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Hair Sheep Keeping in the Tropical Rainforest of Ecuador

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Goal

With the beginning of oil exploitation in Sucumbíos and the construction of roads in the seventies, poor people from the highlands of Ecuador moved into the tropical rainforest to find jobs and to start farming. The settlements, of an average size of 50 hectare per farm, were cleared to establish cash crop production like coffee and cocoa. Later on farmers started with cattle keeping on artificial pastures. Not adapted land use led partially to degradation, mainly due to cattle keeping. Since 1991, the German Agency for Technical Cooperation (GTZ) has tried to develop more sustainable land use systems in the region (PROFORS-Project). The introduction of hair sheep into existing farming systems was part of this approach. In an interdisciplinary research project the ecological and socio-economic impacts of hair sheep keeping were evaluated in an applied research approach. The survey focussed on the ecological and socio-economic impact of hair sheep in the tropical rainforest in Sucumbios/Ecuador (Claus et al. 1999).

Methods

Research was carried out from November 1996 to May 1998 on small scale farms in the province of Sucumbíos in Ecuador. Out of approximately 130 farms with hair sheep, 33 farms were chosen for collecting basic data and 25 farms for a detailed investigation. Together the 25 farms had approximately about 320 hair sheep. Management conditions in sheep keeping on these farms covered a basic standard. The farms chosen were classified into four different farming systems (FS):

- FS 1: separate grazing of hair sheep and cattle on artificial pastures (silvo-pastoral).
- FS 2: free range grazing of hair sheep on artificial pastures, mixed grazing with cattle (silvo-pastoral).
- FS 3: hair sheep grazing in coffee plantations (agro-silvo-pastoral).
- FS 4: combination of farming system 2 and 3 (agro-silvo-pastoral).

The farms chosen were visited regularly by scientists to collect data on ecology, animal husbandry and socio-economic aspects. The techniques of Rapid Rural Appraisal (RRA) were used to start the investigation. The livestock keeping on the farms was analysed as far as reproduction, animal health, productivity and profitability were concerned. The carrying capacities of plantations and artificial pastures and the fodder value of the vegetation were assessed, and the climatic and edaphically conditions evaluated. Vegetation sampling and measurements of the influence of animal grazing on the pastures were carried out as well.

Results

Pasture productivity and carrying capacity

Brachiaria decumbens is the most frequently used grass for seeding on artificial pastures. The productivity amounts to 6.5 to 11 tons dry matter (DM) per hectare and year, depending on soil fertility, livestock rotation, defoliation rate and spittlebug (*Mahanarva sp., Zulia sp.*) damage. The unusual mean stocking density on *B. decumbens*-pastures with rotational grazing consists of 0.6 Livestock Units (1 LU= 400 kg live weight) cattle per hectare and year. With mixed grazing, 0.5 LU ha^{-1} a^{-1} sheep continuously graze in addition to cattle, thus reaching a better fodder utilisation. *B. decumbens*-pastures with only sheep grazing show a mean stocking density of 0.9 LU ha^{-1} a^{-1}. *B. decumbens*-pastures in Sucumbíos are nowadays under grazed. In a sheep grazing experiment with short grazing cycles of four weeks (grazing rest of three weeks), a pasture yield of 11 tons DM ha^{-1} a^{-1} and 8 kg grain maize per 0.15 LU (1 adult sheep à 35 kg live weight) and year, a mean stocking density of 3.6 LU ha^{-1} a^{-1} could be achieved. In such systems 400 kg ha^{-1} a^{-1} live weight can be produced. *B. decumbens* shows a good fodder value (crude protein content of 14 %) for sheep after three weeks grazing rest. This decreases while grazing rests are prolonged.

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On a *B. decumbens* pasture with a yield of 6.5 ton DM ha^{-1} a^{-1}, rotational grazing (typical grazing cycle for cattle in the region with six weeks of grazing rest), a mean stocking density of 1.8 LU ha^{-1} a^{-1} without additional concentrate feeding was achieved. Live weight production was 321 kg ha^{-1} a^{-1}. Grass cover under agro-silvo-pastoral systems (mostly coffee) is spontaneously and yields 1 to 2.8 tons DM ha^{-1} a^{-1}. Usually cattle are not kept on coffee plantations, because of possible damage on the roots by trampling; that is not the case with sheep. Out of 34 classified spontaneous plant species, 14 are not eaten by sheep. Depending on the vegetation type, between 2 % (*Panicum polygonatum*-vegetation type) and 81 % (*Axonopus compressus*-vegetation type) of the biomass is grazed by sheep. The sides covered with spontaneously grazing vegetation are continuously grazed by sheep with a mean stocking density of 0.5 LU ha^{-1} a^{-1}, and 40 kg ha^{-1} a^{-1} liveweight production can be assumed. Sheep browse some invading shrubs like *Vernonia spp.* (local: Chilca) and regrowth of *Psidium guajava* (local: Guayava). Under coffee and cocoa, this is an advantage to reduce clearance efforts. On the other hand, bark stripping on coffee and citrus trees can become a problem. This happens when fodder and minerals are scarce.

Livestock reproduction and productivity

Hair sheep do not lamb seasonal. The lambing rate is 1.4 born lambs per birth, the fertility rate is 1.4 birth per year and the total productivity rate amounts to almost two lambs per ewe and year. The average lambing interval lasts 214 days (n=84) and the age of first partition varies between 9 and 15 month. The number of weaned lambs is superior in mixed grazing of sheep in coffee plantations and on artificial pastures (FS 4). Grazing only under coffee leads to inferior performance (FS 3) as well as rotational grazing on artificial pasture.

Both cattle and sheep can adapt to perhumid conditions as in Sucumbíos. Problems arise when livestock management is bad. Particularly new born and/or weak lambs suffer through inadequate management. Therefore, 50% lamb mortality may occur, but on the farms of the survey a lamb mortality rate of only 23% was observed due to better management conditions. Infections are the major problems in livestock keeping. Umbilicus infection and weak lambs of Barbados Blackbelly multiple birth account for most mortality of lambs. Additionally, lambs die through of accidents and can be killed by dogs or pigs. Hoof-rot of adult hair sheep can be a problem in these wet locations when management is not adequate.

Rabies exists in the region (bats are the vectors). A difficult ecto-parasite is *Dermatobia hominis* (local: tupe). Concerning rabies and *Dermatobia hominis*, cattle seemed more affected than sheep. *Babesiosis* and *Anaplasmosis* have not been found, whereas *Trypanosomiasis* has been detected in blood samples of sheep and cattle. The infected animals did not show sickness caused by these blood parasites. A wide range of different endo-parasites could be found. The farmers treat cattle regularly, but sheep are neglected. The daily live weight gain of the lambs is about 100 g d^{-1} between birth and 270 days. Lambs gain more weight on artificial pasture than under coffee with local vegetation (FS 3). Data on reproduction performance and daily live weight gain should indicate rough trends and are not based on a statistically proved sample.

Conclusions and further research needs

It can be concluded that hair sheep keeping is possible in climates like the rainforest of Ecuador. Productivity and health of the animals show acceptable levels with basic management. People accept hair sheep. Meat of lamb and mutton are also well accepted. Nevertheless, sheep keeping will not substitute cattle keeping which has a higher status, but could supplement cattle keeping without negative ecological impacts. The ecological effects depend on the management and the frame conditions. The most valuable ecological impact is that hair sheep keeping increases farm income without further deforestation. The sheep use other wised unused resources of fodder and family labour. Sheep are less expensive than cattle, and for poor farmers it is easier to start animal husbandry with hair sheep than with cattle. The integration into permanent crop plantations represents the most profitable and ecologically acceptable keeping system. On artificial pastures keeping of some sheep in addition to the cattle stock increases intensity of land-use. Sheep have a different fodder spectrum than cattle. Improvements in hair sheep keeping in the region should focus on animal health, management, housing, fencing and breeding. Extension efforts should consider grazing in agro-silvo-pastoral systems. It is necessary, therefore to investigate rotational grazing in these farming systems. Mixed grazing on artificial pasture with cattle and sheep is viable and could be improved, but investigation is needed, too.

Reference

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