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## Development of animal breeding strategies for the local breeds of ruminants in the French West Indies

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Animal breeding programmes were initiated a few years ago in the local breeds of three ruminant species used for meat production in the French West Indies: Martinik hair sheep, Creole cattle and Creole goat (“*Cabri Créole*”) of Guadeloupe. The population size of these breeds is presented in table 1.

These breeds are the base of traditional farming systems, in small familiar farms with low input level, which represent the main animal production systems in the French West Indies. But they are also used in medium input level production systems on pasture, with the use of irrigation,

*Table 1. Population size of Martinik hair sheep, Creole cattle of Guadeloupe and Creole goat of Guadeloupe.*

	Breeding females	Total number	% total animal
Martinik hair sheep	11 000	28 000	95
Creole cattle of Guadeloupe	25 000	46 000	75
Creole goat of Guadeloupe	20 000	35 000	95

mineral fertilisers, complementary feeding and intensive reproduction management. The management improvement is sometimes associated with the use of exotic breeds, in crosses or pure-bred, mainly in cattle. The development of breeding programmes for the local breeds is a new approach.

The Martinik hair sheep programme, initiated seven years ago, is the more active breeding programme. In the two other species, the programme is still at the beginning. The conception and development of these programmes is quite different in the three species, while the general background seems to be the same. Operational and technical aspects are presented below and the general policy will be discussed later.

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**Organization  
and  
operational  
aspects of the  
Martinik hair  
sheep  
programme**

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In Martinik hair sheep, a commercial structure has existed for years and controls about half of the total production. In 1993 some of the main breeders in this structure decided to create a breeding association, for the maintenance and the management of their sheep population. This population consists of animals originated from various hair sheep breeds largely spread out in the whole Caribbean and mixed in Martinican farms. For this reason, the individuals of the different phenotypes showed little differences in their body measurements and performances in local conditions. Then, all these phenotypes were grouped to constitute the Martinik hair sheep breed. However, 85 percent of the selected animals belong to the Black Belly type. Some phenotypic traits are rejected, such as wool or horns.

The breeding goal has been defined from a technical approach, according to the commercial objectives of the breeders: to improve the nursing ability of the dams and growth and body conformation of the lambs. The objective is also to sustain the qualities of the population, such as adaptation to the tropical climate, in particular to the use of pastures, the resistance to nematode parasites and good animal reproduction characters: prolificacy and deseasonality. The reproduction system involves a high reproduction rate, with three lambings every two years and the regularity of lambing throughout the year, is also taken into account.

After two years of working, the Martinik hair sheep programme was completed in 1995, with its different operating levels in function. These levels are those defined in the French breeding system for the hardy sheep breeds used for meat production. It includes on farm performance recording and selection of young rams in a breeding station. The same criteria are used: number of lambing per year, litter size, viability of the lambs, live weight gain of the litter between ten and 30 days of age (ADG10-30), individual growth between 30 and 70 days (ADG30-70), estimated liveweight at 70 days (LW70), visual assessment of body conformation.

An individual evaluation based on the use of a BLUP-Animal Model procedure is applied on these different traits and performed in the national genetic evaluation process, the same as the other French sheep breeds. Separate indexes are calculated for ewes on litter size and nursing ability (including ADG10-30 and viability), and for the rams on the same traits and growth until 70 days (including both ADG30-70 and LW70). Genetic values of the lambs is also computed for the different traits. The on-farm selection concerns mainly the breeding ewes, for their own performances, particularly their nursing ability. Young male and female lambs are also selected according to the results of their mother, along with their own results for growth until 70 days.

Young rams selected from different flocks are then grouped in a station, where they are raised on pasture, with a limited amount of complementary

feeding. Three bands of about 20 growing rams are controlled in the station each year, between eight and 12 months of age. The main purpose of the station is to control the dissemination of improved rams for breeding; another purpose is to ensure they reach adequate body development. This trait is evaluated at the end of the control period by a trained panel of experts, using a precise scoring method. Rams are finally selected upon a synthetic score including both their origin (parents indexes and individual performances on farm) and their final development in station. About half of the rams are disseminated to the breeders as improved sires, the rest being sold to slaughter.

Therefore, the sheep population in Martinique appears as a stratified population with a few elite breeders, owning about 800 ewes, involved in the breeding programme. Dissemination of selected animals is organized by the breeding association and consists in young rams from the station and ewes from the elite farms. About 200 ewes and 30 rams are sold each year, firstly to the selection breeders for the replacement of their own flock, but also to the base of the population, in the commercial herds or other farms. The selection base remains open, in order to include new farms and new breeding animals in the population under selection.

In the two other species, the breeding programmes have been introduced because experimental results showed the interest in the local breeds and their potential. The target was defined for the first time for the whole breeding population, due to a lack of professional organizations. The first step consists of the inventory of the population and a survey of the management system and the farmers' practices. The purpose of this survey is to describe the population structure and breeding management in order to identify the farmers more concerned with a breeding programme, according to their objectives, what type of animals they use, their strategy of mating and replacement of animals and the herd structure. This step leads to the implementation of a stratified programme, with a few selected breeders identified within the population and involved in the programme. The aims of the genetic improvement programmes are then defined from a technical point of view, according to the farming systems concerned and the production objectives, in terms of the choice of the breeding goal, the organization of the programme and the operations.

This approach already led to the definition of a general framework, approved by the French Ministry of Agriculture in 1995. Then a breeding association was formed in 1998, with about 75 farmers owning more than 2 000 Creole cows. For these breeders, corresponding to intermediate production systems, adaptability of the Creole cattle is important in their extensive management conditions. But they are also concerned with beef production characters. So, the breeding goal is mainly to improve the meat

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## **Technical design of Creole cattle and goat programmes**

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### **Creole cattle**

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production characteristics, and the main traits are growth and conformation. Maternal qualities are also considered, especially nursing capacity, as a secondary goal. The objective is also to maintain the adaptation of the animals: adaptation to tropical climate, resistance to internal parasites, ticks and tick born diseases and longevity.

The technical tools are those used in the French beef and hardy breeds, for the usual production traits; but some adjustments due to the evaluation in local conditions and to particular traits are necessary. On farm performance recording concerns the growth of calves during the first four and seven months, in order to improve nursing ability of the cows and to take into account both maternal and individual abilities for growth. Body development of the calves is visually assessed at weaning. To maintain the adaptation of the local Creole cattle to tropical conditions, the controls took place in usual management conditions in traditional or commercial farms. The initiation of the practical operations took place in 1999 and are carried out by technical extension services.

A breeding station has been planned for the selected young males from the field, but is not yet operating. In this station, bands of about 15 young bulls, selected periodically at weaning, will be maintained on pasture for a year, under improved grazing management. Intensive grazing management will ensure regular growth, but also the direct incidence of tropical climate, parasitism and medium quality forage. Finally, growth on pasture and conformation of the bulls will be estimated at the end of the period. For the first time, adaptation traits will be indirectly assessed by the production obtained in regular conditions; but they could be included in the scheme when some easy control procedures will be developed.

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### **Creole goat**

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The precise definition of the breeding programme is still being studied, but practical aspects could be similar to those of Martinik hair sheep. Important traits in Creole goats concern the mothering quality of the females, which should be maintained. A high prolificacy is usually obtained and probably should not be raised further; but its standardisation could be a reasonable objective. A more consistent genetic progress can be expected for nursing abilities and growth until weaning for which maternal effects are quite extensive. Growth and body conformation are also quite important for the producers. Finally, particular attention is focused on genetic resistance to gastro-intestinal parasites, which is a major disease for goat production in our conditions.

In the different species, the design of the breeding programmes is conditioned by the French and European policies for the animal breeding programme, warranted by the French Ministry of Agriculture. The plans have to be approved by a national commission, which evaluates the different technical and organizational points of the programmes. The general procedures and methods are defined by technical and scientific national institutes, while the practical implementation of the programme for each breed is the responsibility of local technical and administration levels, including breeder representatives. This general framework can be seen as a facility, as the different steps are already well defined and operational tools exist in the French system. According to that scheme, the programmes for Martinik hair sheep and Creole cattle have been both discussed and approved by professional and administrative structures, locally and at a national level. However, in the French overseas departments, the agricultural sector is under-developed and a lot of administrative, organizational or technical aspects have to be newly implemented, without any background.

These policies first suppose that breeder associations are active in control, management and promotion of the breed. They are fundamental in the organization and implementation of the selection procedure at farmer level. Such an association has existed for years in Martinik hair sheep, where the programme was initiated and has been particularly active since the early days. The success of the programme can be attributed to the existence of a strong professional structure, for which its development was also discussed. It also depends to a larger extent on active technical extension services, organized in the early 1970s. European and national financial supports permitted the initiation of the programme. In particular, the investment at the beginning was made by European structural funds. Salaries of two technicians in charge of the farmer technical survey, the on-farm performance recording and the operations in the breeding station, are financed by regional professional structures, partly with their own funds and partly from public subsidies.

In Guadeloupe, the main difficulties in setting up the programmes are the absence of professional structures and the lack of public financial support to initiate the operations. Technical extension services were reorganized in the early 1990s and European and national subsidies for equipment and salaries of technicians were only received in the last few years. In Creole cattle, while the breeders association was constituted in 1998, the technical part is not yet active in the field. This lack of technical support could impair the development of the whole programme, as farmers could lose their trust in it. It constitutes the priority for the next few years, as a consensus exists concerning its interest. For the same reason, the accent in the Creole goat programme has been put firstly on the implementation of a technical survey and performance recording in farm.

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## **General policy for the design of animal breeding programmes in the French West Indies**

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The implementation of selection programmes may also appear as a way to organize the animal production sector. Breeder associations are considered as technical extension services and their advice concerning the herd management is also required by some farmers. In Martinik hair sheep for example, one of the first outcomes was the definition of breeding management strategies, including mating lots and separation of the physiological stage. Technical advice is also required in animal feeding or animal health, in the different species.

The management of animal genetic resources, however, remains controversial. Genetic improvement has often meant the use of specialised breeds. Industrial cross-breeding (first or second generation) is often practised, but also rotational crosses or the substitution of the local animals with specialised breeds. This breeding management is partly due to the awareness of a “fair animal” by the farmers. It is also a consequence of a policy from technical, commercial or administrative organizations, which provides subsidies or technical support to these practices. Technology transfer facilities, such as the promotion of AI or the import of selected animals from northern countries, appears as a short term and low cost solution for animal production improvement. In most cases, technical solutions are adopted without real knowledge of the conditions of their use and their consequences. For example, basic notions on genetics are unknown by most farmers; therefore advantages of AI and cross-breeding in beef cattle are often attributed only to the semen of the selected bull used. Then the necessity to maintain and improve the local breed and its possible contribution as a maternal breed, are neglected. The development of breeding strategies based on local breeds for the usual farming systems appears therefore as a goal. Information and education on breeding management also appears as a key point for the development of animal breeding programmes.

Particular support is given by national research and technical institutions. In particular, experimental results led to a reappraisal of the interest of local breeds. In addition to scientific results, research institutions also play a role in the dissemination of information through education and training. Their references also permit the definition of the technical conditions for the selection programmes: evaluation of the genetic parameters for the different characters, set up of genetic evaluation models adapted to local breeding conditions and studies of the genetic variability of the resistance to parasites. Experimental herds can also be seen, at the present time, as nucleus herds. While the breeding programmes in Creole cattle and goats are not fully operating, experimental flocks can play a role in the dissemination of selected material. But limitations are due to the low number of animals in these flocks. The implementation of on field programmes, based on a sufficient number of dams, is a necessity. In Martinik hair sheep, the selection base is still limited and should also be enlarged in the next years and particular attention is given to the management of the breeding animals, in order to avoid consanguinity.

Several research results showed that the local breeds could be valuable resources for the development of animal production. The techniques and methods to improve their performances are known and have been adapted to various conditions. The maintenance of the breeds and their improvement depends on the adoption of breeding strategies adapted to local animal production.