

# 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 2023

| 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    |
| NEA2  | ...                   | (....)            | ...               | ..             | Not tested | -          | Not tested    |
| NEA4  | ...                   | (....)            | ...               | ..             | Not tested | Not tested | Not tested    |
| AR37  | .... <sup>1</sup>     | ....              | ...               | ....           | ...        | .          | Not tested    |
| RGT18   | (...)                 | Not tested        | (...)             | 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    |
| 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 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, Festulolium & Continental Tall Fescue

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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. |
| 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.   |
| 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