

# ENDOPHYTES

## 1. Endophyte insect control - Ryegrass, Festulolium & Continental Tall Fescue

These tables are developed in New Zealand using New Zealand information. These tables were approved by the NZPBRA executive September 2024

Endophyte brand	Argentine Stem Weevil	Pasture Mealy Bug	Black Beetle	Root Aphid	Porina	Grass Grub	Field Cricket
<b>Diploid perennial ryegrass</b>							
AR1	....	....	•	- <sup>2</sup>	-	-	Not tested
AR37	.... <sup>1</sup>	....	...	....	...	•	Not tested
CM142	Not tested	Not tested	Not tested	....	Not tested	Not tested	Not tested
NEA2	...	(....)	...	••	Not tested	-	Not tested
NEA4	...	(....)	...	••	Not tested	Not tested	Not tested
NEA12	(....) <sup>1</sup>	Not tested	(...)	....	(...)	Not tested	Not tested
RGT18	(...) <sup>1</sup>	Not tested	(...)	Not tested	(...)	Not tested	Not tested
Standard Endophyte	....	....	...	••	•	-	Not tested
Without Endophyte	-	-	-	-	-	-	Not tested
<b>Tetraploid perennial ryegrass</b>							
AR1	(...)	(....)	•	- <sup>2</sup>	-	-	Not tested
AR37	(...) <sup>1</sup>	(....)	...	....	(...)	•	Not tested
CM142	Not tested	Not tested	Not tested	....	Not tested	Not tested	Not tested
NEA2	••	(....)	...	••	Not tested	-	Not tested
Without Endophyte	-	-	-	-	-	-	Not tested
<b>Italian and short term (hybrid) ryegrass</b>							
AR1	••	(....)	•	- <sup>2</sup>	Not tested	-	Not tested
NEA	Not tested	(....)	...	Not tested	Not tested	-	Not tested
AR37	... <sup>1</sup>	(....)	...	....	Not tested	-	Not tested
NEA12	(...) <sup>1</sup>	Not tested	(...)	....	Not tested	-	Not tested
Without Endophyte	-	-	-	-	-	-	Not tested
<b>Festulolium</b>							
U2	....	(....)	.... <sup>3</sup>	....	(••)	...	...
<b>Continental tall fescue</b>							
MaxP (AR584)	Not tested	Not tested	...	(....)	Not tested	(••)	...
Without Endophyte	-	-	-	-	-	-	-

### Notes on Tables

- No control.
- Low level control: Endophyte may provide a measureable effect, but is unlikely to give any practical control.
- Moderate control: Endophyte may provide some practical protection, with a low to moderate reduction in insect population.
- Good control: Endophyte markedly reduces insect damage under low to moderate insect pressures. Damage may still occur when insect pressure is high.

- Very good control: Endophyte consistently reduces insect populations and keeps pasture damage to low levels, even under high insect pressure.
- ( ) Provisional result: Further results needed to support the rating. Testing is ongoing.
- 1 AR37, NEA12, RGT18 endophyte controls Argentine stem weevil Larvae, but not adults. While Larvae cause most damage to pastures, adults can damage emerging grass seedlings. In Argentine stem weevil prone areas it is recommended to use treated seed for all cultivars with novel endophyte.
- 2 AR1 plants are more susceptible to root Aphid than plants without endophyte.
- 3 Active against black beetle adults and larvae.

## 2. Endophyte Animal Safety – Ryegrass, Festulium & Continental Tall Fescue

September 2024

The information in this table is based on animal safety trialling protocols designed to expose animals to simulated worst-case scenario management. This involves forcing them to graze deep into the base of pure perennial ryegrass pastures that have been allowed to grow for several weeks over late spring/summer (similar to a hay crop) where they will encounter the highest concentrations of harmful endophyte chemicals if these are present.

This management does not represent normal farm practice although similar situations may arise on farms in rare circumstances. Under normal farm grazing practices, the contribution of basal pasture material to total animal dry matter intake is relatively low and therefore the intake of harmful

chemicals (if they are present) is diluted. Thus, the likelihood of adverse effects on animals is reduced, but the potential for problems to occur may still exist if the endophyte brand is rated < 4-star for 'freedom from staggers' and/or there are comments on animal performance which flag potential issues.

Comments on animal performance have been moderated based on information from other trials (in addition to the formal animal safety testing protocols), consideration of the 'normal' grazing management practices implemented on farm (see previous paragraph), and recognition that animal diets are very seldom pure ryegrass. Other dietary components such as clovers or non-ryegrass grass species, crops or supplements will dilute the intake of endophyte alkaloids.

Endophyte brand	Freedom from staggers		Effects on animal performance
	Sheep and lambs	Cattle and dairy cows	
AR1	••••	••••	High level of animal performance.
AR37	•••	••••	Typically provides a high level of animal performance. Can cause ryegrass staggers in sheep and lambs in extreme circumstances. Lamb liveweight gain can be reduced during periods of severe staggers. While ryegrass staggers has not been observed in cattle and dairy cows, it could occur on rare occasions.
CM142	(•••••)	••••	Typically provides a high level of animal performance. Can cause ryegrass staggers in sheep and lambs in extreme circumstances. Lamb liveweight gain can be reduced during periods of severe staggers. While ryegrass staggers has not been observed in cattle and dairy cows, it could occur on rare occasions.
NEA	••••	••••	High level of animal performance.
NEA2	••••	••••	Typically provides a high level of animal performance. Lamb liveweight gain could be reduced in extreme circumstances. While no effects have been observed in cattle and dairy cows, body temperature could be elevated on rare occasions.
NEA4	••••	••••	Typically provides a high level of animal performance. Lamb liveweight gain could be reduced in extreme circumstances. While no effects have been observed in cattle and dairy cows, body temperature could be elevated on rare occasions.
NEA12	•••	••••	Typically provides a high level of animal performance. Can cause ryegrass staggers in sheep and lambs in extreme circumstances. Lamb liveweight gain can be reduced during periods of severe staggers. While ryegrass staggers has not been observed in cattle and dairy cows, it could occur on rare occasions.
RGT18	(•••••)	••••	Typically provides a high level of animal performance. Lamb liveweight gain could be reduced in extreme circumstances. While no effects could be observed in cattle and dairy cows, body temperature could be elevated on rare occasions.
U2	••••	••••	High level of animal performance.
MaxP (AR584)	••••	••••	High level of animal performance.
Standard endophyte	•	••	Can cause ryegrass staggers in sheep and lambs, and significantly decrease lamb growth rates in summer and autumn, and significantly increase dags. In dairy cows, it has been shown to depress milksolids production through summer and autumn.
Without endophyte	••••	••••	High level of animal performance.

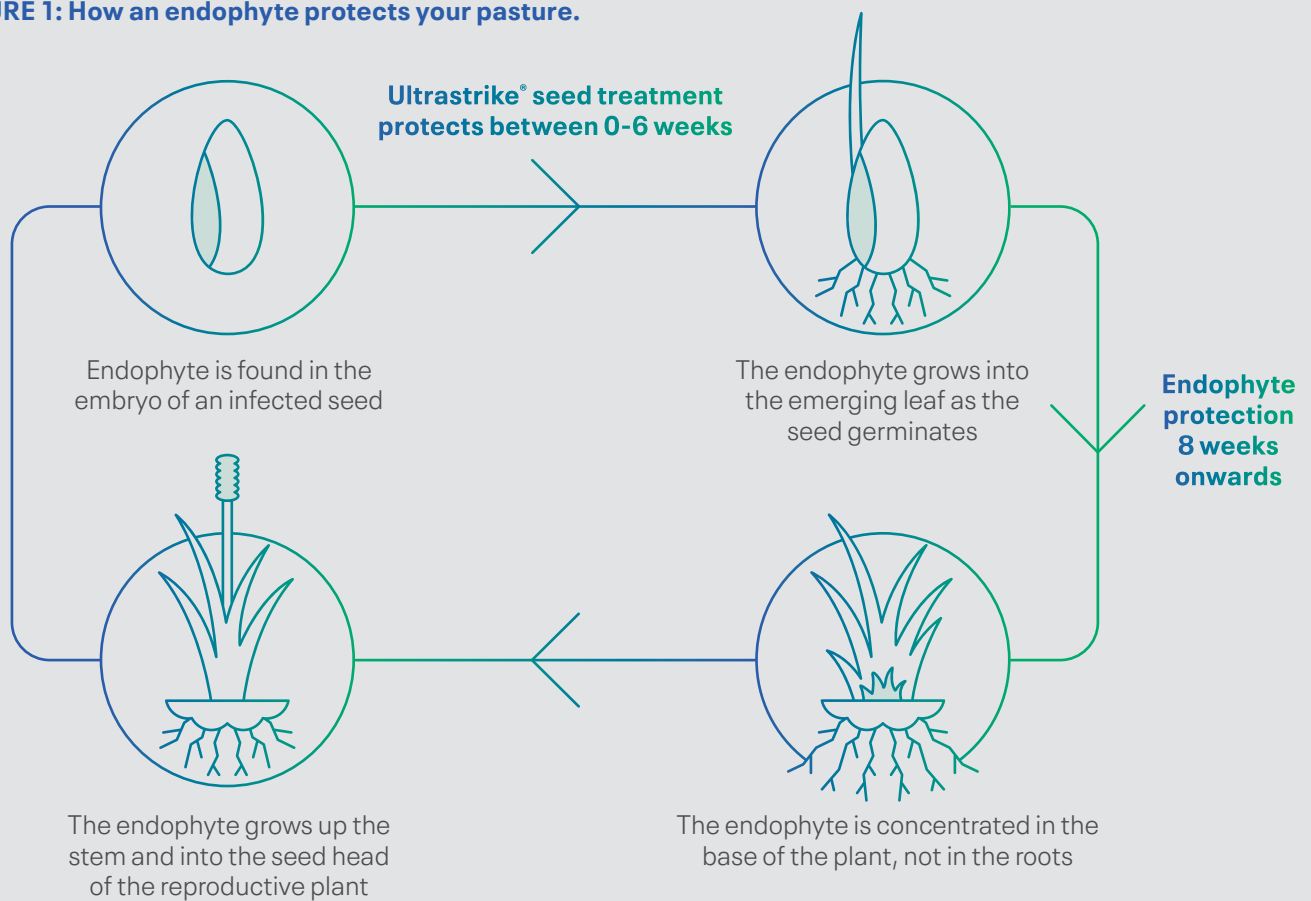
### Notes on Tables

- Likely to cause severe staggers in most years
- Can cause severe staggers in some years
- Can cause severe staggers occasionally
- Very unlikely to cause staggers
- ( ) Provisional result: Further results needed to support the rating. Testing is ongoing.

# HOW AN ENDOPHYTE PROTECTS YOUR PASTURE

An endophyte is a fungus found naturally in many grass species, including ryegrass. It provides the plant with protection from insects, and in return the plant provides the endophyte with a place to live and reproduce.

FIGURE 1: How an endophyte protects your pasture.



# THE BENEFITS OF NOVEL ENDOPHYTES

## AR37 endophyte



Suitable for



**AR37 endophyte takes ryegrass pasture persistence and protection to a premium level.**

### Benefits of ryegrass with AR37 endophyte:

- Provides the best proven balance of pasture production and persistence
- Higher tiller density over time
- Assists with post drought recovery and improves agronomic performance
- Provides stronger control of more insect pests compared to ryegrass cultivars containing AR1 or standard endophyte (SE)
- May produce greater carcass weight per hectare compared to ryegrass cultivars containing SE
- Helps to provide a greater return on investment
- Increased total dry matter production compared to ryegrass cultivars containing AR1 or nil endophyte
- Has no Ergovaline which increase milk production compared to endophytes containing high Ergovaline levels
- Increased sheep performance compared to ryegrass cultivars containing SE
- Low incidence of dags in sheep (similar to that of cultivars containing AR1 endophyte)

**Pests controlled:** Argentine Stem Weevil Larvae, Pasture Mealy Bug, Adult Black Beetle and Root Aphid.

**Available in:** Base, Reason, Three<sup>60</sup>, Vast, Legion<sup>#</sup> and Platform<sup>#</sup> and Expo perennial and Mohaka hybrid ryegrass.

### Limitations of ryegrass with AR37 endophytes:

AR37 varieties should not be used or fed to any other classes of stock other than sheep, beef and dairy (eg. grazing horses/monogastrics)

For important information on insect control and animal safety, see page 106-107 of this guide or visit [www.dlfseeds.com.au/advice/pasture/endophytes](http://www.dlfseeds.com.au/advice/pasture/endophytes)

<sup>#</sup>Due to small number of tip awns, Platform and Legion are certified *Lolium boucheanum*.

### AR37 controls Root Aphid.



Evidence of Root Aphid damage



No evidence of Root Aphid damage

## Endo5 endophyte **Endo5**

Suitable for



**Good pest control and no known risk of ryegrass staggers.**

**Pests controlled:** Black Beetle, Argentine Stem Weevil Larvae, Root Aphid (moderate control) and Pasture Mealy Bug. (Comparatively, AR37 has demonstrated stronger protection against pests and insects).

**Available in:** Reward perennial ryegrass.

### Benefits of ryegrass with Endo5 endophyte:

- Contains no Lolitrem B, the main cause of ryegrass staggers
- Produces less Ergovaline for increased milk production compared to endophytes containing high levels of Ergovaline (Standard endophyte (SE) contains high levels of Ergovaline)
- Increased persistence compared to AR1 endophyte
- Pest and insect protection better than AR1 endophyte

### Limitations of ryegrass with Endo5 endophyte:

May produce lower animal performance levels over summer/autumn compared to ryegrass cultivars containing AR1 or nil endophyte

## AR37, Endo5, AR1 and MaxP<sup>®</sup> endophytes

It is important to choose the right endophyte for your operation.  
If you need a little extra know how, contact us on 1800 619 910 or visit [dlfseeds.com.au/advice/pasture/endophytes](http://dlfseeds.com.au/advice/pasture/endophytes).



## AR1 endophyte

Suitable for



**A novel endophyte option with high animal performance and no known animal health issues.**

**Pests controlled:** Argentine Stem Weevil and Pasture Mealy Bug.

**Available in:** Legion\* and Three<sup>60</sup> perennial ryegrass.

\*Due to small number of tip awns, Legion is certified *Lolium boucheanum*.

### Benefits of ryegrass with AR1 endophyte:

- Delivers excellent animal performance
- Provides a moderate range of insect protection
- Increase in milk production compared to ryegrass cultivars containing Standard endophyte (SE) (in areas where ryegrass persists)

### Limitations of ryegrass with AR1 endophytes:

- Has demonstrated poorer persistence in areas with major insect pest pressure from Black Beetle and Root Aphid
- AR1 can be overgrazed, resulting in more stress on the plant which may affect long term pasture persistence

**Quantica and Hummer are the only tall fescue varieties available in Australia with a novel endophyte for protection from insects.**

## MaxP® endophyte

Suitable for



**A premium endophyte protecting tall fescue with no known animal health impacts for beef, sheep and dairy.**

**Pests controlled:** African Black Beetle, Argentine Stem Weevil, Root Aphid and limited control of Field Cricket.

**Available in:** Quantica and Hummer tall fescue.

### Benefits of tall fescue with MaxP® endophyte:

- An endophyte that improves the ability of tall fescue pastures to handle pest attack and possibly moisture stress
- Aids persistence and performance of tall fescue
- No known adverse animal health effects in beef, sheep and dairy



## ⚠ Standard endophyte (SE)

### Limitations of grass with Standard endophyte:

- Contains Lolitrem B, the main cause of ryegrass staggers which can cause significant stock losses in some seasons
- Milk production may be lower in sheep, weight of lambs may be lower, and adult sheep consistently have lower bodyweight when grazing toxic pastures even when clinical staggers is not apparent

- Contains high levels of Ergovaline, which causes subclinical heat stress and is linked to other negative animal side effects

### Other effects

- Scours/dags
- Affects weight gain
- Lower milk production
- Higher water intake
- General "ill thrift"
- Sub clinical heat stress

The *Neotyphodium* endophytes infecting these grasses are not known to be transferred with pollen or by physical contact (Siegel et al., 1984).

David E. Hume and David J. Barker 2005 GROWTH AND MANAGEMENT OF ENDOPHYTIC GRASSES IN PASTORAL AGRICULTURE. In *Neotyphodium* in cool-season grasses. Eds. CA Roberts, CP West, DE Spiers 201-226 Iowa, IA: Blackwell Publishing.

#Due to small number of tip awns, Legion is certified *Lolium boucheanum*.

For orders and enquiries, get in touch with your local DLF Seeds Sales Agronomist whose details can be found on the back of this guide.



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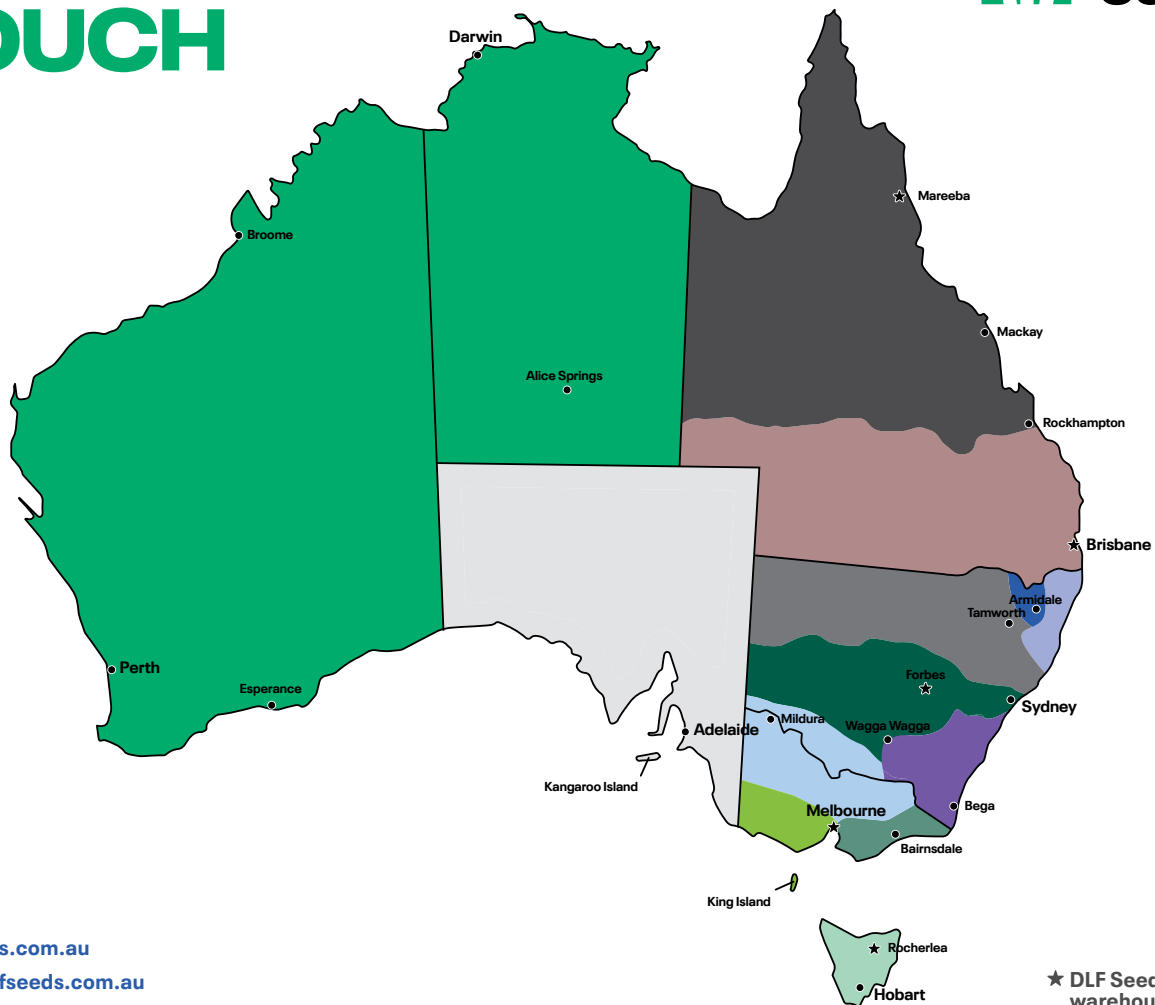
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