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Plant pathology

with Dr Paul Koch

Talking *points*

Knowledge and Comprehension

1. What are microbiomes?
2. What are non-target effects and why do they matter?
3. What are the different impacts that fungicides can have on microbes?
4. Why can fungicide use sometimes lead to disease resurgence?

Application

5. What questions would you like to ask Paul to learn more about his work?
6. What non-target effects might a manager of a professional sports field be concerned about? How might this differ from someone who is growing crops for food?
7. What areas of plant pathology are you most interested in? What skills do you already have that could support you if you wanted to build a career in plant pathology?

Analysis

8. Explain how sequencing and metabolomics enable Paul and his colleagues to understand the impact of fungicides on microbiomes, and explain the difference between the two techniques. Why is it helpful to use both techniques?
9. Paul and his colleagues have found that rather than killing lots of microbes in the microbiome, the effects most fungicides have are more subtle. Why is Paul still concerned about these effects?

Evaluation

10. What factors should be considered when deciding whether or not to use a fungicide?
11. To what extent do you agree with Paul when he says that "turfgrass plays a critical aesthetic, environmental and economic role"? In what ways does turfgrass contribute to these three factors?

Activities

Part of any researcher's role is communicating their work to others who may not have the same scientific background or detailed understanding that they do. Sometimes these may be other professionals in different fields, and sometimes these may be members of the general public.

Paul often works with the managers of professional sports fields to help them care for their turfgrass. In small groups, create a piece of marketing to advertise this service and explain the science behind it in an interesting and engaging way.

In your group, you can decide what form this marketing will take. It could be a presentation, a leaflet, an email, a social media campaign or something else. Think about what may be most suitable and successful for your intended audience, their levels of scientific understanding, and what they may want to know before deciding whether to work with Paul.

For inspiration, use Paul's article and explore the website of the Turfgrass Diagnostic Lab in the Department of Plant Pathology at the University of Wisconsin-Madison (tdl.wisc.edu).

Share your marketing material with another group and ask for their thoughts. What do they like about your work? Do they have any ideas to improve it?

As a group, reflect on the following:

- What did you enjoy?
- What are you pleased with?
- What would you change?
- How would you approach this differently if your target audience was different (e.g., funders, local councils, environmental groups)?

More *resources*

Listen to Plantopia, a podcast from the American Phytopathological Society, to hear interviews and discussions with many different experts on topics including plant diseases, gene editing, food security and more: **plantopiapodcast.org**