Gummy Stem Blight of Cucurbits

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Gummy stem blight, caused by the fungus Didymella bryoniae as the sexual stage (perithecia giving rise to ascospores) and Phoma cucurbitacearum as the asexual stage (pycnidia producing conidia), is a common disease of all major cucurbits and is present wherever they are grown. Both stages of the pathogen can occur on infected tissue during the season, but they vary in importance as inoculum sources. The disease has been reported in New York since the early 1900s. Gummy stem blight refers to the foliar and stem-infecting phase of the disease, black rot to the fruit rot phase (see fact sheet, page 732.10, Fruit Rots of Squash and Pumpkins).

Symptoms and Signs

A wide range of foliar symptoms occurs on cucurbits, which can make diagnosis difficult. For example, on leaves of the muskmelon variety Earligold symptoms may be a water-soaked lesion on the leaf margin, interveinal necrotic scorch, and randomly distributed irregularly shaped circular lesions (fig. 1). Under certain weather conditions all symptoms may occur in a naturally infected field at the same time. Some lesions may be surrounded by a yellow halo, and when spots dry up, they often crack. On pumpkin, a nondescript marginal necrosis is followed by larger, wedge-shaped necrotic areas common to the earlier appearance of powdery mildew (fig. 2). The association of susceptibility to powdery mildew and occurrence of gummy stem blight is discussed later. Leaf symptoms on cucumber and squash are infrequent but are similar in appearance to those on pumpkin. Pycnidia, the asexual fruiting bodies, appear on affected leaves as small black specks, but if the tissue is rapidly killed, as on muskmelon, these diagnostic signs will not be evident on the foliage.
Infected stems first show water-soaked lesions and later appear tan. Older stems, particularly of muskmelon and cucumber, show pycnidia within the affected tissue (fig. 3). Stem lesions often cause gummy, reddish-brown or black beads to exude, a symptom that can be confused with Fusarium wilts and injury caused by insect feeding. In the latter cases, however, pycnidia are not present. Perithecial fruiting bodies, which appear similar, may also be embedded in the same lesion.

**Disease Cycle**

The gummy stem blight fungus is both seed- and soil-borne. The pathogen may be carried in or on infested seed. In the absence of host plants, the fungus can overwinter for a year and a half or more on infected crop residue. The exact length of survival in the Northeast is currently being studied. The fungus survives as dormant mycelium or as chlamydospores (thick-walled modifications of the mycelium). In northern areas of the country in the spring, pycnidia are produced, giving rise to conidia, which serve as the primary inoculum. Under laboratory conditions, young pycnidia appear light brown (fig. 4, left), whereas perithecia already are black (fig. 4, right). As the pycnidia age, they become black, as shown in figure 3. Conidia are released through a pore (ostiole) in the pycnidia (fig. 5), and if moisture is high, conidia exude as “spore horns” containing thousands of conidia (fig. 6). Conidia vary in size, are short and cylindrical, with usually one septum near the middle, or they may be unicellular. Under moist conditions, they are readily dispersed by splashing water.

Both temperature and moisture are critical for germination, sporulation, penetration of conidia, and subsequent symptom development, but moisture (relative humidity over 85 percent, rainfall and duration of leaf wetness from 1 to 10 hours) has the greatest influence. The optimal temperature for symptom development varies depending on the cucurbit; for watermelon 75°F is optimal, for cucumber 75-77°F, and for muskmelon 65°F. The optimal temperature for muskmelon reportedly is lower because of the need to control powdery mildew along with gummy stem blight infection. Symptoms of gummy stem blight often cause gummy, reddish-brown or black beads to exude, a symptom that can be confused with Fusarium wilts and injury caused by insect feeding. In the latter cases, however, pycnidia are not present. Perithecial fruiting bodies, which appear similar, may also be embedded in the same lesion.

**Chemical Control**

Disease-free control should be used for all cucurbit plantings. Obtain seed from reputable sources. If seed is to be saved from open-pollinated varieties, these should originate from disease-free plantings and should be harvested at a location where there is no contamination by airborne conidia. Use of seed disinfectants does not guarantee that all seed is disease-free. Seed disinfectants are more effective when used as solutions or suspensions than as dry dust treatments. To be safe, growers should follow a minimum 2-year rotation out of all cucurbits. To encourage decay of plant debris, crop refuse should be plowed under as soon as possible after harvest. Powdery-mildew-resistant (PMR) cucumber and muskmelon varieties should be grown to reduce the opportunity for gummy stem blight infections. PMR pumpkin and summer and winter squash will be available soon. Cucumber beetles and aphids should be controlled to reduce predisposing cucurbits to disease.

**Cultural Control**

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