Management of local genetic resources by in situ and ex situ methods for research and breeding purpose

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Management of local genetic resources by *in situ* and *ex situ* methods for research and breeding purpose: the case study of the local animal breeds of Guadeloupe and Martinique

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Few studies are implemented towards the management of local genetic resources specifically in the tropics, although there is an urgent need for preservation and breeding improvement of these hardy genotypes. The local breeds of ruminants and pigs of Guadeloupe and Martinique derive from Spanish and African animals, imported in the Caribbean during history. These breeds are of great interest for research and breeding purposes, since they obtain a high productivity and present a natural resistance to diseases transmitted by ticks, for Creole cattle of Guadeloupe, a useful genetic variability for resistance to gastrointestinal strongyles, for Martinik hair sheep and Creole goats, and a great tolerance to heat stress for the Creole pig. They represent valuable resources in the breeding systems practiced in Guadeloupe and Martinique (Gunia, 2010). However some breeders have created breeding associations, recognized by the French Ministry of Agriculture in order to maintain and improve these breeds on the field, in private herds. INRA is also conducting research on the characterization and preservation of these breeds. Their purpose is mainly the implementation of a sound genetic improvement program for both production and adaptation traits, and a better understanding of their adaptation to tropical conditions.

Experimental flocks of about 90 Creole cows, 250 Creole goats, 150 Martinik hair sheep, and 25 Creole sows, are managed as nucleus herds. The complete genealogy is known on about three generations for cattle, 12 for goats, 18 for sheep, and 16 for pigs. The goat nucleus is closed, while the cattle, sheep and pig nuclei are open for sires from private herds. The mean inbreeding coefficient is less than 1% in cattle, about 2.3%, for goats, 1.6% in sheep, and 13% for pigs. The breeding management is rationally performed to keep consanguinity as low as possible. Inventory and management of the base population at the island level is managed by the professional organization, in accordance with the European and French regulations for genetic resource conservation and management programs. Cryopreservation is implemented and a biological resource centre has been equipped in order to conserve biological material, in relation with the national French policy for genetic resource management. Embryos and semen are stored, according to the recommendations applied in the National Cryobank (Danchin-Burge *et al.*, 2006). In goats, a total of 256 frozen embryos from 16 donors are stored by the French National Cryobank, and 1300 doses of semen from 22 bucks are stored in local facilities. In cattle, the semen of 21 bulls has been collected, representing a total of 7200 doses of semen. The same is planned in pigs and sheep. A sample of sires representative of the base populations will also be collected and their semen stored, in the different species.

Genetic research is conducted, and a collection of DNA and other biological samples (blood, cells and tissues) has been initiated for molecular genetics studies. More than 8500 samples are currently stored, with an increment of about 900 samples per year. A set of the base population representative of the diversity in each species is under characterization for a panel of microsatellites or SNP, in cattle, pigs and goats. Other genetic studies are also underway, as the research of QTL for production and adaptation traits in goats and cattle (Chevrotière *et al.*, 2010 or Assenza *et al.*, 2010). Through these activities, combining in situ and ex situ methods for research and breeding purposes, INRA is highly committed in the characterization, preservation and improvement of local genetic resources valuable for the humid tropics, and especially for the Caribbean, in accordance with the regional priorities defined by the FAO in 2007.

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Carcass traits of male and female Creole goats according to slaughter weights, preliminary results

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Introduction

A genetic improvement program on the Creole goat of Guadeloupe is presently underway. It is a medium-sized meat breed with a traditional slaughter weight of 18 kg which can be reached at 6 to 18 months of age, depending on the system. Experiments are on-going at INRA upon the effects of diet, management conditions, helminth infestation on Creole kids with the aim of improving the goat meat production level and quality in the Caribbean. Fattening and carcass performances vary widely with genotype, sex, feeding level, weight or age at slaughter. This paper presents some preliminary results on carcass traits of male and female Creole kids.

Materials and methods

After weaning, entire male kids ($n = 20$) and females ($n = 12$) were reared separately indoors on a slatted floor. The diet was composed of a stand of tropical pasture. In addition, they were offered commercial pellet (10.3 MJ ME and 180 g CP per kg DM). Different husbandry conditions and physiological status resulted in contrasted age/live weight at slaughter. Thus two classes of slaughter weight (SW) were discriminated for males (M) or females (F). Light and heavy animals were defined as folloqs: 16 and 24 kg SW for the M kids and 13 and 18 kg SW for F kids, respectively. Animals were sacrificed according to the standardized procedure. Weighing and measuring of carcass, cuts, and tissues were implemented as described in Liméa *et al*. (2009). Statistical analysis took into account the different effects of sex, management conditions, the class of SW and helminth infestation.

Table 1 *Carcass traits of Creole according to sex and slaughter weighs*

Sex	Male		Female	
SW group	Light	Heavy	Light	Heavy
ADG, g/d	29[a]	37[b]	22[a]	31[b]
Empty LW, kg	11.5[a]	16.9[b]	9.7[a]	13.0[b]
Cold carcass, kg	6.2[a]	9.4[b]	5.0[a]	7.0[b]
Carcass yield, %	53	55	52	54
Conformation score	2.5[a]	3.5[b]	2.0	2.6
Abdominal fat (% ELW)	2.5	3.0	3.1[a]	4.8[b]
Fat % (in the shoulder)	4.2[a]	6.4[b]	5.4[a]	6.6[b]
Muscle/bone (shoulder)	3.35	3.51	3.32	3.70
Back length, cm	44[a]	50[b]	42[a]	47[b]
Buttock width, cm	13	14	13	14
Thorax width, cm	19	21	22	23
Leg length, cm	30	32	32[a]	35[b]
Ultimate pH	5.7	5.8	5.8	5.1
Water losses, %	23[a]	16[b]	25[a]	18[b]

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