2004 BELTWIDE COTTON CONFERENCES, SAN ANTONIO, TX – JANUARY 5-9

PRECISION AGRICULTURE: CURRENT STATE OF THE ART PLANT PATHOLOGY/NEMATOLOGY

Charles Overstreet
Department of Plant Pathology and Crop Physiology
Louisiana State University
Baton Rouge, LA

Abstract

The advent of Precision Agriculture and the equipment, hardware, and computer software associated with it are being explored within the area of Plant Pathology and especially Nematology by numerous scientists throughout the South. One of the most basic tools is the GPS receiver that is mounted on tractors, four-wheelers, or even handheld pocket PC's. These receivers allow a very precise location to be established and insure that this location can be found again. These tools can be used to identify problem areas in a field that can be monitored in the future. The combination of a software program like the Farmworks Site Mate and a handheld pocket PC with a receiver can be used to accurately define disease or nematode areas within a field. It's very easy to check these areas again at a latter time, compare the size of the area, and determine if the problem is spreading. One area that is currently being investigated is the use of soil electroconductivity (EC) to determine soil texture. Nematodes particularly are associated with certain soil textures. Root-knot and Columbia lance nematode are usually only found in very sandy soils. Other nematodes like reniform seem to prefer soils that have more silt or clay present. Research is being conducted in a number of states using a Veris machine to measure soil electroconductivity and nematodes associated within certain soil EC ranges. The goal is to reduce the pesticide usage if only the portion of the field where the problem is treated. Some of the fields that are currently being investigated could have reductions in the amount of nematicide needed by as much as 40-60%. Yield monitors are becoming more popular and can provide very precise information about where potential problem areas are located within a field. Often some of these low yielding areas are associated with nematodes or disease. Combining information such as yield data with soil electroconductivity can be especially helpful in making the correct identification of the problem, especially when soils highly conducive for problems are involved. Aerial imagery using multispectral reflectance is also becoming more popular and can be used as a good indicator of the overall health of a crop. Weak or poorly growing areas can easily be identified. Soil EC readings, aerial photography, yield data, or even historical information about nematode or disease problems from previous years may be useful in identifying and diagnosing these problem spots. The application of variable rate nematicides is being investigated in fields which have been extensively sampled to identify population densities. Work has been done with the use of variable rates of liquid nematicides (such as Vapam or Telone), granular nematicides (such as Temik), and sidedress applications (Temik). Although some of these variable rate applications look promising (either from increased profits or even reductions in overall pesticides), the costs of extensive nematode sampling have currently left them not very practical. Research from Mississippi State looking as hyperspectral analysis of plants infested with the reniform nematode may be a big aid in identifying where and how high the nematode populations are a field. Variable rate technology will be much more likely to be used in the future as better detection aids are developed in pinpointing where and how bad the problems are in a field.