Expert discusses alternatives to pesticides

March 29 2019, by Alison Mairena

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A researcher at the University of Arizona has discovered compounds derived from Photorhabdus, an insect pathogenic bacterium, that have antimicrobial and nematicidal properties that can potentially replace chemical pesticides.

Entomology professor Patricia Stock, interim director of the UA School

of Animal and Comparative Biomedical Sciences, used an UA Accelerate for Success grant and funding from the College of Agriculture and Life Sciences Innovation Venture Investment Program to test the activity of secondary metabolites from Photorhabdus bacteria with applications in agriculture.

Stock is working with Tech Launch Arizona, the UA office that commercializes inventions stemming from research, to develop her research into products that can be used throughout the world.

Q: Why are pesticides necessary?

A: In the United States alone, plants are subject to attack by over 50,000 different pathogens, including fungi, viruses, bacteria, insects and nematodes. Although a variety of chemical and other management tools are available, none is ideal with respect to environmental safety, efficacy or costs. There is an urgent and present need to identify alternatives to chemical pesticides and current antibiotics for more rational and safer crop management against plant-parasitic nematodes and bacteria alike.

Q: Why is it important to find alternatives to chemical pesticides?

A: Evidence exists that the intensive use of chemical pesticides for control of plant parasitic nematodes and other plant pests like bacteria and fungi has led to severe negative environmental impacts. The Environmental Protection Agency is in the process of reviewing the use of organophosphate and carbamate pesticides with the intention of phasing out obsolete and toxic chemicals. That has already happened with methyl bromide, a soil fumigant that had been widely used for controlling plant-parasitic nematodes and other soil-borne pathogens. Although antibacterial compounds such as streptomycin and

oxytetracycline may be less problematic than the above-mentioned pesticides, these antibiotics are currently licensed for use in crop protection. They are now rarely used in human medicine because of the danger of toxicity.

Q: Who will benefit from this technology?

A: Farmers, who will have a safer choice for dealing with plant pests and pathogens. People, wildlife and the environment in general will be less exposed to noxious chemical pesticides.

Q: What's the next step?

A: Our work has been done under laboratory conditions and at a small scale. Our next step is to move to greenhouse trials first and field testing in the near future. It would be great to team up with industry to get their support and form a partnership to move forward to the next step.

Provided by University of Arizona