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**Viability of endophytic fungus in different perennial  
ryegrass (*Lolium perenne*) varieties kept in different  
storage conditions**

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A thesis presented in partial fulfilment of the requirements  
for the degree of Master of Science

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Abstract of a thesis submitted in partial fulfilment of the requirements for the degree of Master of Science.

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by

Elizabeth Rose Kitson

*Epichloë* endophytes form symbiotic relationships with cool-season grasses of the Pooideae family and are known to synthesise a range of bio-protective alkaloids. These alkaloids can provide the grass host with benefits for greater survival including; deterrence of herbivorous pests, increased persistence, better livestock health and protection from abiotic stressors. The commercialisation of novel endophytes is on the increase, and it is important to ensure the survival of the endophyte is maintained so their benefits can be realised.

This study examined the effects of different storage conditions on the viability of three commercial novel endophytes (AR1, AR37 and NEA2/6) and one pre-commercial novel endophyte (815). The different storage conditions were the top of a warehouse, the bottom of a warehouse and a temperature and humidity controlled cool store to simulate current commercial seed storage environments.

The viability of different endophytes decreases independently of grass seed germination ( $p = \text{NS}$ ) however there are many factors influencing the endophyte survival. Over the one year storage period there were significant interactions between endophyte x ploidy (host), endophyte x location and endophyte x ploidy (host) x location. The pre-commercial endophyte, 815, had the largest reduction in viable endophyte when stored outside of the controlled cool store dropping 70 percentage points at the top of the warehouse, compared with AR37 (12 percentage points), AR1 (16 percentage points), and NEA2/6 (46 percentage points) ( $p < .001$ ,  $\text{LSD} = 15.9$ ). In the cool store there was no significant decrease in any of the treatments.

As more novel endophyte/grass combinations are released for commercial sale it is important to test each for compatibility and performance post-storage. The results of this study recommend controlled low-temperature, low-humidity storage to maintain endophyte viability.

**Keywords:** Endophyte, *Epichloë*, perennial ryegrass, *Lolium perenne*, storage

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# Table of Contents

Acknowledgements.....	4
Table of Contents.....	6
List of tables.....	8
List of figures.....	9
Chapter 1 Introduction.....	10
Chapter 2 Literature Review.....	12
2.1 Introduction to endophytes.....	12
2.1.1 Taxonomy.....	12
2.1.2 Biology and development.....	14
2.2 Alkaloids.....	15
2.2.1 Aminopyrrolizidines.....	18
2.2.2 Pyrrolopyrazines.....	19
2.2.3 Indole-diterpenes.....	20
2.2.4 Ergot Alkaloids.....	20
2.2.5 Alkaloid Functions.....	21
2.3 Benefits of endophytes.....	22
2.3.1 Herbivorous insect pests.....	23
2.3.2 Persistence and Productivity of Pasture.....	27
2.3.3 Livestock health.....	28
2.3.4 Abiotic stressors.....	28
2.4 Inoculation and Detection.....	30
2.5 Storage of endophytes.....	31
Chapter 3 Materials and Methods.....	34
3.1 Genotype/Endophyte varieties.....	34
3.2 Storage.....	34
3.3 Germination tests.....	34
3.4 Endophyte viability tests.....	34
3.5 Measurement and Analysis.....	35
Chapter 4 Results.....	36
4.1 Temperature and Humidity.....	36
4.2 Germination.....	39
4.3 Endophyte viability.....	41
4.4 Ploidy.....	43

Chapter 5 Discussion.....	45
5.1 Endophyte viability in different hosts.....	45
5.2 Endophyte viability in different storage conditions.....	47
5.3 Recommendations and future research .....	48
Chapter 6 Conclusions .....	49
Appendices.....	51
Appendix 1. Other work attempted.....	51
Appendix 2. REML variance components analysis results .....	54
Appendix 3. Temperature and Humidity data from bottom of warehouse .....	55
Appendix 4. Temperature and Humidity data from top of warehouse .....	56
References .....	57



## List of tables

Table 1. Nomenclatural changes to agriculturally important grass/endophyte symbioses, as described by Leuchtman et al. (2014) .....	13
Table 2. Commercially available endophytes in New Zealand as of 1/12/16.....	16
Table 3. Alkaloid profiles of the <i>Epichloë festucae</i> var. <i>lolii</i> endophyte strains AR1, AR37, NEA2/6, 815 (Edge) and standard (SE). (adapted from McKenzie (2014)). .....	17
Table 4. Comparison of temperature and relative humidity in 2 different locations in a 1 year period. ....	36

## List of figures

Figure 1. The life cycle of the asexual <i>Epichloë</i> species present in a grass plant. ....	15
Figure 2. Combined autumn dry matter production (kg/ha) of the five endophyte containing grasses versus their respective nil endophyte counterparts LSD (p=0.05) 254. (Evans and Kitson, unpublished data, 2011). ....	29
Figure 3. Effect of final seed moisture content after 12 months storage at ambient temperatures on % of viable <i>Epichloë festucae</i> var. <i>lolii</i> endophyte. Adapted from Rolston et al. (1986).....	32
Figure 4. Temperature differences at the top and bottom of a warehouse over a one year period...	37
Figure 5. Relative Humidity differences at the top and bottom of a warehouse over a one year period.....	38
Figure 6. Differences in the cumulative degree days (using a base of 5°C) in three different storage locations over one year.....	39
Figure 7. Germination (%) of seed containing 4 different endophytes, in two ryegrass genotypes each, stored in 3 different locations for a one year period. P = NS, LSD = 9.7 .....	40
Figure 8. Endophyte viability of 4 endophytes, in two ryegrass genotypes each, stored in 3 different locations for a one year period.....	42
Figure 9. Endophyte viability of different endophyte/genotype combinations in three different storage conditions over one year. ....	44