Disease Update For The Week Of April 30, 2012

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May 1, 2012 – Earlier in Kentucky Pest News, I reported that we were seeing a good bit of Rhizoctonia damping-off and target spot around the state. Reports of these two diseases have slowed, probably due to dry conditions. Compared to previous years, the incidence of Pythium root rot is relatively low. We have, however, seen some collar rot begin to develop on plants that have reached clipping size in float beds. Even though conditions aren't highly favorable for disease, growers should continue to take a proactive approach in managing tobacco seedling diseases. For recommended management practices, consult previous issues of Kentucky Pest News for articles on managing Pythium root rot (No. 1296; April 3, 2012) and both Rhizoctonia damping-off and target spot (No. 1297, April 10, 2012). The focus of this week's report is collar rot and its management.

BACKGROUND. Collar rot begins to appear in float beds around 5 weeks after seeding. Resting structures (sclerotia) of the collar rot pathogen, normally located outside the float system, come out of their dormant state and produce cup-shaped fruiting bodies called apothecia. Apothecia then produce spores (ascospores) that are dispersed on wind currents. When ascospores land on susceptible tissue, they germinate if sufficient moisture is present. Long periods of leaf wetness (greater than 16 hours) are required for this process. Germinated ascospores produce hyphae (fungal "threads") that penetrate tissue and begin the infection process.

SYMPTOMS. The first symptoms of collar rot are small, dark green, water-soaked lesions that appear at the bases of stems; however, these symptoms are not seen commonly. In most cases, this disease becomes apparent when cankers on lower stems result in chlorosis of older leaves and subsequent wilting of plants or flagging of leaf tips (Fig. 1). When clusters of infected transplants collapse, open holes are formed in the plant canopy (Fig. 2). These clusters, or "foci", are usually grapefruit-sized (4-6" in diameter). Stems of affected seedlings generally show a wet necrosis that is amber-to-brown in color, beginning at the base of the plant and extending upward (Fig. 3). Signs of the causal agent, Sclerotinia sclerotiorum, may be present on symptomatic plants or on debris in float trays. These signs include a white, cottony mycelium (fungal mass), present if humidity is high, and irregularly shaped, sclerotia that are white at first and turn black as they mature (Fig. 4). Sclerotia resemble seeds or rodent droppings and are the primary survival structure of S. sclerotiorum and are the primary source of inoculum for outbreaks in subsequent years.

Plants that are 5-7 weeks old are most susceptible to collar rot. We often see the first cases shortly after plants are first clipped following a period of disease-favorable weather. Cool temperatures (60 to 75 ºF), high humidity, and overcast conditions, like those that have been common in Kentucky for the past week, are ideal for development of this disease. It's also important to note that S. sclerotiorum is an efficient colonizer of dead plant matter and weakened or injured tissue, and these are usually the first to be attacked. The fungus will then move from these areas to nearby healthy plants as long as cool temperatures and high humidity prevail. This is one of the ways that secondary spread of the collar rot pathogen takes place, since S. sclerotiorum does not produce airborne spores on infected tissue. The other way in which secondary spread can occur is through dispersal of infected tissue, which happens when infected plants are clipped.

MANAGEMENT. There are no fungicides labeled specifically for control of Sclerotinia collar rot on tobacco transplants, making this a difficult disease to manage. Sound management practices are the most important options that a grower can use to fight collar rot. Adequate ventilation and air circulation are primary concerns, since these limit the duration of leaf and stem wetness. Growers should manage temperatures to promote healthy plants and minimize injury. The latter is important because injured tissues are more susceptible to S. sclerotiorum. Fertility should be kept at around 100 ppm (N); excessive levels of N can lead to a lush, dense canopy that will take longer to dry and will be more susceptible to attack by the collar rot pathogen. Leaf clippings should not be allowed to build up in transplant trays or remain in contact with seedlings. Mow seedlings at a low engine speed with a well- sharpened blade to ensure complete removal (and capture) of leaf pieces in the least injurious way possible. Frequent clippings will reduce the amount of tissue that must be removed by the mower and will cause less plant injury. These result in less leaf material left on the surface of the transplant trays. The collar rot pathogen can overwinter on clippings and diseased plants, so these should be discarded a minimum of 100 yards from the transplant facility, or buried, to reduce the chance of spores making their way back into nearby float beds. Home gardens should not be planted near transplant facilities, and keep a weed-free zone around float beds. Over 300 species of plants, including many weeds, are hosts to S. sclerotiorum, making many weeds potential hosts for this pathogen. Δ

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Figure 1. Early symptoms of collar rot include yellowing of leaf tips and flagging of older leaves.

Figure 2. Collapse of clusters of plants leaves softball- to grapefruit-sized openings in the plant canopy.

Figure 3. Stems infected by S. sclerotiorum typically are water-soaked and exhibit a dark-brown necrosis.

Figure 4. Signs of the collar rot pathogen include dense, white fungal growth and black, irregular sclerotia ranging from the size of a mustard seed to a raisin.