

LOOK-OUT FOR FUSARIUM ROOT AND CROWN ROT OF HOSTA!!

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Hosta is one of the most popular perennials planted in landscapes around the country and, therefore, has become widely grown in nurseries. Many nurseries in South Carolina and throughout the Southeast are increasing production of this popular perennial crop. In fact, some nurseries in South Carolina have hundreds of thousands of hostas in containers, at all stages of development, in their nursery beds. Needless to say, hosta production has become "big business" for many nurseries.

One reason hostas are so popular is because they are considered to be relatively free of problems—including those caused by insect pests and diseases. Although this is true of hostas in the landscape, it is not necessarily true of hostas in the nursery. We are learning that large-scale production of hostas and other ornamental crops in nurseries encourages the development of diseases and insect pests that usually are not problems in the landscape. This happens because large numbers of plants are crowded into relatively small areas and then watered with overhead irrigation. These conditions are ideal for disease development. Because of the importance of the hosta crop to the nursery industry in South Carolina and the Southeast, we are focusing some of our research efforts at Clemson University on diseases of container-grown hostas. In this way, we can learn how best to manage these diseases before they become epidemic and cause serious economic losses in nurseries.

Between 1997 and 1999, several wholesale nurseries in South Carolina had a problem with root and crown rot on container-grown hosta plants. Up to 10% of the plants growing in one nursery were affected, and thousands of plants were culled. Disease symptoms included yellowing of leaves, discoloration and decay of the roots and crowns, and an overall stunting and decline of the plants (see Figures 1 and 2). These symptoms were most evident after plants had been divided and were beginning to re-grow. Diseased plants were taken back to our laboratory and to the Plant Problem Clinic at Clemson. Species of the soil-inhabiting fungus *Fusarium* consistently were isolated from the roots and crowns of diseased plants, but there are no diseases of hosta caused by *Fusarium* species reported in the scientific literature. However, these fungi occur commonly in most soils and are responsible for a number of economically important diseases (including root rots, crown rots, bulb and corm decay, and wilts) on many ornamental, agricultural, and forestry crops. Consequently, we initiated a project to investigate the cause of this previously unreported disease of hosta. Here is what we have learned so far.

Diseased plants from a number of different hosta cultivars were collected in October 1998 and again in September 1999. Isolations were made from discolored vascular tissue in roots and from decayed crowns, and numerous isolates of *Fusarium* spp. were recovered. In fact, *Fusarium* spp. were recovered from all of the diseased plants examined. In all, five species of *Fusarium* were found in hosta roots and crowns, but *F. solani*, *F. oxysporum*, and *Southeastern Floriculture*, January/February, 2000

an unidentified species (*Fusarium* sp.) were most common. Some of these isolates were used to inoculate healthy Francee and Albo Marginata hosta plants growing in a growth room to determine which, if any, of the species isolated were pathogenic and capable of causing disease. Several inoculation methods were tested to help us understand how plants were becoming infected. *F. solani*, *F. oxysporum*, and *Fusarium* sp. all caused disease to some extent, but root and crown rot always was most severe on plants inoculated with the unidentified species—*Fusarium* sp. Therefore, we concluded that the root and crown rot of container-grown hosta plants in nurseries was caused primarily by this unidentified species of *Fusarium*. Isolates of this species do not appear to match the descriptions of the commonly occurring species of *Fusarium*; therefore, representative isolates have been sent to *Fusarium* experts for identification. In addition, the disease only occurred when plants were inoculated by wounding roots and crowns and directly exposing these damaged tissues to inoculum of the fungi. Transplanting plants with wounded roots and crowns into soil containing the suspected pathogens did not result in disease development.

In summary, we suspect this unusual species or form of *Fusarium* occurs naturally in and around nurseries or may be associated specifically with hosta plants. This pathogen appears to infect plants during the division process—i.e., when plants are being divided to increase numbers of plants in the nursery. For example, if a few infected plants are divided then the knives used to divide them have been contaminated and will effectively inoculate subsequent plants that are cut and divided. Consequently, good sanitation practices while dividing plants will be very helpful in preventing this disease from becoming established. Use a clean work area to divide plants, regularly disinfect knives used to divide crowns, disinfect divided crowns with a mild bleach solution, and lastly consider dipping or soaking divided crown pieces in a fungicide suspension before planting. Fungicide products containing thiophanate-methyl usually are very effective against *Fusarium* spp. Further studies on *Fusarium* root and crown rot are in progress in our laboratory. Currently, we are investigating the effects of various production practices on disease development and soon will begin studying the effectiveness of different disease management strategies.

So far, this disease only has been identified in South Carolina, but, in all likelihood, it occurs in other states where it has not yet been detected or diagnosed. We encourage anyone who sees or suspects they have *Fusarium* root and crown rot on hostas to contact us (864/656-7157) so we can determine the distribution of the disease in the nursery industry. We particularly are interested in documenting the occurrence of root and crown rot in other states in the Southeast. By investigating this disease before it has significantly affected many nurseries, we hope to prevent serious economic losses to nurseries in the Southeast.

Acknowledgement and photos on next page.

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Figure 1

Foliar symptoms of Fusarium root and crown rot on hosta plants (cv. Albopicta) from a production nursery; leaves have turned yellow and then brown and have begun to shrivel.



Figure 2

Symptoms of Fusarium root and crown rot on a hosta crown that has been cut open; notice the dark discoloration and decay in the crown and in the vascular column in one of the roots leaving the crown.

