



**SUSTAINABLE BIOECONOMY**  
FOR ARID REGIONS

# GUAYULE GROWING RANGE EXPANSION IN THE SOUTHWEST

## EXECUTIVE SUMMARY

> Guayule is a natural, low-water use, rubber-producing crop native to the southwestern US and central Mexico. It is currently grown in southern AZ (USDA Plant Hardiness Zone 9) characterized by a mild winter climate. The US imported \$1.4B worth of natural rubber in 2020 and Southwest producers can benefit from this market, reducing the US's reliance on imports.

> Expanding guayule production to include regions of higher altitudes and more northern latitudes in the southwest (Zones 6-8) will allow production in more geographical zones and will increase domestic rubber production, potentially allowing more farmers to benefit from the bioeconomy of a new industrial crop.

> To achieve this expansion, funding will be needed to breed guayule cultivars that are more cold-tolerant and adapted to regions with more severe winters compared to the current growing region.

## SBAR ACCOMPLISHMENTS

> Multilocal studies of guayule in AZ to evaluate the yield potentials of different guayule accessions, and evaluation of 24 public germplasm accessions for cold tolerance in NM.

> Weed control studies in guayule to develop appropriate weed management strategies.

> Irrigation optimization to enhance rubber yield of guayule with minimal irrigation water applied.

> Fertility studies to enhance nutrient management of guayule production.

> Metabolic profiling of cold-tolerant plants completed, which showed similarities and differences in cold acclimation response between diploid and polyploid guayule plants.



## GUAYULE DETAILS

- > Natural rubber-producing shrub
- > Native to the Chihuahuan Desert
- > Can be produced as a low-water use row crop
- > A perennial crop, provides harvests for several years
- > Researchers are working to improve guayule germplasm for domestic production

## KEY TAKE-AWAYS

- > Potential \$1.4B market for guayule production in US
- > Market for natural rubber includes high performance tires (airplanes, buses, etc.), adhesives, rubber cement and roadways
- > Cold-tolerant cultivars will expand guayule growing range in AZ, NM, and TX

## POINT OF CONTACTS

- > **John Idowu.** NMSU. Las Cruces, NM.  
jidowu@nmsu.edu
- > **Dennis T. Ray.** UArizona. Tucson, AZ.  
dtray@arizona.edu
- > **Von Mark Cruz.** Bridgestone Americas, Inc. Eloy, AZ.  
cruzvonmark@bfusa.com
- > **David Dierig.** Bridgestone Americas, Inc. Eloy, AZ.  
dierigdavid@bfusa.com

## FUTURE WORK AND NEEDS

- > A major constraint is the lack of cultivars that can survive and perform well in colder regions of the southwestern US. Expanding the growing range to cover USDA Plant Hardiness Zones 6-7 can increase the potential acreage of guayule, especially in AZ, NM, and TX.
- > Preliminary studies are ongoing to screen existing germplasm accessions for cold tolerance in Las Cruces, NM (Zone 8), which has colder winter temperatures than southern AZ. Resources and funding are needed to expand this work by breeding cultivars capable of withstanding lower winter temperatures characteristic of middle to northern AZ and NM.
- > A follow-up testing activity to evaluate the rest of the available guayule germplasm from the NPGS collections would be desirable, since differential response to freezing temperatures was observed on the limited set of polyploid germplasm.
- > More research is needed to determine the effect of irrigation frequency and soil moisture to cold tolerance, winter survival, and rubber yield of guayule germplasm in NM.
- > Testing the selections from Las Cruces and subsequent progenies in various locations in NM and TX is recommended to determine suitable germplasm as well as effect of cold damage to rubber content and biomass yield.



For more information: <https://sbar.arizona.edu>



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