Miller, S.P., Thallman, R.M. *et al.*, unpublished results). These results support published results from laboratory species (Fry *et al.*, 1998) and broiler chickens (Long *et al.*, 2008) across different environments. Hence GxE interactions will be important considerations in SNP association analyses of complex beef production traits in future.

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Genotype by environment interaction on growth and carcass traits in beef cattle in the tropics

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Introduction

A wide variety of beef cattle production systems may be found in the tropics, which could be classified as pasture based systems, mixed farming systems, and industrial systems, following the classification by Seré and Steinfeld (1995). In tropical regions, pasture based systems and mixed faming systems are mainly practiced, with different levels of intensification in management. In that context, one major goal for cattle breeders is to match the type of animal they use to the management conditions they apply.

In this study, our objective was to investigate the genotype × environment interaction (GEI) that may affect growth traits (live weight, average daily gain, yearling weight) and carcass traits (slaughter weight, hot carcass weight, muscular tissue weight, adipose tissue weight and digestive tract weight) expressed across two contrasted systems.

Material and methods

The analysis was made in a database of 718 young Creole calves, born between 1999 and 2008, and distributed between two management conditions during their post weaning growth. The calves were born in different suckling herds, and weaned at about 211 days, at a weaning weight of 157 kg, on average. After weaning and an adaptation period of 40 days on average, 346 steers and 372 heifers were separated into two groups, each on a different management system. The penned animals (176 steers and 200 heifers) were fattened indoor, and fed with cut grass and concentrate (maize: 68%; wheat middling: 22%; soya meal: 8%; UF = 1.05; PDIN = 113 g), distributed up to 60% of their voluntary intake. The grazed animals (196 steers and 146 heifers), were fed outdoor at pastures, only with grazed tropical forages. During the entire experiment, the animals were regularly weighted every 2 weeks. At the end of the growing period, 298 steers were sacrificed. Slaughter ages were defined in order to obtain equivalent live weight range at the end of the fattening period: 14–17 months for penned steers, and 17–21 months for grazing steers. As soon as they arrived at the slaughter house, the steers were kept fasting for 24 hours, and then weighted just before slaughter. The calves were issued from 32 sires and 163 dams; the pedigree was 6 generations deep and a total of 961 animals are included in the pedigree file. Descriptive statistics were obtained with the SAS© software, and the genetic analysis was performed with the ASREML and MATLAB software. The longitudinal dataset collecting the observations on live weight of each animal at different ages was analyzed by a random regression with Legendre polynomials of order two fitted for age, animal effect and permanent individual effect. The fixed part of the model included a fixed effect coding for contemporary groups (by sex, management system, group of weighting), and the covariables age and weight at weaning; the random part included the genetic animal effect and the permanent environment individual effect. The datasets collecting observations on the other traits were analyzed by several bivariate models. The genetic correlations between traits expressed within the same environment were computed by implementing bivariate models where the response variables were two different traits, expressed within the same environment. The GEI affecting each trait was measured by implementing

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bivariate models where the response variables were the observations on one trait expressed in one system and the same trait in the other system. The breeding values obtained by each of these bivariate models were used to compute the correlation between EBV in an intensive fattening system and pasture and to compute the R^2-adjusted of the regression of EBV in intensive against EBV in pasture.

Results and discussion

Our results show the existence of significant GEI for growth during the post weaning period in Creole cattle, fattened in two contrasted environments. The evolution of the heritability of live weight during the post weaning period differ in each system, and the correlation between weight measured in both systems is reduced as age increases. GEI was significant also for yearling weight, average daily gain, slaughter weight, hot carcass weight and adipose tissue weight. The genetic correlations between each trait expressed in an intensive fattening system and the same trait expressed in a pasture spanned from 0.31 to 0.93. These results were in accordance with previous studies performed in the tropics (Menéndez and Mandonnet, 2006). The differences between the genetic correlations between the different traits, estimated in an intensive fattening system, and the corresponding correlations estimated in a pasture spanned from −0.53 to 0.44, and the differences between the phenotypic correlations spanned from −0.22 to 0.18. Due to the low number of animals included in the analysis and the number of offspring per sire, high standard errors of the estimates were obtained. For this reason, these differences cannot be considered as significant, except for the relationship between the empty digestive tract weight and the other traits, which were higher in pasture than in intensive fattening. This result suggests two hypotheses: that the efficiency of the digestive system of Creole cattle is such that it can extract from low nutritional level foodstuffs enough resources to be allocated simultaneously both to production traits and its own energy deposit (de Jong and van Noordwijk, 1992); and that this efficiency could be due to the higher weight of the digestive tract observed in pasture with respect to the intensive fattening system. However, the genetic relationship between tissue deposition and growth potential does not appear to differ between systems.

Conclusion

The design of breeding plans in the tropics should consider GEI affecting growth traits and carcass traits, because it can cause the expected genetic gain of the population to mismatch its expectation. Whereas, correlated responses to selection between traits in each system are expected to be similar.

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Reproductive performance and milk production of Girolando cows imported from Brazil to the Kpinnou ranch in southwest Benin

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Introduction

In Benin, the role of milk in the diet and economy of the pastoral communities is well documented. Milk contributes over 50% of annual Fulani household incomes. Despite its economic importance, food and nutritional values, and the subsequent increase in its consumption, milk is still produced in marginal quantity and national production does not meet the increasing demand. This deficit is met through imports whose economic implications are now a burden. The imports of milk and dairy products rose from 1.514 billion in 1993 to 20 billion FCFA in

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