

Ornamental Research News

Central Florida Research and Education Center

Volume 3, No. 1

January, 1996

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PLANT PATHOLOGY

Cool, Wet Soil and Rhizoctonia

Dr. David J. Norman

During cool, wet weather, both foliage and bedding plants become easily infected with Rhizoctonia. When soil temperatures are below 25°C (77°F) and are saturated with water, Rhizoctonia can cause serious production losses.

The first symptoms of this soil-borne fungal pathogen are reddish-brown lesions that develop on roots. In young plants, the lesions can develop quickly around the stem causing the young plant to rot off at the soil line. When roots are severely infected, foliage will usually yellow and subsequently wilt. In the last stages of the disease, white to brown hyphae can be seen on the soil surface. Occasionally, infected soil splashes onto plant parts above ground where the pathogen can cause necrotic lesions on leaves and stems. Once such an aerial infection occurs on the foliage, water movement can spread infections to foliage of nearby plants.

Rhizoctonia is a very proficient soil inhabitant. This fungus can exist either as a saprophyte, living on plant debris, or as a pathogen, living on live tissue. Rhizoctonia rarely forms spores, but survives as thick-walled hyphae in leaf debris or as sclerotia (small mats of hyphae). Spread of the hyphae and sclerotia usually occurs in leaf debris, contaminated seed, water, or infected media or soil.

In the production of foliage and bedding plants, it is best to use soilless media made up of combinations of peat, perlite, vermiculite and/or bark. Compared to soil, these products have a much lower risk of

having Rhizoctonia present. Heavy media mixes with high water-holding capacities contribute to Rhizoctonia infections and should be avoided. In production, it is also important to keep plants on raised benches to avoid contact with contaminated water or soil. If Rhizoctonia infections are observed, it is more efficient to throw out infected plants in order to lower inoculum levels, than to apply a fungicide treatment.

Sanitation is very important in the control of this disease. All infected material should be removed from the nursery. Trays and benches should be rinsed between plantings with either 10% (v/v) household bleach or a commercial surface disinfectant. Recent developments in biological control have used competitive soil fungi (*Gliocladium* or *Trichoderma*) which can be added to medium or compost. These competitors work either by excreting toxins harmful to Rhizoctonia or simply by out-competing the pathogen for available nutrients in organic debris.

PHYSIOLOGY

Factors Affecting the Efficiency of Overhead Irrigation - Droplet Momentum

Dr. Richard C. Beeson

Discussion of this topic began in the March newsletter by describing effects of container spacing and continued in May by discussing plant canopy effects. The third most important factor affecting the efficiency of overhead irrigation is droplet momentum. Droplet momentum is determined by droplet mass (size) and its velocity when it contacts the plant. Droplet size depends on sprinkler type, nozzle diameter and operating pressure.

Generally, lower operating pressures and larger nozzle diameters produce larger droplets. Since low pressures require larger nozzles to have the same volume flow, significant increases in droplet size can be obtained by reducing operating pressures and increasing nozzle sizes. However, as droplets become larger, the pattern (area of coverage) from individual sprinklers declines. Thus, with permanent-set irrigation, system changes are limited by riser spacing.

With overhead systems, droplet velocity is a function of the height from which a droplet falls. Velocity can be increased by increasing the throw angle of a sprinkler, again limited by riser spacing; or by elevating the riser. What effect does increasing droplet momentum have? Theoretically, momentum is increased 10% by elevating a sprinkler from 4 to 16 feet above ground level. In preliminary experiments, percent penetration through a canopy was increased around 20% by increasing sprinkler heights from 4 to 16 feet. While such increases in percent penetration would have a minimum effect on efficiency, they would substantially reduce the duration of an irrigation event since the amount of water reaching the container surface would be increased. Shorter irrigation durations would lower annual irrigation volumes. Along this line of reasoning, all landscape ornamental nurserymen recognize that nothing re-wets a container better than rainfall. The reason, raindrops hit with maximum velocities

(momentum). The median droplet from a #8 Wobbler on a 4 foot riser impacts a plant with only about 10% of the momentum of a similar sized raindrop.

HORTICULTURAL COMPUTING

The World Wide Web - What it is and how to get there.

Chris Fooshee, Research Coordinator

The World Wide Web (WWW) is a graphical interface to the Internet. Simply, it is a system that calls up documents, formatted in a language called HTML (HyperText Markup Language), from another computer and displays them on your computer using "browser" software (such as Mosaic or Netscape).

Within a given document, certain words and phrases (HyperText) or pictures are highlighted which, when clicked with your mouse, call up other documents from the same remote computer or on another computer on the Internet. These highlighted words, phrases or pictures are called "links".

Once a link is chosen, the program will connect to the computer on which the desired document resides, and display it on your computer. This new document, most likely, will have still more links to other documents on the same remote computer or on still another computer on the Internet.

Documents have an address called a URL or Universal Resource Location. For most sites, this address begins with the characters: `http://` which stands for HyperText Transfer Protocol. An example of a complete address (in this case, for the IFAS homepage) is:

`http://www.ifas.ufl.edu`

If you enter this address in your browser software, it would locate the opening document or "homepage" for IFAS and display it on your monitor. You can then read the information and decide where to go from there. Links to other pages or documents are highlighted in a contrasting color and may resemble bolded text.

Maneuvering within a document is done with the mouse just as in most Windows programs. Moving between links is accomplished by merely clicking on the desired link. To return to the previous link, use the "back" button located on the browser (generally near the upper left hand corner).

The browser program "remembers" each site visited and, if many links have been followed, you can easily return to your starting point. There are other browser functions that remember all the sites contacted during a given session, and yet another that creates "bookmarks" to record the addresses of sites that you find particularly useful (or fun) for easy return at a later date.

Specific WWW information sites can be located by using programs called search engines. These programs are accessible via the WWW and are free to use. Two such engines and their addresses are:

<http://www.yahoo.com>

and

<http://www.lycos.com>

Once you access the program, simply fill in the key word or subject of interest, and the search engine will display a list of the WWW sites where the related information can be found. Then, merely click on the item that sounds most appropriate and the software will take you to that site.

Access to the Internet and the WWW is available through the major online services such as America OnLine, CompuServe, Prodigy and others. These services provide much more than Internet access, but due to the large volume of users, response times can be slow and hourly rates can add up.

To access the WWW directly, one must log into an Internet site using special protocols (TCP/IP, PPP, SLIP, etc) and special browser software (Netscape or Mosaic browsers, Winssocks, etc.) Fortunately, if you have a reasonably fast computer (486 or better) and modem (9600 bps or faster), a local internet provider can supply the necessary connection, software, and assistance to get you on the "Web". These providers generally have local phone numbers, and some even have 800 numbers so that distant users do not have to place expensive long-distance calls. Internet providers, as of this date, charge about \$20 per month for 90 or more hours of access time. Remember, since these are local firms, the phone cost is no more than for a local call.

Unfortunately, locating a provider may not be as simple as using one. The Orlando Yellow Pages lists a few of the available Internet providers under Computer - Bulletin Boards. Others may be located through your local computer store, advertisements or by word-of-mouth. Once you have access, it is possible to obtain lists of other providers from sources on the Internet.

A recent list of Florida Internet providers is available from this research center. Send a self-addressed stamped envelope to

WWW Providers,
c/o CFREC-Apopka
2807 Binion Rd, Apopka 32703-8504;

or if you have access to e-mail, send a request to: WCF@icon.apk.ufl.edu

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