

HealthyGro Fertilizer Trials

Conducted by

LSU AgCenter

Trial 1 – The Effect of HealthyGro Fertilizers on Bermudagrass cv ‘Tifway’ Growth

Objective

Evaluate the effect of HealthyGro compost fertilizers on mature bermudagrass for turfgrass quality, density, shoot and root growth.

Materials and Methods

An eight week study was initiated June 17, 2007 on bermudagrass cv ‘Tifway’ located at the Louisiana State University Golf Course in Baton Rouge, LA. Plots (3x8 ft) were arranged in randomized complete block design with four replications. Fertilizer treatments were as follows:

Fertilizer	Type	Analysis	Rate lb N / M	Frequency
Traditional	NH ₄ NO ₃	34-0-0	0.25	Weekly
Traditional	NH ₄ NO ₃	34-0-0	1	Single
HealthyGro	Composted	16-2-16	1	Single
HealthyGro	Composted	8-3-8	1	Single

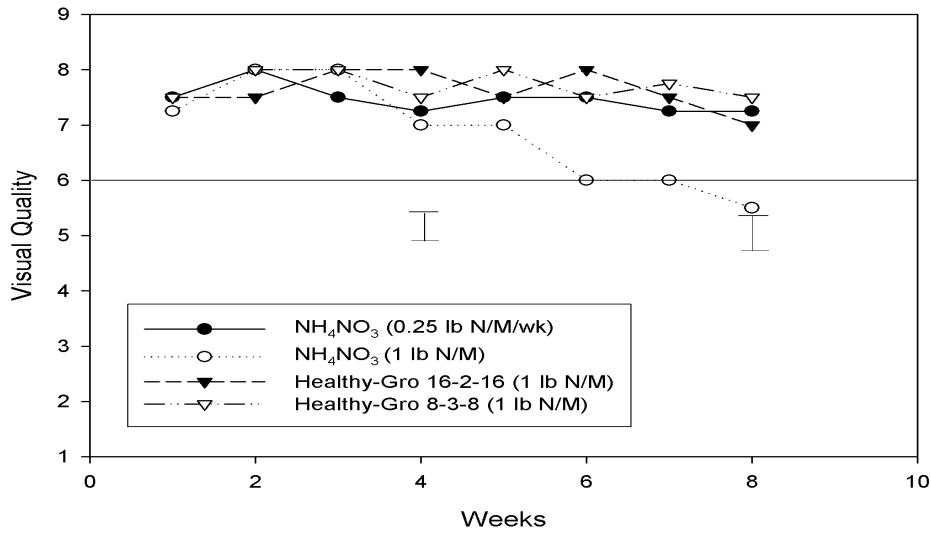
Fertilizer treatments were applied using a 3 ft wide drop spreader with plots irrigated within twenty-four hours after fertilizer application. General maintenance included mowing to a height of ½ inch three times per week and irrigating as needed to sustain bermudagrass growth. Weekly measurements included visual quality ratings based on the NTEP scale of 1 to 9 (1 = brown or dead turf, 6 = minimal acceptable quality, and 9 = ideal quality). At 4 and 8 weeks after initial fertilizer applications, density ratings based on a scale of 1 to 9 (1 = bare soil, 6 = minimal acceptable density, and 9 = dense) were recorded as well as soil cores removed for shoot and root measurements. Shoot tissue and thatch were excised from each core, dried for 48 hrs at 60 C and mass recorded. Roots in the top 6 inches of each soil core were washed to remove soil and debris before being analyzed using the WinRhizo System. The WinRhizo System is an image analysis program designed to measure root architectural parameters such as total root length, surface area, and average root diameter.

Results

Bermudagrass Quality:

During the first three weeks of the study, all bermudagrass had better than acceptable quality. However, over the course of the eight weeks, the two HealthyGro fertilizers were able to maintain higher levels of bermudagrass quality compared to bermudagrass fertilized with single NH₃NO₄ applications. Only through more frequent applications of NH₃NO₄ could bermudagrass quality levels similar to HealthyGro treatments be achieved.

Bermudagrass Visual Quality

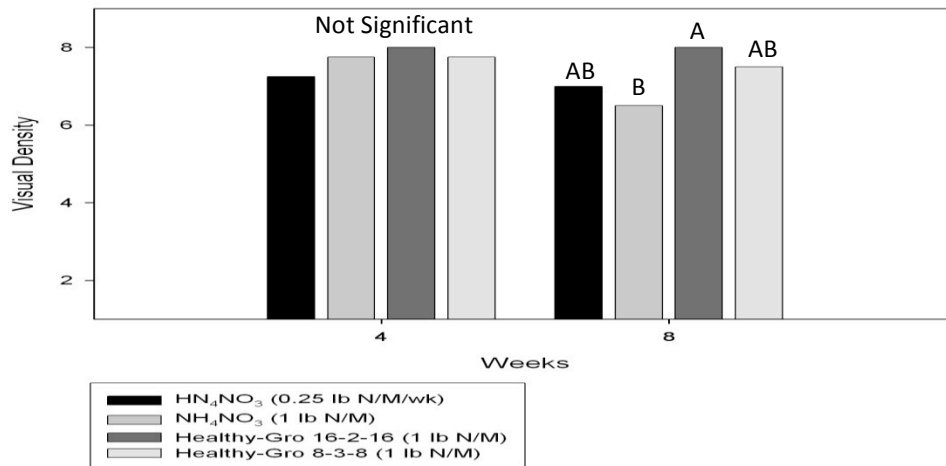


The bars represent LSD at a p-value of 0.05 for quality ratings at 4 and 8 weeks, respectively. The line at 6 represents the minimal acceptable quality. Fertilizers were applied as a single application unless otherwise indicated.

Bermudagrass Density:

Bermudagrass density was statistically similar for all bermudagrass regardless of fertilizer treatment at four weeks after application. However, at week eight, both HealthyGro and weekly NH₃NO₄ fertilizer regimes maintained or increased canopy density compared to bermudagrass receiving single NH₃NO₄ fertilizer applications.

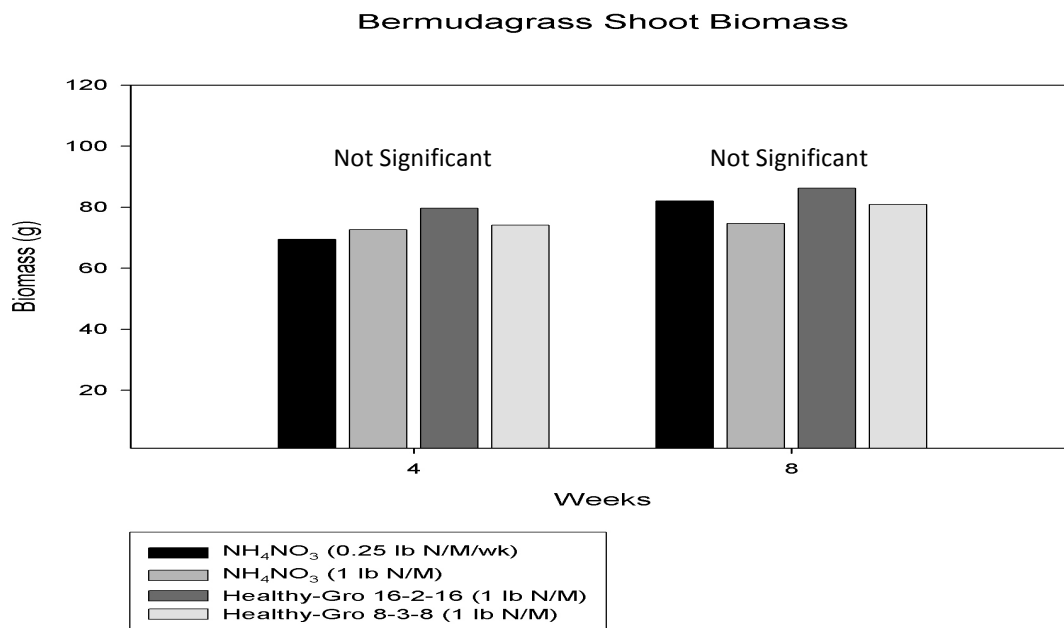
Bermudagrass Density



Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively. Means with the same letter are not significantly different. Fertilizers were applied as a single application unless otherwise indicated.

Bermudagrass Shoot and Root Growth:

Bermudagrass fertilized with HealthyGro fertilizers maintained similar shoot biomass treatments at weeks four and eight compared to NH_4NO_3 fertilizer regimes.



Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively. Means with the same letter are not significantly different.

Fertilizers were applied as a single application unless otherwise indicated.

Root Architecture:

HealthyGro Fertilizers increased total root length (TRL) and surface area (SA) of bermudagrass at 4 and 8 weeks after initial fertilizer applications compared to bermudagrass fertilized with a single NH_4NO_3 application. In order to maintain similar root architecture as bermudagrass fertilized with HealthyGro, more frequent additions of NH_4NO_3 were required.

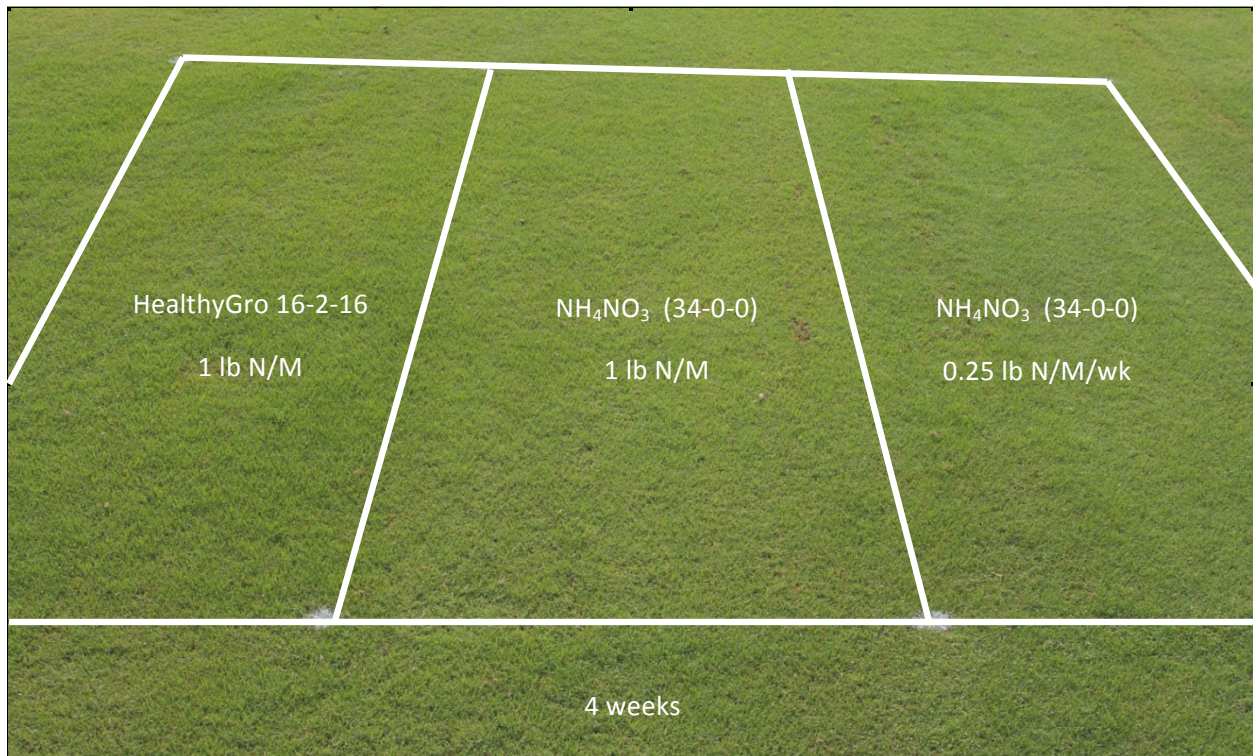
Root Architectural Parameters									
Fertilizer	Analysis	Rate (lb N/M)	Frequency	4 Weeks			8 Weeks		
				TRL (cm)	SA (cm^2)	Avg. Diam (mm)	TRL (cm)	SA (cm^2)	Avg. Diam (mm)
NH_4NO_3	34-0-0	0.25	Weekly	592.3	104.9	0.5641	1456.6	536.9	1.17
NH_4NO_3	34-0-0	1	Monthly	509.7	92.3	0.5767	1009.8	246.6	0.7774
HealthyGro	16-2-16	1	Monthly	715.0	148.6	0.6617	1693.1	543.2	1.02
HealthyGro	8-3-8	1	Monthly	630.2	102.4	0.5176	1621.1	472.2	0.9272
LSD				82.3	22.6	NS	158.2	51.9	NS

Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively.

Overall:

In general, HealthyGro fertilized bermudagrass maintained higher visual quality, increased turf density and rooting at the end of the eight weeks compared to bermudagrass fertilized with a single NH_4NO_3 application. Most likely, the nitrogen from the single NH_4NO_3 fertilizer applications were lost from the root zone through leaching due to greater than normal precipitation (attachment 2) in late June and early July. In comparison, more frequent NH_4NO_3 applications were needed to sufficiently support bermudagrass growth to achieve the same turf quality, density, and rooting as provided by HealthyGro fertilizers.

Attachments:



Weather Data

Month	Temperature (F)		Total Precipitation (inches)
	High	Low	
June	92	72	4.46
July	90	73	8.88
August	96	76	2.24

Trial 2 – Effect of HealthyGro Compost Fertilizers on Bermudagrass cv. ‘TifEagle’ Growth

Objective

Evaluate the effect of HealthyGro compost fertilizers on mature ultradwarf bermudagrass for turfgrass quality, density, shoot and root growth.

Materials and Methods

An eight week study to investigate the effect fertilizers on bermudagrass cv. ‘TifEagle’ was initiated July 2, 2007 at the Louisiana State University Burden Research Center in Baton Rouge, LA. The TifEagle was growing on green built to USGA specifications. Plots were (3x3 ft) arranged in randomized complete block design with four replications. Fertilizer treatments were as follows:

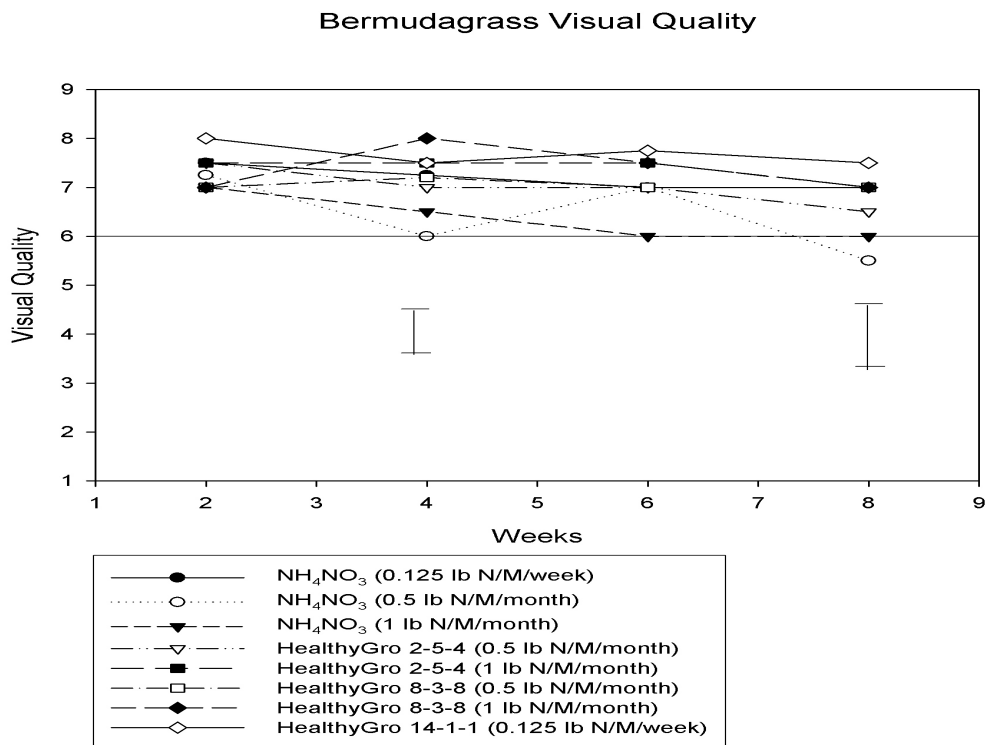
Fertilizer	Type	Analysis	Rate lb N / M	Frequency
Traditional	NH ₄ NO ₃	34-0-0	0.125	Weekly
Traditional	NH ₄ NO ₃	34-0-0	0.5	Monthly
Traditional	NH ₄ NO ₃	34-0-0	1	Monthly
HealthyGro	Composted	2-5-4	0.5	Monthly
HealthyGro	Composted	2-5-4	1	Monthly
HealthyGro	Composted	8-3-8	0.5	Monthly
HealthyGro	Composted	8-3-8	1	Monthly
HealthyGro	Composted	14-1-1	0.125	Weekly

Granular fertilizers were applied using a 3 ft wide drop spreader and plots irrigated immediately after fertilizer application. Liquid fertilizer was applied using a backpack sprayer with water as the carrier and CO₂ as the propellant. General maintenance included mowing to a height of ¼ inch three times a week with irrigation applied as needed to sustain bermudagrass growth. Every other week visual quality ratings based on the NTEP scale of 1 to 9 (1 = brown or dead turf, 6 = minimal acceptable quality, and 9 = ideal quality) were recorded. At 4 and 8 weeks canopy density ratings based on a scale of 1 to 9 (1 = bare soil, 6 = minimal acceptable density, and 9 = dense) were recorded. At the conclusion of eight weeks, soil cores were removed for shoot and root measurements. Shoot tissue and thatch were excised from each core, dried for 48 hrs at 60 C and mass recorded. Roots in the top 6 inches of each soil core were washed to remove soil and debris before being analyzed using the WinRhizo System. The WinRhizo System is an image analysis program designed to measure root architectural parameters such as total root length, surface area, and average root diameter.

Results

Bermudagrass Quality:

At week 2, bermudagrass quality between fertilizer regimes was similar. However, over the course of the eight weeks, HealthyGro and weekly NH_3NO_4 fertilizer regimes were able to maintain high levels of bermudagrass quality compared to bermudagrass fertilized with single NH_3NO_4 applications. Bermudagrass fertilized using liquid fertilizers retained good color throughout the duration of the study. Although, HealthyGro granular fertilizers provided good turf quality, loss of granules was observed with mowing.

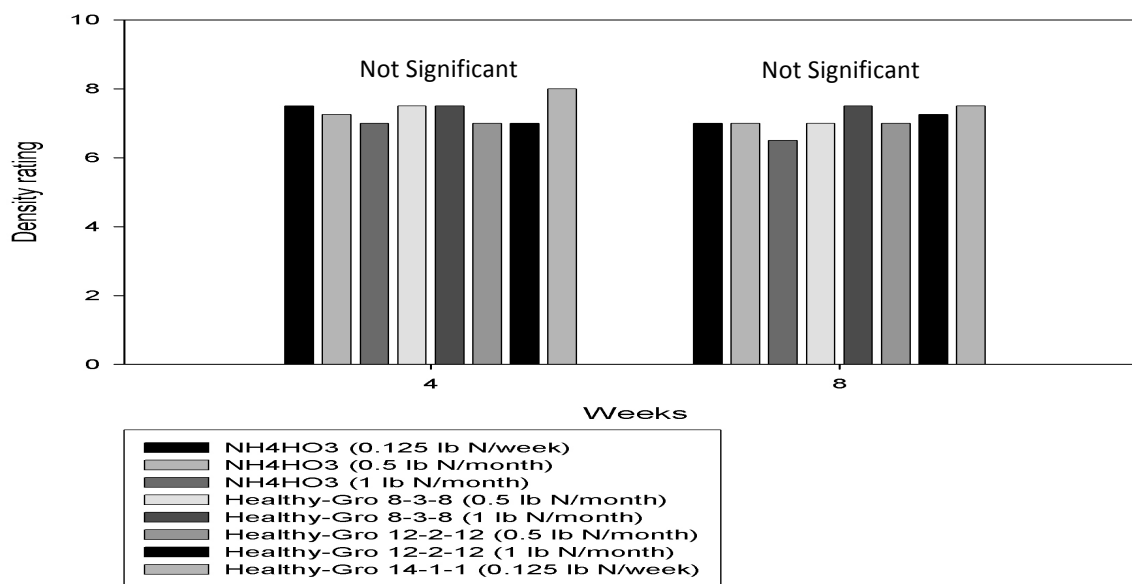


The bars represent LSDs at a p-value of 0.05 for quality ratings at 4 and 8 weeks, respectively. The line at 6 represents the minimal acceptable quality.

Bermudagrass Density:

TifEagle bermudagrass fertilized with HealthyGro fertilizers was able to maintain canopy density similar to TifEagle fertilized using more traditional synthetic fertilizers throughout the duration of the study.

Bermudagrass Density

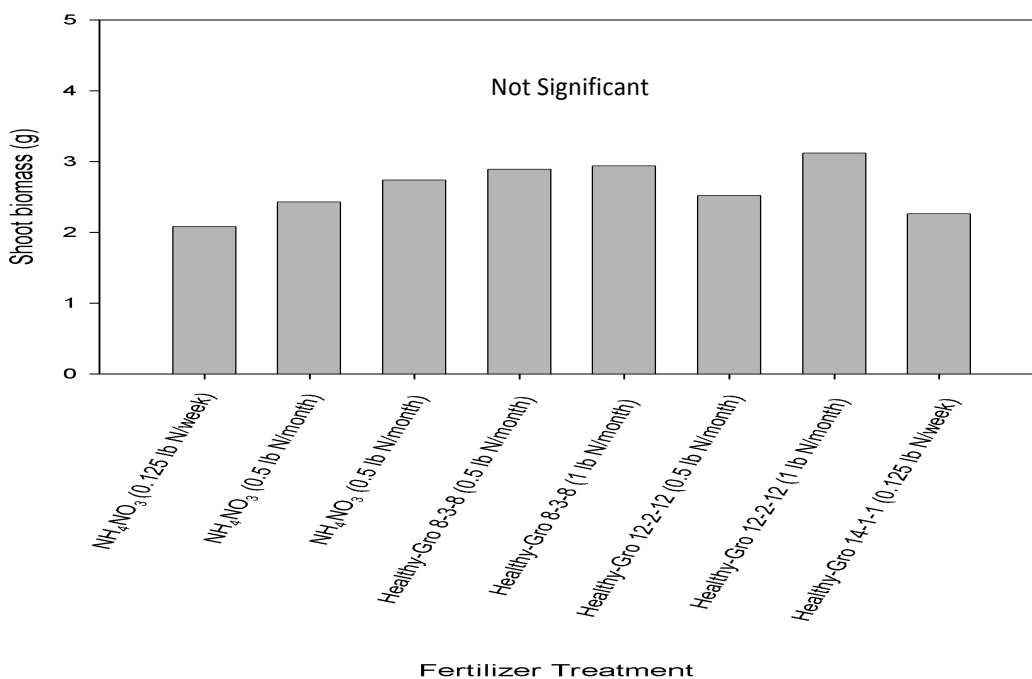


Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively. Means with the same letter are not significantly different.

Bermudagrass Shoot and Root Growth:

Bermudagrass fertilized using HealthyGro maintained shoot biomass and root architecture similar to bermudagrass fertilized using more traditional synthetic fertilizers at week eight in the study.

Bermudagrass Shoot Biomass



Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively. Means with the same letter are not significantly different.

Root Architecture:

Root Architectural Parameters						
Fertilizer	Analysis	Rate (lb N/M)	Frequency	TRL (cm)	8 Weeks	
					SA (cm ²)	Avg. Diam. (mm)
NH ₄ NO ₃	34-0-0	0.125	Weekly	226.3	36.03	0.326
NH ₄ NO ₃	34-0-0	0.5	Monthly	258.1	41.09	0.296
NH ₄ NO ₃	34-0-0	1	Monthly	268.4	42.73	0.318
HealthyGro	8-3-8	0.5	Monthly	244.9	38.99	0.348
HealthyGro	8-3-8	1	Monthly	278.4	44.33	0.288
HealthyGro	12-2-12	0.5	Monthly	288.6	45.96	0.271
HealthyGro	12-2-12	1	Monthly	291.3	46.39	0.326
HealthyGro	14-1-1	0.125	Weekly	239.7	38.17	0.311
LSD				NS	NS	NS

Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively.

Overall:

HealthyGro fertilizers consistently provided better turf color and quality for longer durations compared to monthly NH₃NO₄ applications. HealthyGro fertilizers also provided similar canopy density and shoot and root growth compared to the synthetic fertilizer regimes. Therefore, HealthyGro fertilizers may provide extended color with no detrimental effects on plant growth.

Trial 3 – Effect of HealthyGro Fertilier on Vegetative Establishment of Bermudagrass cv. ‘Tifway’

Objective

Determine the effect of HealthyGro compost fertilizers on vegetative establishment of bermudagrass.

Materials and Methods

An eight week study to investigate the effect of fertilizer regimes on vegetative establishment of bermudagrass was initiated July 11, 2007 at the Louisiana State University Burden Research Center in Baton Rouge, LA. Plots were (6x8 ft) were arranged in randomized complete block design with four replications. Fertilizer treatments were as follows:

Fertilizer	Type	Analysis	Rate lb N / M	Frequency
Traditional	NH ₄ NO ₃	34-0-0	0.25	Weekly
Traditional	NH ₄ NO ₃	34-0-0	1	Monthly
Traditional	NH ₄ NO ₃	34-0-0	2	Monthly
HealthyGro	Composted	16-2-16	1	Monthly
HealthyGro	Composted	16-2-16	2	Monthly
HealthyGro	Composted	8-3-8	1	Monthly
HealthyGro	Composted	8-3-8	2	Monthly

Fertilizer was applied using a 3 ft wide drop spreader and tilled to a depth of 3 inches prior to sprigging. Bermudagrass sprigs cv. ‘Tifway’ were broadcast at 300 bu. acre⁻¹ and incorporate within the soil to ensure good sprig-to-soil contact. Immediately after planting, irrigation was applied to prevent sprig desiccation. Subsequent fertilizer applications were topically applied. General maintenance included mowing to a height of 1 inch twice a week once sprigs were actively growing. Irrigation was applied as needed to sustain bermudagrass growth.

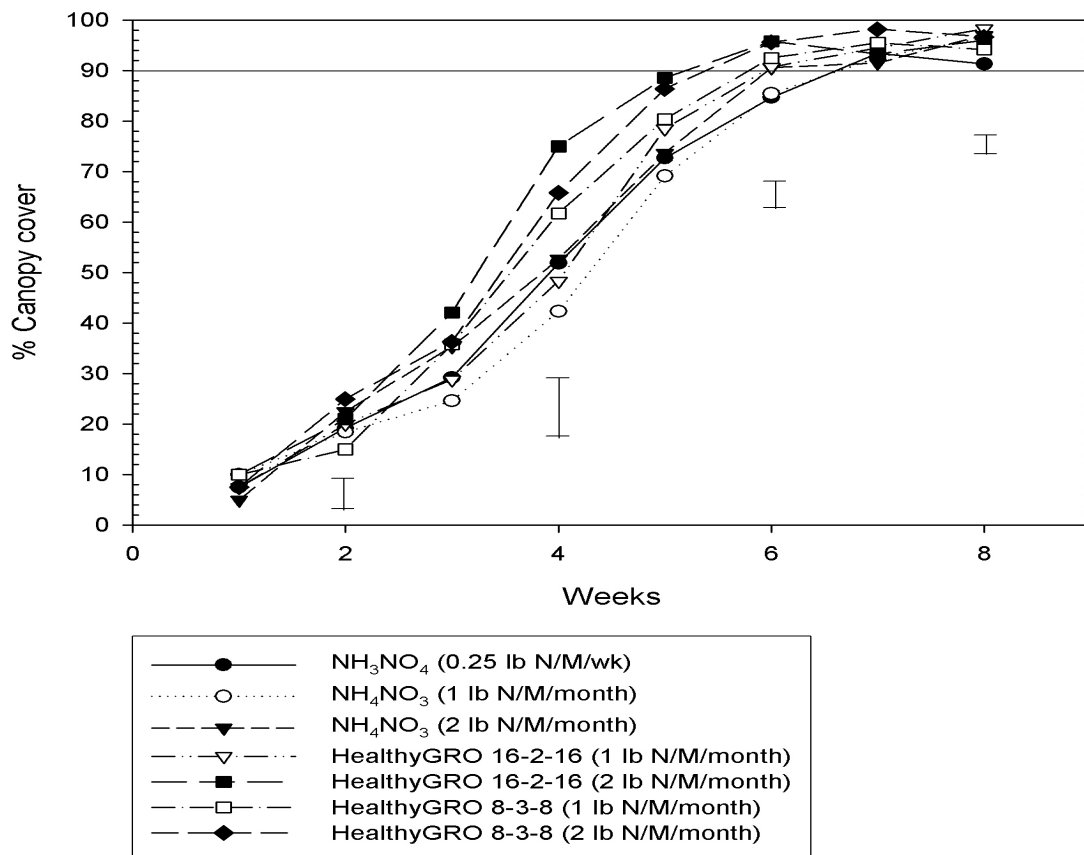
Percent canopy cover was visually rated on a scale of 0 to 100 % each week with 90 % considered an acceptable level of establishment. At the conclusion of the eight week grow-in period, cores were collected from each plot. Shoot tissue and thatch were excised from each core, dried for 48 hrs at 60 C and mass recorded. Roots in the upper 6 inches of each soil core were washed to remove soil and debris before being analyzed using the WinRhizo System. The WinRhizo System is an image analysis program designed to measure root architectural parameters such as total root length, surface area, and average root diameter.

Results

Bermudagrass Vegetative Establishment:

During the first three weeks of establishment, there were no statistical differences in bermudagrass canopy cover among the fertilizer treatments. However, at week four, HealthyGro fertilized sprigs generally exhibited increased canopy cover compared to sprigs under the NH_4NO_3 fertilizer regimes. All HealthyGro and NH_4NO_3 (2 lb N/M/month) fertilized sprigs achieved $\geq 90\%$ establishment within six weeks compared to sprigs fertilized with NH_4NO_3 at rates ≤ 1 lb N/M.

Bermudagrass Vegetative Establishment



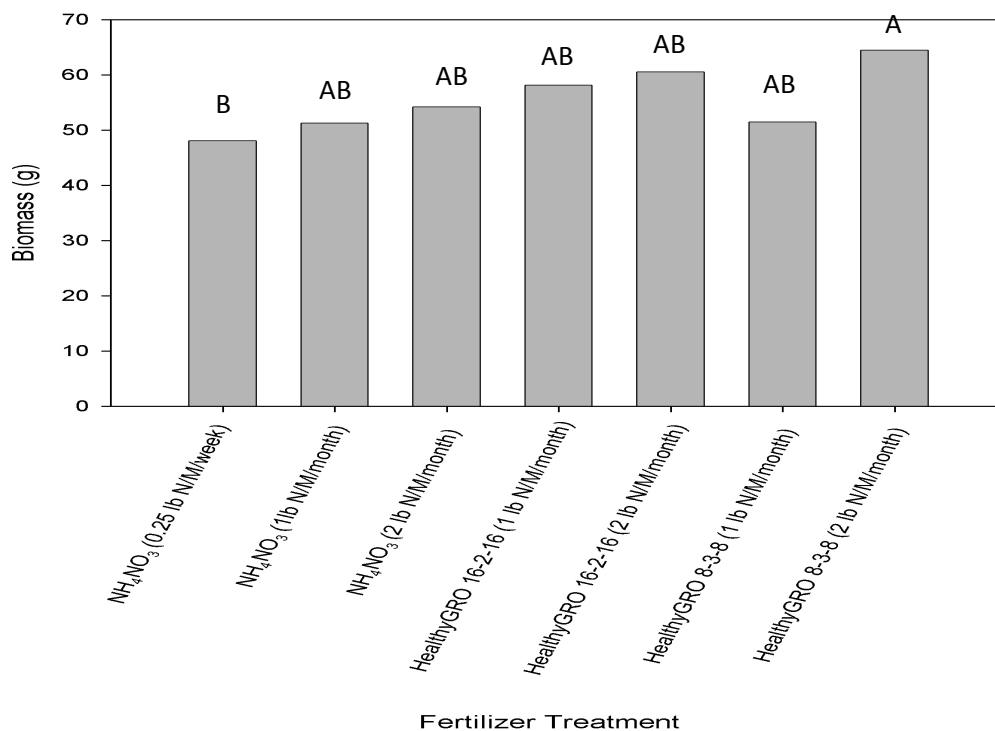
The bars represent LSD at a p-value of 0.05 for 2, 4, 6, and 8 weeks, respectively. The line at 90 % indicates the level of minimal acceptable level for bermudagrass establishment.

The

Bermudagrass Root and Shoot Growth:

Bermudagrass fertilized with HealthyGro fertilizers maintained shoot biomass similar to the more traditional fertilizers with the HealthyGro 16-2-16 applied at 1 lb N/M/month showing the greatest shoot biomass. HealthyGro fertilized bermudagrass generally had greater total root length and surface compared to the NH_4NO_3 fertilizer regimes.

Bermudagrass Shoot Biomass



Root Architecture:

Root Architectural Parameters

Fertilizer	Analysis	Rate (lb N/M)	Frequency	TRL (cm)	8 Weeks	
					SA (cm ²)	Avg. Diam. (mm)
NH ₄ NO ₃	34-0-0	0.25	Weekly	1121.8	290.2	0.824
NH ₄ NO ₃	34-0-0	1	Monthly	985.1	285.5	0.923
NH ₄ NO ₃	34-0-0	2	Monthly	1015.3	366.9	1.151
HealthyGro	16-2-16	1	Monthly	1005.6	298.4	0.945
HealthyGro	16-2-16	2	Monthly	1239.4	439.7	1.132
HealthyGro	8-3-8	1	Monthly	1189.4	407.1	1.094
HealthyGro	8-3-8	2	Monthly	1264.5	393.9	0.992
LSD				153.2	25.4	NS

Means were separated using LSD at a p-value = 0.05 for quality ratings at 4 and 8 weeks, respectively.

Overall:

Bermudagrass sprigs fertilized using HealthyGro fertilizers consistently established (> 90%) within 6 to 7 weeks while maintaining a darker green leaf tissue compared to bermudagrass fertilized with NH_4NO_3 . As a result, HealthyGro bermudagrass had greater shoot biomass and root growth compared to bermudagrass fertilized with NH_4NO_3 .