
# *Understanding Endophytes in a Dairy System*

*Learn about the Ellinbank Trial in Gippsland, Victoria that looked at the effects and management of perennial ryegrass in a dairy system.*

- Benefits of endophytes
- Avoiding or minimising ryegrass staggers
- Pest Awareness
- Selecting perennial ryegrass

## *Introduction*

A recently conducted experiment looking at management and supplementary feeding regimes common to south-eastern Australia dairy systems has provided useful information for dairy farmers using perennial ryegrass based pastures.

The trial was run over 3 years between 2007 and 2010 at the Department of Primary Industry (DPI) Ellinbank Research Farm in Gippsland, Victoria.

## *Findings*

The endophytes used in the trial were AR37, AR1 and wild type and the trial highlighted that there is still a risk of causing ryegrass staggers in dairy cows when using perennial ryegrass that contains wild type endophyte. This is extremely important given the impact that the staggers can cause in dairy cows, and therefore the potential to cause losses to a dairy farmer.

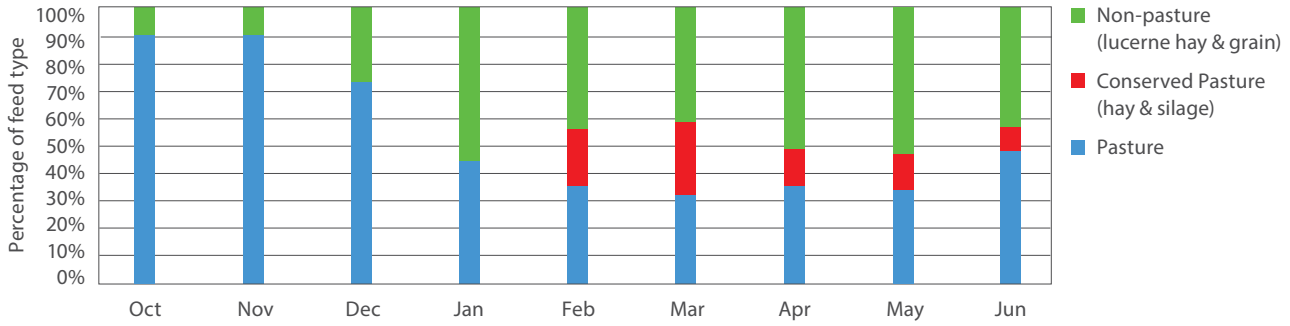
In the Ellinbank trial, 16% of dairy cows grazing ryegrass pastures with wild type endophyte showed symptoms of ryegrass staggers in the first year. There were no recorded ryegrass staggers for the remainder of the trial, due to only moderate levels of lolitrem B (the endophotic alkaloid causing ryegrass staggers) occurring in those subsequent years.

The trial also showed that in a temperate, grass-based system where supplementary feeding made up around two thirds of the total feed used during summer (see Figure 1), the type of perennial ryegrass endophyte used did not impact on milk yield.

## Figure 1: Ellinbank Diet Composition Chart

Figure 1 below shows the seasonal feed intake trends during the Ellinbank trial illustrating the high level of supplementary feeding. It is important to note that at the period with the lowest level of pasture intake (December to February), coincided with the time when ryegrass staggers occurred on wild type endophyte. This result indicates the toxicity of wild type endophyte and is a risk that is not worth taking, or need to be taken, in a dairy situation.

### Average daily intake (as a percentage) by 3 feed options over 3 lactations




## Pests

In the Ellinbank trial, soil samples were taken to identify which pests were present as well as provide accurate data on the population levels of each pest.

Root aphid was identified as being present and in 2009 had a significantly lower population in the AR37 endophyte paddocks (present in 50% of the samples taken) than the AR1 and wild type endophyte areas. It should be noted that populations were not considered to be at levels associated with pasture damage. Other pests that were also present included; the Red and Black Headed Cockchafers, African Black Beetle (Heteronychus arator), Pasture Tunnel Moth (Philobota Productella), White Fringed Weevil (Graphognathus leucoloma) a Pasture Webworm (Hednota spp.) and Mealybugs (Pseudococcidae).

The low incidence of insect pests throughout the trial may account for the lack of differences in pasture growth during the trial, and the resultant lack of difference of milk yield.

Other evidence from the PGG Wrightson Seeds research programme has shown that AR37 endophyte improves perennial ryegrass cultivars productivity and persistence by providing resistance to black beetle, pasture mealy bugs and root aphid over the same ryegrass cultivar with wildtype endophyte and AR1.

Finally, it should be noted that in regions where there are occasional spikes in numbers of damaging pasture pests, or where there is any doubt as to the prevalence of these pests, AR37 endophyte should be used as an 'insurance policy'. It will ensure that persistence is enhanced and productivity is optimised for the life of the ryegrass.

## Selecting a ryegrass with endophyte

PGG Wrightson Seeds believes that when selecting a perennial ryegrass variety, choosing an endophyte should be part of your key selection criteria.

Using a perennial ryegrass with a novel endophyte such as AR1 or AR37 should be seriously considered. AR1 does not cause ryegrass staggers. Although sheep may be affected by ryegrass staggers when grazing AR37 (though on average the frequency, duration and severity of ryegrass staggers is less than for wild type) there continues to be no reports of ryegrass staggers in dairy cows while grazing AR37 after many years of use on commercial dairy farms and two independent trials. As a result, pastures with AR37 are highly recommended for cattle. AR37 should not be used on properties with deer or horses. AR37 is known to cause ryegrass staggers in sheep, but trials show that on average the frequence, duration and severity of the staggers is less than for the wild type.

The type of perennial ryegrass that you sow should be chosen based on its performance for your environment. In dairy situations we recommend farmers exclude varieties that contain wild type endophyte because of the ryegrass staggers risk that they may cause.



**Reference;** Moate et al. (2012). Effects of wild type, AR1 and AR37 endophyte infected perennial ryegrass on dairy production in Victoria, Australia. Animal Production Science, 52, pIII7-1130.