Italian Journal of Animal Science

ISSN: (Print) 1828-051X (Online) Journal homepage: https://www.tandfonline.com/loi/tjas20

Body measurements and morphological indexes of a cattle population in the Adamawa region (Cameroon)

C. Crimella, S. Barbieri, M.G. Giuliani & M. Zecchini

To cite this article: C. Crimella, S. Barbieri, M.G. Giuliani & M. Zecchini (2003) Body measurements and morphological indexes of a cattle population in the Adamawa region (Cameroon), Italian Journal of Animal Science, 2:sup1, 243-253, DOI: 10.4081/ijas.2003.11676005

To link to this article: https://doi.org/10.4081/ijas.2003.11676005

Body measurements and morphological indexes of a cattle population in the Adamawa region (Cameroon)

C. Crimella, S. Barbieri, M.G. Giuliani, M. Zecchini

Istituto di Zootecnica – Facoltà di Medicina Veterinaria – Milano, Italy.

RIASSUNTO – Misure e indici morfometrici di una popolazione bovina dell'altopiano dell'Adamawa (Cameroon) – *Per soddisfare la crescente domanda di derrate di origine animale dei grandi centri urbani in Africa, è necessario migliorare le performance degli animali allevati. Un programma di selezione massale può rappresentare il primo approccio, quando non siano disponibili i dati genealogici della popolazione indagata. I dati morfologici e i pesi raccolti in due anni di lavoro, su una popolazione zebuina e meticcia dell'altopiano dell'Adamawa, hanno permesso di calcolare i relativi indici morfometrici, consentendo di individuare gli animali più idonei a far parte della futura popolazione, sulla quale verrà pianificata una selezione su base genealogica.*

KEY WORDS: Goudali zebu, crossbreeding, biometric index, Adamawa region

INTRODUCTION – Growing population and urbanisation in Central and West Africa lead to an increasing demand for meat and milk products. The improvement of cattle production might cover these needs for human consumption (de Haan, 2001). Mass selection is the first step to develop animal production, where genealogical information might not be available, above all to improve meat production. Body measurements at the end of growth, may be useful as selection criteria (Maiwashe *et al.*, 2002) for performance traits, which have medium and high heritability (Gilbert *et al.*, 1993). The aim of this study was to select animals with the proper body characteristics for meat production, belonging to a cattle population on the Adamaoua plateaux in Cameroon. Body measurements and weight were recorded to calculate the biometric indexes, in order to elaborate a selection program.

MATERIAL AND METHODS – The study was conducted in the Malombo Ranch on the Adamaoua plateaux, located in Cameroon between latitudes 6-8°N and longitudes 10-16°E. The climate is mild (22°C mean annual temperature and 40-60% mean relative humidity) because of the altitude and these conditions favour the promotion of intensive beef and diary cattle production. Indeed, Adamaoua region is the major cattle-rearing zone in Cameroon, carrying the largest population of cattle in the country (Mbah, 1990). A total population of 809 cattle was studied: 502 autochthonous Goudali Zebu (G), 160 Goudali x Brahman (GxB) and 147 Goudali x Charolais (GxC) animals. Previous genetic improvement programs based on exotic Brahman e Charolais semen, introduced these crossbreeds (Mandon, 1957), and now the crossbreed level is not definable. Only the phenotype can distinguish the two different genotypes. Animals were divided in four classes, based on the age (24-36 month young and adult) and sex. A complete description of groups of animals and different numbers, is outlined in Table1.

Table 1. Number and classes of animals incoming to the study.

	Adult male	Adult female	24-36 young male	24-36 young female
G	9	364	32	97
GxB	10	68	25	57
GxC	5	26	20	96
Total	24	458	77	250

Body measurements and weight were recorded at 24 months and repeated after 12 months; adults were checked once. Electronic weight bridge, Lydtin rule and measuring tape were used to collect body measurements and weight (Sasimowski, 1987). The following biometric indexes were calculated (Balasini, 1991): mass index (MI = body weight x 100/height at withers), chest depth index (CDI = depth of chest x 100/height at withers), under *sternum* index (USI = (height at withers-depth of chest) x 100/height at withers), index of boniness (BI = cannon bone circumference x 100/chest circumference). Data were analyses by means of not sequential least square analyses of variance and covariance by using of GLM procedure (SAS, 2000).

RESULTS AND CONCLUSIONS – Biometric indexes and weight of young animals are summarised in Table 2.

Table 2. Biometric indexes and weight (l.s.m.±SE) of young animals related to breed and breed*age interaction.

	Body weight (kg)	MI	CDI	USI	BI
G	293±5^{A}	2.40±0.03^{B}	48.9±0.2	51.1±0.2	10.67±0.08
GxB	304±5^{A}	2.49±0.04^{B}	48.4±0.3	51.6±0.3	10.89±0.09
GxC	273±6^{B}	2.26±0.04^{A}	48.4±0.2	51.5±0.2	10.75±0.08
G*24 month	280±6^{A}	2.30±0.04^{A}	48.6±0.3	51.3±0.3	10.88±0.10
GxB*24 month	261±7^{AB}	2.18±0.05^{AB}	47.5±0.4	52.5±0.4	10.91±0.12
GxC*24 month	244±7^{B}	2.09±0.05^{B}	47.8±0.3	52.2±0.3	10.68±0.11
G*36 month	307±6^{B}	2.49±0.05^{B}	49.1±0.3	50.1±0.3	10.46±0.11^{b}
GxB*36 month	346±8^{A}	2.80±0.06^{A}	49.3±0.4	50.7±0.4	10.87±0.14^{a}
GxC*36 month	302±7^{B}	2.44±0.05^{B}	49.1±0.3	50.9±0.3	10.83±0.11^{a}
Male	307±7^{A}	2.51±0.03^{A}	48.3±0.3	51.7±0.3	11.08±0.09^{A}
Female	273±4^{B}	2.25±0.05^{B}	48.8±0.2	51.2±0.2	10.46±0.05^{B}

^{a,b}: P≤0.05; ^{A,B}: P≤0.01

Weight difference of young animals were significant (P≤0.001) for breed; Charolais crossbreed showed a lower value than the other genotypes. As expected, mass index followed a similar trend. Our results were similar to those summarised by Abassa *et al.* (1993). Sex showed a significant influence (P≤0.01) on weight and high significant influence (P≤0.001) on the MI. Breed*age interaction expressed a significant difference (P≤0.001) on weight: Goudali young were different (P≤0.01) from Charolais ones, at 24 month class. On the contrary, 36 month-old Brahman cattle had higher significant (P≤0.001) weight than the others. Because of high correlation between MI and weight, this index followed the same trend. Only BI was significant affected by sex (P≤0.001) and breed*age interaction (P≤0.05).

Adult Brahman crossbreed females were significant heavier (P≤0.01) than the others; the MI showed also an higher but not significant value for Brahman cattle. Biometric indexes of adult females were significant influenced (P≤0.001) by the breed. These results (Table 3) mean Brahman crossbreed of analysed population is tall-size and heavy cattle, without morphological traits required from beef industry.

Table 3. Biometric indexes and weight (l.s.m.±SE) of adult females.

	Body weight (kg)	MI	CDI	USI	BI
G	344±3^{B}	2.73±0.03	50.5±0.1^{B}	49.5±0.1^{A}	9.82±0.04^{B}
GxB	369±6^{A}	2.82±0.05	51.3±0.3^{A}	48.7±0.3^{B}	9.99±0.09^{aB}
GxC	332±9^{B}	2.64±0.08	50.1±0.4^{b}	49.9±0.4^{a}	10.16±0.15^{a}

a,b: P≤0.05; A,B: P≤0.01

Biometric indexes and weight of adult males (Table 4) didn't show any statistical differences; however, the poor number of sample might affect these results.

Table 4. Biometric indexes and weight (l.s.m.±SE) of adult males.

	Body weight (kg)	MI	CDI	USI	BI
G	469±29	3.57±0.20	50.5±1.2	49.5±1.2	10.97±0.33
GxB	477±29	3.66±0.21	50.6±1.1	49.4±1.1	11.38±0.31
GxC	443±43	3.31±0.30	53.0±1.6	47.0±1.6	11.43±0.44

Data obtained during two years of monitoring were suitable to evaluate the different genotypes and they are utilised to perform a first selection program of this cattle population. A subsequent genealogical selection, based on pedigree information, will be planned to improve the selection progress.

ACKNOWLEDGEMENTS – Research financed by Cofin 1999-2001.

REFERENCES – **Abassa**, P.K., Mbah, D.A., Zamba, P., Tawah, L.C., Messine, O., Oumate, H., 1993. Trop. Anim. Hlth. Prod. 25:179-84. **Balasini**, D., 1991. Edagricole, Bologna. **De Haan**, C., 2001. Page 28 in Proc. 10th Int. Conf. of AITVM, Copenaghen. **Maiwashe**, A.N., Bradfield, M.J., Theron, H.E., van Wyk, J.B., 2002. Livest. Prod. Sci., 75:293-300. **Mandon**, A., 1957. Revue Élev. Méd. vét. Pays trop., 10:129-45. **Mbah**, D.A., 1990 Pages 205-10 in FAO Animal Production and Health Paper No 110, Roma. **Sasimowski**, E., 1987. Ed. Elsevier, The Netherlands. SAS, 2000. **SAS** Inst., Inc., Cary, NC, USA.