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PRODUCTIVITY AND PERFORMANCE OF *B. decumbens* + *D. ovalifolium* ASSOCIATION

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RESUME

Brachiaria decumbens is one of the promising grasses well adapted to infertile acid soils in Tropical Latin America, although it has several problems. One of the problems is its less compatibility with legumes due to its aggressive growth habit. So, it is urgent to find a legume which will be able to associate with this grass.

Recently, *Desmodium ovalifolium* was introduced from South-east Asia, and its prostrate, vigorous growth habit shows the possibility to be compatible with *B. decumbens*.

Therefore, to obtain information on productivity and performance of pasture and animal, association of these two species was established and grazing experiment was initiated from the end of 1979 at CIAT Quilichao Station.

During the last 20 months, this pasture had shown tremendously high productivity (animal live weight gain: 1100 kg/ha/year, 240 kg/animal/year, 660 g/animal/day), and maintained good grass/legume balance, so far. This high productivity was obtained with the high stocking rate of 4.5 animals/ha due to the high carrying capacity (forage availability) of this pasture.

Rainfall distribution affected to forage availability, protein content of forage and through them to animal productivity. There was a positive correlation ($r = 0.65^*$) between forage availability and animal weight gain per hectare.

Rainfall distribution also affected to botanical composition (grass/legume balance) of pasture and grazing performance of animal.

During rainy season, animals selected *B. decumbens* preferably and legume proportion in diet was very little, however, in dry season selection of *D. ovalifolium* increased gradually. And there was a negative correlation ($r = -0.68^*$) between water balance and relative selection index (% herbage in diet/% herbage on offer) of legume. This grazing performance (selection) was related to botanical and chemical composition of forage on offer. Forage quality (in terms of in vitro digestibility and P, K, S contents) of *B. decumbens* was always better than that of *D. ovalifolium*, and preference for this grass may attribute to its better quality. During rainy season when grass availability is abundant, animals consume grass mainly, and it results the decrease of grass proportion toward dry season. Therefore, in dry season, consumption of legume increases relatively, because of the shortage of grass. And this increment of legume consumption results to improve legume quality (through regrowth), and accelerates more consumption of legume. This is the probable reason of dry season access to legume.

This dry season access to legume is well-known and very reasonable performance of animal on grass-legume pastures, and contributes to avoid their weight losses during dry season, and to obtain high weight per year. This is one of the reason why we need legumes particularly during dry season.

Pasture performance, in terms of forage availability, botanical and chemical composition, under grazing condition is different from that of cutting treatment. And also grazing system (continuous vs. rotational grazing) affects to these characteristics. So, it is desirable that evaluation of germplasm will be done under grazing conditions as early stage as possible.

METHODOLOGY FOR ESTIMATING FORAGE AVAILABILITY.

Forage availability and also botanical composition of pastures are very important attributes which explain changes in animal weight under grazing and determine proper pasture management. So, it is necessary to obtain reliable estimation of these attributes in grazing experiments.

The most common method for estimation is to cut several sampling plots, to separate grass and legume, and to weigh them. However, to obtain reliable estimation huge amount of samples should be taken from wide and heterogeneous grazing pastures. But, it is very tedious, time and labor consuming work and practically impossible to be done. Furthermore, cutting practice disturbs pastures.

Therefore, several non-destructive method for estimating forage availability had been developed. The Double-Sampling Method proposed before is one of these methods and is particularly useful to measure forage availability in very heterogeneous pure grass pastures. However, this method has some difficulty for estimating forage yield and botanical composition in grass-legume mixtures.

A modification of the Double-Sampling Method was tried to solve these difficulties. Principle of Double-Sampling Method is based on the existing of linear correlation between forage volume visually estimated and dry weight of forage cut and weighed. But theoretically, volume is consisted of two component: "plant height" and "basal area". So, instead of visual estimation of forage volume, coverage and plant height of grass and legume components of unit area (1 m^2 quadrat) were measured respectively. A highly significant ($P < 0.01$) positive correlation was found between the "coverage x height" and "dry weight" of the grass and legume. This high correlation existed not only in the case of bunch type pasture such as *A. gayanus* - *S. capitata* mixture, but also prostrate type pasture such as *B. decumbens* - *D. ovalifolium* mixture.

A number of samples (measurement of height and coverage) should be taken according to the area and structure of pastures so as to be obtained representative mean values, and dry weight of grass and legume per hectare could be estimated respectively, by substituting these mean values of coverage x height into corresponding regressions which had been calculated before hand.

In this method, estimation of coverage and plant height is more objective than visual estimation of forage volume in conventional Double-Sampling Method. And bias on the estimation by different observers were very little.

Advantages of this modified "coverage x height method" to estimate dry matter yield can be summarized as follows:

1. Measurements of coverage and height are more objective than visual estimates of forage volume.
2. Measurements can be done on the grass and legume and the dry weight of each component estimated independetly.
3. Additional information can be obtained on botanical composition and pasture structure.