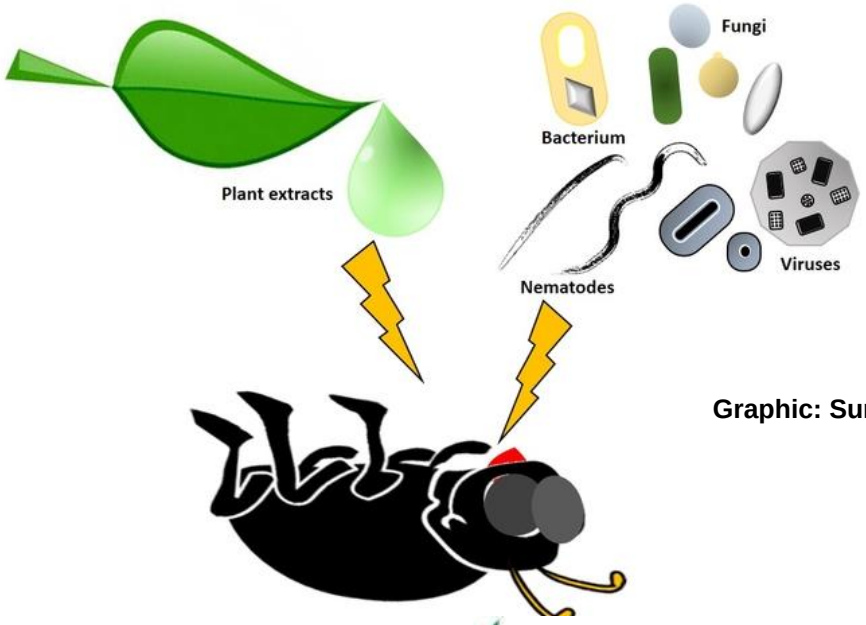
Crop bioprotection product development

John Caradus



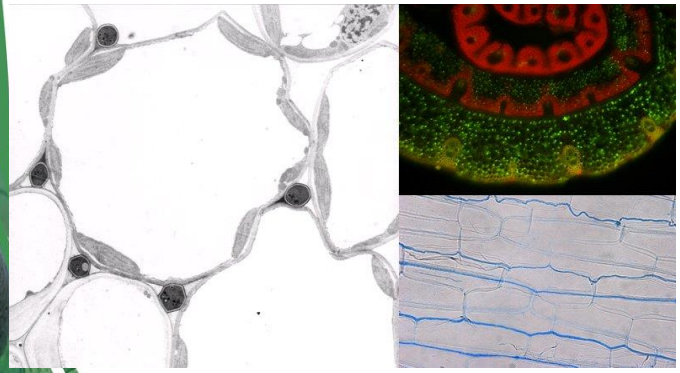
Graphic: Surendra Dara

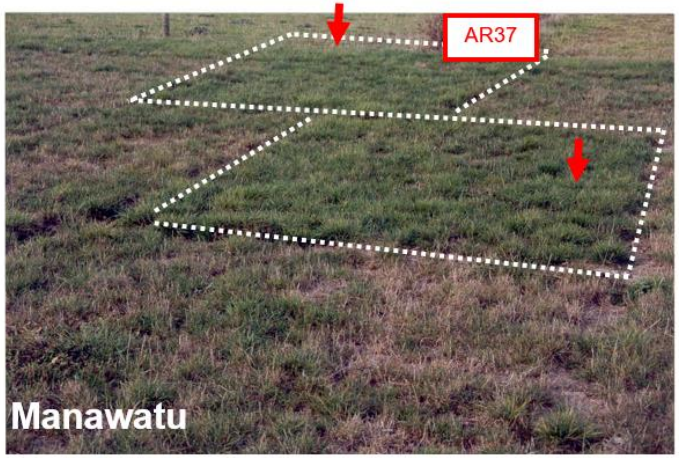
grasslanz®
unique plant opportunities

Current products

Epichloe fungal endophyte

- Obligate endophyte that is transmitted through seed
- Sold in over 4000MT of ryegrass seed annually in NZ
- AR37 alone is estimated to contribute $3.6 billion to NZ economy over its patent life; benefit to cost ratio = 80

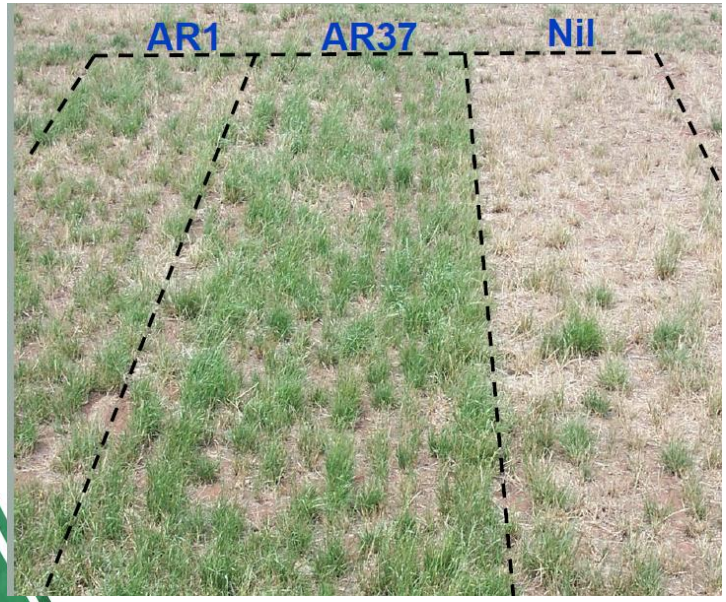




AR37® grasslanz endophyte

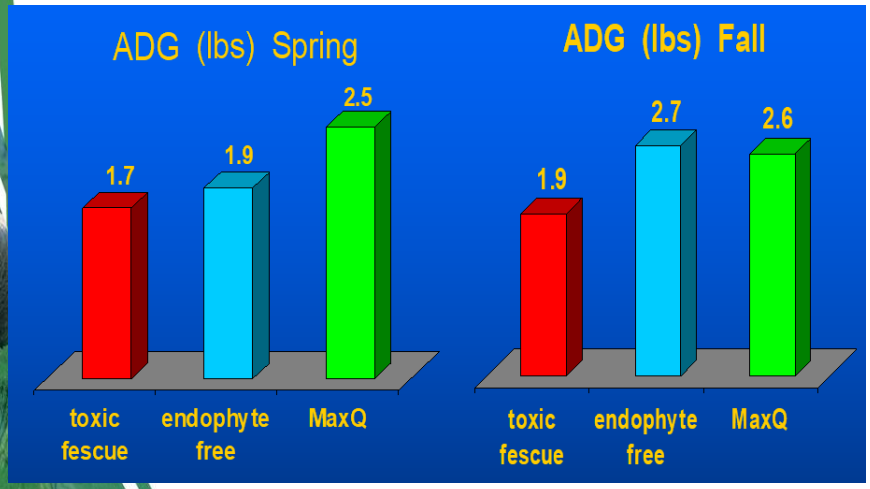
Attributes AR37

- Broad pest resistance – excellent pasture persistence
- Effective in providing improved drought tolerance
- Improved profitability for farmer
- Licensed to 2 seed companies – premier endophyte by sales volume

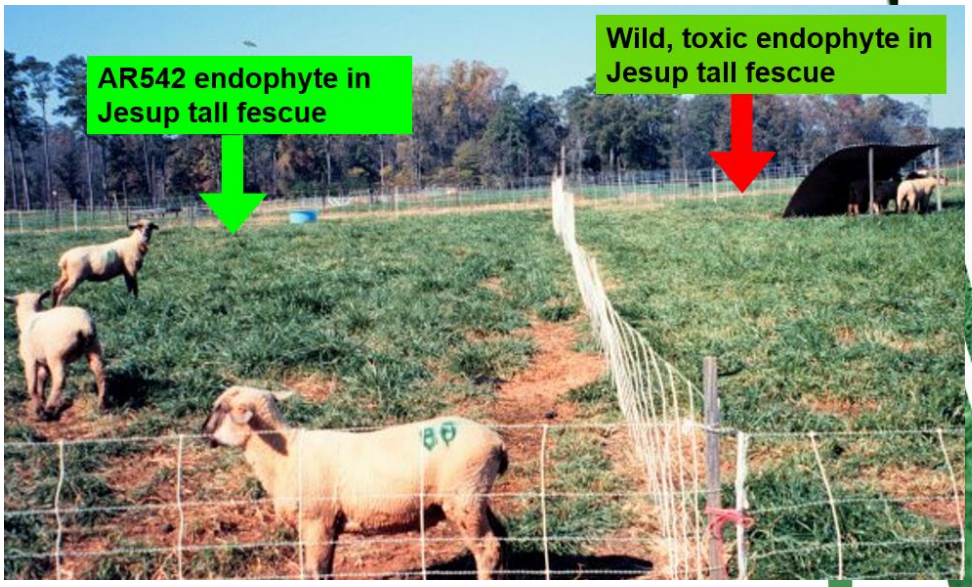


MaxQ in tall fescue

- No fescue toxicosis
- Good stand persistence on farm
- Good transmission through seed production
- Good viability in seed storage
- Improved profitability for the farmer



Growth rate of beef steers

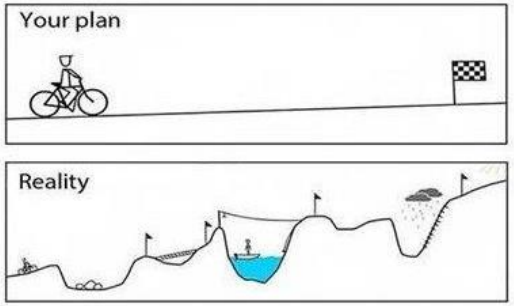


Reasons for success

- A great R&D team – multi-disciplined approach and very good science
- Good efficacy data - information demonstrating its effectiveness on-farm
- Solves real problems faced by farmers - delivers on its promises and improves their profitability
- Quality control provides a consistent high-quality product
- Appropriate management of the IP
- Committed commercial partners with an effective path to market
- Technologies that can be used without it being disruptive to traditional on-farm management systems

A word of caution:

- It may take longer than you think, and good ideas/concepts do not necessarily result in commercial reality

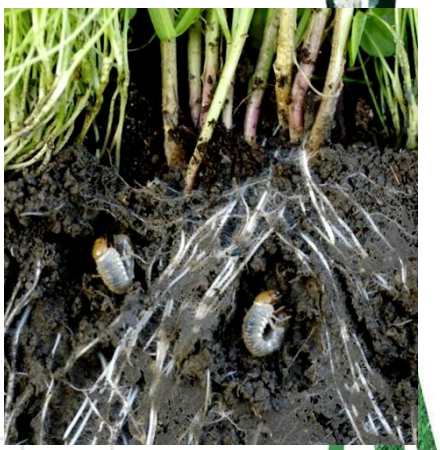


Future opportunities in development

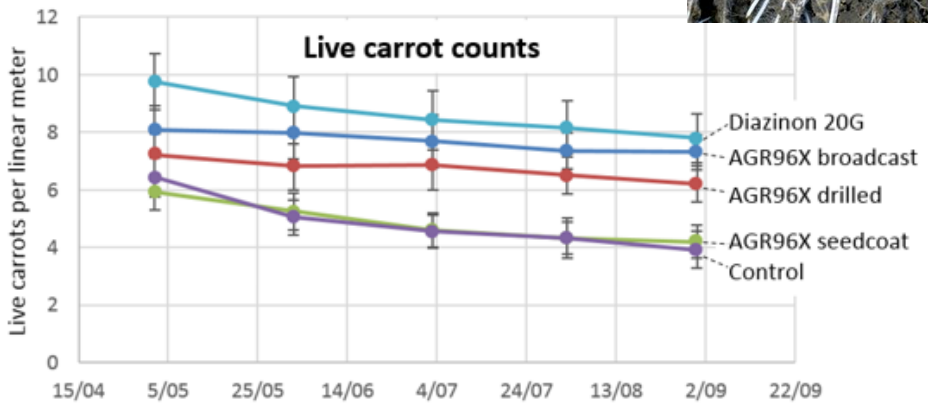
- AGR96X – *Serratia proteamaculans*
- Active against grass grub and Manuka beetle

Disease and mortality rates 12 days after maximum challenge with *S. proteamaculans* AGR96X and *S. entomophila* A1MO2 (data from Hurst et al. 2018)

Pest species	Activity measure	S. proteamaculans AGR96X	S. entomophila A1MO2
Grass grub	% diseased larvae	10.7 ± 4.2	97.6 ± 2.4
	% dead larvae	87.5 ± 4.5	2.3 ± 2.3
Manuka beetle	% diseased larvae	6.3 ± 4.3	0
	% dead larvae	90.6 ± 5.2	0

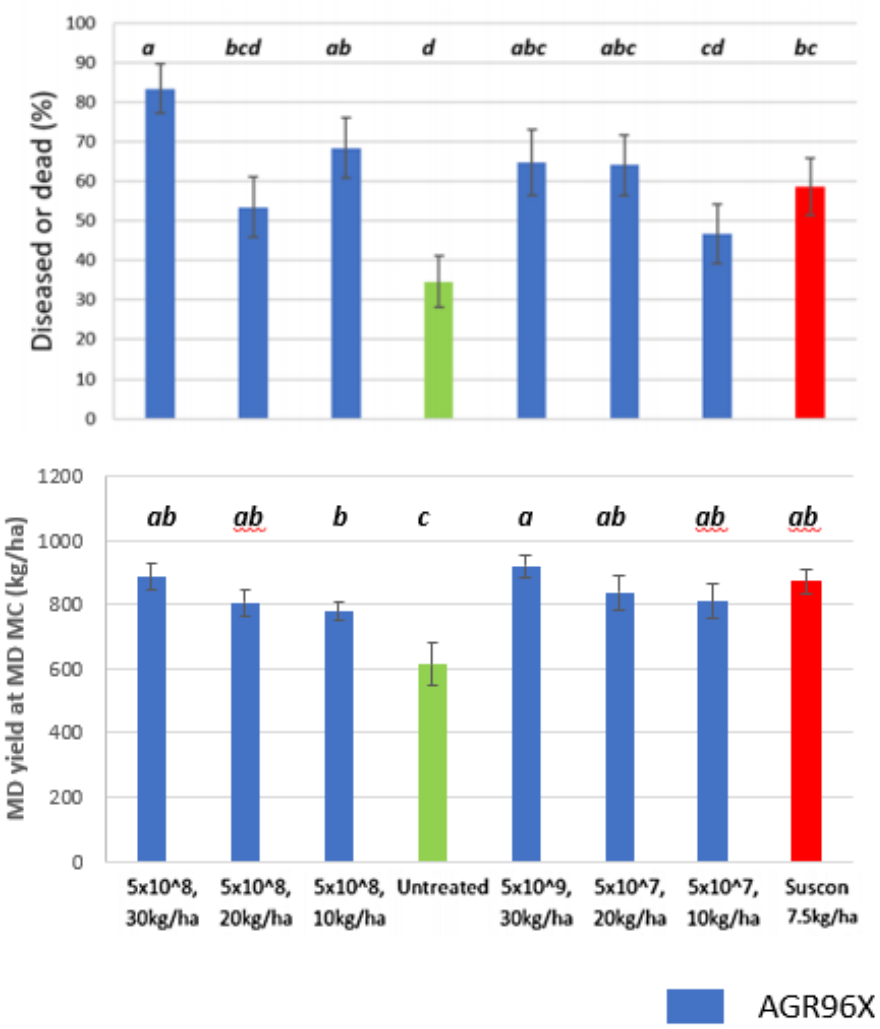


Impact of AGR96X on live carrot numbers in grass grub invested paddock



Future opportunities in development

- AGR96X applied to clover seed crops



Dead or diseased (%) grass grubs 10 days after application (drilled)

Machine dressed clover seed yields

Challenges for biopesticides

- Market size – some pests in NZ are unique – e.g., grass grub, porina, Manuka beetle
- Being price competitive compared with conventional chemistry products
- Fermentation capability
- Inconsistent or moderate results in the field
- Formulation capability
- Regulation requirements – timing and cost

However:

Effective, low risk and environmentally sustainable pest management solutions are crucial to meeting producer, consumer and regulatory needs. Biopesticides are likely to become an increasing important component in pest management systems. (Glare et al. 2012)