A GLOEOSPORIUM DISEASE OF THE SPICE BUSH

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In June, 1909, Dr. M. T. Cook, formerly of the Delaware Experiment Station, called my attention to a disease of the spice bush fruit. Diseased material was at once collected and cultures made from the interior of the affected fruit, care being taken to observe all the rules of asepsis. In three days a pure culture of a Gloeosporium had appeared in all the poured plates. As far as I could determine from literature, no Gloeosporium disease was reported to attack the spice bush. Shear[1] in his extensive studies on the genus Glomerella does not mention the spice bush as being the host to a Gloeosporium. Ellis and Everhart[2] first described *Gloeosporium officinale* E. & E. on sassafras in Delaware. *Sassafras variifolium* (Salisb.) Ktze. is a shrub, which in common with the spice bush, *Benzoin aestivale* (L.) Nees. belongs to the family Lauraceae. In studying the disease, the possible identity of the spice bush Gloeosporium with that of the sassafras at once suggested itself. Studies were therefore made to determine the pathogenicity of the fungus, its identity with *Gloeosporium officinale* E. & E. and the relationship of both fungi to *Gloeosporium fructigenum* Berk. of the bitter rot of the apple.

Symptoms.—The spots on the green immature spice bush fruit are characterized at first by small darkish depressions. Several of these spots either coalesce and form a larger one, or a single spot gradually enlarges and invades the whole area of the fruit which as a result drops off prematurely. The ascervuli usually appear later when the fruit drops, or within twenty-four hours if placed in a moist chamber. The disease is not confined to the fruit alone, but may attack also the tender foliage and twigs. The symptoms on the plant later are those resembling somewhat the injury due to fire blight of young apple shoots, with the difference, however, that in the spice bush the disease seems to be limited to the tender portions of the plant. Diseased leaves do not seem to form ascervuli while still attached to the plant, but

[1] Shear, C. L. and Wood, A. K. Studies of fungous parasites belonging to the genus Glomerella. Bur. Pl. Ind. Bul. 252, 1913.

[2] Ellis, J. B. and Everhart, B. M. New species of fungi from various localities. Proc. Acad. Nat. Science, Philadelphia: 322–386, 1894.

readily develop within twenty-four hours when placed in a moist chamber. A pure culture of the Gloeosporium may be readily obtained from both infected leaves and stems of the spice bush by first sterilizing the surface, then placing bits of tissue in agar plates.

Pathogenicity.—The method of inoculation was to spray the leaves and fruits of the spice bush with an atomizer containing a heavy suspension of the Gloeosporium spores from a pure culture in sterile water. The inoculated parts were then enclosed in lamp chimneys and both open ends closed with sterile non-absorbent cotton. Checks were treated similarly but they were sprayed with distilled water. Ten chimneys were used at one time, two for the checks and eight for the inoculations. The experiment was repeated three times, and the lamp chimeys were not taken off before twenty-four hours. After each experiment the lamp chimneys were immersed in 5 per cent. formaldehyde for ten minutes, then rinsed in sterile water. Typical infections began to appear on the tender leaves in from three to eight days, but the older leaves remained healthy. The inoculated fruits also showed the typical spotting. All the checks remained healthy. The symptoms obtained from the artificial inoculations were the same and identical with those of the natural infections. The above experiments were carried on in June and July of 1909. In the fall of that same year young spice bush seedlings were dug out in the woods and planted in sterile pots and soil in the laboratory. The seedlings were kept for four weeks. Two dried up and were discarded, eight made a good start and showed no disease. Two of these plants were left as checks and six sprayed with a heavy suspension of the Gloeosporium spores from a pure culture originally isolated from the diseased spice bush fruit. All the eight plants were covered with bell jars for twenty-four hours. A week after infection the tip leaves of the inoculated seedlings turned brown and died, whereas the leaves on the check plants remained healthy. The fungus was readily re-isolated from the artificially infected leaves, and these when placed in a moist chamber for twenty-four hours were covered with a layer of acervuli of salmon-colored spore masses.

Identity of the spice bush Gloeosporium.—I have already mentioned that *Gloeosporium officinale* E. & E. has been reported on sassafras leaves. In pure cultures this fungus and the spice bush Gloeosporium cannot be distinguished from *Gloeosporium fructigenum* Berk. of the apple. Typical infections on the spice bush were obtained with spores

of *Gloeosporium officinale*. Similar results were also obtained when the sassafras was inoculated with spores from the spice bush Gloeosporium. The checks remained healthy. This seems to prove that the Gloeosporium from the spice bush and *Gloeosporium officinale* E. &. E. from the sassafras are one and the same. In previous papers I[3] have attempted to show that *Gloeosporium officinale* E. & E. is the same as *Gloeosporium fructigenum* Berk. of the apple, since it produces typical symptoms of bitter rot of the apple and also infects the sweet pea, producing the typical symptoms of anthracnose. Inoculation experiments were carried on with the spice bush Gloeosporium on apples in the orchard, and on sweet pea seedlings. The results obtained were the same as those above stated with *Gloeosporium officinale* E. &. E. This seems to prove that the Gloeosporium from the spice bush is identical with *Gloeosporium officinale* of the sassafras and that both are one and the same with *Gloeosporium fructigenum* Berk. of the apple whose perfect form is known as *Glomerella rufomaculans* (Berk.) S. & v. S. The spice bush and particularly the sassafras are so widespread in the lower part of Delaware that they are being considered as weeds. The apple is well adapted to this soil and climate and it is rapidly gaining a high rank in the agriculture of the State. In view of these facts, it is important to exterminate both the spice bush and the sassafras and thus prevent them from harboring and carrying the bitter rot fungus to the apple.

Summary

A new Gloeosporium disease of the spice bush (*Benzoin aestivale*) is recorded on both fruits and tender leaves.

The spice bush Gloeosporium is an active parasite.

The spice bush Gloeosporium is the same as *Gloeosporium officinale* E. &. E. from the sassafras (*Sassafras variifolium*) as proved by cross inoculations. Both the Gloesporium from the spice bush and *Gloeosporium officinale* appear to be the same as *Gloeosporum fructigenum* Berk. which causes the bitter rot of the apple, since each may infect both the apple and the sweet pea.

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[3] Taubenhaus, J. J. A study of some Gloeosporiums and their relation to a sweet pea disease. Phytopathology 1: 196–202. 1911. A further study of some Gloeosporiums and their relation to a sweet pea disease. Phytopathology 2: 153–160, 1912.