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Construction of a Mobile Spectrophotometer for Mapping Plant Health: Combining Crop Circle[™] and GPS Technology

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Crop Circle™ and GPS Technology

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The leaves of a healthy turfgrass plant will reflect and absorb wavelengths of light differently than that of an unhealthy one. From these values, researchers have formed equations, known as “Vegetation Indices”, to better quantify measurements of ground cover, biomass, and overall plant health. Scientists obtain these light values through the use of a spectrophotometer.

The measurement of a plant’s response to light in the field proved problematic for early spectrophotometers, as they didn’t account for variations in available sunlight. This was overcome with the introduction of active light measurement systems, like the Crop Circle™, which can independently measure a plant’s reflectance to pulses of light emitted at rates of over 20,000 times per second. No longer dependent on light from the sun, these sensors allow for accurate measurement at any point in the day.

With the introduction of GPS technology, came the ability to produce maps of plant cover and health over large areas. By correlating the reflectance values of a plant with its respective GPS coordinates, we can form a bird’s eye view of relative plant health using different colors. The commercialization of high precision GPS receivers has allowed researchers to plot these maps with increased accuracy, limiting error to less than 1 inch.

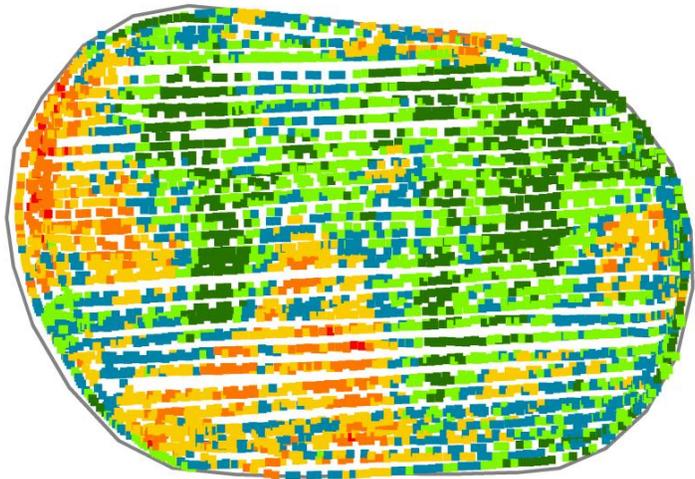


Photo Courtesy of TurfScout®

The use of GPS coordinated data has strong potential for improving turfgrass health diagnosis in the field. As the price and size of these materials begin to decrease, turfgrass managers can expect their application to become more practical. Equipping your mowers with a spectrophotometer and GPS receiver may allow for daily assessment maps of problematic areas otherwise invisible to the naked eye.