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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
SOUTHEASTERN DIVISION

BADER FARMS, INC.,
Plaintiffs,

vs.

Cause No. 1:16CV299 SNLJ

MONSANTO CO., AND BASF CORPORATION,
Defendants.

=====

TRIAL DAY 13
VOLUME 13A - Pages 2125 - 2171

BEFORE THE HONORABLE STEPHEN N. LIMBAUGH, JR.
UNITED STATES DISTRICT JUDGE

FEBRUARY 12, 2020

=====

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DR. GUIDO SCHNABEL:
DIRECT EXAMINATION BY MR. ANDERSON

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The trial resumed on Wednesday, the 12th day of February, 2020, before the Honorable Stephen N. Limbaugh, United States District Judge, of the Eastern District of Missouri, Southeastern Division, before a jury and two alternate jurors, who were impaneled, selected and sworn.

(Proceedings resumed in open court outside the presence of the jury.)

THE COURT: Good morning.

Any preliminary matters?

MR. RANGLES: Yes, Your Honor. If it please the Court, I think we can speed things along here with an agreement I have with Mr. Anderson regarding some exhibits for Dr. Schnabel.

I don't know if you want me to read the numbers, but I provided the numbers of a series of photos that have been stipulated to be admitted.

You will notice that I drew a little bracket around the B-893s, and we're going to admit just that entire composite exhibit.

THE COURT: It needs to be posted, Christy.

THE CLERK: Oh, I'm so sorry.

MR. RANGLES: Would you like me to read them

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1 individually?

2

Would you like me to read them individually or --

3 THE COURT: Yeah. Well, just go ahead and do that.

4 MR. RANGLES: Okay. Your Honor, if you'll see the
5 little bracket I made. Pursuant to an agreement we're just
6 going to admit the composite Exhibit B-893.

7 THE COURT: Okay.

8 MR. RANGLES: And the rest of those individually as
9 listed. I'm happy to read them if you would like.

10 THE COURT: No, that's fine. I've got them now.

11 MR. RANGLES: Okay. Then without objection we
12 would move these to be entered.

13 MR. MANDLER: You may want to read them just for
14 the record.

15 MR. RANGLES: That's what I was asking.

16 THE COURT: So what are these exhibits?

17 MR. RANGLES: These are photos taken by the
18 witness. There's no dispute as to their authenticity, and
19 Mr. Anderson stipulates that they may come in with the
20 witness.

21 THE COURT: Well, these are -- well, they're BASF's
22 exhibits?

23 MR. RANGLES: Yes.

24 THE COURT: So what was the problem?

25 MR. RANGLES: There isn't a problem. That's what I

2132

1 was indicating. I was just saying instead of going through
2 the laying of foundation with each photo we're in agreement
3 that these may come in and just be used with the witness.

4 THE COURT: I see. Okay. That will help things.

5 (The following exhibits were offered into evidence
6 and admitted by stipulation between the parties: Exhibit
7 B-745.0007, B-817.0001, B-833.0013, B-847.0018, Group
8 Composite B-893 Exhibits: B-893.0014, B-893.0016,
9 B-893.0026, B-893.0027 and Plaintiff's Exhibits 1380, 1381,

10 1382, 1383, 1384, 1385 and 1386.)

11 MR. RANGLES: Yes. Thank you.

12 THE COURT: Great. Thanks.

13 Any other preliminary matters?

14 MR. MILLER: Nothing, Your Honor. Thank you.

15 THE COURT: Okay. Bring the jury in.

16 MR. RANGLES: Your Honor.

17 (Jury in.)

18 (Proceedings resumed in open court.)

19 THE COURT: Please be seated.

20 Good morning, ladies and gentlemen.

21 Mr. Mandler.

22 MR. MANDLER: We have a little short video from Dr.

23 Jeff Birk.

24 (Excerpts of the Videotaped Deposition of Dr.

25 Jeffrey Howard Birk taken on June 20th, 2019, were played for

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1 the jury as reflected in and filed in a separate document in
2 this file.)

3 MR. MANDLER: Your Honor, that concludes the video
4 of Dr. Jeffrey Birk.

5 We would move to admit the exhibits of the testing
6 he described, which is B-361, B-503, B-546, B-555, B-982 and
7 B-1028.

8 MS. GEORGE: No objection, Your Honor.

9 THE COURT: They're admitted.

10 MR. RANGLES: Your Honor, we may wish to enter some
11 exhibits from that. We need to double check. We think
12 they're all entered, but we just need to check that.

13 THE COURT: That's fine.

14 All right. Call your next witness.

15 MR. ANDERSON: BASF calls Dr. Guido Schnabel.

16 DR. GUIDO SCHNABEL,
17 being produced and sworn, testified as follows:

18 THE COURT: You may proceed.

19 MR. ANDERSON: Thank you, Your Honor.

20 DIRECT EXAMINATION

21 BY MR. ANDERSON:

22 Q. Good morning. Can you please state your name and
23 address for the record.

24 A. My name is Guido Schnabel. I live at 115 Princess Lane
25 in Clemson, South Carolina.

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1 Q. Would you please tell the jury a little bit about
2 yourself.

3 A. I was born in Germany and moved to the United States in
4 1997 and got married and live with my wife in Clemson, South
5 Carolina and have two kids, 16 and 14.

6 Q. Please tell the jury why you're here today.

7 A. I'm here to discuss my opinions and conclusions about my
8 investigations at Bader Farms.

9 Q. Dr. Schnabel, lets turn to your education. Did you
10 obtain an undergraduate degree?

11 A. Yes, I did.

12 Q. In what?

13 A. In agricultural sciences.

14 Q. After your undergrad, did you get additional education?

15 A. I did.

16 Q. And what degree did you obtain, if any?

17 A. I got a master's degree in agricultural sciences in
18 Giessen, Germany. And I got a Ph.D. in agricultural sciences
19 at the University of Stuttgart.

20 Q. For your master's and Ph.D. did you have a particular
21 focus or emphasis?

22 A. Both are with focus in plant pathology.

23 Q. What is plant pathology?

24 A. Plant pathology is the study of plant diseases. Plants
25 can be attacked just like humans can by bacteria, fungi,

2135

1 viruses. So I study plant diseases that are attacked by
2 those things.

3 Q. After you got your Ph.D., what did you do next?

4 A. I went to Michigan State University and did a
5 postdoctoral stay in a lab at Michigan State University.

6 And --

7 Q. What did you study at Michigan State University as part
8 of that postdoctorate?

9 A. I studied the efficacy and phytotoxicity of fungicides
10 on apples and peaches, and I also studied the genetics of
11 plant pathogens in the lab.

12 Q. How long --

13 A. So the --

14 Q. Go ahead.

15 A. I'm sorry. So the efficacy and phytotoxicity studies,
16 those were all field studies.

17 Q. Did they involve peaches?

18 A. Apples and peaches.

19 Q. How long were you at Michigan State?

20 A. About three and a half years.

21 Q. Where did you go after Michigan State?

22 A. After that I accepted a position at Clemson University.
23 I became an assistant professor there. I moved through the
24 ranks, associate professor, and then full professor.

25 Q. What year did you start at Clemson?

2136

1 A. In 2000.

2 Q. And you're still there today?

3 A. Still there today.

4 Q. What's your current title at Clemson University?

5 A. I'm a professor and research and extension plant
6 pathologist.

7 Q. Do you specialize in any crops?

8 A. I do. I specialize in peaches and also small fruits.

9 Q. I heard you mention both professor and extension in your
10 title. Let's tackle those one at a time.

11 As a professor at Clemson do you do research on
12 peaches?

13 A. I do.

14 Q. Can you provide a few examples of the type of research
15 you do on peaches?

16 A. I go out and have actually field trials at grower
17 locations. So if a specific grower has a problem, then I
18 would try to solve that by doing a little demonstration
19 trial, so that he sees that things can do -- can be done
20 differently and maybe better.

21 I also have access to a research station that belongs
22 to Clemson University that's the Musser Fruit Research Farm,
23 and there I have seven acres of peach land that I use for
24 efficacy studies and phytotoxicity studies on fungicides and
25 pathogens.

2137

1 I also have a lab, and in that lab I study did the
2 genetics of fungi.

3 Q. As part of your research on peaches do you study
4 Armillaria?

5 A. I do.

6 Q. You mentioned your experimental farm. I believe you
7 referred to it as Musser Farms; is that right?

8 A. Musser was Musser

8 A. MUSSEY, YES. MUSSEY.

9 Q. And I apologize, because I'll probably say that wrong
10 again, I'll apologize to you in advance.

11 On that experimental farm are you involved in the
12 establishment and taking care of the peach trees?

13 A. Yes. So the experiments that I set up at the Musser
14 Farm I -- you know, obviously, I have some help, but I also
15 do a lot of the planting myself. The spraying I do myself.
16 I do pruning and the thinning. I also do the harvesting.
17 You know, I'm a hands-on kind of guy.

18 Q. Can you please tell the jury the relationship between a
19 pathogen and a disease.

20 A. The disease -- so the pathogen attacks the plant and
21 causes a disease.

22 Q. Can you give us an example of a pathogen and a disease.

23 A. The pathogen -- the disease would be Armillaria root
24 rot, for example. You've heard a lot about it already. And
25 the pathogen would be Armillaria tabescens.

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1 Q. And as part of being a professor do you do any teaching
2 or instruction?

3 A. I do. Every two years I teach a plant disease
4 diagnostics course for undergraduate and graduate students,
5 and that is being done out in the field at the research
6 station. And I show them what diseases look like and how to
7 diagnose them. Mostly on peaches.

8 Q. Do you also publish materials regarding peaches?

9 A. I do.

10 Q. How many papers, roughly, have you published regarding
11 peaches?

12 A. Peer-reviewed papers I would say around 50, and
13 non-peer-reviewed extension articles, hundreds.

14 Q. Have you ever published regarding Armillaria in peaches?

15 A. Yes.

16 Q. Can you please explain to the jury at a very high level
17 what the peer-review process is?

18 A. The peer-review process is sort of the backbone of
19 scientists. We need to have a way to double-check
20 ourselves, to double-check our work.

21 So when we do experiments in the lab, we write up the
22 results, and we make figures and tables and form a
23 manuscript. That manuscript is being sent to a journal.
24 And the journal then sends it out to peers that are also
25 experts in the field, and they give an assessment of that

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1 work.

2 And then a decision is made by the senior editor as
3 to whether there is merit to publish that work or if it needs
4 to get rejected, because maybe there's some flaws in the
5 methodology or in the conclusions.

6 Q. Do you sit on the other side of the table where you peer
7 review others' materials?

8 A. I do. I'm a senior editor at -- I think it's called
9 associate editor for the journal Pesticide Biochemistry and
10 Physiology, and I basically receive manuscripts from other
11 labs and send them out for review. They send me their
12 comments, and I make the final decision as to whether this
13 manuscript should be published.

14 Q. Let's turn to your -- the extension side of your job.
15 Can you tell the jury what you do as part of your extension
16 appointment as it relates to peaches, please?

17 A. Basically I make sure that growers do a good job
18 producing high quality peaches and make sure that they have
19 the tools to produce high quality peaches as it relates to
20 disease management.

21 Q. Does that mean then that you consult with commercial
22 peach operations?

23 A. Correct.

24 Q. Just give the jury a little flavor of the types of
25 things that you would do in consulting with commercial peach

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1 operations.

2 A. So in the spring and summer I would go out to the farms,
3 and mostly South Carolina, you know, that's what my
4 responsibilities are, but I also visit farms elsewhere, and I
5 would talk to the farm manager or the owner, and he would
6 show me the problem spots, the problem areas, and we would go
7 and discuss those.

8 And I would ask him what he did. And I would tell
9 him, you know, what I thought about this and what it might
10 be, and together we form -- we are trying to find a solution
11 to the problem.

12 Q. So commercial peach operations seek you up for your
13 advice and expertise?

14 A. Absolutely.

15 Q. Is your responsibility regarding peaches state specific,
16 or do you work outside of your state borders?

17 A. I do work outside the state borders as well, yes.

18 Q. Are you invited to speak on peaches?

19 A. Yes. Yes. I'm a regular speaker at production
20 meetings in other states.

21 Q. How long have you been working with peaches, Dr.
22 Schnabel?

23 A. For more than 20 years.

24 Q. How long have you been working with Armillaria on
25 peaches?

2141

1 A. For more than 20 years.

2 Q. Is providing expert opinions regarding peach orchards a
3 regular part of the work that you do at Clemson University?

4 A. Yes.

5 Q. What percent of the time do you spend on research versus
6 extension?

7 A. About 60 percent research and 40 percent extension.

8 Q. In addition to the field visits you've already described
9 are there other outlets you use to try to help commercial
10 peach growers produce a better crop?

11 A. I am one of the publishers of our production guide,
12 which is a southeastern production guide. That's what our
13 growers in the Southeast use to produce peaches.

14 Q. Okay. If we could pull up B-98 for the Court, counsel
15 and witness, please.

16 Dr. Schnabel, what is Exhibit B-98?

17 A. That's the production guide from 2014.

18 (Defendant's Exhibit No. B-98, Production Guide
19 from 2014, was identified.)

20 MR. ANDERSON: BASF offers B-98.

21 MR. RANGLES: We object to this as substantive
22 evidence. If he wants to offer it as a demonstrative, that's
23 fine.

24 MR. ANDERSON: I'll ask a foundational question.

25 BY MR. ANDERSON:

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1 Q. Dr. Schnabel, is Exhibit B-98 a reliable authority on
2 peach reduction?

3 A. Yes, it is.

4 MR. ANDERSON: Under Federal Rule of Evidence
5 803(18)(B) we would offer B-98.

6 MR. RANGLES: May we approach?

7 THE COURT: I'm sorry.

8 MR. RANGLES: May we approach?

9 THE COURT: Yes.

10 (Proceedings were held at sidebar, outside the
11 hearing of the jury.)

12 THE COURT: What's the objection?

13 MR. RANGLES: I object to this as hearsay, improper
14 bolstering and irrelevant. He's already said it's a growers
15 guide for Southeast -- the Southeastern states, not Missouri.
16 Given that its propensity for confusion outweighs any
17 probative value, given that it's talking about the standards
18 in the Southeastern states and its hearsay nature I object.

19 MR. ANDERSON: Well, it's not hearsay. I laid a
20 foundation around the hearsay objection. The next question
21 is going --

22 THE COURT: What is this document again?

23 MR. ANDERSON: It's a pamphlet on how to grow
24 peaches in short.

25 THE COURT: And it's something that he's relying

2143

1 on?

2 MR. ANDERSON: It's not only that it's something
3 he's relying on, but my next question is that Bill Bader
4 relied on it, because he -- Bill Bader produced this in his
5 deposition. This is his spray guide.

6 MR. RANGLES: He testified that it's a guide for
7 Southeastern Missouri growers. This is a long document.
8 I'm not willing to concede --

9 THE COURT: You mean the Southeastern U.S.?

10 MR. RANGLES: Southeastern. Yes.

11 THE COURT: You said Southeastern Missouri.

12 MR. RANGLES: I'm sorry, too many southeasterns.

13 Thank you.

-- -----

14 It has no relevance to the Bootheel. The fact that
15 he may have used it for a limited purpose, he may introduce
16 that portion for a limited purpose, but not the rest.

17 THE COURT: I'm going to overrule the objection and
18 allow it in for substantive evidence.

19 MR. ANDERSON: Thank you.

20 (Proceedings resumed in open court.)

21 THE COURT: The objection is overruled.

22 MR. ANDERSON: Permission to publish.

23 THE COURT: And the exhibit is admitted. Yes.

24 (Defendant's Exhibit No. B-98, Production Guide
25 from 2014, was received.)

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1 BY MR. ANDERSON:

2 Q. Dr. Schnabel, what did you refer to this document as?

3 You had some shorthand title for it.

4 A. 2014 production guide.

5 Q. And this is the --

6 A. What we call --

7 Q. Sorry. And it's the 2014 Southeastern Peach, Nectarine,
8 and Plum Pest Management and Culture Guide?

9 A. That's why it's called the production guide because
10 nobody wants to say all this.

11 Q. And there's -- I see -- I see Guido Schnabel, Clemson
12 University listed on the first page. Is that you?

13 A. Yes.

14 Q. And this is something you work on just once, or is this
15 a yearly thing? How often is this updated?

16 A. That's updated every year.

17 Q. And do you have an understanding whether or not Bill
18 Bader utilizes this document?

19 A. I believe he does.

20 Q. Exhibit B-79 -- well, this gets updated each year?

21 A. Yes.

22 Q. And you're involved in subsequent years as well?

23 A. Yes.

24 Q. Other than the Southeastern Peach Guide are there
25 outlets you try to use to help commercial peach growers

2145

1 produce a better crop?

2 A. One thing we do -- I developed is a smart phone app,
3 MyIPM, and that is being used by thousands of peach growers,
4 small fruit growers to identify pests and diseases and get
5 informed about management options.

6 Q. Do you charge for that app, or is it free?

7 A. That's free. That's part of the extension service that
8 I do.

9 Q. You've been working with peaches for 20 plus years.
10 Have you won any awards for your research work?

11 A. I have.

12 Q. What have you won?

13 A. I won the Lee Hutchins Award in 2011, I believe, from
14 the American Phytopathological Society. That's our main
15 society. And that was for excellence in research.

16 And I won the 2015 Excellence in Extension Award from
17 the same society.

18 MR. ANDERSON: BASF offers Dr. Schnabel as an
19 expert on peaches, Your Honor.

20 MR. RANGLES: No objection.

21 THE COURT: All right. He'll be accepted as an
22 expert.

23 BY MR. ANDERSON:

24 Q. Dr. Schnabel, let's turn to your assignment in this
25 case. What were you asked to do?

1 A. I was asked to investigate Bader Farms and provide
2 conclusions to opinions.

3 Q. Are you being paid for the time you spend working on
4 that assignment?

5 A. I am.

6 Q. What is your hourly rate?

7 A. \$300 an hour.

8 Q. Did you physically inspect Bader Farms as part of this
9 assignment?

10 A. I did.

11 Q. How many times did you inspect Bader Farms?

12 A. I would say three times.

13 Q. And can you tell the jury the date and year -- I'm
14 sorry, the month and year of those inspections?

15 A. Sure. So in 2018 I was there in July, and in 2019 I
16 was there in end of May and end of July.

17 Q. How many days did your inspection in July of 2018 take?

18 A. That was two days.

19 Q. How many days was your inspection in May of 2019?

20 A. Two days.

21 Q. And how many days was your inspection in July of 2019?

22 A. One day.

23 Q. And how many hours roughly in each of those days did you
24 spend inspecting Bader Farms' orchards?

25 A. About maybe eight to ten hours.

1 Q. Each day?

2 A. Yes.

3 Q. Did you take any photographs?

4 A. Yes.

5 Q. How many roughly?

6 A. Hundreds.

7 Q. Did you take detailed field notes?

8 A. Yes.

9 Q. Other than your inspections of Bader Farms what else did
10 you do as part of your assignment?

11 A. I reviewed pictures and documents by Mr. Bader. I
12 reviewed depositions by Mr. Bader and Mr. Baldwin and expert
13 reports by Mr. Baldwin. I reviewed satellite pictures. I
14 was asked to do a DNA analysis and maybe a couple more
15 things.

16 Q. Did you look at spray records?

17 A. I did look at spray records.

18 Q. Any environmental records?

19 A. And I looked at weather data.

20 Q. In light of your investigation assignment, education and
21 experience have you made certain observations regarding Bader
22 Farms?

23 A. I have.

24 Q. In light of your investigation, assignment, education
25 and experience have you formed opinions regarding Bader

2148

1 Farms?

2 A. I have.

3 Q. Have you formed those opinions to a reasonable degree of
4 scientific certainty?

5 A. Yes, sir.

6 Q. What is your opinion as to what is causing damage to
7 Bader Farms' mature peach orchards?

8 A. That would be Armillaria root rot.

9 Q. What in your opinion is causing damage to Bader Farms to
10 young peach orchards?

11 A. There's planting issues.

12 Q. Other than those two things are there other issues
13 causing damage to Bader -- Bader Farms peach orchards?
14 A. Yes. There are other diseases that show up like
15 bacterial spot, for example, is one. There's bacterial
16 canker that I saw. There was fungal twig dieback. There
17 was limb dieback. There was some sunburn. There was
18 damage that I think was caused by frost. And there was boll
19 damage. There was deer damage. I think those are the main
20 ones.

21 Q. In your opinion were the problems you observed at Bader
22 Farms the result of dicamba?

23 A. No.

24 Q. Would you please explain at a high level what you
25 observed regarding Armillaria at Bader Farms mature peach

2149

1 orchards?

2 A. Armillaria root rot was present in Bader Farms peach
3 orchard.

4 Q. Do different Armillaria pathogens -- and here I'm
5 talking about tabescens versus mellea, for example -- behave
6 differently as it relates to peach trees?

7 A. They do.

8 Q. How so?

9 A. Armillaria tabescens is a very aggressive pathogen of
10 peach whereas Armillaria mellea not so much.

11 Q. Just so we have an understanding when we speak about
12 Armillaria for the rest of your testimony are we referring to
13 Armillaria tabescens unless we specify otherwise?

14 A. Yes.

15 Q. The jury has heard a lot about Armillaria root rot, so
16 we don't need to go into too much detail, but from a high
17 level what are the symptoms of Armillaria root rot?

18 A. So there's two type of symptoms. There's the above

19 ground symptoms and the below ground symptoms. Above ground
20 symptoms would -- there's a little different symptomology
21 there. Sometimes in the spring you can have the entire tree
22 collapse all at once during bloom.

23 And also there's another symptomology where you would
24 see in the early summer individual limbs collapse first and
25 then followed by -- by the entire canopy. And that can drag

2150

1 out for, you know, a year or two or so.

2 The below ground symptoms are the presence of
3 mycelial fans or mycelial strands in the bark itself.

4 Q. I believe the jury has heard the term "infection
5 centers." What does that term mean to you?

6 A. So Armillaria moves from tree to tree in an orchard and
7 also from one tree within a row -- from tree to tree within a
8 row in an orchard and also can jump over to the next row and
9 infect trees of the next row.

10 So if you envision this, you've got, you know, dead
11 trees accumulating and then also fanning out into the
12 adjacent rows that would form an infection center, sort of an
13 oval roundish center.

14 Q. And this is something you've observed over your
15 20 years?

16 A. Yes.

17 Q. Is the presence of Armillaria root rot easy for a
18 specialist to visually confirm?

19 A. Yes.

20 Q. In your normal extension work do you diagnose Armillaria
21 root rot by observing mycelial fans?

22 A. Yes.

23 Q. How many peach trees have you dug in your career and
24 confirmed Armillaria root rot?

25 A. Oh, gosh, I would say thousands over the last 20 years.

2151

1 Q. Is Armillaria root rot a new issue for peach growers?

2 A. No.

3 Q. How does Armillaria tabescens interact with healthy
4 versus stressed peach trees? Is there any difference?

5 A. There's no difference. Healthy trees go down just as do
6 the stressed trees.

7 Q. Does Armillaria tabescens need a weakened peach tree to
8 kill that peach tree?

9 A. No, it doesn't.

10 Q. So Armillaria tabescens progresses at the same rate in
11 peach trees regardless of whether the tree is healthy or
12 stressed?

13 A. I've seen it in well-manicured orchards in South
14 Carolina, and I've seen it in stressed orchards in South
15 Carolina, and I can't tell a difference if there's any
16 difference in speed or incidence or severity. Nothing.

17 Q. And you've seen this multiple times in your career?

18 A. Yes.

19 Q. Are current rootstocks used on peach trees susceptible
20 to Armillaria root rot?

21 A. Yes.

22 Q. Can Armillaria have an impact on shoot growth or twig
23 length?

24 A. Can you repeat that question?

25 Q. Sure. Can Armillaria have an impact on shoot growth or

2152

1 twig length?

2 A. Yes.

3 Q. Is Armillaria root rot at Bader Farms?

4 A. Yes.

5 Q. How did you determine that Armillaria root rot was
6 present at Bader Farms?

7 A. I investigated the orchards, and I found infection
8 centers.

9 Q. Exhibit B-825.0008 for Court, counsel and the witness,
10 please.

11 What is this exhibit, Dr. Schnabel?

12 A. That's an infection center at Bader Farms.

13 (Defendant's Exhibit No. B-825.0008, Photo of
14 Infection Center at Bader Farms, was identified.)

15 MR. ANDERSON: BASF offers about 825.0008.

16 MS. GEORGE: No objection.

17 THE COURT: Okay. It's admitted.

18 (Defendant's Exhibit No. B-825.0008, Photo of
19 Infection Center at Bader Farms, was received.)

20 BY MR. ANDERSON:

21 Q. All right. Dr. Schnabel, the jury can now see this
22 exhibit. Can you just explain to the jury in this exhibit
23 what in there tells you this is an infection center?

24 A. Those trees that died in a row you can see that in the
25 background there are still trees alive, and I would think

2153

1 that probably over time those trees will also die, but the
2 disease basically moved from tree to tree within those rows
3 and also between rows.

4 That could have happened -- you know, certain
5 infections could happen in several spots, and they merge into
6 one big infection center. So that could have happened here,
7 or it could be one infection center spreading out.

8 With this young of a block probably there was
9 multiple individual infections going on, but they merged all
10 into each other into one big infection center.

11 And sometimes there's some escapees as well where
12 maybe root grafts were not formed between neighboring trees,
13 and so you have this one tree over here which is still
14 hanging on. It might not even be infected yet, but
15 eventually it will go down.

16 Q. When you were -- I'm sorry, were you done?

17 A. I'm just saying it's not a clearcut, you know, every
18 year you've got a tree dying. It might take a while.

19 Q. When you were in this field at Bader Farms, did you
20 visually confirm the presence of the Armillaria?

21 A. Yes.

22 Q. Exhibit B-827.005 for Court, counsel and the witness,
23 please.

24 Dr. Schnabel, what's B-827.005?

25 A. That's an infection center of Armillaria root rot.

2154

1 (Defendant's Exhibit No. B-827.005, Another
2 Infection Center at Bader Farms, was identified.)

3 BY MR. ANDERSON:

4 Q. At Bader Farms?

5 A. At Bader Farms.

6 MR. ANDERSON: BASF offers B-827.005.

7 MR. RANGLES: No objection.

8 THE COURT: Admitted.

9 (Defendant's Exhibit No. B-827.005, Another
10 Infection Center at Bader Farms, was received.)

11 BY MR. ANDERSON:

12 Q. Dr. Schnabel, the jury can now see this. Is there
13 anything materially different from this picture than the last
14 other than it being a different infection center?

15 A. It's a different infection center on older trees, a
16 little bit older trees I would say, but, here again, you've
17 got the infection center, and inside there's a few trees that

17 got the infection center, and inside there's a few trees that
18 are still hanging on that haven't been infected yet, but
19 other than that it's the same thing.

20 Q. When you were in this field, did you visually confirm
21 the presence of Armillaria?

22 A. I did.

23 Q. Were the Armillaria infection centers that you
24 identified at Bader Farms all in low spots?

25 A. No.

2155

1 Q. When you found what you believed to be an Armillaria
2 infection center at Bader Farms, tell the jury what you would
3 do after you identified the infection center.

4 A. After I identified the infection center, the first thing
5 I would always do is look for a tree that has died, actively
6 dying at the periphery of the infection center, at the edges
7 of the infection center, and there I would dig down with the
8 shovel, dig a little hole and try chop off a piece of bark in
9 the lower part of the tree, and I would find mycelial fans in
10 that bark.

11 Q. If you would put up B-732 for Court counsel and the
12 witness, please.

13 Dr. Schnabel, what's B-732 on the first page there?

14 A. That's a dying tree.

15 (Defendant's Exhibit No. B-732, Dying Tree, was
16 identified.)

17 BY MR. ANDERSON:

18 Q. At Bader Farms?

19 A. At Bader Farms.

20 MR. ANDERSON: BASF offers 732, Your Honor.

21 THE COURT: Admitted.

22 (Defendant's Exhibit No. B-732, Dying Tree, was
23 received.)

24 BY MR. ANDERSON:

25 Q. Dr. Schnabel, you were telling the jury that you'd look

2156

1 for a dead tree when you'd see an Armillaria infection
2 center. Is this an example of that?

3 A. Yes.

4 Q. And then you said the next step was once you identified
5 a tree like this you chopped some bark off to look for
6 mycelial fans?

7 A. That's correct.

8 Q. Exhibit B-792.001 -- no, actually just B-792.

9 Dr. Schnabel, what the first page of B-792?

10 A. That's a tree with the bark chopped off.

11 (Defendant's Exhibit No. B-792, Tree with Bark
12 Chopped off, was identified.)

13 BY MR. ANDERSON:

14 Q. At Bader Farms?

15 A. At Bader Farms.

16 MR. ANDERSON: BASF offers B-792.

17 MR. RANGLES: No objection.

18 THE COURT: Admitted.

19 (Defendant's Exhibit No. B-792, Tree with Bark
20 Chopped off, was received.)

21 BY MR. ANDERSON:

22 Q. All right. So we've got started with the infection
23 center, and you identified the dead tree or dead or dying
24 tree. And now we're to the point where you start, for lack
25 of a better term, hacking into the tree. Why don't you tell

2157

1 the jury what this photo shows.

2 A. So we had to dig down a little to get into the lower

3 part of the tree, because that particular fungus doesn't grow
4 above the soil line. You wouldn't find that kind of
5 mycelium in the upper part of the tree.

6 And you would then take the shovel and just ram it
7 inside that bark, and you would see these mycelial fans that
8 are white, beige in color.

9 Q. Dr. Schnabel, can you touch the screen and circle for
10 the jury where you want them to focus. Let's see if that
11 works.

12 A. Oh, yeah. Cool.

13 Q. Great.

14 A. Right there. So that -- that would be the mycelial fan
15 right there.

16 Q. And this is what you observed at Bader Farms?

17 A. Yes.

18 Q. Let's go to -- did you observe this in all of the places
19 that you identified an infection center?

20 A. Yes.

21 Q. Let's go to B-825.003, please, for Court, counsel and
22 the witness.

23 Dr. Schnabel, what is B-825.003?

24 A. That's the same thing. It's mycelial fans at the lower
25 part of the tree at Bader Farms.

2158

1 (Defendant's Exhibit No. B-825.003, Mycelial Fans
2 on Tree at Bader Farms, was identified.)

3 MR. ANDERSON: BASF offers 825.003, Your Honor.

4 MR. RANGLES: No objection.

5 THE COURT: Admitted.

6 (Defendant's Exhibit No. B-825.003, Mycelial Fans
7 on a Tree at Bader Farms, was received.)

8 BY MR. ANDERSON:

9 O. So in the previous photo there was a lot more white.

10 They don't always look like that; is that right, Dr.

11 Schnabel?

12 A. They don't always look like the massive amount of
13 mycelial fans, correct. If I had dug a little deeper, I
14 would see the massive -- more massive amounts, but the fungus
15 has the ability to grow out to the soil line, and that's what
16 you see here is that white mycelium.

17 Q. And B-825.0010 for the Court, counsel and the witness,
18 please.

19 Dr. Schnabel, what is about B-825.0010?

20 A. That is a chunk of bark with mycelial fans.

21 (Defendant's Exhibit No. B-825.0010, Chunk of Bark
22 with Mycelial Fans, was identified.)

23 BY MR. ANDERSON:

24 Q. From?

25 A. Bader Farms.

2159

1 MR. ANDERSON: BASF offers B-825.0010, Your Honor.

2 MR. RANGLES: No objection.

3 THE COURT: Admitted.

4 (Defendant's Exhibit No. B-825.0010, Chunk of Bark
5 with Mycelial Fans, was received.)

6 BY MR. ANDERSON:

7 Q. But now instead of looking at the actual tree this is a
8 chunk of bark taken from the tree?

9 A. Yes.

10 Q. And tell the jury what the significance of this
11 photograph is, Dr. Schnabel, if you would, please.

12 A. Well, it's a chunk of bark that contains mycelial fans
13 throughout that piece of bark.

14 Q. So you can identify it both on the tree and sometimes
15 from bark chunks taken off of the tree?

16 A. Yes.

17 Q. You can take that down.

18 When you were looking at Bader Farms at these
19 infection centers, did you only look at the trees at the
20 edges of Armillaria root rot, or did you look at other places
21 as well?

22 A. No. We also looked at those survivors, those
23 stragglers, inside the infection centers, and we would -- at
24 least one tree per infection center we would confirm, of
25 course, that the Armillaria pathogens is also present in the

2160

1 center of these infection centers.

2 Q. So you were there both in 2018 and 2019. Did you see
3 any changes to the infection centers from '18 to '19?

4 A. The infection centers were expanding, actively
5 expanding.

6 Q. Is that what you'd expect from Armillaria root rot?

7 A. Yes.

8 Q. In your everyday work as visual confirmation of
9 Armillaria root rot like we just went through with the jury,
10 is that what you rely on to diagnose it?

11 A. Absolutely.

12 Q. Other than observing the infection centers, the dying
13 trees, and the mycelial fans at Bader Farms mature orchards,
14 did you do anything else to confirm that it was, in fact,
15 Armillaria tabescens?

16 A. We did DNA testing.

17 Q. How did you go about doing that? We just -- well, how
18 did you go about doing that?

19 A. Okay. So we would get down and get our chunk of -- of
20 material, and, you know, it has to be a good, thick chunk,
21 and we would put it in a separate bag, put it in a cooler,
22 and then we would move it to our lab

22 and then we would move it to our lab.

23 We would surface sterilize the product to make sure
24 that there's no outside contaminants in there, any DNA, any
25 living organisms. Then we would store that piece. Of

2161

1 course, they were all stored separately. And we would do a
2 DNA extraction of the DNA inside that bark. And we would
3 then do a test, a published test, to determine whether this
4 would be *Armillaria tabescens*.

5 Q. So let's break that down a little bit. You take the
6 samples in the field of the bark?

7 A. Yes.

8 Q. Is that similar to the photo we were just looking at of
9 the bark sample?

10 A. Yes.

11 Q. And you take each one of those and put it in a separate
12 bag?

13 A. Yes.

14 Q. Put it on ice and get it back to your lab?

15 A. Yes.

16 Q. How much material is necessary to perform this DNA test?

17 A. A good chunk.

18 Q. Is there a residue test or some different type of test?

19 A. It's not a residue test. It's a DNA test.

20 Q. Before the DNA test takes place what do you do with the
21 sample to make sure there's no contamination?

22 A. Well, as I said, we surface sterilize the chunk of bark,
23 and we do it with sodium hypochlorite to eliminate any
24 contaminants on the outside, any contaminating -- possibly
25 contaminating DNA or microorganisms.

2162

1 Q. Does *Armillaria tabescens* have a unique DNA fingerprint?

2 A. Yes.

3 Q. What were the results of the DNA testing you did on the
4 samples taken from Bader Farms?

5 A. They tested positive for Armillaria tabescens.

6 Q. If we could have Exhibit B-775 for Court, counsel and
7 the witness, please.

8 Dr. Schnabel, what is Exhibit B-775?

9 A. That's a summary of the DNA analysis.

10 (Defendant's Exhibit No. B-775, Summary of DNA
11 Analysis, was identified.)

12 BY MR. ANDERSON:

13 Q. Of samples taken at Bader Farms?

14 A. Of samples taken at Bader Farms.

15 MR. ANDERSON: BASF offers B-775, Your Honor.

16 MR. RANGLES: No objection.

17 THE COURT: It will be admitted.

18 (Defendant's Exhibit No. B-775, Summary of DNA
19 Analysis, was received.)

20 BY MR. ANDERSON:

21 Q. All right. Dr. Schnabel, the jury can now see B-775.

22 Why don't you tell them at a high level what this shows.

23 A. So within a row you've got your samples. They've got
24 lab numbers, and there's like 23 displayed. 22 of them --
25 for 22 of them we've got sufficient DNA, and they all tested

2163

1 positive for Armillaria tabescens. For one of them 12-G we
2 just didn't get enough DNA out of the bark, so we couldn't
3 run the test.

4 Q. So 12-G the issue there was the sample was too small, so
5 you couldn't actually run the genetic test?

6 A. Correct.

7 Q. The sample column, what are those references?

8 A. Say that again?

9 Q. Sorry. The sample column, what is that referencing?

10 Are those the --

11 A. Oh, those are the field and tract numbers at Bader

12 Farms.

13 Q. And every sample that you collected from 2018 where you

14 had enough bark was positive for *Armillaria tabescens*?

15 A. Yes.

16 Q. Now, there's an actual -- the DNA test is called a gel

17 test: Do I have that right?

18 A. Gel electrophoresis, yes. Well, the DNA test is called

19 PCR analysis, but we run the product on a gel called

20 electrophoresis gel.

21 Q. If we can go to Exhibit B-770 and 783. Dr. Schnabel,

22 what are these exhibits?

23 A. So that would be the gel analysis of the samples from

24 the bark chunks that we obtained.

25 And if I may just explain this a little bit better.

2164

1 (Defendant's Exhibit No. B-770, Gel Analysis of

2 Bark Chunks, was identified.)

3 (Defendant's Exhibit No. B-783, Gel Analysis of

4 Bark Chunks, was identified.)

5 BY MR. ANDERSON:

6 Q. Hold on. The jury can't see it yet, Dr. Schnabel.

7 A. Oh.

8 Q. No, that's -- they haven't.

9 MR. ANDERSON: BASF offers B-770 and 783.

10 MR. RANGLES: No objection.

11 THE COURT: Admitted.

12 (Defendant's Exhibit No. B-770, Gel Analysis of

13 Bark Chunks, was received.)

14 (Defendant's Exhibit No. B-783, Gel Analysis of

15 Bark Chunks, was received.)

16 BY MR. ANDERSON:

17 Q. All right. Dr. Schnabel, now the jury can see it, so
18 why don't you go ahead with your explanation, please.

19 A. Okay. I'll try my best. So there's numbers up there,
20 1 through 16. Those are the numbers right there. And the
21 field and tract number samples are between 2 and 12.

22 And the controls are over here. The controls
23 mean -- so those controls are *Armillaria mellea* markers, so
24 that would be the one high up in lane 15. And the *Armillaria*
25 *tabescens* marker is in lane 14.

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1 And then the control -- the nontemplate control would
2 be in lane 13. That's to make sure there's no
3 cross-contamination between samples. So if that lane is
4 empty, that means there was no cross-contamination.

5 And all of those samples over here are in line with
6 this one, same level. That means they match for *Armillaria*
7 *tabescens*.

8 Q. So lane 15, the one that is not in line, that was not
9 from a sample taken at Bader Farms?

10 A. No. That's our lab tester strain for *Armillaria mellea*.

11 Q. And you talked about lane 13. Lane 13 is empty, because
12 that is a control to make sure there's no
13 cross-contamination?

14 A. Right.

15 Q. If there was cross-contamination, something would show
16 up in lane 13?

17 A. You would see a band there.

18 Q. Other than these samples you took in 2018 I believe the
19 jury heard that Dr. Brannen took some samples, and he sent
20 them to you. Did you test those samples?

21 A. I did.
22 Q. And did you test them --
23 A. I did.
24 Q. -- in the same general manner you did your own samples?
25 A. I did, yes.

2166

1 Q. Same controls to make sure there's no contamination?
2 A. Same controls, same procedure.
3 Q. If we could go to Exhibit B-784, please.
4 Dr. Schnabel, what is Exhibit B-784?
5 A. That would be a summary of the DNA results for Dr.
6 Brannen.
7 (Defendant's Exhibit No. B-784, Summary of DNA
8 Results from Dr. Brannen, was identified.)
9 MR. ANDERSON: BASF offers B-784.
10 MR. RANGLES: No objection.
11 THE COURT: Admitted.
12 (Defendant's Exhibit No. B-784, Summary of DNA
13 Results of Dr. Brannen, was received.)
14 BY MR. ANDERSON:
15 Q. We don't need to spend a lot of time on this, but these
16 are the results from Dr. Brannen?
17 A. Yes, they are.
18 Q. And high level what the were the results?
19 A. Same thing here. So we analyzed 22 samples. 20 -- 21
20 of them we got good DNA that we could use for actually
21 running the test that tested positive for Armillaria
22 tabescens.
23 So in this column it should say Armillaria
24 tabescens -- or Armillaria specific PCR positive for
25 Armillaria tabescens is what it should say. I don't know

2167

1 why it doesn't say it.

2 And one was an insufficient sample where we couldn't
3 just run the test.

4 Q. And you use the same process, you have gels for this as
5 well?

6 A. Yes.

7 Q. If we could pull up B-1038, please, first and second
8 page side by side. Thank you.

9 Dr. Schnabel, what are these from, B-1038?

10 A. So, again, you've got your *Armillaria tabescens*
11 tester --

12 Q. Dr. Schnabel, the jury can't see it yet. Sorry.
13 You're getting ahead of me.

14 What is this?

15 A. Those are the gels for Dr. Brannen's samples.

16 (Defendant's Exhibit No. B-1038, Gel Analysis for
17 Dr. Brannen's Samples, was identified.)

18 MR. ANDERSON: BASF offers 1038.

19 MR. RANGLES: No objection.

20 THE COURT: Admitted.

21 (Defendant's Exhibit No. 1038, Gel Analysis for Dr.
22 Brannen's Samples, was received.)

23 BY MR. ANDERSON:

24 Q. Dr. Schnabel, the jury can now see them. Again, we
25 don't need to spend too much time on here, but is this

2168

1 basically the same type of information we were looking at
2 with your test results?

3 A. Yes. The same type of information. What you want to
4 look at is lane 13. That's our marker for *Armillaria*
5 *tabescens*. Lane 12 there's no DNA. And then you've got DNA
6 all over here. So those are the samples that match in size

7 with the marker DNA.

8 Q. So we talked about Dr. Brannen's -- you can take that
9 down. Thank you.

10 We talked about Dr. Brannen's from 2018. We talked
11 about yours from 2018. Were there other samples taken?

12 A. Yes.

13 Q. And when were they taken from?

14 A. In 2019 -- yeah, in 2019 I took more samples.

15 Q. If we can have Exhibit B-849, please.

16 Dr. Schnabel, what is B-849?

17 A. Those are some additional samples I took in 2019.

18 (Defendant's Exhibit No. B-849, DNA Summary for
19 Samples Taken in 2019, was identified.)

20 MR. ANDERSON: BASF offers B-849, Your Honor.

21 MR. RANGLES: No objection.

22 THE COURT: Admitted.

23 (Defendant's Exhibit No. B-849, DNA Summary for
24 Samples Taken in 2019, was received.)

25 BY MR. ANDERSON:

2169

1 Q. Again, we don't need to spend a lot of time. Is this
2 the same type of information for your tests in 2019?

3 A. Yes, they are.

4 Q. And what were the results?

5 A. Positive. All positive for *Armillaria tabescens*.

6 Q. Let's go to B-848, please.

7 What is B-848, Dr. Schnabel?

8 A. That is the gel picture that goes with the table.

9 (Defendant's Exhibit No. B-848, DNA Gel Analysis
10 for 2019 Samples, was identified.)

11 MR. ANDERSON: BASF offers B-848, Your Honor.

12 MR. RANGLES: No objection.

13 THE COURT: Admitted

THE COURT: 11:00:00.

14 (Defendant's Exhibit No. B-848, DNA Gel Analysis
15 for 2019 Samples, was received.)

16 BY MR. ANDERSON:

17 Q. Again, same thing as we talked about in the previous
18 testing?

19 A. Same thing.

20 Q. And lane 8 in this one, that's your negative control,
21 which confirms there was no contamination?

22 A. Correct.

23 Q. So we've got 43 positive tests from 2018 and six
24 positive tests from 2019; is that right?

25 A. That's correct.

2170

1 Q. Can Armillaria have an impact on scaffold limbs?

2 A. Yes?

3 Q. Did you observe any scaffold limb decline at Bader
4 Farms?

5 A. Yes.

6 Q. Did you attribute any scaffold limb decline that you
7 observed to Armillaria?

8 A. Yes.

9 MR. ANDERSON: Is now a good time to take a break,
10 Your Honor?

11 I'm about to switch topics. It's probably a good
12 time.

13 THE COURT: I'm sorry?

14 MR. ANDERSON: We're about to switch topics.

15 THE COURT: Okay. We'll take a recess of about 10
16 minutes.

17 And remember the admonition I've given you not to
18 discuss the case, and we'll call you back in soon. Thank
19 you.

20 Court is in recess.
 21 You may step down.
 22 (Witness stepped down from the witness stand.)
 23 (Proceedings stood in temporary recess.)
 24
 25

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1 C E R T I F I C A T E

2
 3 I, Alison M. Garagnani, Registered Merit Reporter
 4 and Certified Realtime Reporter, hereby certify that I am a
 5 duly appointed Official Court Reporter of the United States
 6 District Court for the Eastern District of Missouri.

7 I further certify that the foregoing is a true and
 8 accurate transcript of the proceedings held in the
 9 above-entitled case and that said transcript is a true and
 10 correct transcription of my stenographic notes.

11 I further certify that this transcript contains
 12 pages 2125 through 2171 inclusive and that this reporter
 13 takes no responsibility for missing or damaged pages of this
 14 transcript when same transcript is copied by any party other
 15 than this reporter.

16 Dated Cape Girardeau, Missouri, this 12th day of
 17 February, 2020.

18
 19
 20 -----
 /s/Alison M. Garagnani
 Alison M. Garagnani, CCR, CSR, RMR, CRR
 21 Official Court Reporter
 22
 23
 24
 25