

Abstract:

As a result of the mutualistic symbiosis between the endophytic fungus *Neotyphodium lolii* and *Lolium perenne* (perennial ryegrass), various alkaloids are produced, including Lolitrem B and Paxilline. The increased production of Lolitrem B in *N. lolii* infected fodder grasses can cause the undesirable animal disorder ryegrass staggers. However, there are positive effects of the symbiosis, in that endophyte-infected grass becomes more competitive than uninfected in the presence of biotic and abiotic stresses.

The aim of this work was to make detailed investigations of the effects of the *Neotyphodium*/grass interaction under the meteorological conditions ruling in Germany. The occurrence of *N. lolii* in varieties and ecotypes of *L. perenne* was assessed by staining plant tissue and subsequent microscopic examination. Infected plants were found only rarely in varieties, but were more frequent in ecotypes. NIR-Spectroscopy was tested as a possible method for detecting the presence of *N. lolii* in *L. perenne*. As expected, the NIR-spectra of the seed samples in diffuse reflection could be obtained, but no significant differences were detected between results for *N.*-colonised and *N.*-free samples.

Analysis of *N. lolii*-infected *L. perenne* from field trials for Lolitrem B showed that there is the potential for ryegrass staggers to occur in Germany. The Lolitrem B concentration of some samples was above the threshold for toxicity of 2000 µg/kg DM. The influence of the parameters temperature, fertilizer and season on Lolitrem B content, and the distribution of Lolitrem B within the plant, were studied in field trials as well as in accompanying climatic chamber experiments.

In addition to the *in vivo*-investigations, the *in vitro* production of Lolitrem B- and Paxilline by *N. lolii* isolates was explored.