Thrips and Botrytis Newsletter 2019

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Research Update: Not all spots are Botrytis.

Background:

It is not a secret that *Botrytis cinerea* is the most common pathogen affecting the postharvest quality of cut flowers; however, there are other pathogens lingering in greenhouses and ready to jump on rose flowers at the next best opportunity. Just like Botrytis, they can damage flower petals and reduce profits. Some of the most frequent and problematic pathogens in cut-rose production greenhouses worldwide include *Podosphaera pannosa,* the causal agent of rose powdery mildew, and *Peronospora sparsa,* the causal agent of downy mildew.

While we were evaluating incidence and fungicide resistance development in Botrytis isolates from commercial rose shipments from South America, we noticed some other fungi present in the decaying rose petals. We decided to take a closer look and find out if they were plant pathogens or if they were fungi just hanging out and having a field day on petals that were already decaying for other reasons.

Summary of the experiments and results:

Flower tissues from five commercial rose shipments were incubated in humidity chambers and the presence or absence of different fungi was recorded. Spores and fungus actively growing in plant tissue in form of mycelium were placed on artificial laboratory medium that allowed their growth apart from the rose. We examined the fungal colony for shape, color, and determined the identity of the fungi down to the species level. Besides Botrytis, we counted a total of six different fungi on flower tissue. Fresh flowers were exposed to each of the six fungi to make sure those were pathogens able to cause disease and not just visitors.

Four of the six fungi were able to cause disease and produced spores after days of development in the flower tissue. These pathogenic fungi were identified as *Alternaria alternata*, *Cladosporium cladosporoides*, *Epicoccum nigrum*, and *Penicillium citrinum*. Our studies confirmed that *Botrytis* was the most common fungus, however, we cannot ignore the other

pathogens. In order of occurrence, they were *Alternaria alternata*, *Epicoccum nigrum, Penicillium citrinum and Cladosporium cladosporoides* (Figure 1). Each of those pathogens has their unique requirements for infection, sensitivity to fungicides, and even host (cultivar) specificity. So, when we study Botrytis and come up with recommendations for control, we must make sure that we also suppress the not-so-common enemies of roses.

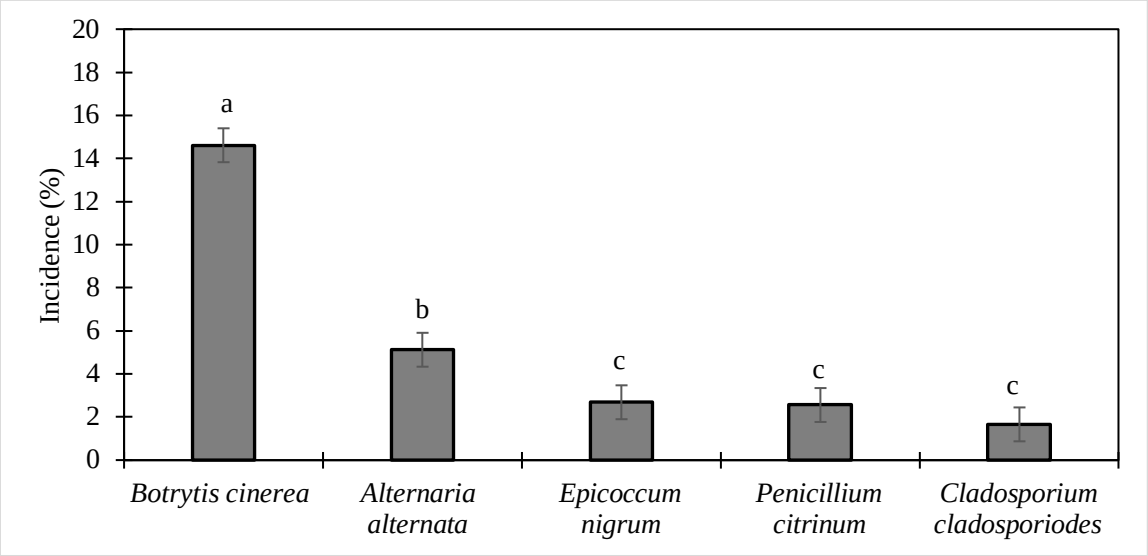

Figure 1: Average incidence (% of roses tested) of different pathogens in rose tissue after evaluation of five commercial shipments.

The initial symptoms on rose petals for each of these fungi start as small, discolored areas; therefore, they can easily be confused with *Botrytis* at first. However, as the infection progresses unique characteristics emerge. Symptoms of *Alternaria alternata* infection are small and circular that rapidly evolve into black lesions with gray to black dots (spore production facilities) aligned in a circular fashion (Figure 2). *Epicoccum nigrum* lesions are necrotic and irregularly-shaped, and they grow more rapidly on the petals. Under high humidity conditions, white mycelia forms on the surface with small-circular dark gray formations called sporodochia. *Penicillium citrinum* starts as necrotic lesions with circular to irregular shapes that rapidly develop green spore masses surrounded by white areas. Finally, *Cladosporium cladosporoides* infection starts as necrotic region with little color, which produce olive green spore masses under high humidity conditions.

These observations have implications for *Botrytis* management*, s*ince *Botrytis* incidence is often based only upon early symptoms which are similar amongst these five fungi. The most accurate way to determine which fungi are present in your greenhouses is to place roses into humidity chamber to allow the fungi to develop and sporulate. In most cases, the spores give away the identity of the pathogen!

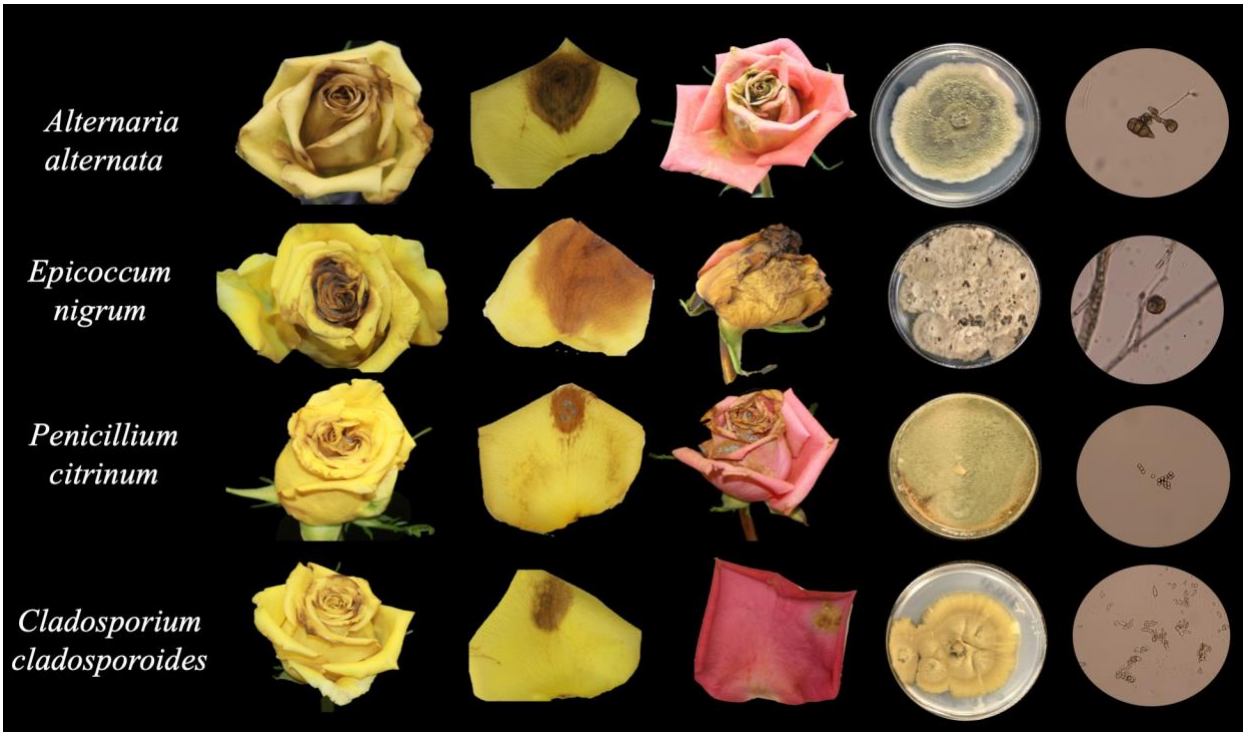

Figure 2: Symptomology, morphological characteristics, and microscopic features of four fungi causing infections in rose flowers.