Nutrient Seed Coating for Grasses

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Introduction

Fertilizers can be applied in several ways: broadcast, band, in seed row or as a seed coating. Especially phosphorus as a pre-seeding application is important for early establishment. Fertilizers applied in a seed coating are alike to cause phytotoxicity, due to the salinity shown by some soluble fertilizers. Typical nitrogen content found in commercial products is 1-2%, with the effects often being negligible. A new seed coating has recently been patented (iSeed® by DLF Trifolium) containing 20% nitrogen and 4% phosphate with both fast acting nitrogen and phosphorous, and slow release nitrogen.

The paper summarizes the results of different trials carried out to evaluate the effects of the nutrient seed coating on some key performances of turfgrasses.

Materials and methods

In trial 1 the effect of two nutrient seed coating materials was tested on the lateral root formation of *Lolium multiflorum* (cv. 'Fabio') grown for two weeks in transparent Petri dishes (diameter 14 cm) filled with sandy soil (pH 7.5, high in P and Ca, low in all other nutrients, maintained at 18 % w/w soil moisture content. Four seeds were placed in each dish and six replications were adopted. Nutrient seed coating treatments contained nitrogen only (iSeed 15N) or nitrogen and phosphorous (iSeed 15N 4P). A control treatment was also included in the trial for which no fertilizer was added. The number of lateral roots was counted daily. Further details of the trial are reported in Jokinen et al. (2006).

In trial 2 a pot experiment was carried out in the greenhouse with alternating temperature (+20/+16^{o}C for 18h/6h respectively). An equivalent number of seeds per pot of *Lolium multiflorum* (cv. 'Fabio') were sown in the same sandy soil as trial 1. Pot size was 3.5 l. Nutrient seed coating treatments contained nitrogen only (iSeed 30N) or nitrogen and phosphorous (iSeed 30N 4P). A control treatment was also included in the trial for which no fertilizer was added. Two cuts at three weeks intervals were performed and phytomass collected. The phosphorus and nitrogen content in clippings was determined and the nutrient uptake per pot calculated. Further details of the trial can be found in Ylikojola (2006).

In trial 3 a field experiment was carried out in the UK in 2006 with the aim of assessing the effect of the nutrient seed coating on the quality of a sward (Crossley et al, 2007). The following turfgrasses were used: *Lolium perenne* 'Sauvignon', *Festuca rubra* 'Cezanne', *Poa pratensis* 'Limousine' and *Agrostis capillaris* 'Manor'. Fertilization treatments were: pre-seeding fertilization (28 kg ha^{-1} N and 18 kg ha^{-1} P) and nutrient seed coating (iSeed 20N 4P equivalent to a nutrient rate of 24 kg ha^{-1} N and 5 kg ha^{-1} P). Turf quality was determined by weekly visual assessments, using a 1-10 scale (1 = poor quality, 10 = best quality). Results are reported as average across species.

In trial 4 a field experiment was carried out in the Netherlands in 2007 in order to assess the effect of nutrient seed coating on turf density. In May 2007 two existing sports field were overseeded using 40 kg of a mixture containing 75% *Lolium perenne* (cv. 'Bizet I' and 'Conrad I') and 25% *Poa pratensis* (cv 'Limousine' and 'Julius') (Terwissche, 2007). Pre seeding fertilization was applied at a rate of 50 kg ha^{-1} of N, for both control and nutrient seed coating treatments. The nutrient seed coating treatment received an extra fertilization of 8 kg ha^{-1} of N and 1.6 kg ha^{-1} of P. The number of plants was counted on a surface area of 509 cm^{2} in August 2007.

Results and discussion

Trial 1. The nutrient seed coating was not phytotoxic for roots. The number of lateral roots per seedling, as observed until 15 days after sowing, was increased by the nutrient seed coating treatment from the start of the root formation (Figure 1). The coating treatment containing only nitrogen proved to have a more relevant effect compared to the treatment containing both nitrogen and phosphorous.

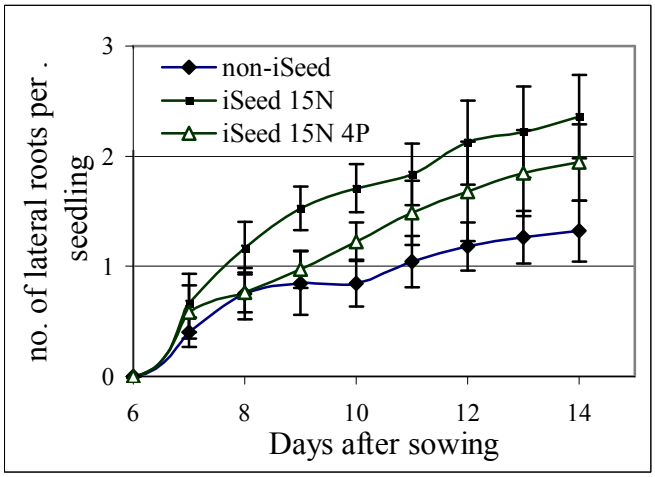

Figure1: Root structure (number of lateral roots per seedling) as influenced by nutrient seed coating. Bars show the standard error of means

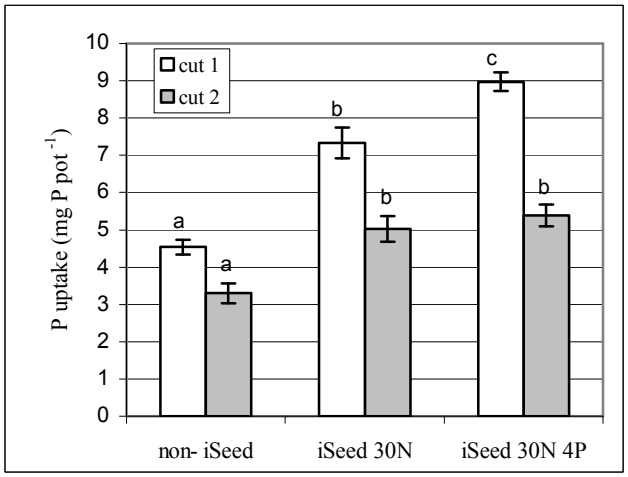

Figure 2: Phosphorous uptake as influenced by nutrient seed coating. Bars show means standard deviation. Within a cut, means with different letters are significantly different at P≤0.05.

Trial 2. The nutrient seed coating improved the uptake of phosphorous (Figure 2). Although the addition of phosphate didn't increase the number of lateral roots, as observed in trial 1, it did have an influence on the level of phosphorous uptake. The effect observed on nitrogen uptake was similar (results not shown).

Trial 3 and 4. The nutrient seed coating resulted in a better sward quality (Figure 3) and one of the reasons might be the increased number of plants observed in the field trial 4 (Figure 4).

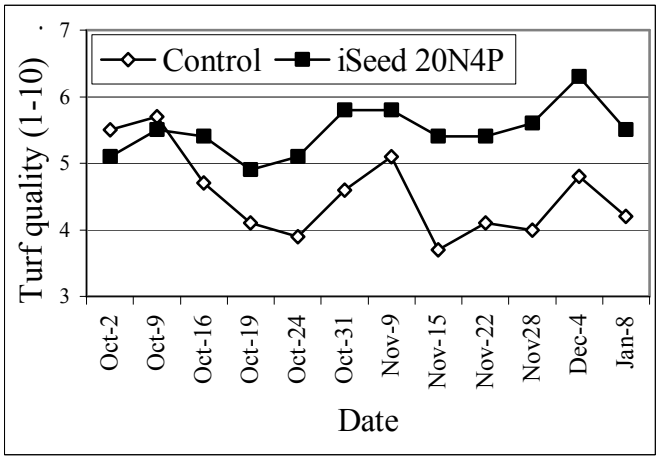

Figure 3: Mean sward quality as affected by treatments during establishment.

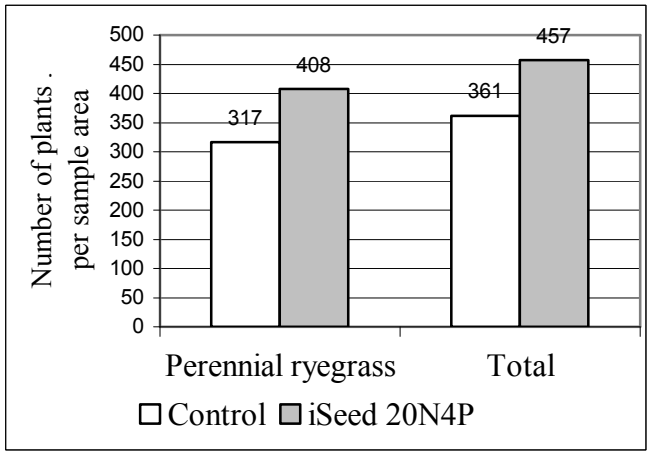

Figure 4: Number of plants counted on a sample area of 509 cm^2

Literature cited

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