

Natural Rubber Bounces Back for Farmers

DECEMBER 24, 2015 08:00 AM

Like Share 27 Tweet



Buckeye Gold has a one-two production punch: natural rubber and inulin, a food product used by diabetics.

© Clare Knebusch, Ohio State University

Edison, Firestone, Ford, or Rockefeller, the giants of American industry and invention believed one crop could rule them all: natural rubber.

Industrialization, subterfuge and war couldn't gain rubber a crop foothold in the United States, but latex-producing plants are back on the edge of farmland, backed by the muscle of genetic breeding. Natural rubber is a titan's playground, with U.S. market value upwards of \$40 billion each year, and a mere crumb from the table could bring windfall profits to U.S. growers.

Henry Wickham is the forgotten man of agriculture. In 1876, he emerged from the Brazilian jungle and steamed to London with a cache of pilfered Hevea seeds, setting off a seismic shift in global

rubber production. The rubber tree seed escape essentially destroyed the Amazonian rubber boom, and Wickham's pods became the foundation of Southeast Asian production which still dominates the rubber market today. Another tremendous shift may be in the cards if U.S. farmers gain entry to a phenomenally lucrative rubber realm.

Tropically grown Hevea trees will never flourish in the U.S.

However, the future of U.S. natural rubber production is in Buckeye Gold dandelion, guayule and sunflower. Katrina Cornish, an Ohio State University research scholar and endowed chair in Bioemergent Materials with the College of Food, Agricultural, and Environmental Sciences, believes rubber crops are destined for major U.S. acreage and will become part of typical farming rotations.

As a leader in the vanguard of rubber research, Cornish says all three U.S. natural rubber crops are packed with promise. "The agronomic systems for sunflower rubber are already in place. We know how to grow vast quantities of sunflower and need to ramp up yield. Guayule production is ongoing and shows tremendous promise. Dandelion rubber will be at the market stage in just a few years."

Buckeye Gold is currently under commercial farm testing. Latex is stored in the dandelion taproot. "Rubber crops have to fit in with existing agronomic systems. With Buckeye Gold, a slight modification on a carrot harvester is a change farmers will make," describes Colleen McMahan, lead scientist on domestic natural rubber for USDA-ARS.

Buckeye Gold can be irrigated or grown dryland in any locale with common dandelion presence. In areas with a short growing season, Buckeye Gold can overwinter and handle a hard freeze. Natural rubber crops failed in the past, but McMahan points to the game-changing factors of genetic breeding and sustainability demand. In addition, Buckeye Gold carries a one-two punch, producing a highly desirable (inulin) food product used by diabetics. "There are economic blocks, but breeding improvements are incredibly fast. Buckeye Gold could become a new industrial crop for the U.S.," says McMahan.

Sunflower Rubber

Edison Agrosiences is using biotechnology to increase the concentration of natural rubber in sunflower leaves and using agronomics to increase the amount of leaves per unit land area. "Sunflowers produce between 1% and 2% natural rubber in the leaves, but we're going to have a major increase through biotech," says Tom Christensen, CEO of Edison and Ag TechInventures, an innovation lab where Edison is a portfolio company.

The rubber in sunflower leaves isn't harvestable as latex, but instead exists as particles within leaf cells. Edison is testing both genetic and agronomic mechanisms to stop flowering and boost biomass growth. Seed heads are removed early in development to allow for more

rubber production in leaves. Sunflower rubber has a significant advantage over other new crops due to existing agronomics, according to Christensen. Sunflower planting, fertilization, harvest, weed control, and overall management are well understood.

Edison will have a substantial portion of its R&D program in field plots by 2016 and expects to have a commercial pilot in the field by 2019 with several thousand acres of sunflower for rubber. Christensen points to the need for a North American rubber value chain. “We don’t know if we could repurpose already existing extraction facilities or if we’d need to build from the ground up.”

“There’s so much interest in sunflower rubber,” adds Cornish. “We could have sunflower as a viable rubber crop in just a few years with proper investment.”

Sunflower rubber can be grown in a broad range of climates. As a 90-day crop tolerant to drought and heat, Christensen hopes to take sunflower into empty rotations to the south of traditional growing areas in the northern plains. “It’s difficult to overstate the significance of the natural rubber market. We’re increasing the amount of rubber sunflower makes in order to create an economic crop that can be grown in a number of climates in a short period.”

Guayule

Guayule is a rubber-producing shrub native to southwest Texas and northern Mexico. It has tremendous promise and is further along in development than Buckeye Gold or sunflower. Bridgestone has invested over \$120 million in a research farm and processing plant in Arizona.

Guayule’s enormous advantage? It does not cause latex allergy and brings a price premium. In storage, Hevea latex begins deteriorating at six months. Solid guayule rubber can be stored as bales and remains stable for multiple years, according to Cornish. She says low-input guayule offers phenomenal latex value for growers. “If you compare production with latex value, I’m talking about \$500,000 per acre for surgeon gloves or \$300,000 for condoms. That means plenty of money for the farmer, processor, manufacturer, investor, retailer and others.”

Mike Fraley, CEO of PanAridus, is at the forefront of guayule production. PanAridus guayule varieties mature at 16 to 18 months, with annual crops thereafter, compared to Hevea trees, which require six to eight years to mature. Hevea plantations typically yield 1,700 lbs. per acre, but some of Fraley’s varieties are beating the hevea average.

PanAridus contracts with Arizona growers at a measured pace to fit the extraction process and market. Fraley insists on walking before running. “People fall off the rails by overreaching,” he says. “We first

show the ag community the product value and then we'll contract big acreage. We've got enough seed for 100,000 acres right now."

PanAridus relies on its genetics and processing for quality, and depends on growers for tonnage. "That dog doesn't hunt about demanding quality from growers because it's our responsibility. Guayule is going to work for significant grower profit," notes Fraley. Beyond rubber, PanAridus is aiming for 100% utilization of the guayule shrub. High-value resins for adhesives, fragrance, or flavor, and bagasse for biofuel and building supplies.

The U.S. market demands 1.2 million metric tons of natural rubber per year, and virtually every pound is imported. PanAridus wants to meet 15% of U.S. consumptive needs with 160,000 to 180,000 guayule acres within a decade. "I've worked with corn and cotton, but guayule is the most exciting crop species I've ever encountered," explains Fraley.

Rubber Road

The Southeast Asia rubber industry's catbird seat has worn wobbly. Hevea rubber production is analogous to maple syrup collection. Trees are cut, and weeping latex is collected in buckets in a labor-intensive system. Southeast Asia's Hevea trees are highly susceptible to South American leaf blight, which has already decimated rubber trees in Brazil. All rubber acreage in Southeast Asia is derived from Wickham's seed samples, which is a heritage of about 15 trees. The remarkably narrow genetic window places the miles and miles of cloned Hevea acreage on a precarious perch if leaf blight emerges.

Despite Southeast Asia's rubber troubles, demand is doubling with development in Asia, Brazil, China, and India. "The world economy is headed for a massive rubber shortage in the future," warns Cornish. "We need our own major acreage ready when the shortfalls hit. Once Africa reaches a certain development point, demand will be even stronger."

U.S. manufacturers pump billions of rubber dollars into the Southeast Asian economy every year. Globally, 12 million metric tons of natural rubber are produced each year. "We're headed to 20 million tons very soon, and in 30 years we'll be needing 30 million," says Cornish. "Where's it going to come from? Not the Hevea rubber tree. We'd better be growing it right here on American farmland."

[Back to news](#)

Comments

Leave a Comment

No comments have been posted to this News Article

