Taking Photos of Plant Disease Problems

"A good photograph is knowing where to stand." **– Ansel Adams**

"We must remember that a photograph can hold just as much as we put into it…" **– Ansel Adams**

"When I photograph, what I'm really doing is seeking answers to things." **– Wynn Bullock**

"To photograph is to confer importance." **– Susan Sontag**

Diagnosis is the first step in disease management. Identifying the disease or the cause of a problem is necessary before appropriate management methods can be taken. Sometimes a diagnosis can be made from photos, but, in most cases, a diagnosis cannot be made using only photos. This is partially because symptoms, such as wilting or leaf spots, can be caused by different pathogens, by insects, or by abiotic factors, such as nutritional deficiencies. In addition, photos do not provide the information necessary to make a diagnosis. Necessary information may refer to the presence or absence of various signs (the physical presence of a pathogen; e.g., fungal growth) or of certain parts of a plant, a field, or landscape. Many photos can also be out of focus or poorly exposed, so obtaining information from them is difficult.

Usually, diagnosis depends upon laboratory examination and/or testing of a physical sample to identify the cause of the problem. Even if a diagnosis cannot be made from photos, photos can provide important information that can be used in the diagnostic process, especially if a physical sample is poor or has been damaged. For these reasons, it is important to provide the best photos possible. This means providing photos that are of good quality and that capture the best views of the subject.

If you plan to send photos for assistance with a potential plant disease problem, submit a series of photos that show multiple views:

1. The location of the symptomatic plant(s) and the area surrounding the plant(s) (a "field view").
2. The entire plant (a "plant view").
3. A close-up of any symptomatic plant parts (e.g., an entire leaf or fruit).
4. A close-up of any signs or symptoms (e.g., fungal survival structures [sclerotia] or fruiting bodies or an area that shows stem anomalies or several leaf spots/lesions).

"Field views" and "plant views" can show patterns of symptoms that are important to diagnosis. Examples of patterns include the pattern of chlorotic leaves on a plant, the pattern of symptomatic plants in a landscape or field, and the pattern of branch tips dying back in a tree.

In some cases, when plants (annuals) are dying and a client is willing to sacrifice a plant that is in advanced decline, it can also be helpful to send a photo of the root system and the crown of the plant. It is important to dig a plant up to gain access to the roots since pulling a plant from the ground may damage roots. Also, remember to gently remove the soil from the roots so that the roots are clearly visible.

An example of a series of photos that provides good information and captures the relevant views described above is presented in **Figure 1**. Examples of photos that show close-ups of plant parts, signs, and symptoms are presented in **Figure 2**.

If you have access to tools, such as a smartphone lens attachment, that provide magnified views of a subject, you can take additional photos that show a magnified view of signs or symptomatic areas (e.g., fungal growth or leaf spots/lesions). Examples of photos taken using a smartphone with a magnifying lens attachment are presented in **Figure 3**.

When sending photos of potential plant disease problems to Extension agents or specialists, please do not send photos without additional information. Photos alone can provide valuable information, but the combination of photos and information, such as the variety of the affected crop and descriptions of the symptoms together, can be monumental in comparison. Information that should be collected when investigating a potential plant disease problem can be found in the publications *Information Collection Form for Plant Disease Problems* (Form 1138, available only to MSU Extension employees) and *Plant Disease Sample Submission Form* (Form 1139, available at extension.msstate.edu).

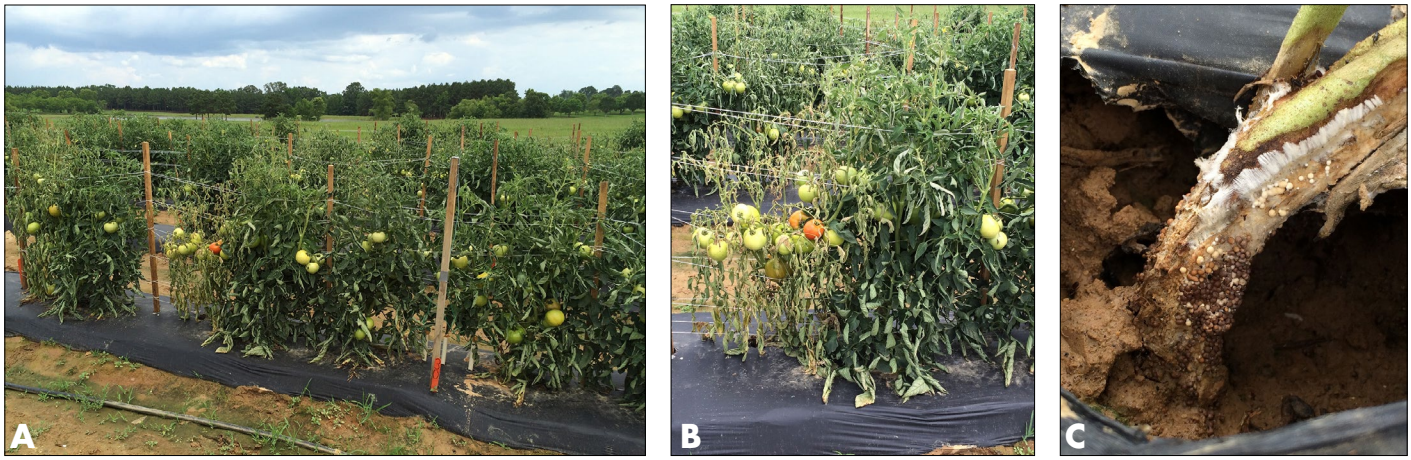

Figure 1. A good example of a series of photos showing multiple views and providing relevant information. A) "A field view" of a tomato planting. Two tomato plants showing symptoms of wilting are visible. These plants are not clustered together but are next to non-symptomatic plants. B) A "plant view" of the entire wilted tomato plant near the center of the photo in Figure 1A. This entire plant, as opposed to a single branch or only a part of the plant, is wilted. A non-symptomatic plant is also visible. C) A close-up of the base of the stem of the symptomatic plant in Figure 1B. White, thread-like fungal growth (mycelia) and round, tan and brown, seed-like structures (sclerotia) on the mycelia are visible. Photos: R. A. Melanson, MSU Extension, bugwood.org.

Figure 2. Good examples of close-ups of symptomatic plant parts and/or signs. A) A close-up of an early blight lesion on a tomato stem. Concentric rings of fungal growth are visible in the lesion. B) A close-up of a gummy stem blight lesion on a watermelon stem. Drops of dark-colored sap exuding from the stem are visible. C) A close-up of brown anthracnose lesions on the upper surface of a watermelon leaf. D) A close-up of dark-colored fungal growth on the lower surface of a basil leaf with downy mildew. *Note*: Diagnoses of the diseases shown in these photos were made following examination of physical samples. Photos: R. A. Melanson, MSU Extension, bugwood.org.

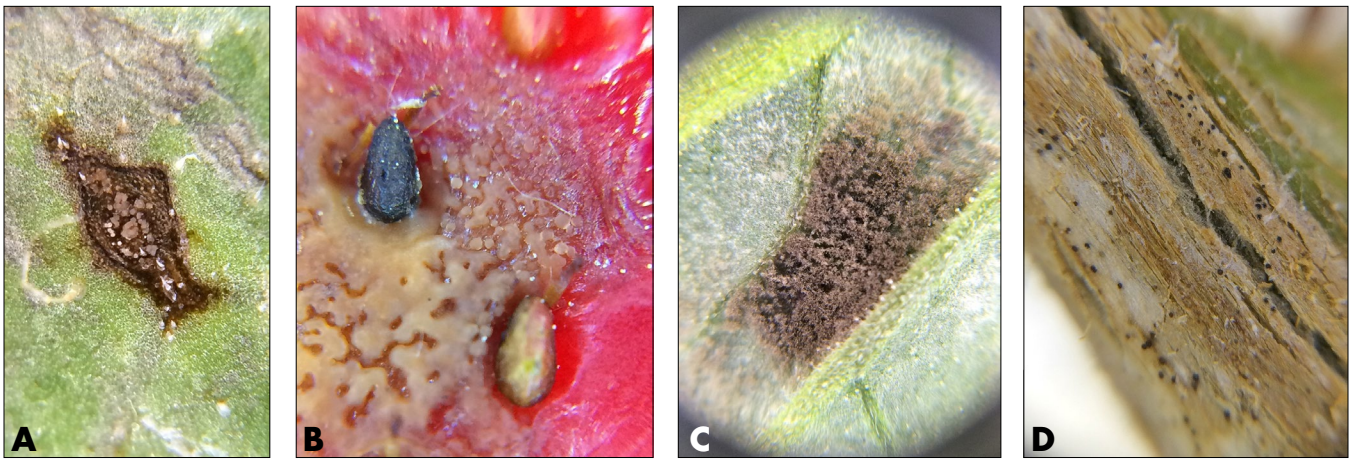

Figure 3. Good examples of magnified views of signs and/or symptoms. A) A magnified view of an anthracnose lesion on a watermelon leaf. Salmon-colored fruiting bodies (acervuli) are present in the center of the lesion. Figure 2C shows an expanded view of a watermelon leaf showing multiple lesions. B) A magnified view of salmon-colored anthracnose fruiting bodies (acervuli) on a strawberry fruit. C) A magnified view of the olive-green fungal growth on the lower surface of a tomato leaf. This growth is characteristic of leaf mold and occurs opposite yellow lesions on the upper surface of infected tomato leaves. D) A magnified view of a gummy stem blight lesion on a watermelon stem. Round, black fruiting bodies (pycnidia) are present in the lesion. *Note*: Diagnoses of the diseases shown in these photos were made following examination of physical samples. Photos: R. A. Melanson, MSU Extension, bugwood.org.

Tips

- Use a smartphone or digital camera to take high-quality photos that can be sent via email. Low-quality photos become very pixelated when viewed using the zoom feature of image software, and important detail can be lost.
- When possible, view photos taken with a digital camera or smartphone on a computer screen to determine which photos are in focus. Then, send only photos that are in focus and that focus on the correct plant part, sign, or symptom.
- In some cases, the size of an object or lesion in a photo cannot be determined from the photo. In these cases, it may help to place a ruler or an object of known size, such as a penny, next to the object before taking a photo so that a size reference is present in the photo.

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