

APPLICATION OF ANIMAL BIOTECHNOLOGIES TO SUSTAINABLE DEVELOPMENT OF LIVESTOCK FARMING IN WEST AFRICA

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Summary

Animal genetic resource knowledge is the first step of any genetic improvement programme. Studies, made by the *Centre International de Recherche-Développement sur l'Élevage en zone Subhumide* (CIRDES), have been consisted in an inventory analysis of West African cattle breeds, in their molecular characterization and in the analysis of the karyotype in order to assist any genetic conservation strategy plan. Serial Analysis of gene Expression (SAGE) technology is being used and genes that could be involved in trypanotolerance will be describing soon.

Abstract

In the framework of CIRDES research-development activities, numerous biotechnologies (PCR and related techniques, cytogenetics etc.) are used. The global objective is to improve cattle breeding and health. Thus, some microsatellite alleles have been found to be significantly associated with local cattle breeds; they highly contribute to the better understanding of the phylogenetic relationships between cattle breeds (figure 1).

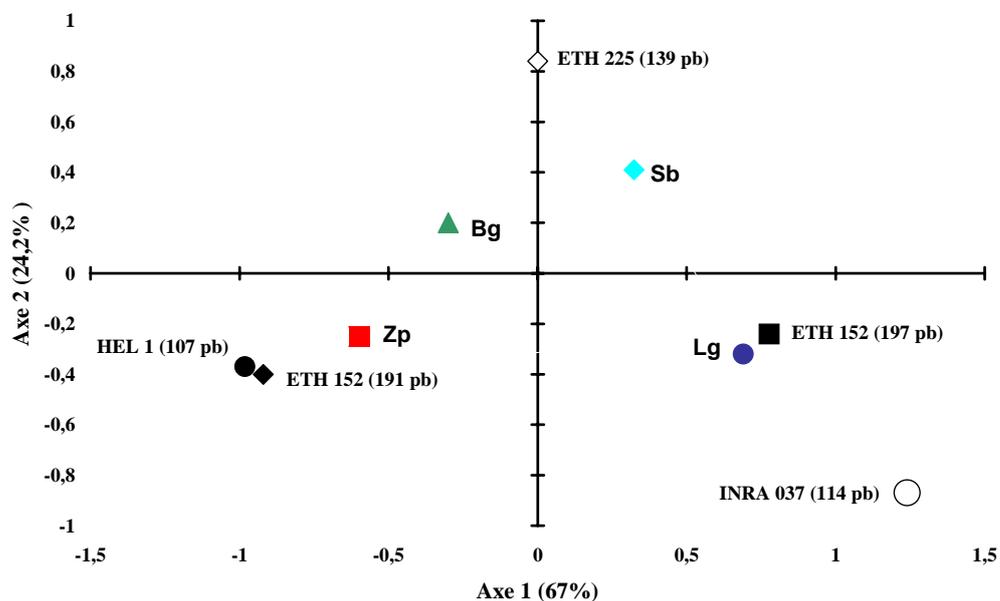


Figure 1: Relationship between microsatellite alleles and cattle breeds
Bg = Borgou; Lg = Lagune; Sb = Somba; Zp = Zebu peul;

Chromosome anomalies (1/29-roberstonian translocation), that decrease fertility, were discovered among several cattle populations (table 1) and adequate measures had been proposed to the breeders. This participates in the genetic improvement of local cattle and to the conservation of animal genetic resources.

Table 1 Prevalence of 1/29-robertsonian translocation

Cattle breed	Experimental station condition		Indigenous condition	
	Sampling size	1/29-robersonian translocation	Sampling size	1/29-robersonian translocation
Lagoon	80	0.0 (0%)	-	-
Somba	-	-	125	13 (10.4%)
Borgou	119	20 (16.8%)	33	Bad mitosis
Zebu	18	0 (0%)	75	2 (2.7%)

In the reproduction biotechnologies field, CIRDES is working on the control of the cattle sexual cycle. The artificial insemination techniques, the techniques of multiple ovulations and embryos transfer are used to assist periurban cattle breeding (milk and meat purposes). A bank with more than 10,000 doses of semen of a few local cattle breeds is available. This participates in the genetic improvement of local cattle breeds and in the genetic resources preservation.

So, biotechnology research will be useful in the biodiversity conservation and in the improvement of animal production and health. Urgently, the available new technologies must be transferred to Developing countries research centers. Indeed, the domain of application of biotechnologies to livestock breeding is wide and has enormous potentials. When new technologies are rationally used to complement traditional approaches, this will obviously result in sustainable increases in livestock productivities.

Keywords

Biotechnology, Biodiversity, Cattle breeds, Chromosome, CIRDES, Microsatellite.

References

- Belemsaga D.M.A., Thevenon S, Sylla S., 2005. Inventory analysis of West African cattle breeds. (in press) : Kluwer academic/plenum publisher, New York, USA
- Berthier D., Quere R., Thevenon S., Belemsaga D., Piquemal D., Marti J. and Maillard J.C. (2003). Serial analysis of gene expression (SAGE) in bovine trypanotolerance : preliminary results. *Genet. Sel. Evol.* 35 (Suppl.1) S35-S47.
- Moazami-Goudarzi, K., Belemsaga D.M.A., Ceriotti G., Laloë D. , Fagbohoun F., Kouagou N. T., Sidibe I., Codjia V., Crimella M. C., Grosclaude F. and Toure S.M. (2001). Caractérisation de la race bovine Somba à l'aide de marqueurs moléculaires. *Rev. 'Elev. Méd. Vét. pays Trop.*, **54**, 1–10.
- Thottappilly G., Monti L.M., Mohan Raj D.R., Moore A.W. (Editors), 1992. Biotechnology: enhancing research on tropical crops in Africa. CTA, IITA : 364 p.