

# Native Perennial Legumes for Louisiana

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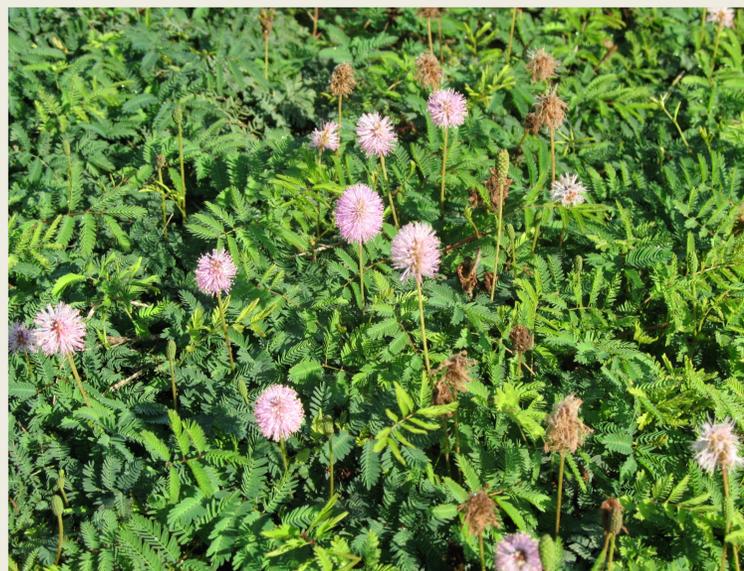
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## Abstract

Native legumes are widespread across Louisiana and most of the 134 species listed as native in the 1998 Atlas of the Vascular Flora of Louisiana are perennial herbaceous species. Seed of perennial herbaceous legumes from Louisiana is not commercially available. Seed collections from naturally occurring Louisiana populations of *Rhynchosia latifolia* and *Mimosa strigillosa* resulted in sustained stands and increasing populations from continuing seed production. Plantings of several other widespread species including *Centrosema virginianum*, *Tephrosia virginiana*, *Strophostyles umbellata*, *Neptunia lutea*, and *Stylosanthes biflora* did not persist. Seed of species native to Louisiana from initial seed collections in Texas have been increased by the USDA, NRCS Plant Materials Program and have been subjected to preliminary evaluations in Louisiana. Plantings of Texas ecotypes indicate substantial potential for Crockett germplasm herbaceous mimosa (*M. strigillosa*) and selections of prairie acacia (*Acacia angustissima* var. *hirta*). Crockett germplasm herbaceous mimosa has been successfully grown on both sandy upland sites and clay bottomlands. Plantings of prairie acacia have persisted and made vigorous growth on a sandy upland site but have failed to colonize beyond the initial individual plants despite substantial seed production. Lack of commercial seed availability limits potential use of these species and provides opportunity for commercialization of selected native legume species and subsequent enhancement of ecosystem function across the highly disturbed landscapes typical of Louisiana. Potential uses of native legume species include wildlife food plantings, prairie and longleaf pine savanna restorations, erosion control, and perhaps even forage for livestock grazing.

## Introduction

Louisiana has an extensive native legume flora with most of the 134 species identified as native (Thomas and Allen, 1998) typically growing as herbaceous grassland species. These species have been ecologically important in natural grasslands, savannas, and open woodlands providing such benefits as biologically fixed nitrogen, herbage of high protein concentration, and seed for grassland birds. Widespread land-use change has resulted in tremendously diminished and highly fragmented populations of existing native legumes. Genetic erosion of existing germplasm is highly likely. The currently available native legumes, even in the many small remnant populations commonly found, provide a resource of unknown value for native ecosystem restoration, wildlife food plantings, erosion control, and likely as forage plants in extensively managed multiple-use grasslands.



Herbaceous mimosa (*Mimosa strigillosa*)

## Germplasm Evaluations

Research involving the native legumes of Louisiana has been primarily limited to taxonomy. Most species now occur as sparse isolated populations within fragmented minimally disturbed areas or those temporarily left to successional processes. A wide range of growth forms occur including small upright herbs, vines, and sub-shrubs. Species such as *Centrosema virginianum* and *Strophostyles umbellata* are widespread but typically sparse growing. *Stylosanthes biflora* and *Tephrosia virginiana* can form substantial colonies which likely provide meaningful local ecological contributions. Seed collections from natural populations have been sufficient for only minimal evaluation of a few species, and most such plantings have failed to produce persisting populations (Pitman, 2009). Dense naturally occurring populations of *Mimosa strigillosa* occasionally develop on minimally maintained disturbed sites such as roadsides where taller growing competition is periodically mowed. *Acacia angustissima* var. *hirta* occurs in Louisiana primarily on rather rare small natural prairie sites such as the Keiffer prairie soil of central Louisiana. *Rhynchosia latifolia* occurs as isolated and sometimes rather dense colonies on widely dispersed upland sites through much of the state. *Desmodium paniculatum* is widespread but rare in Louisiana. The latter four species have been recognized as potentially suitable for commercial propagation as a result of seed production potential, seedling vigor sufficient to support colonization, and perennation of individual plants (Pitman, 2009; Noah et al., 2012b). *Acacia angustissima* var. *hirta* collections from Texas are highly diverse with adaptation to at least some Louisiana upland sites (Noah et al., 2012a). The only substantial seed increase of perennial legumes native to Louisiana has been with Texas ecotypes.

Table 1. Legume species native to Louisiana with commercialization\* potential.

Species	Common name	Growth form	Current status	Genotype origin	Reference
<i>Acacia angustissima</i> var. <i>hirta</i>	Prairie acacia	Rhizomatous sub-shrub	Germplasm releases:		
			Plains	Texas ecotypes	USDA-NRCS, 2012b
			Rio Grande	Texas ecotypes	USDA-NRCS, 2012c
<i>Desmodium paniculatum</i>	Panicled tickclover	Upright forb	Ecotype evaluations	Texas ecotype	Noah et al., 2012b
<i>Mimosa strigillosa</i>	Herbaceous mimosa	Dense, low stolons	Germplasm release:		
			Crockett	Texas ecotype	USDA-NRCS, 2012a
<i>Rhynchosia latifolia</i>	Prairie snoutbean	Upright forb	Ecotype evaluations	Louisiana ecotypes	Pitman, 2009

\*Potential for commercialization indicated by seed production characteristics, seedling vigor, and perennial growth of individual plants.



Prairie acacia (*Acacia angustissima* var. *hirta*)

## Opportunities and Limitations

Limited seed production of most species will make seed costly and rare.

Such rare seed of native legumes in other regions is marketed through the internet in small quantities for use as small percentages of seed mixes. Such seed could be targeted to specific landscape sites in restoration, or even pasture, plantings.

Selected species with commercial-scale seed production potential such as *Mimosa strigillosa* and *Acacia angustissima* var. *hirta* can be more extensively planted to restore contributions of the legume component typical of natural grassland ecosystems allowing restored sites and managed pastures to benefit from biological nitrogen fixation, high protein herbage, seed for grassland birds, and other contributions of diverse plant communities not provided by grasses alone.

Pastures based on legumes, whether native or introduced, will typically be substantially less productive for livestock than intensively managed introduced grass pastures, but they will be less costly, less hazardous to the environment, and provide increased benefits such as wildlife habitat and aesthetic value.

## References

- Noah, R.L., J.P. Muir, J.A. Brady, R.D. Wittie, D.H. Kattes, W.D. Pitman, G.L. Rea, and M.R. Brakie. 2012a. Genotypic and phenotypic variability in three prairie acacia accessions. *Crop Science* 52: 951-959.
- Noah, R.L., J.P. Muir, R.D. Wittie, D.H. Kattes, W.D. Pitman, G.L. Rea, and M.R. Brakie. 2012b. Prairie acacia, panicled tick-clover, and herbaceous mimosa herbage, nitrogen and seed yields, nutritive value, and regional adaptation. *Agronomy Journal* 104: 265-270.
- Pitman, W.D. 2009. Establishment and survival of native legumes on upland sites in Louisiana. *Native Plants Journal* 10: 240-250.
- Thomas, R.D. and C.M. Allen. 1998. Atlas of the vascular flora of Louisiana, Vol. III: Dicotyledons. Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, Baton Rouge, LA.
- USDA-NRCS. 2012a. Release brochure for Crockett Germplasm herbaceous mimosa (*Mimosa strigillosa*). USDA-Natural Resources Conservation Service, East Texas Plant Materials Center, Nacogdoches, TX.
- USDA-NRCS. 2012b. Release brochure for Plains Germplasm prairie acacia (*Acacia angustissima* (P. Mill.) Kuntze). USDA-Natural Resources Conservation Service, James E. "Bud" Smith Plant Materials Center, Knox City, TX.
- USDA-NRCS. 2012c. Release brochure for Rio Grande Germplasm prairie acacia (*Acacia angustissima* (Mill.) Kuntze var. *hirta* (Nutt.) B.L. Rob.). USDA-Natural Resources Conservation Service, E. "Kika" de la Garza Plant Materials Center, Kingsville, TX.