In pursuit of homegrown tires

By Larry Edsall

Because "Guayule farmer" isn't an official job description at Bridgestone Americas Inc., Bill Niaura says his title is Director of New Business Development, for an experiment the world's largest tire and rubber company is conducting at two sites in Arizona.

New business, indeed. Currently all of the world's supply of natural rubber—the material used in everything from automobile tires to rubber gloves—comes from outside the United States. But Bridgestone is investing millions of dollars to determine if a plant that is native to the desert of northern Mexico and the southwestern United States might become a viable alternative source for such rubber.

The plant is guayule, which is pronounced "why-YOU-lee."

America's dependence on imported oil is a widely known subject of political debate and economic concern. However, largely overlooked is the fact that none of the world's supply of natural rubber is produced within the country, or even on the North American continent.

That rubber—nearly 11 million tons of it a year—comes from the white sap of a species of Hevea trees, which grow only in equatorial areas. The trees are native to Brazil's Amazon region, but have been exported. Some 93 percent of the world's natural rubber supply comes from Southeast Asia, with 4 percent from Africa and 3 percent from South America, Niaura told the Phoenix Automotive Press Association during a presentation on Bridgestone's new Arizona-based guayule research project.

Guayule, a woody shrub, produces natural rubber in its bark and roots. Some believe it was from guayule that the Aztec extracted the rubber they used in their ball games.

Research by Bridgestone and others has shown the natural rubber guayule produces can be directly substituted for that from the Hevea tree, Niaura said. He added that Bridgestone believes the potential yield per acre might be even greater for guayule once the wild plant is domesticated for agricultural production. Niaura's task is to lead the research teams that will determine if that can be done, and if a viable business case can be made for guayule as a significant source for viable natural rubber production.

Last year, Bridgestone Americas Tire Operations purchased 281 acres of farmland near Eloy. The company will use that land as an agricultural research facility. Among the challenges the research team faces, Niaura said, will be obtaining enough seeds to plant rows of guayule. Each flower that blooms on a guayule plant produces five seeds, he said, but only one of those seeds contains a viable embryo to start a new plant.

But cultivating guayule is only part of the challenge. Soon, the company will break ground at a corner of the former General Motors desert proving grounds in Mesa for a facility to do research on extracting the rubber and other resources from guayule plants.

While Hevea rubber is collected by bleeding the tree's sap, the entire guayule plant must be harvested and processed, said Niaura, who has a graduate degree from the University of Akron in polymer sciences and has worked for Bridgestone for 20 years.

Niaura said only about 7 percent of the plant's mass is natural rubber and a business case must be made for using the rest of the plant as well. Some of that mass, he said, is a pine tar-like resin that can be used by the adhesives industry. The remaining biomass could be burned to produce energy—Niaura said the biomass has the same energy density as coal, but with the benefit of being carbon neutral.

But Bridgestone also wants to explore another possible use for this byproduct of natural rubber production: It seems that termites will not eat the woody part of the guayule plant—in fact, they'll starve themselves first, Niaura said—and it may be that the biomass left after extracting rubber and resin might be used in a termite-proof product for the building materials industry.

Bridgestone hopes to have a pilot crop growing at Eloy by 2015 but has not set a target date for potential commercialization of guayule natural rubber.

Asked how many people the two facilities employ, Niaura started to count on his fingers.

"Now?" he said. "About 10."

But, he added, eventually some 45 people will work at the two experimental stations.

However, should the experiments prove viable, well, that's when Niaura's full job description comes into play. ■

(Top) Groundbreaking for the new Biorubber Process Research Center in Mesa, Arizona (rendering at left). Left to right: Hank Hara, chief technology officer, Bridgestone Americas Tire Operations, LLC; Hiroshi Mouri, president, Bridgestone Americas Center for Research and Technology; Bill Niaura, director of new business development, Bridgestone Americas, Inc.; Gary Garfield, CEO and president, Bridgestone Americas Inc.; Scott Smith, mayor of Mesa; Tatsuro Hamada, VP and officer of tire research and material development, and central research, Bridgestone Corporation; Hideki Komatsu, director, central research, Bridgestone Corporation; Mick Suzuki, vice president of business strategy and enterprise support, Bridgestone Americas, Inc.

(Center) Guayule plants and a tire made from guayule on exhibit at the Bridgestone Biorubber Process Research Center.

(Right) Program director Bill Niaura.