

The Importance of Plant Diagnostics

What's wrong with my crop? That's one of the most common questions for Extension educators. While some growers can be hesitant to talk about production challenges, others realize that early and correct diagnosis of a problem can save a lot of frustration, money and time compared to no action — or even worse, taking a wrong corrective measure. Successful diagnosis can make the difference between a marketable crop and one in which some or all of the plants have to be thrown away.

Some growers are reluctant to submit a sample to a diagnostic lab because of the time-sensitive nature of the crop production, where time is money. In this situation, the grower could seek a diagnosis, and pursue corrective action in the meantime. It also can be helpful to email images of the symptoms to the diagnostic lab while also sending a physical sample (however, photos alone are usually inadequate). This gives the diagnostician a “heads-up” that the sample is coming, and allows time to ask relevant questions.

Diagnosing a crop problem usually necessitates gathering a lot of information on the crop history and culture, and some of that desired information is below. Obviously knowing which crop(s) is affected is important, because some crops are particularly sensitive to specific environmental, cultural, insect and disease problems.

Symptoms. What are the symptoms, how prevalent are they, and is the problem getting worse? Gaining an understanding of the specific symptoms, and how they may have changed over time, is very important to understand the problem. Is the problem only with a particular crop, or are multiple cultivars and species impacted? Did the problem suddenly appear (if so, when?), or has the problem gradually gotten worse over time? Are most or all plants of a cultivar/species affected, do the symptoms appear at random within the crop, or is there a pattern to the problem? For example, are affected plants only along the edge of a greenhouse wall, primarily under hanging baskets, or clustered in a certain area?

pH and EC. What is the pH and electrical conductivity (EC) of the growing substrate? A common production problem is related to the watering and fertility of a crop. Crops have different tolerances to substrate pH — some do best at a pH of 5.4 to 6.0 (those in the “petunia group” including calibrachoa, bacopa, dianthus, etc.) while others perform best at a pH of 6.0 to 6.6 (those in the “geranium group” including marigold, lisianthus and New Guinea impatiens). Some crops grow best at lower fertility rates (a low EC), and leaves may curl when the fertility is too high. In contrast, some plants need higher amounts of macro- and/or micro-nutrients for healthy growth.

While knowing the pH and EC helps with a diagnosis, more information may be needed if the problem is suspected to be nutritional, especially for micronutrient-related concerns. In this case, sending a sample of the growing substrate (or sometimes plant tissue) to a lab for nutritional analysis can be very informative.

Pesticides/PGRs. What pesticides and growth regulators have been applied, when, and at what rate and volume? One of the possible causes of a crop problem is phytotoxicity from application of, or an excessive amount of, a chemical. If the grower suspected a plant disease was the problem, it's useful to know the chemical history of a crop, especially in the past few weeks. If a pathogen is suspected, a diagnostician may attempt to culture it to identify the bacteria or fungus. It is best to avoid making

pesticide applications to plants immediately prior to submitting them for diagnostics. If a pesticide application is necessary, collect a small group of symptomatic plants prior to making any applications.

Environment. What have been the environmental conditions? In particular, what are the day and night temperature setpoints, and has the greenhouse been cooler or hotter than desired? Some crops are more susceptible to chilling damage than others, while other plants don't tolerate heat as well, especially if plants experience drought stress. In addition to temperature, it can be useful to know about the light environment as well as humidity conditions.

Oftentimes, a combination of two or more factors leads to a crop problem, which makes diagnosis more challenging. The more information about the crop history and symptomology, the more accurately and quickly the problem(s) can be identified. With an early and correct diagnosis, recommendations can often (but not always) be made to overcome the problem. Unfortunately, some problems cannot be overcome (such as herbicide damage), or may be so severe that it's best to discard the plants.

While there is usually a small diagnostics fee, the amount is trivial considering potential consequences of ignoring the problem or making a wrong corrective action. In addition, an early and correct diagnosis can limit the incidence and severity of the problem, and may eliminate unnecessary pesticide applications. In the U.S., visit www.npdn.org to find a diagnostic lab near you. [gpn](http://www.gpn.org)

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