Botryosphaeria dothidea—Where Will It Stop?

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To the average person, *Botryosphaeria dothidea* sounds like some creature from outer space. But to scientists, particularly those at the University of Georgia, *B. dothidea* is a tiny organism to be respected. This organism has crippled apple production in parts of Georgia and now is threatening our entire peach industry.

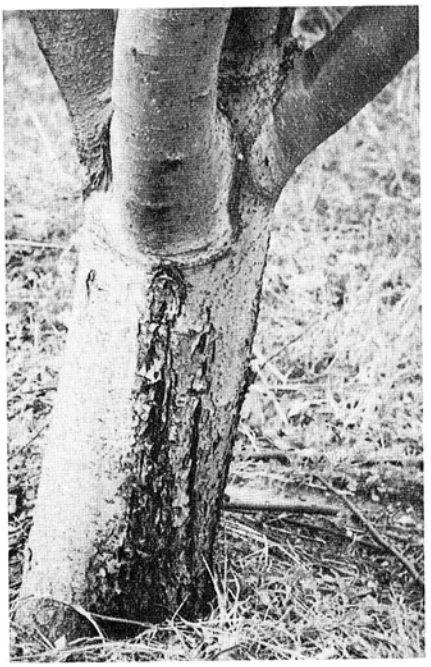
At least four serious fruit diseases can be attributed to this fungus. Even though most of the damage has been limited to southeastern fruit crops, it is very likely that *B. dothidea* will become well known to fruit growers all over the United States in the next few years. Because of the potential this organism has for damaging fruit crops nationwide, I want to give a brief summary of what *B. dothidea* has done in Georgia in recent years as well as a brief description of the research conducted to cope with the diseases caused by this fungus.

Bot Canker on Apples

In the late 1960s, several hundred acres of apples were planted in the peach-growing area of middle Georgia. Most scientists realized that the terrain and environment in this area were less than ideal for growing apples, but premium prices for apples harvested in July and August enticed growers to set large orchards. Twelve-month cold storage has since destroyed that advantage.

About 1973, when most orchards were 5 to 6 years old, a severe snowstorm and unusually low temperatures hit middle Georgia. Numerous cracks appeared in the apple tree bark, particularly in the Mollie and Golden Delicious cultivars. By midsummer, bark on the trunks began to peel off and large cankers developed. The late Jack Taylor identified the disease as bot canker and said that if it were not brought under control, every apple tree in middle Georgia could be wiped out in a short time.

Indiana and New York had been confronted with bot canker, but no controls were available. Lab tests at Georgia showed that benomyl and captafol would kill the *B. dothidea*



Bot canker on apple.

organism. Fortunately, benomyl was cleared for use on apples. We recommended that all trunks and scaffold limbs be sprayed with a high rate of benomyl at monthly intervals. We also recommended that an outdoor water-based latex paint be applied to the trunks immediately after the first benomyl spray. Orchards where benomyl sprays were applied or the trunks painted are still in production today; those where these control practices were not used have long since disappeared.

Recent research at the University of Georgia shows that four or five benomyl applications at 2-week intervals will eradicate *B. dothidea* from old cankers. Once the fungus is eradicated, benomyl applications every 4 to 6 weeks will prevent new infections. It was also determined that wounds caused by high or low temperatures or mechanically provide an opening for the fungus. Pruning wounds, however, seem to be the opening most frequently used by *B. dothidea* at the present time. Bot canker is occurring more frequently in northern Georgia apple orchards but has not been as devastating as in middle Georgia.

Bot Rot on Apples

About a year after bot canker attacked the trunks of middle Georgia apple trees, a fruit rot suddenly appeared. This was identified as bot rot caused by *B. dothidea*. Fruit losses in Georgia were extensive, particularly during and after harvest. Bot rot or white rot had been reported in other apple-growing states, and such fungicides as folpet, captan, and benomyl had been used for control. Fungicide evaluation tests showed that benomyl was the only fungicide suitable for bot rot control under Georgia conditions, however.

The first big question was, "When do you apply a fungicide to control bot rot?" Several investigators have noted that apple fruit in the field is not rotted until midsummer, but others have shown that primary infections might occur soon after bloom. Since this rot was so devastating, benomyl applications, at first, were recommended at 2-week intervals throughout the season. After following this schedule one season, we realized the amount of damage eight to 10 benomyl applications were causing to the growers' pocketbook. Also, Alternaria core rot became severe in orchards where numerous benomyl applications were used.

With this in mind, Georgia scientists established a research project to determine when infection occurred, so we could eliminate some fungicide applications. Apples were collected at weekly intervals, beginning 3 weeks after petal-fall, and inoculated with *B. dothidea*. Little infection occurred until the sugar content reached approximately 10.5, a level not reached in middle Georgia until early July, or about a month before harvest.

For the past 3 years growers have been urged to apply bot rot sprays when the sugar content of their apples reaches 10.5. This procedure requires only two benomyl applications, compared with eight before the research was conducted, and has saved apple growers thousands of dollars in fungicide costs.

Gummosis, a New Peach Disease

About the time apples were introduced into the peach-growing areas of middle Georgia, a new problem developed on peaches. Numerous gum deposits were noticed on the trunks and scaffold limbs of peach trees. This gum appeared to exude through bark lenticels. This problem was rather widespread in the late

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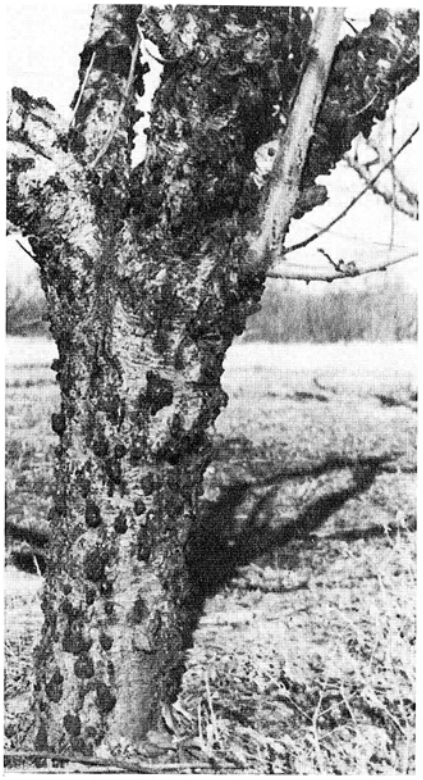
60s but was not identified as a disease until 1974, when *B. dothidea* was named the causal organism. Did the introduction of apples into this peach-growing area contribute to the development of gummosis or did *B. dothidea* go from peach to apple, causing bot canker and bot rot? Did a change from clean cultivation to the use of herbicides in the row with sod middles increase inoculum by preserving more deadwood on the orchard floor? We may never know the answers.

A 1982 survey revealed that gummosis had spread to 24 Georgia counties, as well as into Florida, Alabama, and Louisiana. Even though the disease does not appear to cause tree death, it does weaken the tree and reduce yield. Gummosis is now in east central Georgia near South Carolina's major peach-producing area. Hopefully, it will produce no immediate threat to South Carolina's multimillion-dollar peach industry.

No control has been developed yet for gummosis, but several practices are being investigated. Lime sulfur applications (1.5 gal/acre) at 2-week intervals during the growing season produce no control, but current research at the University of Georgia indicates that 12 gal of lime sulfur per acre, applied at bud swell, might give adequate control. Benomyl trunk sprays, combined with paint applications, also show some promise.



Gummosis on peach.

Since this organism comes from deadwood, removing or destroying prunings would seem to be of value. Some growers use flail mowers to chop up prunings, thus preventing inoculum from increasing in deadwood.

An important question being asked by peach growers today is, "Can the organism responsible for causing gummosis be spread in budwood?" If it can, it definitely poses a threat to all peach-producing states. Sufficient data for answering this question should be available in the near future.

Bot Rot on Peaches

In 1980, an unusual rot appeared on peach fruit of the Blake variety in a northern Georgia orchard. This rot, somewhat darker and drier than brown rot, was identified as being caused by *B. dothidea*. Bot rot recurred in the same orchard in 1981 and was also found in a few other locations.

At present, bot rot does not seem to pose a great threat to our peach crop. Most growers use a preharvest spray of benomyl plus captan. Benomyl controls bot rot on apples and should do the same on peaches.

Less than 10 years ago, *B. dothidea* was something that occurred on blueberries in other states. Today this organism is very real to Georgia fruit growers and researchers. University and USDA research plant pathologists have done an excellent job in providing timely research sufficient to keep most Georgia fruit growers in business.