

Impact of AR37, a selected *Epichloë* endophyte, on Italian ryegrass yield performance across regions in New Zealand

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The selected *Epichloë* endophyte strain AR37 first became commercially available in 2007 in New Zealand cultivars of perennial ryegrass (*Lolium perenne*), before being extended into shorter-term ryegrass cultivars. In 2012, the cultivar Asset was the first commercially available Italian ryegrass (*L. multiflorum*) with the option of AR37 or endophyte-free. Over the past 10 years, the use of *Epichloë* endophytes in shorter-term ryegrass cultivars has expanded, with more than 10 hybrid (*L. boucheanum*, syn. *L. hybridum*) or Italian ryegrass cultivars with a selected *Epichloë* endophyte option now available.

The National Forage Variety Trials (NFVT) evaluates commercial and pre-commercial ryegrass cultivars within New Zealand through the New Zealand Plant Breeding and Research Association. The diploid Italian ryegrass cultivar Asset has been evaluated in 15 NFVT, varying in duration from 12 to 18 months, with AR37 or endophyte-free. To understand the effect in production that AR37 provides Asset Italian ryegrass, these trials were analysed for seasonal and total dry matter yield, nationally and by region.

Asset with AR37 demonstrated increased production over endophyte-free, with the combined multisite analysis showing an 11% increase in dry matter yield in the first summer post sowing, and a 14% increase in dry matter yield in the second autumn. The four

trials located in the Upper North Island displayed the greatest benefits of AR37, with a 9% mean increase in dry matter yield over the period from sowing to the end of the first summer. In three of the four trials, AR37 had a significantly greater dry matter yield in the summer and second autumn.

Of the 11 trials located in the Lower North Island and Upper South Island, there were no seasons that differed significantly in the combined seasonal analysis within each region. In an analysis of the individual trials, two of the four Lower North Island trials had significantly greater dry matter production with AR37 in summer and the second autumn than endophyte-free. In the Upper South Island, three of the seven trials had significantly greater dry matter yield for AR37 than endophyte-free in both the summer and in total production over an 18-month period.

The results confirm that AR37 in Asset Italian ryegrass provided equal or greater total dry matter yield over endophyte-free Asset across all trials within 12 to 18 months, giving confidence that endophyte can have a positive impact on Italian ryegrass dry matter yield. While this work did not investigate the specific factors contributing to the benefits of endophyte, future work would help validate how *Epichloë* endophytes support the resilience of shorter-term ryegrasses under varied environments within regions and seasons.