

Abstract

In a series of six trials in the Upper Belize River Valley, Belize, Central America, potential forage legumes were tested for yield and persistence on major Belizean soil types (fertile and infertile alluvial terraces (Inceptisols) and infertile Low Pine Ridge Ultisols), under various management regimes. The area receives about 1500 mm rainfall/annum and the major constraints to growth are a cool season (December to February) and a three month dry season (March to June).

Legumes tested included native and commercial lines, and promising lines from other locations. Selected first from introduction plots, they were tested under low fertilizer conditions with top dressings of 12 kg/ha of P and 20 kg/ha of K. Cutting for dry matter yields and mob grazing for palatability and persistence were done on six-weekly cycles.

During mob grazing pre- and post- grazing observation ratings were given to the swards in order to determine the relative performance and palatability of the species. The ratings proved to be useful.

The three most successful forage legumes were Desmodium gyroides DC. , Leucaena leucocephala (Lam.) de Wit. cv Peru and Macroptilium atropurpureum (D.C.) Urban cv Siratro. These were persistent under cutting and mob grazing and gave good dry matter yields in the dry season.

D. gyroides was the highest yielding legume on all three soil types and combined well with Para grass (Brachiaria mutica Stapf.), Pangola grass (Digitaria decumbens Stent.), jaragua grass (Hyparrhenia rufa (Nees.) Stapf.), Guinea grass (Panicum maximum Jacq.), Coastal

Bermuda grass (Cynodon dactylon (L.) Pers.) and native savanna grass (Mesosetum angustifolium (Swallen) Swallen). It yielded significantly more dry matter than the control when combined with Para grass. When cut at three heights (5, 25, and 50 cm) and three frequencies (2-, 6-, and 8-week average), higher yields and greater persistence occurred with the two higher cutting heights and the six week cutting cycle. It was particularly successful in the infertile Ultisols. The palatability of D. gyroides was high.

Leucaena leucocephala showed excellent vigour and high palatability. It combined well with Pangola, Coastal Bermuda, jaragua and Guinea grasses on the alluvial soils, but grew poorly on the Ultisols.

Siratro persisted well with Para under mob grazing, and Pangola, Guinea and jaragua grasses under cutting and grazing on the fertile alluvial soils. It produced significantly more total dry matter combined with Guinea and Pangola grasses compared to the control. Its yield was much reduced with Coastal Bermuda grass on the infertile alluvial soil and on the Ultisol. The production of Siratro was highest in the dry season making it a very valuable plant for Belizean pastures. Its palatability varied markedly.

A grazing experiment was conducted on a mixed legume-grass sward with Pangola grass and Stylosanthes guianensis (Aubl.) Sw. cultivars Cook and Endeavour, Centrosema pubescens (L.) Benth., M. atropurpureum cv Siratro and Desmodium intortum (Mill.) Urb. cv Greenleaf. The trial involved rotational grazing with unreplicated high and low stocking rate treatments of 7.5 and 5.0 animals/ha respectively in the wet season and 3.8 for part of the cool and dry seasons in the high treatment with 2.5 animals /ha for the remainder, while the low

treatment had 2.5 animals/ha. Live weight gains after 490 days were 908 and 664 kg/ha/annum for the high and low rates. The legumes which were most productive and persistent were the two S. guianensis cultivars in the high stocking rate treatment and Siratro in the low stocking rate treatment. Legumes formed 30 % and 21 % (dry matter basis) of the green grass and legume mixture in the high and low stocking rate treatments respectively.

D. intortum cv Greenleaf had high dry matter yields in a pure sward cutting trial over nine months (June - March) on the alluvial site. However its persistence was very poor both in pure sward and combined with grasses. Native lines of Centrosema pubescens (L.) Benth. (CF6-1) and M. atropurpureum (CF3-2) gave lower yields than the commercial genotypes Siratro and centro, under cutting in pure sward. Under mob grazing with Para grass, however, the native lines had highest plot covers. The native M. atropurpureum gave significantly higher dry matter yields in the cool season than Siratro, but lacked the greatly increased production of Siratro in the dry season. Centro, which persisted in all grasses with which it was tried was found to produce better in warm wet weather, however, it was an over-all low producer of dry matter.

Native lines of Calopogonium caeruleum (Benth.) Hemsl., and Centrosema plumieri Benth. had low palatability and low dry matter yields but persisted well in mixed swards under cutting and mob grazing, particularly with Para grass on the fertile alluvial site. At all sites a commercial line of Crotalaria angyroides HBK. and a native line of Crotalaria retusa L. were high yielding in mixed swards, though not persistent.

Comparisons of control plots of trials at the fertile alluvial site indicated that Guinea and Pangola grasses were higher producers of dry matter than jaraguá while Para grass had low productivity under cutting and low persistence under mob grazing.