



SUSTAINABLE BIOECONOMY FOR ARID REGIONS

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GUAR

CHARACTERISTICS & USES

> Guar (*Cyamopsis tetragonoloba*) is a legume crop native to semi-arid and subtropical regions of India and Pakistan, and has been grown in the United States since World War II. The green pods are edible by humans and cattle, and the mature seeds contain guar gum that has many uses, such as: a thickener, emulsifier, bonding agent, or a soil stabilizer, among others. Guar gum is of special interest today for its application in natural gas extraction.

> Guar is a 3-4ft. tall, leafy, single- to multi-stemmed summer annual legume, with relatively large oval-shaped leaves. Flowers grow near the stem, and are most often self-pollinated. The seed pods grow in clusters, giving the plant its common name: cluster bean.

GROWING GUAR

> Guar and bean crops use similar equipment for planting, tillage, irrigation, harvest, and transport.

> Guar may be successfully established by using pre-emergence herbicides and pest control chemicals when needed.

> Guar is relatively inexpensive to grow and is suited to marginal farmland. As a legume, guar works well in rotation with other crops.

> After bean pod harvest, the remaining plant material is incorporated into the soil, or may be collected and used as a co-product in different revenue streams.



COURTESY OF KULBHUSHAN GROVER

BENEFITS OF GUAR

- > Resistant to drought
- > Restores depleted soil nitrogen
- > Guar meal, the product after extracting gum, can be a source of protein-rich cattle feed



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KEY CHARACTERISTICS

- > Grows well in hot and dry conditions
- > Seed pods range from 1.5-2 inches long and contain six to nine seeds
- > Used as a forage crop for cattle

DISEASES THAT POTENTIALLY IMPACT GUAR

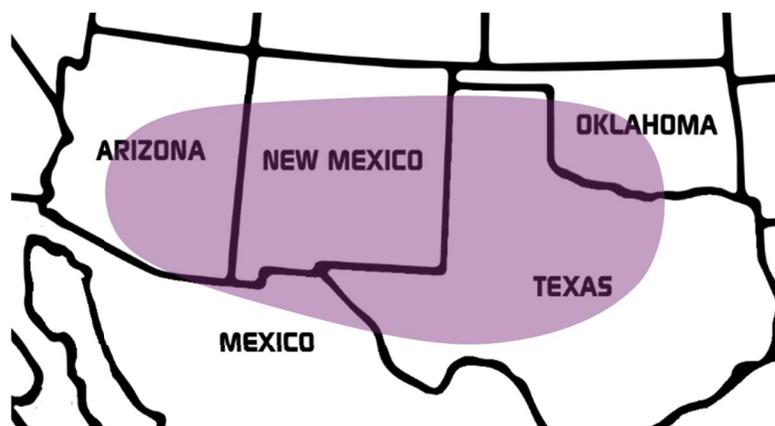
- > Southern blight, caused by *Sclerotium rolfsii* fungus
- > Alternaria leaf spot, caused by *Alternaria* genus pathogens
- > Texas root rot, *Phymatotrichum omnivorum*
- > Bacterial blights
- > Various viruses

ONGOING SBAR RESEARCH

- > **Variety selection:** identifies varieties to expand the growing range; evaluate lines for higher gum and protein content; evaluate yield and disease resistance
- > **Establishment:** determine best planting dates and densities for optimum yield; use in rotations with different crops
- > **Irrigation:** optimize timing and amount of irrigation for best yields
- > **New Uses:** enhance quality of guar meal; evaluate bagasse for biofuel production; develop new co-products



GENERAL GROWING LOCATION



THE SBAR PROJECT

> The Sustainable Bioeconomy for Arid Regions (SBAR) project is evaluating raw material development, production, and delivery in the southwestern United States to generate a self-sustaining regional economy. Our approach is to optimize guayule and guar production to support the economies of the southwestern United States. As water becomes less available for agriculture, it is important to identify and test drought and heat tolerant crops that grow well in arid regions, and provide positive economic returns.

For more information: energy.arizona.edu/SBAR



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