STOP #10

FORCASTING DISEASE OUTBREAKS WITH A PESTCASTER

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Trying to predict disease outbreaks for proper timing of pesticides is not new. For years superintendents have relied on a combined temperature-humidity scale to predict Pythium blight outbreaks, the rule being that when the combined total of humidity and temperature reaches 150 it's time to spray. While this was a good rule of thumb it was far from accurate and often resulted in many unnecessary fungicide applications being made.

Other prediction models have been based on phenological events such as flowering of plants. Two classic examples are applying pre-emergence crabgrass herbicides when the forsythia is in bloom, or applying an insecticide to control the adult black turfgrass beetle just before egg laying based on when the black locust is flowering.

More precise models are being developed today because of the advancements in computer technology and weather gathering equipment. Most turfgrass diseases occur under certain environmental conditions provided there is a susceptible host and a virulent pathogen present. The environmental parameters are air temperature, soil temperature, soil moisture, leaf wetness, and relative humidity. Not all of these environmental factors are involved in the development of every disease but at least two of them are involved in all disease development. Mathematical models to predict disease occurrence can be developed by measuring these factors over time and correlating them with disease outbreaks.

These models are based on collection of hundreds of thousands of data points. It would be impossible to assimilate all this data without a computer. Once the data has been analyzed by the computer, a mathematical model is developed. It is then field tested to see if the model is valid. This can also be a time consuming process if the data has to be collected from several different weather measuring instruments and put in to the formula and analyzed by the computer. However, if the model is placed in a microprocessor (a type of computer) that can record all the weather and environmental data, analyze it, and incorporate it into the model then the task is much easier. Once the model has been validated, and any necessary corrections made, it is ready for the end user.

Neogen corporation has a unit called Pestcaster with a Pythium blight model, an anthracnose model, and an annual bluegrass seedhead emergence model. This microprocessor will collect the weather information, assimilate it into the models, and tell you when to make your fungicide application. Likewise, the microprocessor will accumulate the degree days for annual bluegrass seedhead emergence, assimilate it into the model and inform the golf course superintendent when to apply Embark for maximum seedhead reduction.

This could eventually save golf courses thousands of dollars over a period of years. For example with the moderate temperatures the past two seasons neither pythium blight or anthracnose were serious problems in the northern mid-west. But since the superintendent has no way of knowing this, fungicides were applied based on calendar dates that the diseases usually occur in

"normal" years, because they cannot afford to take a chance of losing turf to diseases. Another problem is when these diseases come earlier or later than "normal" as occurred in the northern mid-west in 1983. Turf was lost in 1983 when the weather conditions for Pythium blight and anthracnose occurred earlier and later than "normal". Had the Pestcaster been available and in use on these golf courses, fungicide application would have been made at the proper times and no turf loss would have occurred.

The pest caster is also an excellent weather station that will give hourly readings for air temperature, relative humidity, soil temperature, leaf wetness, and inches of rainfall or irrigation. It will print all this information on to an accompanying printer for your permanent record that can be reviewed at the superintendents convenience to correlate weather conditions with events that occurred during the season.