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## Evaluation of the interest of resilience traits in the genetic improvement of Creole goat

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## Introduction: background and purpose of the study:

Breeding for animals that have better resistance and resilience to nematode challenge is one of the sustainable alternative approaches to reduce nematode effects. It promises to produce animals whose progeny are less reliant on anthelmintic treatment with acceptable performance, health and welfare. Feasibility and implications of breeding for increased resistance in Creole goat has been investigated

during the last decade (Mandonnet *et al.*, 2006; Gunia *et al.*, 2013) at the Animal Production Research Unit, INRA. However, knowledge on genetics of Creole goat resilience and its relationship with production and resistance traits are still weak. Preliminary results on this topic are presented below.



## Material and methods

A total of 8521 records from 4597 animals, collected for 15 years at INRA-Gardel experimental farm, Guadeloupe (French West Indies), was analyzed. Growth rates of two groups of half-sib growing kids (3-11 months of age) raised on nematode infected (GRi) and non-infected (GRni) pastures were estimated. Number of treatment (drenching requirement) (NBT) based on FAMACHA© score, were recorded on suckling does as well as fecal egg counts (FEC) and packed cell volume (PCV) on 11 month old kids. Genetic variance components were estimated with ASREML software (Gilmour *et al.*, 2006). The deterministic simulation program SelAction software (Rutten *et al.*, 2002) was used to estimate the influence of the designed breeding scheme on resilience traits.

## Results and discussion

- Moderate genetic variability was assessed on resilience criteria in Creole goats (Tables 1 & 2).
- Kids growth in infected environment and number of treatment required in does seem to be **unrelated with resistance** traits ( $0.03 \pm 0.20$  and  $0.03 \pm 0.12$  Tables 1 & 2).
- **GRi and GRni** have a **great part of common genetic control** in Creole kids ( $0.81 \pm 0.25$ , Table 1). However, selection for improved GRni would lead to unfavorably correlated response on resistance, and *vice-versa* ( $0.28 \pm 0.22$  Table 1).
- The actual breeding scheme in Creole goats (Gunia *et al.*, 2013) will lead to **favorably correlated responses on resilience** traits (Table 3).

**Table 3:** Direct and correlated annual selection responses (<sup>1</sup> expressed in % of the mean, <sup>2</sup> expressed in % of direct response)

	Direct annual selection response	Correlated selection response
NBT <sub>does</sub>	-0.07 (9.6%) <sup>1</sup>	-0.003 (4.6%) <sup>2</sup>
GRi <sub>3-11m</sub>	1.17 (3.3%)	1.29 (110%)
GRni <sub>3-11m</sub>	0.84 (2.1%)	0.53 (63%)

**Table 1:** genetic parameters of resilience and resistance criteria in kids (heritability on the diagonal and genetic correlations above).

	GRni	GRi	FEC <sub>11m</sub>
GRni	0.16 ± 0.06	0.81 ± 0.25	0.28 ± 0.22
GRi		0.20 ± 0.07	0.03 ± 0.20
FEC <sub>11m</sub>			0.19 ± 0.04

**Table 2:** genetic parameters of resilience and resistance criteria in does (heritability on the diagonal and genetic correlations above).

	NBT <sub>does</sub>	FEC <sub>11m</sub>	PCV <sub>11m</sub>
NBT <sub>does</sub>	0.16 ± 0.09	-0.03 ± 0.12	-0.27 ± 0.24
FEC <sub>11m</sub>		0.19 ± 0.04	-0.20 ± 0.15
PCV <sub>11m</sub>			0.14 ± 0.02

## Références:

- Gilmour *et al.*, 2006. ASReml User Guide Release 2.0 VSN Int. Ltd, Hemel Hempstead, UK.  
Gunia *et al.*, 2013. *Journal of Animal Science* doi:10.2527/jas.2011-5071  
Mandonnet *et al.*, 2006 *Animal Science* 82: 283-287.  
Rutten *et al.*, 2002. *Journal of Heredity* 93: 456-458.