Impacts of Agroforestry Production Systems with Ruminants in CUBA

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Introduction In Cuba some technologies for ruminant management with the use of silvopastoral systems formed by grasses and tree legumes have been developed , involving calves , cows and heifers and bull for fattening , in which the results depend on the animal potential , availability and quality of the associated species and stocking rate management .

The objective of this work is to analyze the main impacts of silvopastoral systems on the ecosystem and to show the results of several works developed in Cuba with fodder woody plants .

Materials and methods Cuba is located between 19° and 21° of latitude North and 19° and 81° of longitude West , and the soils are of medium fertility . Annual mean rainfall is 1 200 mm , 70-80% of which occur in the May-October period and the rest in the November-April period . Mean temperature is 23℃ and relative humidity is 60-70% during the day 80-90% in the night . Among the diverse types of Silvopastoral systems under study , the protein banks and multiple associations of legumes and grasses have contributed much to the development of sustainable dairy and meat production , and could be considered as systems that can be extended to the farmers and that integrate well with the production objectives of Cuban cattle production .

Results and discussion

Soil productivity The study of the edaphic biota in a *Panicum maximum-Leucaena leucocephala* silvopastoral system (with a tree density of 555 plants/ha and a stocking rates no higher than 2 animals/ha) , showed an individuals density as well as the biomass weight 2 .41 times higher than the system with *P . maximum* only (control) . (Sánchez et al . ,2007) .

Agronomic studies Leucaena has been the most studied genus among trees for livestock feeding , and in the collection of 109 accessions the most represented one *was L . leucocephala* with 90 . Among the most rapidly established species are : *L . leucocephala* , *Albizia lebbeck* , *Albizia procera* , *Albizia kalkora* , *Gliricidia sepium* , *Bauhinia purpurea* and *Bauhinia* sp .

Impacts on production The use of the agroforestry modules for sheep with low productive potential coming from a commercial herd , which were fed mulberry forage and *P . maximum* ad libitum , allowed weight gains of 130 g/animal/day , they did not show foot rot and parasitic infestation was eliminated . In Holstein x Zebu calves under grazing conditions , with grasses that had neither irrigation nor fertilization , and fed mulberry forage at 2 .6% of live weight , weight gains of 773 g/animal/day were recorded . Gains higher than 500 g/animal/day can be reached in growing cattle as well as productions of milk higher than eight liters per cow without supplementation using silvopastoral systems (Milera et al . , 2007) .

Conclusions The combination of herbaceous and tree species has a positive impact on soil and animal productivity and climatic stress , bromatological composition of the herbaceous stratum , increase of organic matter and edaphic biota , which influence the physical and chemical properties and the productive responses of the soil .

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