IMPACT OF WORM POWER ON ROOTING ON A CREEPING BENTGRASS/ANNUAL BLUEGRASS FAIRWAY, 2017

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INTRODUCTION

Root length and mass of turfgrass plants often declines during the warm summer months. For this reason, it is important to evaluate existing commercially available products to improve our ability to increase root length and mass and in turn, plant health. Worm Power is an organic soil amendment purported to promote root development. The objective of this research was to evaluate the efficacy of various rates and application intervals of Worm Power on rooting during the summer months.

MATERIALS & METHODS

Two experiments were initiated to evaluate the effects of Worm Power on root length and weight. A one-year field study was conducted at the Valentine Turfgrass Research Center located in University Park, PA.

Turfgrass species within the study area was a 60/40 mixed stand of *Agrostis stolonifera* L. and *Poa annua* L. Soil at this location was a Hagerstown silt loam (fine, mixed, mosaic, Typic Hapludalf) with a pH of 7.2 and 2.3% organic matter. All treatments were applied with a CO_2 pressurized (40 psi) sprayer equipped with an air-induction flat fan nozzle (TeeJet AI9508EVS), calibrated to deliver 2.0 gal of water 1000 ft^{-2}. The area was mowed three times per week to a height of 1.3 cm. Treatments were initiated on 22 Jun and reapplied until 31 Aug. All rates and application intervals are listed in the data tables.

Plots measured 3 ft x 6 ft and were arranged as a randomized complete block design with three replications. Turfgrass color and quality was visually assessed every other week. On 19 Sep, 3 soil cores measuring 2.5 cm in diameter and 10 to 12 cm deep were harvested per plot.

A second experiment was initiated in Conetainters under greenhouse conditions. Plugs from the aforementioned fairway (3.8 cm in diameter and 5 cm deep) were placed in Conetainers atop 7 cm of soil. Treatment rates and application intervals were the same as the field study. The study was a completely randomized design with 4 replications. Plants were watered and trimmed regularly to simulate field conditions. On 8 Aug 2017, the study was terminated.

Figure 1. Worm Power was applied to a fairway at various rates and application intervals and evaluated for root development in the field and in the greenhouse.

In both experiments, approximately 2 cm of thatch was removed from each plug, and soil separated from roots using a root rinsing station. After washing, root length was measured to the depth of the majority of root ends. Roots were then placed in a drying oven for 24 hours at 66C. Dry root weight was determined and roots were then placed in an ashing oven at 400C for 24 hours. Ashed weight was then recorded. Values for loss on ignition (LOI) were calculated based on the equation below.

$$\text{LOI} = \frac{(Dry\ Weight - Ashed\ Weight)}{Dry\ Weight}$$

All data were subjected to analysis of variance and means were separated at $P \leq 0.05$ according to Fisher's Protected least significant difference test.

RESULTS & DISCUSSION

No differences in turfgrass color or quality or root length or mass were observed in either study. Although no differences were observed in this fairway trial, further research is needed to assess the impact of Worm Power on root development on golf course putting greens and turfgrass grown on different soil types.

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Table 1. Root mass based on loss on ignition of annual bluegrass/creeping bentgrass grown in Conetainers following treatment with various rates and application intervals of Worm Power, 2017.

Treatment and rate	Application Code[z]	LOI (g) [y]
Wormpower 4 oz.	ABCDE[z]	0.520 a [x]
Wormpower 8 oz.	ABCDE	0.679 a
Wormpower 8 oz.	ACE	0.730 a
Wormpower 16 oz.	ABCDE	0.479 a
Wormpower 16 oz.	ACE	0.443 a
Wormpower 32 oz.	ACE	0.615 a
Non-treated	-	0.774 a

[z] Treatments were applied on the following dates: A = 8 Jun, B = 22 Jun, C = 6 Jul, D = 19 Jul, and E = 3 Aug.

[y] Turfgrass roots were collected on 8 Aug and washed for data analysis. Loss on ignition was calculated using the formula (dry weight-ashed weight)/(dry weight).

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Fisher's Protected least significant difference test.

Table 2. Root length and mass (LOI) of a creeping bentgrass/annual bluegrass fairway following treatment with various rates and application intervals of Worm Power, 2017.

Treatment and rate	Application Code [z]	Root Length (cm)[y]	LOI (g)[x]
Wormpower 4 oz.	ABCDE	8.2 a[w]	0.446 a
Wormpower 8 oz.	ABCDE	7.2 a	0.465 a
Wormpower 8 oz.	ACE	8.2 a	0.603 a
Wormpower 16 oz.	ABCDE	8.6 a	0.393 a
Wormpower 16 oz.	ACE	7.2 a	0.462 a
Wormpower 32 oz.	ACE	8.5 a	0.536 a
Non-treated	-	7.0 a	0.535 a

[z] Treatments were applied on the following dates: A = 8 Jun, B = 22 Jun, C = 6 Jul, D = 19 Jul, and E = 3 Aug.

[y] Root length was measured from soil cores extracted to a depth of 10 to 12 cm on 19 Sept. Thatch (2 cm) was removed prior to measurements. Root length was recorded to the depth of the majority of the roots.

[x] Loss on ignition was calculated using the formula (dry weight-ashed weight)/(dry weight).

[w] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Fisher's Protected least significant difference test.