

Aeschynomene and carpon desmodium: legumes for bahiagrass pasture in Florida

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Introduction Soils and climate are very diverse across Florida, and no single legume has state-wide adaptation. However, aeschynomene (*Aeschynomene americana*), an annual, and carpon desmodium (*Desmodium heterocarpon*) cv. Florida, a perennial, are the most commonly used legumes for grazing on the central and southern peninsula, which produces 65% of Florida's beef calves. Both grow well with bahiagrass (*Paspalum notatum*), which is the main pasture grass, with ~1M ha state-wide. Circa 65K ha of bahiagrass contain at least limited quantities of aeschynomene and 14K ha contain carpon desmodium.

The Florida Agricultural Experiment Station (FAES) did not release Aeschynomene. The first experimental planting was in 1952, and since then there have been many research trials and considerable extension effort, leading to adoption by cattlemen. Seed production reached a peak in the mid-1970s, when ~200 t/year were produced, but it has declined to 60 t/year currently. Circa 18% of cattlemen in the region currently grow aeschynomene in bahiagrass pasture, which is down from 57% in 1990.

Carpon desmodium was introduced into Florida in 1964 and the FAES released it in 1979. There have been many research trials and much extension effort, but carpon never achieved the popularity of aeschynomene. Seed production of carpon reached a peak in the late 1980s with ~20 t/year and currently is 4 t/year. Circa 5% of cattlemen now grow carpon desmodium.

Major reasons for adoption Aeschynomene was the first palatable, highly nutritious legume adapted to seasonally wet, relatively infertile soils of the region. Carpon desmodium was the first perennial, and although lacking the palatability and nutritional qualities of aeschynomene, it was persistent under close grazing. Many cattlemen sowed these legumes in bahiagrass to improve nutritive value, especially in late summer when livestock gain on bahiagrass is often poor. Seed was produced locally and was relatively inexpensive. Both legumes reseed themselves with proper management.

Why have these legumes not been more successful? Although partnership between cattlemen, seedsmen, research, and extension was strong, the difficulty of consistently establishing and maintaining these legumes in pasture was underestimated. Autumn is the season when aeschynomene produces seed and when the legume has the greatest potential impact on animal performance. Regular grazing in autumn reduces aeschynomene seed yield significantly and precludes development of the large seed bank needed for re-establishment year after year. Either seed yield or use as a fodder must be compromised, and most producers will use a currently available forage resource instead of limiting grazing to favour seed yield. Aeschynomene seedlings emerge in spring, but late-spring drought can be devastating to re-establishment in many years. Carpon desmodium use has been limited due to unreliable and/or slow establishment. This problem probably could be solved by research, but it has not received sufficient attention. Overall, when vagaries of weather are considered, neither legume is dependable. The probability of successfully establishing and maintaining these legumes is not great enough to offset the relatively high cost of seed and management. Even when successfully grown, economic benefits are not realized easily or readily in the extensive cow-calf production system in Florida.

Why has legume usage declined? There is less demand for seed of all forages in Florida. Little native land is being converted to planted pasture, and much planted pasture land has been converted to other uses such as citrus and urban development. Although considerable aeschynomene seed is still produced, about half is sold for wildlife plantings. Aeschynomene is currently US\$6.50/kg and carpon is US\$9.25/kg, so many cattlemen feel it is too expensive. Seed supply varies widely from year to year, and seedsmen are unwilling to maintain a large inventory because seed shelf-life is limited. Seedsmen are very selective on fields harvested due to tropical soda apple (*Solanum viarum*), a prohibited, noxious weed seed under the Florida Seed Law and the Federal Seed Act.

The future Cattlemen will continue to purchase and sow these legumes, but there is not likely to be resurgence in popularity. Some cattlemen have had many failures with legumes and are not receptive to their use. Cattlemen believe that grass-based systems with nitrogen fertiliser are more dependable and produce more forage. Less support for research and extension and increased focus on issues other than production agriculture will limit attention given to pasture legumes.