poorest condition that lie in typically higher producing areas. Areas that grow the most feed are key areas to concentrate on.

Choosing the right companion species:

Including a range of additional species with your SF Moxie™ and SF Hustle™ perennial ryegrass can help aid pasture performance by increasing production and pasture quality. Depending on what species are included in the mix; reduce the sowing rate of the perennial ryegrass to accommodate.

- Clovers are one of the main drivers underpinning New Zealand's high pasture production. Due to their nitrogen fixing capability, clovers are one of the most economic and valuable additions to any grass based pasture system. Not only do they provide much needed soil available nitrogen to the companion grass species accompanying them, but their own quality e.g. metabolisable energy (ME), protein content and production is also high. This high quality leads to increased animal intake and pasture performance.

To help ensure the clovers sown in the mix establish well, it is important that they are not shaded out by the ryegrass. Also, ensure they are also not sown too deep as this can affect adequate establishment. Consider the clover seed size when determining the required sowing rates of the legume component of the mix. Red clover is a much larger seed than white clover, so its sowing rate should be higher.

- Companion herb species such as chicory and plantain are characterised by their extensive root structure. This enables access to deep soil minerals which can be transferred to grazing animals and also aids in their ability to handle periods of moisture deficit. Herbs offer high nutritional quality and production and can help enhance permanent pastures.
- Additional grass species in permanent pasture mixes. The inclusion of more than one grass species in a mix can really help build pasture resilience, as the different species can complement each other's growth patterns and help extend production when the pasture's production would otherwise be limited. One such species that should be considered as an option to include in perennial ryegrass mixes is new generation cocksfoot.

See our full range of high performing companion species on the next page.

Grazing management:

To help ensure your new SF Moxie™ and SF Hustle™ pasture gets off to the best start, some points should be followed regarding grazing management:

- New pasture should be grazed as soon as plants will withstand pulling. This early grazing will encourage rapid tillering and influence early feed production.
- Once established and the paddock has had its first grazing, monitor the ryegrass leaf stage as an indicator of when the paddock is ready to graze again. Pastures should be grazed at the 2.5 – 3 leaf stage to best balance feed quality, recovery after grazing and total feed production. Good grazing management will help promote plant tillering. Grazing too early (low covers) will reduce yield and regrowth but can also affect the plants' ability to restore its energy reserves. Grazing too late (high covers) increases the amount of dead material at the base of the pasture which in turn reduces quality. This also affects clover and other companion species survival due to increased shading and can lead to lower pasture utilisation and increased levels of pasture disease.

Include SF Moxie™ and SF Hustle™ together with the appropriate companion species in your perennial pasture planning.

Step 1: Look at your current pasture/stock/farm production and performance.

Step 2: Define the steps you'll need to take to reach your optimum goals.

Step 3: Build a sound plan and timeline for implementation.

Step 4: Seek expert advice to challenge your thinking. Share your plan with them.

Step 5: Ensure this fits with your overall farming system.

Choosing the right

companion species

SF Greenly II
New generation cocksfoot

SF Greenly II cocksfoot is a robust, fine leaved and upright cocksfoot that produces well in a range of environments. New breeding helps ensure palatability and productivity. An ideal companion to any perennial ryegrass pasture to help build resilience (reduce rate of perennial ryegrass to accommodate).

Feed available

Option for summer dry regions, performs over warmer months.

Stock suitability

All types, especially sheep, can be set stocked.

Sowing rate

2-5kg/ha
as secondary grass component of permanent pasture mix.

SF Boston
Plantain

SF Boston is a later flowering plantain. It can extend the period of productive growth in the summer.

SF Boston is suitable for both rotational grazing and set stocking.

Feed available

SF Boston can extend the period of productive growth in the summer because of its late flowering, remaining vegetative longer into the summer.

Stock suitability

All stock types.

Sowing rate

1-2kg/ha
in a pasture mix.

SF Punter™
Chicory

SF Punter™ provides high energy forage with proven animal health benefits and increased animal production.

SF Punter™ offers outstanding productivity and quality and is widely used across the country in a range of environments and conditions.

Feed available

Very strong summer and autumn growth plus cool season production.

Stock suitability

All stock types.

Sowing rate

1-2kg/ha
in grass seed pasture mix.

SF Quest
Medium-leaf white clover

SF Quest is a multi-purpose clover bred by AgResearch for tolerance to clover root weevil. Its high stolon density ensures good persistence. SF Quest performs well under rotational grazing or set stocking in both dairy and sheep grazing situations.

Feed available

Strong spring and summer growth combined with very good cool season production.

Stock suitability

All stock types.

Sowing rate

2-4kg/ha
in grass seed pasture mix.

SF Rossi™
Red clover

SF Rossi™ is a quality red clover which was bred for persistence and disease tolerance. Utilise its high quality to enhance pasture mixes.

SF Rossi's tap root helps ensure summer production while its high quality ensures maximum animal performance.

Feed available

Features excellent performance over the key growing seasons.

Stock suitability

All stock types.

Sowing rate

3-5kg/ha
in grass seed pasture mix.

Subterranean
Clovers

SF Narrikup (Subterraneum) is a very vigorous mid-late season subterraneum clover.

SF Rosabrook (Subterraneum) is a mid maturity subterraneum clover.

SF Rouse (Yanninicum) is a mid to late flowering variety of the waterlogging-tolerant yanninicum subspecies of sub clover.

Feed available

Flowering dates (mid and late) to help ensure extended production. Graze until flowering then reduce stocking rate to promote seed set.

Stock suitability

All stock types.

Should be sown in late summer/autumn

Sowing rate

10kg/ha
as the sole subterranean clover or

5kg/ha + 5kg/ha
Sub combination in perennial pasture mixes.

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