

Fusarium and Vanilla: Time to Worry?



Deadly *Fusarium* has taken root in Madagascar; Hank Kaestner wonders if the industry is ready for the repercussions

Fusarium, an opportunistic root fungus, was first noted in 1898 in S.J. Galbraith's "Vanilla Culture as Practiced in the Seychelles Islands."¹ At the time, the United States sought to break the vanilla monopolies of Madagascar and Mexico by cultivating the temperamental orchid in Puerto Rico. This proved unsuccessful. While Galbraith's report described vanilla as a robust plant with remarkable yields per acre, he also discovered that any breakout of disease—particularly *Fusarium*—would lead to the rapid and complete destruction of all vines. One hundred and twelve years later, the threat remains as present as ever.

"That's what people today don't understand about *Fusarium*," says Hank Kaestner, a consultant with Dammann and Co. and presenter at the recent Vanilla 2009 event in Jamesburg, New Jersey. "Once *Fusarium* gets into a plantation, it's very difficult to eradicate. It moves very quickly to eliminate the crop."

Of course, other diseases afflict vanilla, including *Phytophthora*, which causes a blackening of the growing tip of the vanilla, eventually killing the entire vine. However, says Kaestner, "*Fusarium* is really insidious because it starts in the roots, so unless you pull the roots out of the ground you won't see it—you just see the plant getting weaker and the color getting less bright green." Sometimes, in an effort to save itself, the plant will attempt to send out new aerial roots in search of nutrients, but Kaestner describes this as a "last ditch effort."

Deadly and Thorough

Kaestner's career in vanilla and spices has spanned more than 35 years. He estimates that he has traveled overseas nearly 200 times since his career began, making annual trips to Madagascar since 1974. In that time, Kaestner says, "I've seen *Fusarium* [root rot] in a number of countries ... only more recently in Madagascar." He explains that the fungus is relatively unknown to people in the flavor and fragrance industry; few people, aside from agronomists, are likely to have come across the disease. Yet it has proven devastating in places such as Indonesia and Central America—particularly Costa Rica and Guatemala—where *Fusarium* wiped out newly introduced vanilla crops before they could become commercially significant. In southern China, an infestation led to complete destruction. Meanwhile, in the highlands of north

Sumatra, which was a major vanilla producing area 20 years ago, not a single vine can be found today. Again, *Fusarium* was the culprit.

Fusarium Takes Root in Madagascar

Kaestner first saw *Fusarium* in Madagascar in 2003. "Only in 2007–2008 has it spread very rapidly," he says. Today, some agronomist reports have cited *Fusarium* infestation rates in the country as high as 80%. "It is very, very widespread." In fact, according to another Vanilla 2009 presenter, agro-virologist Michel Grisoni of the Centre de Coopération Internationale en Recherche Agronomique pour le Développement-Unité Mixte de Recherche, *Fusarium* is now at the pandemic stage in Madagascar. (It also threatens vanilla crops in Uganda and India.) Grisoni's work includes 12 years of field surveys in the southwest Indian Ocean, including Madagascar, Réunion, Mayotte and Comoros—the heart of Bourbon vanilla production. (Grisoni has also identified *Cymbidium mosaic* virus and potyviruses, *Phytophthora*, and *Conchaspis angraeci* as key threats to vanilla production.) "I saw widespread, complete destruction in areas just north of a major producing area [in October 2008]," says Kaestner. "In some places, I could not find a single healthy vanilla plantation. To me, that's a scary thing because knowing historically that once it gets in, it can [lead to] a very rapid and complete destruction of vanilla. That's not to say that every plantation or area in Madagascar is infected with *Fusarium*. There are some new areas that we're hoping can provide us with long-term stability for the market."

Kaestner has reported his findings at a number of trade organization meetings. The response, he says, has been markedly skeptical. Yet he notes that others in the industry have taken note of the *Fusarium* threat and are responding accordingly to take into account potential price shocks.

Causes of Infestation: A Perfect Storm

Why *Fusarium*? Why now? Kaestner has a few theories. To begin with, he says, "In Madagascar, vanilla is grown intensively in a tiny region of roughly 100 miles [north to south] by 20 miles [east to west]." Called SAVA, this area on the northeast tip of the nation-island is home to one of the most centralized crops in the world, aside from perhaps nutmeg. It's easy to see how any negative

event can impact supplies. In addition, Kaestner says, *Fusarium* isn't an invasive species brought in from afar. It is indigenous to Madagascar: "It's not *Fusarium* that's new—it's the way vanilla is grown." He explains that when the European Economic Community entered the region in the 1990s and introduced new, intensive growing techniques to vanilla plantations, the opportunities for *Fusarium* increased. Meanwhile, when vanilla prices were low, farmers pollinated more flowers than usual in order to maintain income, in the process over-taxing and thus weakening the plants.* And, since 2000, a series of cyclones have hit Madagascar, resulting in widespread salt spray, which stresses and fatigues vanilla plants. Add to this literal perfect storm of circumstances the fact that vanilla is an orchid, a class of plants known for being finicky even in the best of times. The result, says Kaestner, is weakened, highly susceptible crops.

"At the same time," Kaestner adds, "if you go back to the source countries, in India the land under cultivation there has gone from 5,000 hectares down to 1,000 hectares because the farmers aren't even making a quarter of the money [off vanilla] that they need to break even. They're ripping up vanilla and putting in other crops. Prices are great for people using vanilla, but it's a catastrophe for the poor farmer who's using the income from vanilla to buy rice, one of the food staples in Madagascar, which have doubled or tripled [in price] in the last five years." Kaestner says that even before *Fusarium* resurfaced in Madagascar the flavor and fragrance industry faced a supply and demand scenario in which demand grew while supply fell as a result of lower prices. "*Fusarium* is just the icing on the cake," he says, "in terms of this potential situation for a rather dramatic market turn." Vanilla 2009 presenter Rick Brownell (Virginia Dare) has noted as much in the abstract of his presentation on the vanilla crisis, stating, "The factors leading up to the [vanilla] crisis [10 years ago] are eerily similar to those in the vanilla market today—increasing demand and shrinking supplies. Is another vanilla crisis around the corner? If so, can the industry survive again this time?"

As Kaestner and Brownell have noted, there are the market forces to consider. Kaestner says that the recent history of vanilla has been one of dramatic market swings. Over the last three to four years, he notes, the industry

has experienced relatively low prices. As a result, vanilla has popped up in all sorts of products. Kaestner informally keeps an eye on new vanilla products at local stores, recently spotting Navan, a liquor spiked with pure vanilla; Kashi Island Vanilla cereal; and Coke Vanilla Zero. "This is exactly what happens when prices are cheap," Kaestner says of growing vanilla product launches. "You've seen vanilla cropping up in all sorts of new places, which is exactly what happened in the 1990s, before the last shortage. You've seen demand growing with all sorts of new vanilla products."

Solutions


Despite some industry resistance, Kaestner feels the word on *Fusarium* and its potential effects on vanilla prices and supplies is getting out. "Whether they can do much about it, I'm not sure," he says. "People say to me, 'What can we do—are there hybrids that might be resistant?'" In fact, *Vanilla pompona*, which is one of the species that's not commercially used for vanilla ... seems to be holding up pretty well as vines around them are dying off because of *Fusarium*." Some have suggested, then, that a hybrid be developed using both *pompona* and *planifolia* varieties. Unfortunately, he says, *pompona* isn't bulletproof against *Fusarium*, and even if it were, the logistics of propagating a handful of healthy vines in a very short amount of time would be extremely difficult.

To skeptics, Kaestner says, "I don't mean ... there's going to be no vanilla in the world," but adds, "I'm sharing information that scares the heck out of me."

References

1. P Rain, *Vanilla: The Cultural History of the World's Favorite Flavor & Fragrance*. Putnam/Tarcher (2004)

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*In a story posted earlier this year on www.perfumerflavorist.com titled "Vanilla Pricing," Henry Todd Jr. (AM Todd) noted: "Vanilla vines, just like people, become susceptible to illness when experiencing stress and fatigue due to excessive work. Given the very low prices currently paid on the open market for green vanilla beans, the farmer is simply pollinating more flowers on a single vine than he should. This maximizes the farmer's sales in the short term, but also overworks his vines and thereby jeopardizes their long-term health. For reference, good vanilla cultivation practices call for pollinating no more than eight flowers per cluster on a vine. It has been reported that many farmers in Madagascar are pollinating more than double that amount today. This practice has only emerged over the last five years. Interestingly, a question that has been little discussed to date is whether Malagasy farmers would pollinate fewer flowers even if prices were more attractive. Conventional wisdom says that they would. However, both quantitative and anecdotal evidence suggests that this behavior [excessive pollination] has been institutionalized in Madagascar. If true, there could be long-term implications for the country not only in terms of stemming the spread of disease but also in protecting its image as a high quality supplier to the world."