

## PERENNIAL RYEGRASS AND TALL FESCUE RESPONSES TO WATER DEFICITS

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Endophyte infection has little effect on growth of tall fescue when grown under near optimum conditions. However, infection with endophyte is associated with more dramatic and consistent differences in dry matter production when tall fescue plants are subjected to stress, especially drought. We examined whether this same reaction occurred in perennial ryegrass.

### MATERIALS AND METHODS

Micro swards (each 0.1 m<sup>2</sup>) of perennial ryegrass cultivars Nui, Kangaroo Valley, Victorian and Lincoln, and tall fescues Kentucky 31, Torpedo, Advance and New Zealand wild ecotype were grown in a glasshouse. Six of these genotypes were free of *Acremonium* spp. endophyte and these were compared with the same genotypes with one or more different endophyte strains. The number of endophytes separately combined with each cultivar varied but a total of 10 endophytes were used. Each box was watered twice per week so that the average soil moisture content after watering was 33%, 66% or 100% of available soil water. The micro swards were harvested four times by cutting the herbage with hand shears. After the third harvest all boxes were watered to 100% available water to compare the recovery of swards after the previous watering treatments.

### RESULTS AND DISCUSSION

There were significant differences in the dry matter (DM) production from each of the watering treatments at all four harvests (Table 1). It is notable that, after applying equal quantities of water to all boxes after March 20, there was significantly more regrowth in the boxes which had previously had least water availability. There were no significant interactions between the watering treatments and the plant/endophyte combinations.

Table 1. Herbage production at 3 levels of watering. Mean of all plant/endophyte associations.

Available water (%)	February 3	February 24	March 20	April 10
	(g DM/box)			
33	14	69	53	150
66	22	118	96	138
100	32	170	139	122
I.s.d ( $P=0.05$ )	1.3	7.3	9.5	8.6

Endophyte presence did not affect DM production at the first and fourth harvests. At the second and third harvests, a single Advance/endophyte association had significantly more DM production than the endophyte free Advance. At the second harvest, one of the Nui/endophyte associations had significantly more DM production than two other Nui associations but was not significantly different to the endophyte

free Nui. Endophyte presence, therefore, had no consistent effects here. However, possible endophyte effects during more intense drought need investigation.

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