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

Nicki Donnelson: Ancient farmers through trial and error determine the best fit between a crop, the soil, and weather conditions. They had plenty of land to choose from to find the perfect fields for their crops. But as the availability of cultivatable land diminishes and as climates change, our ability to grow enough food is becoming limited too. This is the root of Dr. Laszlo Kovacs' research. He's a geneticist and biology professor at Missouri State University, interested in the agricultural industry.

 He is my guest today on the Missouri State Journal. He's here to tell us about the work he's doing to identify genes that will help preserve the viticulture industry and beyond. More than anything, Kovacs loves being in the beauty of the Ozarks, collecting wild relatives of the cultivated grape. Much of Kovacs' work involves wild grape species, because biologically, saving native plants provides great benefits. Those species may have critical genes for something in the future, which is worth preserving. For the last 10 years or so, he and his students have been collecting plants of two interesting North American grapes. He tells us more.

Laszlo Kovacs: So two of the white grapes we are most interested in are both native here. One is called the Rock Grape, and the other one is called the River Bank Grape. This one's grow very close to one another in nature, but actually occupy very different niches, especially in terms of soils. So the River Bank Grape grows in the frog plane. There's plenty of moist soil available for it to obtain nutrients, but Rock Grape grows actually in the river bank of intermittent rivers. So it has to survive some very difficult conditions. Those conditions are poor in nutrients.

Nicki Donnelson: To find the water and nourishment to survive in this nutrient poor area, the roots dive deep. His team realized that this is a very valuable trait for drought-prone areas. He notes that this ability to root deeply could be advantageous in other agricultural products.

Laszlo Kovacs: Today, the climate is changing rapidly. In certain areas where they used to have sufficient precipitation and enough moisture in the soil, now they have to irrigate. Now, irrigation has its problems. It makes the soil saline, a lot more solids accumulate. And of course, it's expensive and freshwater is in limited supply. So there is a search for plants that root very deep and able to find moisture, even under very dry conditions.

Nicki Donnelson: Kovacs is participating in a multi-million dollar grant project funded by the National Science Foundation, experimenting with crosses and grafting. Though this technology has been around for more than two millennia, they are working to see how the root stock influences the characteristics of the shoot.

Laszlo Kovacs: And it's kind of a unique situation, and grapevine, we can actually graft the cultivated grapes. So we can graft the grapevine on the root stock. So the root system is formed by an entirely different plant than the floating part of the plant, which we call [scion 00:03:34]. So we essentially are really focusing on the grafting and how we can find genes or gene variants or genomic regions in these plants that we will be able to utilize, exploit, so that grape growers can grow quality grapes, even under the conditions that they have to face.

Nicki Donnelson: As the climate continues to change rapidly, people worldwide are experiencing difficulty with adapting to the needs of their crops. For example, the lengthened summer season taxes peak ripening season for grapes, making grapes less desirable if picked at the traditional time. In order to protect this very important export, for example, French winemakers may look to the work Kovacs' team is doing.

Laszlo Kovacs: One way to solve that problem is to grow their grapes on a rootstock that will slow the maturity, the ripening process. So even though the summer might be two weeks longer, your grapes are still going to ripen two weeks later. So these are the problems that we are looking at to solve. And as most plant leaders, we believe that the solution is in the wide relatives of crops. In this case the wide relatives of grapevines.

Nicki Donnelson: Thanks for listening. That was Dr. Laszlo Kovacs. I'm Nicki Donnelson 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.