

## GM 23. CREOLE GOAT PERFORMANCES AND MAIN CONSTRAINTS IN GUADELOUPE

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### Abstract

#### Potencial productivo y resistencia a enfermedades de la cabra Criolla en Guadalupe

Esta revisión global describe el potencial productivo y de resistencia a enfermedades de la cabra Criolla criada en los 15 últimos años en condiciones experimentales del INRA, en Guadalupe. Se estudiaron los resultados de 1 904 partos; 145 lactaciones individuales; 6 375 cabritos predestete y de 1 097 registros de crecimiento postdestete así como las variaciones genéticas (13 machos y 489 progenies) en resistencia a parásitos internos. Los datos se analizaron por diferentes modelos lineales. La fertilidad promedio fue de 90 % (3 épocas de apareamiento en dos años); con 2.1 cabritos /parto. Su peso al nacer fue de 1.73 kg y al destete fue de 7.8 kg. Se encontraron significativos efectos de la edad de parto, el tipo de partos y el sexo sobre los resultados. La producción de leche de la cabra Criolla fue 792 g/d con una gran variabilidad ligada al nivel de alimentación. La infección por parásitos internos fue permanente con una prevalencia de *Haemonchus* el cual es responsable de 80 % de la mortalidad predestete. Se encontró una significativa variabilidad genética para la resistencia a la infección gastrointestinal a 6 meses de edad de los cabritos. Por otro lado se manifiesta una resistencia genética a la coudriosis. Se concluye que la cabra Criolla tiene un alto potencial productivo en condiciones tropicales y constituye un recurso genético muy productivo el cual será organizado en un programa de mejora genética.

**Palabras claves:** Cabra Criolla, productividad, enfermedades, Guadalupe.

**Key words:** Creole goat, productivity, illness, Guadalupe.

### Introduction

Goats are raised for meat production in the Caribbean. Goat production systems are mainly extensive and based on natural savannas, leading to poor animal performances (Devendra and Mc Leroy, 1982). Although goat production is of great importance for sustainability of small farms, few studies were carried out to improve this production. The knowledge on the potential productive capacity of local populations remains limited. In Guadeloupe, production of Creole goats have been investigated since almost 15 years in grazing systems. This paper presents an overview of the performances of Creole goats including reproductive, lactating and growing performances and mortality rates. Furthermore the main diseases constraints are described.

### Materials and methods

Performances were recorded in an experimental farm of INRA located in the dry zone of Guadeloupe. The humid tropical climate of this region is characterised by a marked dry season during 7 months (< 50 mm/month). The local population, a small-sized breed (25 kg liveweight, LW) derived from european, african and indian breeds. The reproduction was managed to obtain 3 kiddings within 2 years. Mating period was completed by systematically using the male effect. Three kiddings seasons have been defined: dry season (mid-march), intermediate season (mid-july) and the rainy season (mid-november). The kids were weaned between 75 and 85 days of age. The goats grazed a stand of *Digitaria decumbens*. Pastures were irrigated, fertilized with 300 kg N/ha/year and managed in a rotationnal system (35 days of regrowth). The average stocking rate ranged from 50 to 95 does/ha (i.e. 1250 to 2650 kg LW/ha). Does were complemented during their reproductive cycle (different levels). After weaning, sex were separated. Cohorts were reared exclusively on *Digitaria* pastures (same management) at an average 1200 kg LW /ha/year during a 8 months fattening period. Regular drenchings against ticks (every two weeks) and helminths (every month for kids and every two months for adults) were applied.

Data on reproductive performances were collected during 15 years, 599 females totalized 2 259 exposures to the male and 1 904 kiddings. Milk production characteristics were described from 145 lactations. The data from the regular animal performances upon 6 375 kids, were used to estimate the preweaning performances. General linear model procedures (SAS, 1988) were applied to adjust data to the following sources of variation: years, experiments nested to the year, rank of lactation, litter size or number of suckling kids, sex, season and alimentary level. Postweaning performances were studied in different experiments: 458 females and 639 males in

3 years. The grazing system and preweaning growing results were added in the model as a factor of variation and a covariable respectively. In another research program, genetic variation of the resistance of 13 sires to internal parasites was assessed by the mean postweaning performances of their 489 offsprings (both sex). Animal growth, parasitological records and blood analyses were the main variables studied according to different models with fixed variation factors such as litter size, cohort, age; and random effects in repeatability models (worm burden and animal effects).

## Results and discussions

Creole goat demonstrated a permanent sexual activity all over the year (Chemineau *et al.*, 1991). In adult non pregnant females ovulatory and oestrus cycles persisted continuously: more than 90 % of ovulating females 9 months/year. Onset of puberty is precocious: 190 days of age and 11.4 kg LW. Resumption of post-partum sexual activity, even depending on season of parturition and on number of younglings suckled, is rapid: about 50 % of cyclic females 2 months after kidding. For this continuous breeder, the average mating and fertility rates were above 90 % over a 15 years period (Alexandre *et al.*, 1997a). Litter size (LS) was 2.1 kids per kidding. More than 80 % of the kiddings had a LS higher than 2 kids born alive and 95 % had zero born dead ones. Litter size increased (50 % ) with rank of kidding from the first to the fifth kidding. Age at first kidding occurred at  $17.2 \pm 3.1$  months and the mean kidding interval was 8.5 months. The plasticity of reproduction of this breed, coupled with their high ovulation rate and litter size, and with their good maternal qualities placed them among the better productive ones of the tropical zone as reviewed by Devendra and McLeroy (1982); Chemineau *et al.* (1991); and Alexandre *et al.* (1997a).

The mean daily production of milk after adjustment to the main sources of variations was  $792 \pm 206$  g/d. The lactation curves were characterised by an early and poorly marked peak of production: second week of lactation and 550 vs 1020 g/d for goat suckling single vs double kid, respectively. Nutritional levels affected yields and the fat content of milk averaging 50 g lipids/kg of milk. From our results, Creole goats appeared as good milk producers compared with other tropical meat breeds (Alexandre *et al.*, 1997a).

The mean preweaning daily weight gain (DWG) and mortality rate after adjustment to the main sources of variations were  $75 \pm 15$  g/d and 15.7 %. The analysed sources of variation (Alexandre *et al.*, 1997a) were litter size, sex, rank of lactation and season of kiddings. Weights at birth (BW) was  $1.73 \pm 0.34$  kg and weight at weaning (WW) ( for an average age of  $82 \pm 15$  days) was  $7.75 \pm 1.76$  kg. BW and WW varied with litter size and sex: 15 % of difference between single and multiple kids and 10 to 8 % of variation between males and females. DWG 10-30d (from 10 to 30 days ) and DWG 40-70 d were  $84.3 \pm 25.9$  g and  $65.7 \pm 24.0$  g respectively. It was concluded that in good husbandry conditions, Creole goats have preweaning performances similar or higher than those recorded for other tropical breeds (Devendra and Mc Leroy, 1982; Alexandre *et al.*, 1997a).

Different pasture managements tested with fattening kids from 3 to 11 months (Alexandre *et al.*, 1997b) lead to an average 36.3 g/d for male creole kids. Grazing and animal managements carried out on female kids allowed in the best case, about 37 g/d over the postweaning period.

Studies on farms and on station showed that digestive strongylosis are the main disease of small ruminants in the lesser antilles (Aumont *et al.*, 1997). The Nematode *Haemonchus contortus*, the Cestode *Moniezia*, sp. and the protozoa *Eimeria* spp. are the main digestive parasites. The prevalence of *Haemonchus* sp. and *Trichostrongylus* spp. range from 80 to 100 %. Incidences of these worms are higher than 60 % per month. The strongylosis induced more than 80 % of the mortality rate before weaning, ie. 40 %. Resistance of *Haemonchus contortus* to anthelmintics (benzimidazoles) are common. The main sources of variation of infestation risk are irrigation, climate and susceptibility of animals. The intensive systems based on irrigation, fertilisation and high livestock rate induce very important risk of parasitic infestation. Studies on genetic variability in Creole goat resistance to natural infection with gastro-intestinal nematodes are now being conducted on-station in two grazing systems (Mandonnet *et al.*, 1997). A significant genetic variability in favourable and unfavourable environments was shown for the 6 month old goats. Genetic correlations between resistances and growth performances was  $+0.50$  ( $P < .001$ ). An integrated plan including animal and pasture managements, feeding supplements and genetic resistance is now being studied to control the parasitic diseases.

Goats are susceptible to heartwater (cowdriosis). Outbreaks of caprine heartwater occur everywhere in Guadeloupe throughout the year. The epidemiological cycle of the disease is characterized by an unstable balance between a very pathogenic stock of *Cowdria*, a widespread but very little infected tick, and a Creole goat population including some resistant lineages (Camus *et al.*, 1996). The most efficient way to fight against cowdriosis is to dip regularly animals.

## Conclusion

We conclude that Creole goat, a local tropical breed, has high productive capacities provided husbandry conditions are adequate. Thus there exists scope for improvement for the goat breeders. Different traits based on reproductive and maternal performances as well as resistance to internal parasitism will be included in the genetic improvement program of the guadeloupean Creole goat.

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