

**“Do we need to breed
more ryegrasses?”**

**Terry Olsen
Year 2002**

**For Primary Industry Council / Kellogg Rural Leadership
Programme.**

Contents

	Page(s)
Introduction	1
Acknowledgements	2
Background	3
What are options in re-grassing?	4,5
What changes could come about?	6,7,8
Conclusions	9,10

Introduction

- This report attempts to analyse the main drivers in the breeding of ryegrasses and what role is farmer concern playing in the direction of new varieties.
- There seems to be many varieties of rye grass available for farmer selection, but are farmers themselves aware of what is happening and what production goals are being met.
- The objectives have been to discuss with local farmers because of my knowledge of the district in which we farm, South Manawatu and North Horowhenua, so can go some way to be aware of the challenge these farmers face at times. Contact plant breeders and commercial seed companies in regard to possibilities that farmers have.
- There are limitations faced by seed breeders relative to commercial marketing realities, time taken to produce new varieties and political outcomes.
- The structure is background to plant breeding, current situations and future possibilities.
- Commercial sensitivity is a limitation in this report. The time spent gathering information into the difference of opinion as to the way the future may look was surprising but not a limitation.

Acknowledgements

I also gratefully acknowledge assistance from the following:

Simon Moloney	Land Corp Farming Ltd.
Bruce Belgrave	Agresearch, Palmerston North
Tom Lyons	Agresearch, Palmerston North
Stephen Bennett	Agri-seeds, Palmerston North
Cory Matthew	Massey University, Palmerston North
Nick Cameron	Cropmark Seeds
Nick Pyke	Foundation for Arable Research
Frances Wilson	Agri-seeds Christchurch
Allan Stewart	PGG Christchurch
Shaun Meers	Farmwise Group
Ross Gordon	Farmwise Group – resigned
Martin Jensen	Seed grower – South Canterbury
Farmers	Local Area
Dennis Nieuwkoop	www.4seed.co.nz , www.4forage.co.nz

Background

It is necessary to examine the background in some way. In my own farming situation we re-grass 15-20% of the area farmed each year. This is a significant cost and at times I have experienced mixed results, but this is in no way a reflection of the grasses used. The soil type is challenging, peat loam, in that pasture pulling is a large problem. Mostly in this soil type pasture lasts four to five years depending on seasonal variations. So how do other farmers fare?

I had discussions with local farmers regarding soil type and climatic differences. The conclusion arrived at suggests that some of us out there are not really greatly aware of what re-grassing options there may really be.

Farmer awareness ranged from those on more challenging soil types and /or climatic variations. Such farmers seemed to be more aware of the options and willing to try different combinations. The soil types in discussion are sands or peat loams, prone to winter wet or summer dry.

On easier soil types, i.e. silts and clays (well drained) with more summer rainfall the awareness of possibilities was not as great and they were certainly less willing to try different options. It could be concluded, however that they were happy with the current options that are available. Still though lack of awareness was a surprise.

What are options in re-grassing?

At this stage when a decision is made to re-grass the current range of ryegrass cultivars available is in excess of 40 ranging from extreme annuals to traditional perennials. The decision can also be complicated with a range of cocksfoots and fescues. Clovers and herbs can also add to an outcome.

How did we get in this situation of so much choice?

The main reason has to be commercial responses, the need for market share and also the need to keep ahead of disease and pests.

In New Zealand the plant breeders are faced with a situation where there is no industry wide standard with regard to what plant performance traits should be in selection priorities. The main direction to breed more plants comes from observations made by the plant breeders themselves. Methods used to obtain improvement in ryegrass are:

- perennial – Italian hybridisation
- flowering date manipulation
- endophyte strains
- tetraploidy these plants having larger tillers but seemingly less persistence
- desirability

New Zealand Plant Breeders can however participate in the National Forage Variety Testing Scheme. In this scheme the total yield and botanical composition are monitored for three years under conditions as close as possible to those encountered in farm practice. The Forage testing scheme is controlled by New Zealand Plant Breeders Research Association. – NZPBRA. It is considered that the yield test evaluations are carried out extremely well. It must also be

appreciated that yield evaluations are expensive to achieve. However it seems these yield evaluations largely ignore the potential animal production. This being the case it can be imagined how a variety could be sold on the basis of having very high dry matter yield potential but not necessarily the best for animal production.

NZPBRA also has funded trips to bring into New Zealand plant material from overseas, that can extend the genetic base for future cultivar development.

Generally it takes between ten to twelve years of time to breed and evaluate new plants, so as one can imagine it is a costly exercise.

What changes could come about?

It must be borne in mind that the success of Grassland farming in New Zealand at this stage is largely gained from achieving reasonable animal production from relatively cheap feed sources which have been based mainly around rye and clover pastures. These have been proved over time to be relatively simple to establish and managed with reasonable ease.

It is likely that there will be a greater awareness of desirable benefits in animal performance. Grasses could well be targeted for the yield for a certain time of the year. Farmer education in regard to what grasses can offer also needs to be addressed but it should be borne in mind what the particular farmer is intent on achieving.

Seed companies will also no doubt be challenged to produce more seed at cheaper cost to the end user.

The ability to manipulate the flowering date of a grass plant can offer a much more robust management system to the farmer. New Zealand markets also require grasses that offer winter growth.

Fescues offer some interesting possibilities. However more research is required for the New Zealand situation. There has been significant work done on the fescues in European countries, where they have been bred for winter hardiness and as a consequence have almost no winter growth potential.

Currently in New Zealand, one seed company is known to be multiplying 100 acres of a tall fescue crossed with annual ryegrass called LOFA for a French breeding company.

Fescues also offer a much broader germplasm base with which to work with for improvement.

A very recent development on the New Zealand scene is ARI Endophyte. This has been the result of 15 years of research and development. ARI Endophyte is considered a major break through for all pastoral farmers; offering to date improved animal performance over standard endophyte grasses.

Briefly endophyte is a natural fungus that lives in the ryegrass seed and plants. Endophytes produce chemicals known as alkaloids. There are three main chemicals Lolitrem B, Ergovaline, Peramine. Lolitrem B causes ryegrass staggers. Ergovaline can contribute to heat stress.

Peramine deters the female Argentine Stem Weevil from feeding and laying eggs. Peramine is therefore considered to be a "friendly" alkaloid and the only alkaloid produced by the ARI strain of endophyte.

Argentine Stem Weevil is a major pest outside Otago and Southland. Estimated to cost New Zealand farmers between \$40-200 million per year in lost production.

The introduction of genetic modification technology into New Zealand seems remote because of the current Political Climate. There is however the technology where by genetic modification a grass could be induced to form seed heads by the application of ethanol as a simple spray. The end results would see a dramatic increase in the improvement of feed quality.

Environmental issues must have some impact on future thinking. The ability to irrigate may be challenged. Fertiliser use / leaching, gas emissions and the ability to dispose of effluent may call for a re-think down on the farm. Some of these issues are well known to some of us now.

Conclusions

- Grassland farming in New Zealand is served by committed and enthusiastic Plant Breeders who do have willingness to do some work together NZPBRA.
- It seems that plant breeding in New Zealand is still in a juvenile state. Because of funding issues it is possible some of the technology developed in New Zealand may be sold overseas which is disappointing.
- There have been significant gains made in pasture production in New Zealand by being able to manipulate flowering dates.
- Further grassland plant breeding will always be necessary in order to keep ahead of problems of disease and persistence.
- In an ideal situation a database of farmer experiences with different types of plants relative to soil type climatic zones and/or management techniques, would be desirable. This is however unlikely to come about.
- Impact of environmental concerns could be a challenge.
- Consumer requirements in regard, for example, meat or milk composition could challenge plant breeders into the future.
- Alternatives- Fescues or Herbs. There are some breeders who are wildly enthusiastic towards fescues and the use of the likes of chicory. Other breeders consider that ssbecause of our past success in New Zealand with ryegrass and clover plants that these combinations will still reign supreme.

- I was given this call for the future grassland plantings on a dairy farm of suitable soil types.

- 30% of productive area fescues/fescue types and white clover.
- 55% productive area ARI ryegrass types.
- 15% Italian type ryegrass and chicory.

?????

I wish all those people associated in grassland plant breeding every success for their future work and want to thank them for the willingness that they have had in sharing some of their thoughts with me.