GENETIC TRENDS IN NELLORE BREED IN BRAZIL

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INTRODUCTION

The Zebu cattle has been the most prominent breed in Brazilian prevailing beef cattle production systems, representing 80% of the herd either as pure or as crossbred. Nowadays the most numerous Zebu breed is the Nellore, representing close to 70% of the herd under performance control programs in Brazil. Despite its large size, the productive performance of the Brazilian beef cattle herd is relatively poor. One of the reasons is its genetic potential, which has not yet been properly worked. The works on it began no more than four decades ago. By the years 1960’s, the Brazilian Zebu Cattle Association (ABCZ) initiated its performance control program. In 1982 the National Beef Cattle Research Center (CNPGC) started its support to ABCZ program. The advances on methodology and computation capacity turned possible to obtain accurate predictors of the genetic transmission ability of the animals. The agreement between CNPGC and ABCZ provides the tool for the prediction of the expected progeny differences (EPD’s) for the breeders since 1987 (Rosa et al.). Thenceforth, several authors have obtained EPD’s and studied genetic trends of Zebu beef cattle breeds in Brazil utilizing different programs and methodologies (Euclides Filho et al., 1986 ; Pimenta Filho, 1986 ; Ferraz Filho, 1996 and Agro-pecuária CFM, 2000). Due to this, nowadays the beef cattle breeding is a top subject either for breeders or ranchers. As predicted by Cunningham and Klei (1995), experience is showing that EPD’s based on individual performance and relatives performances, considering several herds, are better predictors than those based only on individual performance in a herd. This study had as objective the evaluation of the genetic trends for preweaning (the direct and maternal effects) and postweaning traits and reproductive traits in Nellore breed. To achieve this objective it was utilized the archives containing the EPD’s, obtained from the 2001 version of the national Nellore sire evaluation. The genetic trends were calculated by the regression of the annual average EPD’s on animal birth year and were originated from a population of 1,123,447 for weaning weight (WW), 1,132,468 for preweaning daily gain (PWG), 1,062,422 for yearling weight (YW), 941,678 postweaning daily gain (AWG), 979,636 for age at first calving (AFC), 612,442 for the interval between the first and second calving (IFS) and 732,142 for intervals among other calvings (IOC), produced by animals born from 1965 through 2001. The adjusted weaning and yearling ages were respectively 240 and 426 days.

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MATERIALS AND METHODS
It was utilized the EPD’s archives containing records from animals born from 1965 to 2001 totaling 1,123,447 (WW), 1,132,468 (PWG), 1,062,422 (YW), 941,678 (AWG), 979,636 (AFC), 612,442 (IFS) and 732,142 (IOC). The adjusted weaning and yearling ages were respectively 240 and 426 days. Those EPD’s were obtained to compose the Sire Summary of Zebu Beef Breeds related to the year of 2001 (Sumário de Touros, 2001), under mixed model methodology. It was considered valid record from healthy animals, born from sire and dam with known age, either under grazing or under grazing system with supplementation. After the analysis for consistency it was used the animal model considering multiple traits. The model included contemporary groups and age of dam, as fixed effects besides sire and dam as random effects. The contemporary group was formed by sex, year and season of birth, feed system besides the farm where the animal was raised. The genetic trends were calculated by the regression of the annual average EPD’s on animal birth year, including the period between 1965 and 2001.

RESULTS AND DISCUSSION
The weight (kg) at weaning and yearling were, respectively, 183.73 and 240.76. The preweaning daily gain was 644.6 g/day. The genetic trends observed for weights and gains were positive (P<0.01) as well for reproductive traits. The regression coefficients expressed in genetic standard deviation unit, resulted in annual increments of 1.1930% (WW) and 3.0695% (PWG) for direct genetic effect. The results in the literature show genetic trends which are positive, null or even negative considering preweaning gains as well as weaning weight. The 1996 Nellore Sire Summary of CFM (Agro-pecuária CFM, 2000), presented an annual genetic trend for weaning weight of 1.73kg. Ferraz Filho (1996) analyzing records from Polled Nellore, obtained positive genetic trend for weaning weight pointing to an increase of 18.22 kg for a 12-year period analyzed, which represented 1.5 kg/year. Genetic gains resulted from selection for weaning weight were observed by others authors as Pimenta Filho (1986) and Silva (1990). Nevertheless, results found by Nobre et al. (1988) showed negative genetic trends suggesting no selection response for preweaning period. Euclides Filho et al. (1986) also obtained null or negative genetic trends, for the same trait. The genetic trends obtained by Silva et al. (1998) suggested bigger progress in preweaning gain than in postweaning one, being maternal effect present. The authors reported that the gains obtained were small, mainly for the postweaning gain. Ferraz Filho (2001) evaluated the direct and maternal genetic trends for weaning and postweaning weights of Tabapuã breed in Brazil. The author concluded that due to the existing genetic variability for the traits, the genetic changes attained were below the possible ones. In the present study, concerning to maternal effect, the regression coefficients expressed in genetic standard deviation unit, resulted in annual increments of -0.1261% (WW) and -4.6350% (PWG). Eler et al. (1995) obtained positive result, concluding that the maternal effect contribution for the phenotypic variance weaning weight was small. The postweaning daily gain was 342.13 g/day. The regression coefficients for direct effect, expressed in genetic standard deviation unit, resulted in annual increments of 1.2070% (YW), 1.8838% (AWG), -1.2782% (AFC), -2.0086% (IFS) and -0.5333% (IOC). The genetic trend for AFC is in agreement with that reported by Lôbo et al. (2001). Results in the 2000 Nellore Sire Summary of CFM (Agro-pecuária CFM 2000), showed genetic gain of 2.74kg/year for
long yearling weight. Positive genetic trend for yearling weight was observed by Nobre et al. (1988) too. On the other hand, Silva (1990) found negative genetic trend for this same trait, studying several herds through brazilian regions. Usually the authors show that the phenotypic changes were mainly originated from environmental sources.

CONCLUSIONS
The genetic trends obtained in this study for direct effects suggest bigger progress in preweaning gain than in postweaning one. It was also possible to conclude that progress can be obtained for the reproductive traits. The negative maternal effect might indicate to be important to act carefully during sire selection.

REFERENCES