Speaker 1: The Missouri State Journal, a weekly program keeping you in touch with Missouri State University.

Emily Yeap: Across North America, including Missouri, bats of certain species are dying in worrisome numbers from a disease called white-nose syndrome, a fungal disease. This disease kills the bats while they are in hibernation. Dr. Tom Tomasi, Missouri State University biology professor, and his colleague, Dr. Christopher Lupfer, Missouri State biology assistant professor, are working together to find out why the disease kills some bats and not others. I'm Emily Yeap.

Tomasi joins me today to share more about the research project.

Tom Tomasi: The research question that we're addressing is why some species are highly susceptible to this disease first identified in a cave in New York state, and has since spread through much of North America, including taken a large toll of bats here in Missouri. It only kills them when they're hibernating, and they can be hibernating in a cave where another species is that seems to be okay. It doesn't seem to be dying from this. We're trying to figure out what makes some species sort of automatically resistant to the disease, and others are highly susceptible.

Emily Yeap: Tomasi and Lupfer look at the immune function of species of bats that are highly susceptible to white-nose syndrome, and compare it to those that are resistant.

Tom Tomasi: One way we've been doing this is actually collecting bats of different species, and bringing them into the laboratory, put them in our hibernation chambers, and they spend the winter with us. Some we've infected and some we have not to try to look at the differences that the bats show. We've also been taking cells from the wings of bats. We just go out, take a little biopsy, and then let the bats go, and culture cells from those wings, and then test those bats. Some of those cells we infect with the fungus, and some we don't to use as a control to see what immune function genes are turned on when the cells, or the whole bats are exposed to this fungus that causes the disease.

Emily Yeap: What has the research revealed so far?

Tom Tomasi: Because the hibernating bats have stored up some body fat before they hibernate, they go for several months without eating and living off of their stored body fat, and what we think is happening is that the species that are dying off in massive numbers their immune system is trying to fight the disease even when they're hibernating. Of course, that requires energy, so they burn through the stored energy before it's spring time when they can start feeding again, so they're starving to death. That's the most straightforward symptoms that we're seeing is there's no body fat left on them.

 Our results have shown that different genetic analysis of several different genes and proteins that the animals make as part of their immune function, that the species who are resistant just let the fungus grow on them without trying to fight it. It's a skin fungus. It's much like humans might have athlete's foot, or certain kinds of fungus that grow on our skin. It's not lethal. If it raises our metabolism a little bit because our immune system is fighting it, that's okay, we just eat a few extra calories. But for the bats that don't have any extra calories they can eat when their immune system tries to fight the disease, it ultimately seems to lead to their downfall. At least all the evidence that we've collected so far says the bats that make it are the ones that don't turn on their immune system even though that seems counterintuitive.

Emily Yeap: With their findings, Tomasi and Lupfer hope to make some helpful predictions.

Tom Tomasi: As I said, the disease started in New York and has moved steadily westward. It hasn't got to the outhwest very much, and we don't know which of those bat species might be highly susceptible and which ones might be resistant. We're actually trying to determine some of that now. We've gotten wings cells from some of those bats, and we grow them in dishes, and we're going to be testing those to see if we can predict which species of bats, especially in the Southwest, might be ones that will be fine and which ones might be highly susceptible.

Emily Yeap: Since bats often have a bad reputation, Tomasi stresses that their benefits are much greater than the risk of bats infecting us.

Tom Tomasi: We rely on the bat a lot for consuming insects. At least the species here. Bats in other places of the world pollinate plants. Fruit bats will eat the fruit, and fly around and deposit the seeds wherever they're dropping guano, and the seeds will germinate. We should do what we can to preserve and conserve bats, because they're important in our environment, and I think they're really cool animals.

Emily Yeap: That was Dr. Tom Tomasi, Missouri state biology professor. I'm Emily Yeap for the Missouri State Journal.

Speaker 1: For more information contact the office of University Communications at (417) 836-6397. The Missouri State Journal is available online at ksmu.org.