Nitrogen fertilizer costs have increased dramatically over the last year and can be expected to increase in the future. Urea in April 2007 cost $453/ton, up from $200/ton in 2000. In April 2008, urea cost $590/ton in south Texas. The impacts of these high prices on the cost of production of all crops, including forages, is self-evident. In response to higher fertilizer costs, producers have two alternatives. The first is to utilize fertilizers more efficiently through the use of soil tests and alternative application methods. The second alternative is to reintroduce into their management practices that were the norm until the advent of cheap synthetic fertilizers after 1945. These practices include crop rotations involving legumes or, in the case of forage producers, the use of legumes as a component of the forage crop. Forage-based livestock production systems in south Texas are either extensive with few or no inputs or intensive irrigation-based systems with a high level of inputs. While some cultivar development has taken place in south Texas, there has been little organized research into the role of legumes in forage production systems in this area. Soils in this region tend to be high pH, and many clovers and other legumes are not adapted.

In addition to the need for improved sources of nitrogen for agricultural purposes, there is convincing evidence that, without increased inputs of nitrogen, the ability of terrestrial ecosystems to absorb the ever-increasing concentration of atmospheric carbon dioxide will decrease. It has been argued that terrestrial ecosystems can act as a sink for the elevated concentrations of carbon dioxide and, in fact, that increased levels of carbon dioxide are beneficial. In contrast, Reich et al. (http://www.nature.com/nature/journal/v440/n7086/full/nature04486.html), suggest that nitrogen availability will limit the potential plant response to increased concentrations of atmospheric carbon dioxide. This finding further supports the urgent need to develop legume-based systems to maintain sustainability of forage production systems throughout Texas.

**Process**

- Introduced and native legumes will be tested for their adaptation and nitrogen-fixing ability in the south Texas environment
- Adapted legumes will be grown in small plots and in cooperation with producers to determine suitability for extensive use.

**Objective**

Develop new cultivars of legumes from both native and introduced species that provide economically worthwhile quantities of nitrogen to forage-based systems in south Texas.

**Outcomes**

- Objective data relating to the nitrogen contribution of legumes to forage systems in south Texas
- Identification of new, adapted cultivars
- Development of legume/forage management strategies that optimize production from forage-based systems