Apple scab fungus more resistant to pesticides

JOHN FLESHER - AP Environmental Writer - Associated Press

Apple growers in the eastern U.S. have a despised enemy known as apple scab — a disease caused by a fungus that forms ugly brown or greenish-black pockmarks on the fruit's skin. A scabby apple is unfit for grocery stores because consumers are notoriously picky about blemished fruit.

Growers have kept the disease under control for decades by spraying trees with pesticides. Now, researchers say the chemicals may be losing their effectiveness as apple scab becomes ever more resistant, worsening the threat of outbreaks in commercial orchards.

"We've dealt with fungicide resistance over the years, but this time we're losing three or four different classes of completely unrelated fungicides at the same time," said Henry Ngugi, a plant pathologist with Penn State University's Fruit Research and Extension Center. "We have to literally go back to the drawing board."

Just one scab lesion can reduce an apple's value by 85 percent because it can't be sold as table fruit, said Janna Beckerman, a Purdue University botany professor. It still can be used for juice, sauce or other products, but that brings much less money. If the lesion splits open, bugs get inside and the apple becomes worthless.

Anecdotal reports from orchard owners and agriculture extension agents suggest the disease is spreading in parts of the Midwest and Northeast, although the situation can vary from one farm to another. Pesticide resistance and wet spring weather, ideal for the fungus' growth, are considered likely culprits.

The U.S. Apple Association, an advocacy group representing 7,500 growers, doesn't know how widespread the problem is but fears it could get "significantly worse" unless the cause is nailed down and a solution found, regulatory affairs director Mark Seetin told The Associated Press in an e-mail.

"I'm seeing growers who are doing what I'd consider a good job of spraying but still have a lot of scab in their orchards," Ngugi said. In a newsletter article earlier this month, he reported seeing "levels of apple scab that I never imagined possible" during recent orchard visits.

"This may sound scary," he wrote, "but it is my considered opinion that if the level of devastation from scab reoccurs in the coming years, it would threaten the Pennsylvania apple industry."

Jim Lerew, who grows about 600 acres of apples in York Springs, Pa., said more than half of his crop has scab damage. "It's definitely the worst ... I've seen in my lifetime," he said.

Others in the industry say things aren't so dire. The Michigan Apple Committee is funding research on apple scab but "it's not something that anyone is panicking about," executive director Denise Donahue said. Growers in Michigan, which ranks third nationally in apple production, are more worried about pests such as the brown marmorated stink bug, she said.

Scab rarely shows up in Washington, the biggest apple growing state, thanks to the arid climate. But it's the most damaging fungal disease in orchards east of the Mississippi River. In the moist Upper Midwest, some of the most popular apple varieties — McIntosh, Gala and Fuji among them — are particularly susceptible. Growers apply fungicides up to a dozen times a season to ward off the disease.

For decades, manufacturers have come up with replacements for chemical mixtures the fungus outwitted. By using a rotating lineup of fungicides from year to year, farmers usually stayed a step ahead of the scab.

But the fungus now appears to be overcoming multiple fungicides at once. In a paper published this month in the journal Plant Disease, Beckerman and several colleagues described samples collected in Indiana and Michigan that are resisting all four of the most commonly used classes of chemical treatments.

Another ominous sign: The fungus apparently hasn't developed any new weaknesses while evolving to resist the pesticides, unlike what usually happens in nature, the paper said.

The earliest generation of fungicides came along in the 1960s. They worked well, but drew increasingly tight regulation because they endangered other organisms. So, companies devised chemicals that specifically targeted apple scab. Although the newer products are safer for the environment, it's easier for the fungus to mutate and resist them — "evolution on steroids," said Wayne Wilcox, a Cornell University plant pathology expert.

No new classes of fungicides are known to be under development, he said. That leaves growers with a narrowing list of options.

They could try new mixtures of existing chemicals. Or they could revert to the older varieties, which the fungus never defeated. They're legal if used in compliance with Environmental Protection Agency guidelines, but are more expensive and must be applied more frequently to be effective.

Despite the inconvenience and higher expenses for growers, consumers are unlikely to be affected by the fungicide resistance problem unless apple scab reaches "catastrophic" levels, Wilcox said. Farmers can't afford to pass along much of the added cost because grocery stores could stock more apples from competing regions.

"It puts more of a burden on the apple grower," said George Sundin of Michigan State University, who teamed with Beckerman on the research. "They'll have to work harder to produce the crop that the public desires."

Ryan Richardson, who runs a pick-your-own orchard in Hobart, Ind., lost 15 percent of his crop to apple scab in 2009. Since then he's invested in new spraying equipment, switched his assortment of chemicals and tried techniques such as spreading nitrogen on the ground to break down leaves that might harbor the fungus.

It's a constant battle — "definitely something that keeps you up at night," Richardson said. "I have a lot of pickers who wouldn't be happy if I had a lot of scabby apples."

Apple lovers who prefer fruit grown closer to home could help matters by broadening their tastes, Beckerman said. Some lesser known varieties — Gold Rush is one example — resist the fungus, but aren't very popular.

"Consumers say they want fewer pesticides," she said, "but they buy the varieties that require more pesticides."

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