



Virginia Tech University

School of Plant and Environmental Science



Evaluating Root Development & Root Strength With APEX-10 A Peat Humic Substance & Leonardite Humic Acid from Coal

By: Dr. Erik Ervin Ph. D, and Dr. Xunzhong Zhang Ph. D.

Overview

Kentucky bluegrass is widely used on athletic fields due to its durability and aesthetic appeal. However, one of the primary challenges for field managers is establishing a strong, functional playing surface shortly after sodding.

This study aimed to evaluate the effects of APEX-10, in comparison to humic acid derived from leonardite coal on newly sodded Kentucky bluegrass. The research specifically assessed their influence on **root strength**, **root mass**, **tiller density**, and **visual quality** of the turf.



Materials & Methods

Sod was transplanted onto a six-inch root zone composed of sand to simulate athletic field conditions. Expanded metal sheets were embedded in the root zone to facilitate and measure root penetration into the underlying sand layer. Two independent trials were conducted over a six-month period, each lasting three months. These trials were designed to evaluate treatment effects under consistent and controlled conditions.

Treatments and Maintenance Practices

Two independent trials were conducted:

- **Trial 1:** April 1 – July 1
- **Trial 2:** July 15 – October 15

The following treatments and practices were implemented:

- A **15-30-15 granular fertilizer** was applied at a rate of **1 lb. per 1,000 sq. ft.**
- **APEX-10** was applied at a rate of **3 oz. per 1,000 sq. ft.**
- **Leonardite-derived humic acid** was applied at a rate of **15 g per 1,000 sq. ft.**
- APEX-10 and leonardite treatments were applied **biweekly**, totaling **six applications per trial**
- Turf was **mowed twice weekly** to a height of **1.5 inches**, with mowing suspended **two weeks prior to the conclusion of each trial**
- All plots received **1 inch of irrigation per week**, with additional watering **as needed**
- A **20-20-20 foliar fertilizer** with micronutrients was applied to all plots at **0.5 lb. N per 1,000 sq. ft.**

Measurement Parameters

- **Photochemical Efficiency** was measured at Weeks 2 & 4, and then monthly to monitor plant stress and photosynthetic performance.
- **Shoot Density** was assessed at Week 4 and again at the conclusion of each trial to evaluate canopy development.
- **Shoot Growth** was measured using 4-inch plugs extracted from each plot to determine biomass accumulation.
- **Root Mass** was evaluated at Weeks 2 and 4 to track early root development.
- **Root Strength** was assessed at 60 and 90 days after sodding with a **metal root pull**

Results

The application of APEX-10 led to **significant improvements** in **root mass**, **root strength**, and **tiller density** compared to leonardite. This indicates stronger establishment and improved structural development.

Conclusion

Previous research indicates that humic substances may enhance root development by mimicking auxin-like hormonal activity in plants. This auxin-like effect is believed to stimulate root initiation, elongation, and overall root system architecture, contributing to improved nutrient and water uptake efficiency.

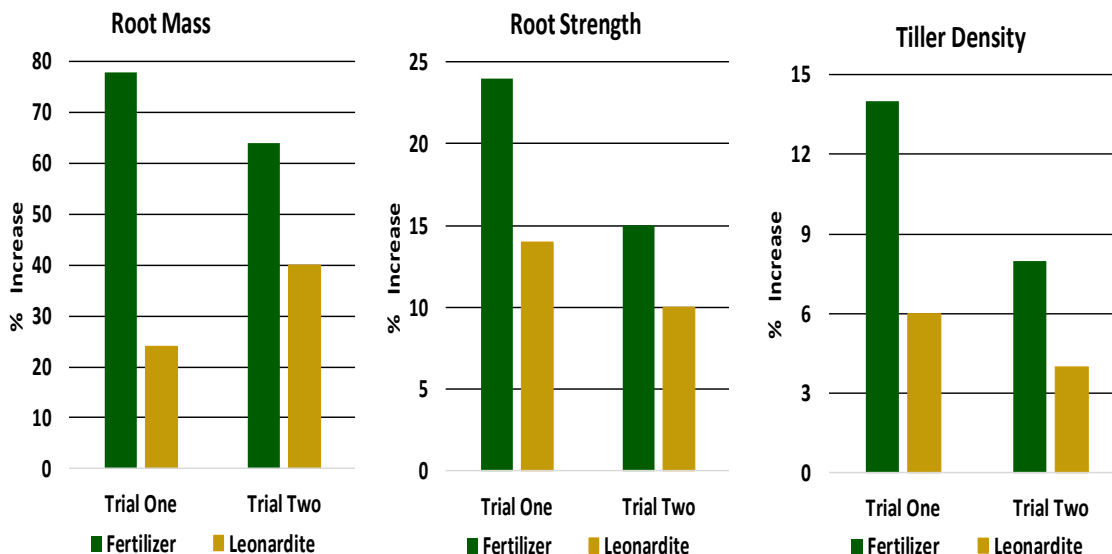
The findings of this study confirm that **APEX-10 is measurably superior to leonardite-derived humic acid** in promoting **root establishment** and **root strength**. These results support the use of APEX-10 as a more effective solution for enhancing early sod development and improving overall turf performance.



Testing Data

	60-days Lbs. / ft ²	90-days Lbs. / ft ²	Increase
Fertilizer	809	920	13%
Leonardite	884	1,118	15%
APEX-10	948	1,323	36%

Chart Represents % Increase **APEX-10** Had Over Fertilizer and Leonardite



Green Nature LLC
(856) 912-3111
Info@greennature.life

