

AR37 endophyte sets the standard in insect control

Production and persistence advantages for a ryegrass are gained by choosing **AR37** endophyte. With the best insect protection commercially available from a ryegrass endophyte, **AR37** provides protection against porina, black beetle (adult), pasture mealy bug, root aphid and Argentine stem weevil (larvae).

Large ryegrass production differences between **AR37** and other endophytes occur in the Waikato, BOP and Northland regions. The differences are mostly due to the feeding of more than one insect at any given time, particularly over summer and autumn months. For example, Argentine stem weevil (larvae), root aphid and black beetle (adult) feeding can be more damaging than the impact of drought on ryegrass plants alone.

AR37 endophyte has repeatedly shown marked improvement in ryegrass production in northern regions.

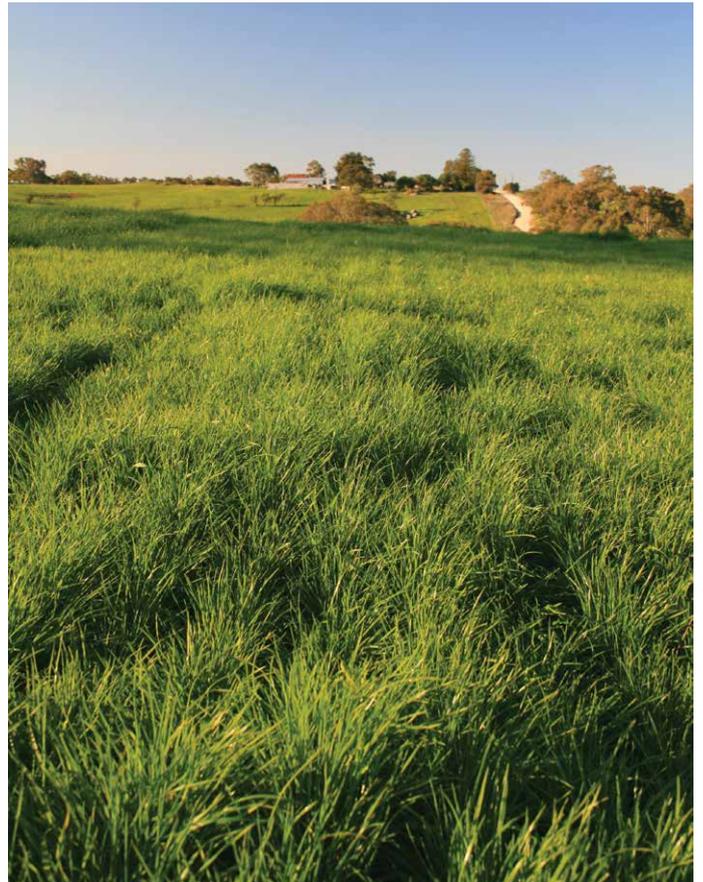


Ryegrass with **AR37** endophyte (right) demonstrates persistency advantages over **AR1** endophyte (left) in the same cultivar, in the presence of black beetle adult, Waikato 2009.

Importance of Endophyte

Endophyte is extremely important to farmers as it has a dramatic effect on the persistence and production of ryegrass pastures in most regions of New Zealand. There are now several novel endophytes available, and each can provide different levels of insect protection and effects on grazing animals.

At Agricom, we market the AgResearch novel endophytes **AR1** and **AR37** in most of our ryegrass cultivars, as well as providing low endophyte (LE) options. AgResearch novel endophytes are thoroughly developed and tested with world-renowned science, with emphasis placed on testing effects on animals, insects, pasture production and persistence.





Endophyte Selection

Ryegrass Endophytes

Where insect pressures are low, **AR1** is an excellent option for animal health and production, and provides good pasture persistence in many regions. **AR37** is increasingly being used in regions where other endophytes are not providing enough insect protection; these insects negatively affect pasture persistence and production. **AR37** provides ryegrass the best long term, natural protection from porina and root aphid, along with other common insects (see Table 1). Several trials have confirmed both pasture production and persistence advantages of **AR37** over **AR1** and standard endophyte.

Animal performance of both sheep and milk production in dairy cows is the same when animals are fed perennial ryegrass with **AR37**, when compared with **AR1** or nil endophyte (see 3 in Tables 2 and 3). The combination of the insect tolerance and persistence advantages makes **AR37** a valuable technology for many farmers.

AR37 can cause ryegrass staggers. In perennial ryegrass with **AR37**, trials have shown that on average the frequency, duration and severity of ryegrass staggers is less than for standard endophyte. However on occasions sheep (and potentially other animals) grazing **AR37** ryegrass may be severely affected. After many years of use on commercial dairy farms, ryegrass staggers have not been observed in dairy cows on-farm to date. **AR37** varieties should not be used on properties grazing either deer or horses. For more information on animal health and performance (see Tables 2 and 3).

Does AR37 Protect Against Porina?

AR37 is the only novel endophyte that gives proven ryegrass protection against porina caterpillars. It has three stars on the insect control table indicating that it provides good control. **AR37** markedly reduces insect damage under low to moderate porina pressure. Damage may still occur when porina pressure is high. Moderate pressure occurs at levels up to approximately 100 porina/m² or 4 porina per standard spade. Pasture production is reduced when 20 - 40 porina/m² are present. At this level they consume the equivalent amount of drymatter as 1 SU.

Higher porina numbers cause plant deaths in unprotected pastures. At 100 porina/m² and greater, high to extreme pressure is exerted on the pasture which **AR37** alone cannot protect against. In situations of high to extreme pressure look at possible chemical control options and talk to your local seed retailer.

No endophyte prevents porina moths laying eggs in pasture. In mixed pastures other plants may provide a safe feed source and this means porina are often found at low levels in pastures based on **AR37** ryegrass, but the endophyte is still working and will deter and poison the caterpillars. No other ryegrass endophyte provides this level of protection against porina.

AR1, **AR37**, **MaxP** and **Endo5** endophytes are used under license from Grasslanz Technology Limited.

AR1, **AR37** and **MaxP** endophytes are protected under the New Zealand Plant Variety Rights Act 1987. **AR37** is protected by patent in New Zealand.

Endo®, **MaxP** and **AR** logos are registered trademarks of Grasslanz Technology Limited in New Zealand.

Seed Storage

When using ryegrass seed with endophyte, it is important to plant the seed whilst it still has a good percentage of the seed's endophyte, as all endophytes can die in seed if stored for too long, especially in warm/moist environments. Agricom has a rigorous testing and storage policy for endophyte seed to ensure adequate endophyte levels. Farmers also need to be aware of the length of time and storage conditions between purchase and planting.

Summary

Before choosing a ryegrass cultivar to match your expectations for persistence, production, and animal performance, you must first select the most appropriate endophyte. If persistence is an important criteria, you need to consider which endophyte provides the best protection to the insects that are likely to be an issue for your farm. Thought can then be given to other attributes such as flowering date, ploidy and palatability.

For more information visit www.ar37.co.nz or see the guide 'Porina management and the role of AR37 endophyte'

Endophyte Insect Control (Perennial and Long Rotation Ryegrass)

These ratings are indicative and may vary slightly between cultivars. If Argentine Stem Weevil or Black Beetle adult are present at sowing, an appropriate seed treatment is recommended to improve insect control during establishment. The ratings in this table are based in part on glasshouse studies where test plants are 100% infected with endophyte, whereas commercial seed must meet minimum standards of 70% of seeds infected.

The three tables were compiled by AgResearch, DairyNZ and NZPBRA*.

*Correct as of print December 2018

TABLE 1. DIPLOID PERENNIAL RYEGRASS

Insect	AR1	NEA2	AR37	Standard Endophyte	Without Endophyte
Argentine Stem Weevil	◆◆◆◆	◆◆◆	◆◆◆◆ ¹	◆◆◆◆	-
Pasture Mealy Bug	◆◆◆◆	(◆◆◆◆)	◆◆◆◆	◆◆◆◆	-
Black Beetle Adult	◆	◆◆◆	◆◆◆	◆◆◆	-
Root Aphid	- ²	◆◆	◆◆◆◆	◆◆	-
Porina	-	Not tested	◆◆◆	◆	-
Grass Grub	-	-	◆	-	-
Field Cricket	Not tested	Not tested	Not tested	Not tested	Not tested

Notes on Table 1

- ¹ **AR37** 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 Also active against Black Beetle larvae.

Key to Table 1

- **No control**
- ◆ **Low level control:** Endophyte may provide a measurable 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 data are needed to support the rating. Testing is ongoing.

Endophyte Animal Health & Performance (Perennial and Long Rotation Ryegrass)

These ratings are indicative. Animal performance and health can vary under different management systems and between seasons.

TABLE 2. LIVESTOCK PERFORMANCE - SHEEP & LAMBS

Insect	AR1	NEA	NEA2	AR37	U2	Standard Endophyte	Without Endophyte
Freedom from ryegrass staggers	◆◆◆◆	◆◆◆◆	◆◆◆◆	◆◆◆◆ ²	◆◆◆◆	◆ ¹	◆◆◆◆
Animal production	◆◆◆◆	◆◆◆◆	◆◆◆◆	◆◆◆◆ ³	◆◆◆◆	◆◆ ¹	◆◆◆◆

TABLE 3. LIVESTOCK PERFORMANCE - DAIRY COWS & BEEF CATTLE

Insect	AR1	NEA	NEA2	AR37	U2	Standard Endophyte	Without Endophyte
Freedom from ryegrass staggers	◆◆◆◆	◆◆◆◆	◆◆◆◆	◆◆◆◆ ²	◆◆◆◆	◆◆ ¹	◆◆◆◆
Animal production	◆◆◆◆	Not tested	Not tested	◆◆◆◆ ³	◆◆◆◆	◆◆◆ ¹	◆◆◆◆

Notes on Table 2

- ¹ Standard endophyte can cause severe ryegrass staggers, can significantly decrease lamb growth rates in summer and autumn, and significantly increase dags.
- ² Ryegrass containing **AR37** endophyte can cause severe ryegrass staggers, but the frequency of ryegrass staggers is much lower than for ryegrass with standard endophyte. **ONE50 AR37** may give rise to higher instances of ryegrass staggers than other **AR37** cultivars in some situations.
- ³ Lambs grazing ryegrass containing **AR37** endophyte can have reduced LWG during periods of severe staggers.

Notes on Table 3

- ¹ Standard endophyte can cause ryegrass staggers, and has been shown to depress milk solids (MS) production through summer and autumn.
- ² While ryegrass staggers has not been observed on cattle and dairy cows, it could occur on rare occasions.
- ³ In dairy trials overall MS production from ryegrass containing **AR37** endophyte is not significantly different from that with **AR1**. A small reduction in MS was observed over summer on ryegrass containing **AR37**. A contributing factor to this was the lower clover content in **AR37** pastures.

Key to Tables 2-3

- ◆ **Moderate animal production and health:** This endophyte is known to regularly cause significant problems.
- ◆◆ **Moderate animal production and health:** This endophyte is known to regularly cause significant problems.
- ◆◆◆ **Good animal production and health:** This endophyte can cause problems from time to time.
- ◆◆◆◆ **Very good animal production and health.**

NB - All trialling for ryegrass staggers occurs under simulated worst case scenario management, and does not represent normal farm practice.