A Golf Course's Battle with Diseased Bermudagrass

A golf course in Wichita, Kansas, was subject to a serious disease outbreak across their 'Vamont' bermudagrass fairways and tees that was first noticed during turf green-up in the early spring. Digital photos were taken (e.g. Photo A) and a sample was collected from the perimeter of a patch. These were sent to Kansas State University's Plant Diagnostic Clinic, and the diagnosis was spring dead spot (Photo B). As the season progressed, turf on the perimeter of the patches spread into the voids (Photo C). The superintendent needed to know why the disease occurred and how it could be avoided in the future. You have been called in to consult on this problem.

You first asked the superintendent a series of questions to delineate the cultural practices followed at the course during the previous year. You learned that the bermudagrass was well-established on a fine-textured silty clay loam soil with a relatively high pH that ranged from 7 to 8. The turf was mowed to ½-inch height about three times per week. Automatic sprinklers were used to irrigate the turf during the summer to prevent drought stress; the superintendent was judicious about the amount of water that was put out. The water source was well with slightly high alkalinity (Table 1).

The fairways and tees were fertilized with a total of 5 lbs. N per 1,000 ft^2 for the season from granular urea applied with a Vicon spreader. An application of 1 lb. N per 1,000 ft^2 was applied on each of the dates June 14, July 15, August 17, September 12, and October 5. A general soil test had been done in late October (Table 2); nothing appeared extremely 'out-of-line.' Core aerification had not been done for a couple of years. No fungicides had been applied in the previous year.

Weather patterns had been similar to previous years' through the fall and winter, including amount of rainfall. However, unseasonably cold temperatures had occurred during the period leading up to turf green-up.

Assignment: Provide a thorough explanation to the superintendent as to factors that contributed to disease development this year. Propose a multi-faceted approach to combat the disease into the future.

Photo A. Symptoms appeared in the spring as soon as the bermudagrass started to green-up.

Photo B. Necrosis of bermudagrass roots and stolons resulted from the infection caused by the spring dead spot pathogen.

Photo C. Spots still evident in June, although recovery is occurring.

Table 1. Water quality report.

Alkalinity (ppm Ca carbonate equivalent)	276
Chlorides (ppm)	32
EC (uMHOS/cm)	600
Hardness, Total (ppm)	350
pH	7.37
Chlorides as salt (ppm)	53
Nitrate-N	4.2
Total Dissolved Solids (ppm)	440
Calcium (ppm)	86
Magnesium (ppm)	22
Sodium (ppm)	42
% Sodium	28

Table 2. Soil Test report, late October.

Analysis	Result	Optimal
Soil pH	7.8	5.5-6.0
Organic Matter	2.5%	
CEC	14.9	
K Saturation	1.8%	2.0 – 4.0%
Mg Saturation	22.9	10-20%
Ca Saturation	75.3%	50-70%
K/Mg Ratio	0.3	
Ca/Mg Ratio	6.4	
Phosphorus	15 ppm	70-110 ppm
Potassium	94 ppm	180-270 ppm
Magnesium	465 ppm	240-390 ppm
Calcium	2996 ppm	2000-2800 ppm
Sulfur	12 ppm	20-400 ppm
Boron	1.8 ppm	1.7-2.5 ppm
Copper	3.0 ppm	Varied
Iron	100 ppm	9-40 ppm
Manganese	86 ppm	Varied
Zinc	4.1 ppm	4 -10