

# Infill as a Biostimulant to Enhance Health

a research report submitted to E. Marker A/S

by

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**Background:** Maintaining a quality putting green surface requires sound management practices such as proper fertility, irrigation, cultivation, mowing, and pest management. Northern European golf courses benefit from the proper implementation of the aforementioned management practices; however, fungal diseases like anthracnose and Pythium are common problems on golf course turfs. Infill is a biostimulant product that may improve turfgrass health by decreasing the severity of common turfgrass disease like anthracnose and Pythium. The likelihood of German greenkeepers adopting Infill as a biostimulant to suppress disease pressure would increase if a study were conducted on a German golf course that demonstrated its potential benefits.

**Objectives:** To improve turfgrass health by lessening anthracnose and Pythium disease pressure.

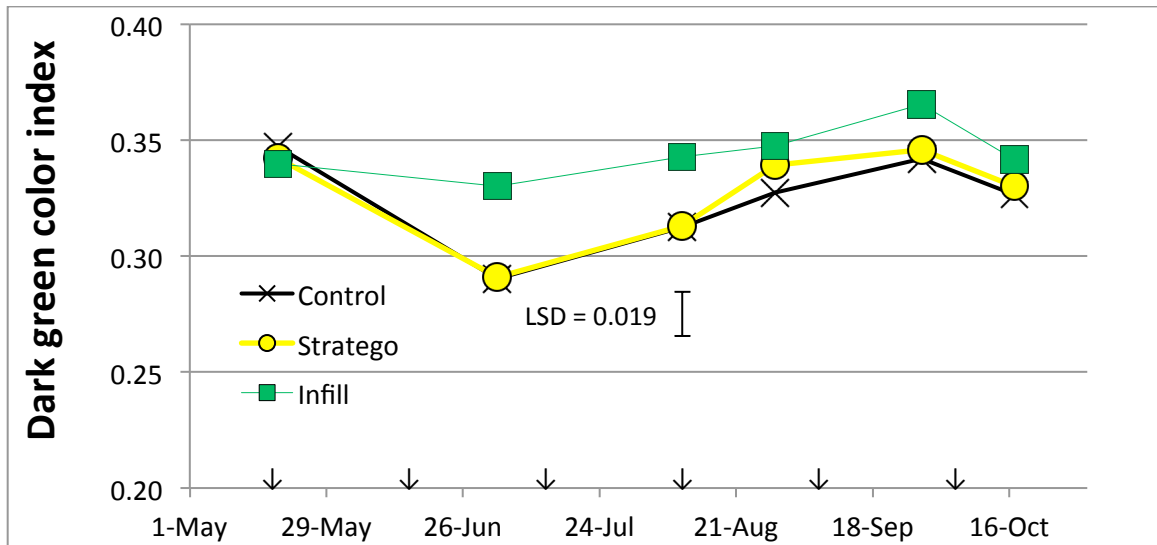
**Methods:** ***Experimental area.*** The proposed study was conducted at Golf Club Hittfeld E.V. in Hamburg, Germany, on a sand based putting green in a 10,000 m<sup>2</sup> nursery. Treatments were applied to individual 1 x 1 m plots with four replicates. Treatments began late 2011 with 28 days separating follow up applications for a total of five applications. Treatments included Infill biostimulant, a commonly used commercial fungicide (Stratego), and an untreated control for comparison. Infill was applied at 20 L/ha and Stratego was applied at 1 L/ha.

***Evaluations.*** Evaluations were made from digital images taken of the plots at regular intervals. Digital images were acquired using a standard camera and lighting system to ensure the images are of high quality and are unaffected by ambient light. The images were analyzed using SigmaScan software for: 1) percent green coverage and density, which was used as an estimate of field safety, 2) turf colour, which was used to estimate treatment residual and efficiency 3) Anthracnose and pythium incidence was visually estimated on a percent scale (0-100%) and was compared to digital image analysis percent green cover ratings.

***Data analysis.*** For each evaluation, a one-way analysis of variance was computed to determine if the effect of fertilizer source is significant ( $P < 0.05$ ).

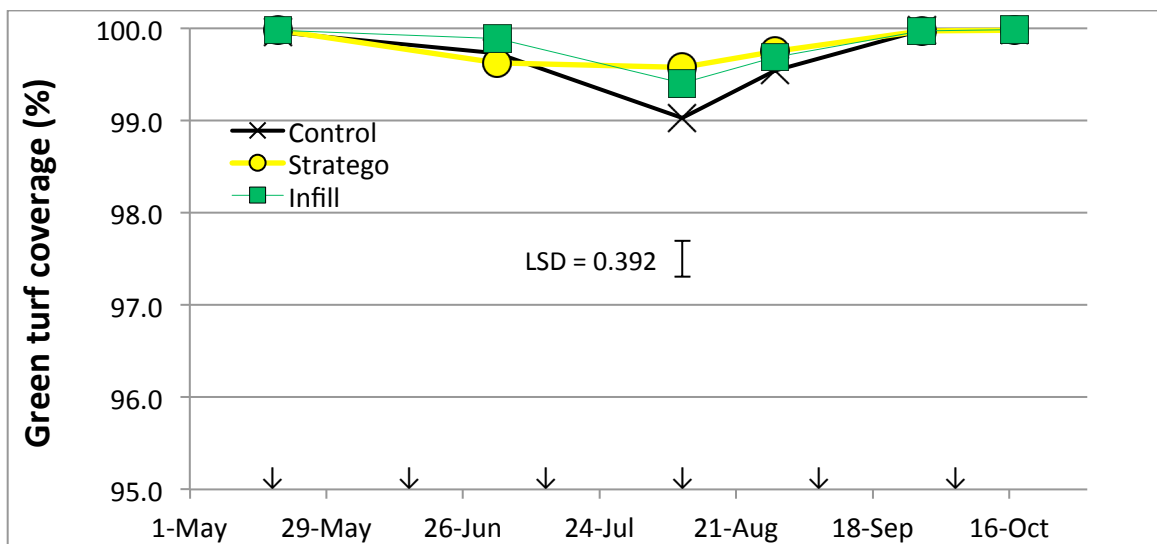
**Results:**

**Turf color.** After the second and third Infill applications the Dark Green Color Index (DGCI) was greater than the control plots. The DGCI differences occurred on 3 of the 5 rating dates (Fig. 1).



**Figure 1. Dark Green Color Index for Infill Biostimulant for Plant Health, Hamburger Land and Golf Club, Hittfeld Germany, 2011.**

**Turf coverage.** On one rating date the Stratego treatment had greater percent green turf cover than the control plot, but was not significantly different from the Infill treatment (Fig. 2). Since disease pressure in the summer of 2011 was minimal, little differences were observed for percent green cover since no major disease events occurred.



**Figure 2. Percent Green Turf Cover for Infill Biostimulant for Plant Health, Hamburger Land and Golf Club, Hittfeld Germany, 2011.**

**Disease.** Unfortunately, because of the unusually cool and wet summer that occurred in Northern Germany in 2011, disease pressure for anthracnose and pythium was extremely low. Thus, no disease occurred throughout the study. However, the 2011 weather conditions were ideal for moss incidence and observations showed that the Infill as a Biostimulant was very effective for controlling moss compared to the Stratego fungicide or untreated control. This supports similar findings for moss control reported in the United States; where, products containing iron sulfate (Infill) are effective controls for moss.