



Ten Basic Steps to Less Disease in Your Crop

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Have you ever heard the saying, "It's time to get back to the basics" or "Don't forget about the basics?" Both of these statements reflect a need to go back and reenforce or explore the fundamentals of the process in which one is involved. It is necessary to go back and explore because somehow we have strayed from the basics and thus we have lost the ability to achieve the greatest possible result. We often hear this type of thing associated with sports. The golf professional may tell you that you have lost a few yards on our drive off of the tee because you no longer are applying the basic principles involved I a proper golf swing. Or your music instructor may tell us that you are out of tune and out of time because you have forgotten some of the fundamental techniques associated with playing your particular instrument. We all can do a better job of many things in life from playing sports to raising children if we just remember the basics. With regards to disease control or disease management in the greenhouse we must also remember the basics. If we forget about the disease control basics we can quickly find ourselves in a situation where we are constantly trying get things under control and it seems as if we are spending an inordinate amount of time and money putting out disease and insect fires.

What are some of the basic principles of greenhouse disease control and how may they be applied in an effort to get the most out of our disease control program? These are the issues I will discuss in this months article and I can guarantee if you make a serious effort to incorporate most of these disease control basics into your production program, you will see less disease and you will apply less fungicide to your crop. The following are ten steps or basic principles which a grower can use to achieve less disease in the greenhouse.

Number 1. Always start with disease-free seed, cuttings, or propagation material. This is the first rule of growing a disease-free crop and the most important. If you don't start with clean material you have allowed yourself two strikes right of the bat. Be sure to purchase material from a reputable producer that can guarantee that the material they are providing you is free of disease and insects.

Number 2. Grow disease resistant material, if possible. Though floriculture is lagging somewhat behind in the production of disease resistant material when compared to agronomic crops, it is important to select crops that have disease and insect resistance particularly if you have chronic disease problems such as powdery mildew and other common fungal diseases.

Number 3. Quarantine incoming plant material. As you bring material into the

greenhouse from various locations and producers it is important to keep that material separated from the rest of the crop until you can be sure that the new material is disease and insect-free. If possible, set a small area in the greenhouse aside as a quarantine area. Use sticky traps and daily monitoring of the crop in that area for at least a week or until you feel confident that the quarantined plants are clean. Obviously greenhouse space and the time of the year will dictate the amount of space and time that can be committed to the quarantine.

Number 4. Practice good sanitation techniques. I have said this before and I will say it again, the cleaner the greenhouse the less disease and insects. Greenhouse sanitation covers many things. It means the greenhouse floor is free of weeds and algae. The area surrounding the greenhouse is weed-free. Weeds harbor insects and virus diseases. The hose nozzles are not laying on the floor or in a pool of water, they are hung up off the floor. Trash cans are sealed tight with lids that fit. Dead and senesced plant tissue such as leaves and flowers have been removed from plants and that debris has been placed in a trash can, not on the floor. Pet plants have been removed from the greenhouse or at the least have been relegated to a remote part of the production facility. Also make sure that the potting area along with benches and floors have been sanitized with some sort of disinfectant such as GreenShield or a similar product prior to potting or placing plants on the bench.

Number 5. Monitor and suppress insect and mite populations. In order to have a disease-free crop you must keep the insects and mite populations to a minimum. Besides the direct feeding damage on the crop, insects and mites can vector viruses. The most economically important of the insects is Western Flower Thrips (WFT) and the virus it vectors, Impatiens Necrotic Spot Virus. The only way to know if your greenhouse is free of WFT is to use some sort of monitoring device such as yellow or blue sticky traps. These traps need to be monitored on some sort of regular basis in order to know what insects you have and what is the status of their populations.

Number 6. Modify the environment to suppress disease. The higher the humidity in the greenhouse the greater the disease incidence. This is because most disease causing organisms thrive in an environment where the humidity is high and there is lots of moisture. The cut off point for humidity is approximately 85%. When the humidity is higher than 85%, disease will be difficult to suppress even with fungicides. Use fans to encourage air exchange around the crop and use heating and venting to help reduce the humidity. Try to avoid having water on the surface of leaves for an extended period of time. If you must overhead water do it in the morning so that the plants will go into the evening with dry leaves and flowers. Avoid over watering your plants. Over watering will encourage root rot diseases. Use a growing medium that is well drained and does not allow for saturated conditions. Try not to use native soil in your growing medium unless you are very sure the soil is pathogen-free. Most native soils contain all of the major root rotting organisms. If you grow plants on the floor of the greenhouse make sure the area under the plants is well drained and does not allow for standing water.

Number 7. Avoid plant stress. The greater a plant is stressed the more susceptible it is to pathogen infection. Keeping a plant stress-free means that you make sure that the plant has adequate water, the salts are in balance, the pH is correct, the light and temperature requirements have been met, and the plant is supplied with the proper nutrients necessary for optimum growth and development. If salts are too high, the plant roots could be damaged and damaged roots are much more susceptible to root rot. If the growing temperature is too low, the plant could be more susceptible to attack by leaf spot fungi and so on and so on.

Number 8. Monitor the crop on a daily basis. This just means that you the grower are aware of what is going on with the production of your crop at every stage of its growth and development. Monitoring your crop may be as simple as walking through the greenhouse every day just to get a feel for what is going on. This way there will be not any surprises and if a disease or insect problem does arise, it will not be at the stage of a full-blown epidemic before it is noticed. Early detection of disease equals better control.

Number 9. Keep unauthorized personnel traffic to a minimum. This is something that even the best growers don't do, however, they should. As you well know, there is a wide range of expertise among the employees that work in your greenhouse. Some of these employees have knowledge and expertise with diseases and some don't. Unexperienced employees walking through your greenhouse for unnecessary reasons is a good way for to spread diseases. Unnecessary touching of plants either purposely or accidentally can lead to the spread of pathogens, particularly viruses and bacteria. Also, if there is a disease outbreak, knowing what employees have been in a particular part of the greenhouse and when they were there will be important information when it comes to pin pointing the cause and scope of the problem.

Number 10. Use fungicides as a last resort.* If you have incorporated all or many of the first nine steps and you are still having disease problems it may be necessary to use a pesticide such as fungicide. However, if you have followed these nine steps you should have to use less fungicide when it is needed.

I am very much aware that for many growers some of steps one through nine may not be possible to incorporate due to space, time, and economic constraints. I am also aware that trying to incorporate all nine of these steps at one time is next too impossible, so here is what I am suggesting. At the start of each growing season or at the start of a new cropping season try to incorporate one or two the first nine steps. Since any one of these steps will help reduce disease and the steps are cumulative, you do not have to do all of them at one time to see some effect. Eventually these basic principles will become the disease control foundations of your production process and you will wonder why they haven't always been part of your plant growing program.

By-the-way cut out the enclosed table, hang it on the note board over your desk, and periodically check off the steps that you have incorporated.

* There may be situations where preventative applications of fungicides are necessary in order control disease on a specific crop. In this case the other nine steps should be carried out with preventative applications.

Quick Reference Table: Ten Steps to Disease-Free Growing

- 1. Always start with disease-free seed, cuttings, and propagation material.**
- 2. Grow disease resistant crops, if possible.**
- 3. Quarantine incoming plant material.**
- 4. Practice good sanitation techniques.**
- 5. Monitor and suppress insect and mite populations.**
- 6. Modify the environment to suppress disease.**
- 7. Avoid plant stress.**
- 8. Monitor the crop on a daily basis.**
- 9. Keep unauthorized personnel traffic to a minimum.**

10. Use pesticides as a last resort.

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