STUDIES ABOUT INTERBREEDING BRAHMAN × CHAROLAIS
I.—Live weight at birth, 6 months and 8 monts of age and variance of F_2 in relation on F_1 generation

Etudes sur le croisement Brahman × Charolais.
I.—Poids vif à la naissance, 6 mois et 8 mois d'âge et variation de la F_2 en rapport avec la F_1

Estudios sobre el cruzamiento Brahman × Charolais.
I.—Peso vivo al nacer, a los 6 y 8 meses de edad y variación de la F_2 en relación con la F_1

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The first crosses between Brahman × Charolais was made in Angola at the Central Animal Husbandry Station (Ganda) and was reported to IX International Congress of Animal Production (LIMA PEREIRA, 1966).

The results are showing in the Tables 1 and 2.

The initial stages of our crossbreeding work were undertaken at Ganda where conditions are not really hot.

The mean annual temperature was 21 °C, maximum temperatures mean was 27.2 °C and 14.6 °C as the mean of minimum of temperatures. The maximum variante is 32 °C of temperature. Altitude: 1,460 meters. The vegetative cover is the same of African belt between 8° and 10' 26' and 50' S throught the high veld country. The rainfall is in average 1,447 mm by year.

The F_1 generation was deslocated to South Angola for Experimental Farm Cafu, near Cunene (16° 10' S and 15° 18' E). This Experimental Farm is situated in Mopane veld (*Colophospermum mopane*) with mixed grass, lower altitude 1,160 meters and annual rainfall 742.7 mm.

The F_2 generation was obtained by interbreeding the best bulls of F_1 generation with the females F_1 of same way cross and maintained in extensive conditions without suplementation.

The results are showing in Tables 3 and 4.

According with several authors [ROBERTSON (1949), MAULE (1953), WARWICK (1955)] the way to follow is cross, male and female obtained in the F_1 generation, and utilize this F_1 bulls for improve the native cattle.

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TABLE 1

MALES

CROSSES BRAHMAN × CHAROLAIS (F_1)
WEIGHT (KG) AT DIFERENTS AGES

Zootechnic Station of Ganda (Mariano Machado)

Animal number	Date of birth	Weight at birth	6 months weight	8 months weight
224	30-7-65	43	280	348
225	1-8-65	46	276	350
230	12-9-65	46	266	310
231	15-9-65	48	273	311
239	4-11-65	44	264	270
240	6-11-65	34	210	230
241	10-11-65	46	235	300
254	20-2-66	37	160	—
255	20-2-66	42	190	—
259	20-3-66	40	—	—
		$\bar{x} = 42$	$\bar{x} = 239$	$\bar{x} = 302$
		$N = 10$	$N = 9$	$N = 7$
		$s^2 = 19{,}8$	$s^2 = 1882$	$s^2 = 1795$
		$s = 4.4$	$s = 43$	$s = 42$

TABLE 2

FEMALES

CROSSES BRAHMAN × CHAROLAIS (F_1)
WEIGHT (KG) AT DIFERENTS AGES

Zootechnic Station of Ganda (Mariano Machado)

Animal number	Date of birth	Weight at birth	6 months weight	8 months weight
227	26-8-65	32	218	270
229	8-9-65	45	250	290
232	23-9-65	50	253	300
237	28-10-65	41	205	220
243	1-12-65	45	239	263
247	23-12-65	38	200	213
248	25-12-65	45	190	210
249	28-12-65	50	210	240
		$\bar{x} = 43$	$\bar{x} = 220$	$\bar{x} = 250$
		$N = 8$	$N = 8$	$N = 8$
		$s^2 = 37$	$s^2 = 568$	$s^2 = 1233$
		$s = 6$	$s = 23$	$s = 35$

TABLE 3

MALES

CROSSES BRAHMAN × CHAROLAIS (F_2)
WEIGHT (KG) AT DIFERENTS AGES
Zootechnic Station of Cunene (Cafu)

Animal number	Date of birth	weight at birth	6 months weight	8 months weight	12 months weight
B-26	28-10-69	33	215	200	244
B-28	20-11-69	40	235	240	300
B-29	21-11-69	39	175	210	258
B-30	11-12-69	36	190	255	254
C-15	29-10-70	46	244	264	300
D-31	1-12-71	40	230	240	240
D-36	12-12-71	—	191	210	240
D-37	12-12-71	39	234	250	260
E-15	10-21-72	30	189	220	260
E-18	17-2-72	33	170	200	240
F 3	3-1-73	44	215	240	—
F- 6	4-1-73	30	196	225	—
F-14	10-1-73	33	195	230	—
F-26	22-1-73	34	160	196	—
		$\bar{x} = 36$	$\bar{x} = 202$	$\bar{x} = 227$	$\bar{x} = 257$
		$N = 13$	$N = 14$	$N = 14$	$N = 10$
		$s^2 = 25$	$s^2 = 694$	$s^2 = 480$	$s^2 = 521{,}6$
		$s = 5$	$s = 26$	$s = 21$	$s = 22{,}8$

TABLE 4

FEMALES

CROSSES BRAHMAN × CHAROLAIS (F_2)
WEIGHT (KG) AT DIFERENTS AGES
Zootechnic Station of Cunene (Cafu)

Animal number	Date of birth	Weight at birth	6 months weight	6 months weight	12 months weight
C- 5	5-3-70	36	147	163	210
C- 7	15-6-70	36	196	242	244
C-13	27-10-70	34	180	200	220
D-13	23-8-71	32	—	212	243
D-28	1-12-71	—	200	220	230
D-34	11-12-71	35	200	215	210
D-35	11-12-71	32	200	230	230
D-44	20-12-71	34	180	208	180
E-83	20-12-72	30	107	114	112
F- 7	4-1-73	30	181	100	—
F-21	16-1-73	35	150	190	—
		$\bar{x} = 33$	$\bar{x} = 174$	$\bar{x} = 197$	$\bar{x} = 208$
		$N = 10$	$N = 10$	$N = 11$	$N = 9$
		$s^2 = 5.1$	$s^2 = 936{,}3$	$s^2 = 1270{,}1$	$s^2 = 1704$
		$s = 2{,}4$	$s = 30{,}5$	$s = 35{,}6$	$s = 41{,}2$

In tropical ecological conditions when we back crossed the F_1 generation to one or the other parent will be consequent loss of productive ability on the one hand or the resistance to disease and parasites on the other (grading), when the way is crossbreeding with selection among filial generations, work also conducted by HAYMAN (1972) in Badgery's Creek, Australia with Sahiwal, Sindhi and Jersey.

It is well pointed that control of a characteristic by many genes provides a stability of phenotypic expression that may not occur when only single genes are involved (ERLICH and HOLM, 1963).

The critical view of MCDOWELL (1972) about the recapitulate of makeup of the Santa Gertrudis by RHOAD (1949) as precisely 5/8 Shorthorn and 3/8 Zebu was a disservice as a narrow view has caused planners to forget that maximum flexibility in creating «gene pools» has been the basis of sucess for most of the strains of cattle, swine and sheep accepted by commercial producers. Also the other aspect pointed by MCDOWELL (1972) is would be the 20 or more years required to reach the planned combination (third generation) for intensive selection, and forget the selection by individuality among the F_1 animals.

The selection will be made after 1st generation (F_1) or after F_2 (second grading) generation when according PEREIRA DA SILVA (1966) it is necessary when working with milking cattle with good milking temperament.

It is yet necessary to think not only in term of breed or the fixed breed but in terms of improved strains of cattle. In crossing two or more breeds it is necessary in this phase to take cauction with the phenotypic caracters, coat colour and shape of horns, and cross only breeds with good analogy in this aspects for minor variation in type, because the wide segregation of small number of genes. But when crossing two or more breeds with great difference in the parent stocks there should be little or no increase in variation in the F_2 over the F_1.

The crossbreds nucleus (F_1 – Brahman × Charolais) is a suitable and hard animal for improvement the beef production in native and lower crossbred herds on extensive conditions of exploitation. Your performance is better in that conditions than Santa Gertrudis breed.

SUMMARY

The performances of Brahman × Charolais (B × Ch.) first cross (F_1) and the second cross (F_2) obtained by intermating were compared during a 4 years period. Mean performance data were weight at birth, 6 months and 8 months in two different ecological conditions of production for to study the amount of variance in this records in specific diferent tropical conditions, Ganda and Cafu in Angola.

The males of F_1 cross (B × Ch.) weight at Ganda 8 months 302 Kg and the F_2 at Cafu 227 Kg the Standard deviation was in F_1, 43 and in F_2, 21. For females the weight at 8 month of F_1 at Ganda was 250 Kg and at Cafu the F_1 weight 197 Kg with a Standard deviation respectively 35 (F_1) and 35,6 (F_2). For the other period of age, at birth and 6 months there are the same Standard deviation with no more variance.

The resultes obtained suggested not increased variation in the F_2 in relation to F_1 generation and no more variation in and unfavorable environment, Cafu, comparatively with Ganda.

RESUMEN

Los rendimientos del primer cruzamiento Brahman × Charolais (B × Ch.) (F_1) y del segundo cruzamiento (F_2), obtenidos por cruces recíprocos, se han comparado durante un período de cuatro años. Los datos de rendimientos medios fueron: peso al nacer, a los seis y ocho meses de edad en dos condiciones ecológicas diferentes de producción, para estudiar el grado de varianza en sus controles bajo condiciones específicas tropicales diferentes, en Ganda y Cafu (Angola).

Los machos de la F_1 (B × Ch.) pesaron en Ganda a los ocho meses 302 Kg, y los de la F_2 en Cafu, 227 Kg. La desviación estándar fue de 43 en la F_1 y de 21 en la F_2. En las hembras, el peso de la F_1 en Ganda a los ocho meses fue de 250 Kg, y en Cafu, la F_2 pesó a dicha edad 197 Kg, con una desviación estándar de 35 y 35,6, respectivamente. Para el otro período de edad, al nacimiento y a los seis meses, existió la misma desviación estándar, pero no mayor varianza.

Los resultados sugieren que no aumentó la variación en la F_2 con respecto a la F_1, sin que la variación fuera mucho mayor en un ambiente desfavorable (Cafu) en comparación con Ganda.

RESUME

Les rendements du premier croisement Brahman × Charolais (B × Ch.) (F_1) et du deuxième croisement (F_2), obtenus par croisements réciproques, ont été comparés pendant une période de quatre années. Les données des rendements moyens furent: poids à la naissance après 6 et 8 mois d'âge dans deux conditions écologiques différentes de production, afin d'étudier le degré de variance dans leurs contrôles, sous de conditions spécifiques tropicales différentes, en Ganda et Cafu (Angole).

Les mâles de la génération F_1 (B × Ch.) pesèrent en Ganda, après 8 mois de la naissance, 302 Kg, et ceux de F_2 en Cafu, 227 Kg. La déviation standard fut 43 dans F_1 et 21 en F_2. Chez les femelles, le poids de la génération F_1 en Ganda, après 8 mois de la naissance, fut 250 Kg, et en Cafu, au même âge, la génération F_2 pésa 197 Kg, ayant une déviation standard de 35 et 35,6 respectivement. Quant à l'autre période d'âge, à la naissance et après six mois, il y eut la même déviation standard, mais la variance ne fut pas majeure.

Les résultats suggerent que la variation dans F_2 n'augmenta pas quant à F_1, sans qu'elle fût beaucoup plus grande dans une ambiance défavorable (Cafu), en comparaison avec Ganda.

REFERENCES

EHRLICH, P. R., and HOLM, R. H. (1963): *The Process of Evolution.* MacGraw-Hill Publ. N. Y.

HAYMAN, R. H. (1972): *Bos indicus* and *Bos taurus* crossbred dairy cattle in Australia. 1. Crossbreeding with selection among filial generations. *Aust. J. Agric. Res.*, 23, 519-532.

LIMA PEREIRA, J. (1966): Some observations on Charolais cattle at the Central Animal Husbandry Research Station, Ganda Angola. 9th Int. Congr. Anim. Prod., Edinb. *Anim. Breeding Abstr.*, 34(4):497, N. 2898.

MCDOWELL, R. E. (1972): *Improvement of Livestock Production in Warm Climates.* W. H. Freeman and Company, San Francisco.

MAULE, J. P. (1953): Crossbreeding Experiments with Dairy Cattle in Tropics. (Review Article), *Anim. Breed. Ab.*, 21(2):105.

PEREIRA DA SILVA, J. M. (1966): Subsidios para o estudo genético e fisiológico de produção de leite em Moçambique ao sul do Save. *Revista dos Estudos Universitários de Moçambique,* serie IV, Ciências Veterinárias, Vol. III.

ROBERTSON, A. (1949): Crossbreeding experiments with dairy cattle. *Anim. Breed. Abs.*, 17(3):201.