MILK PRODUCTION POTENTIALS OF HOLSTEIN-FRIESIAN CATTLE IN THE DERIVED-SAVANNAH ZONE

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ABSTRACT

Some 78 Holstein-Friesian cattle in a private commercial farm in the derived savanna zone of Northern Cross River State were used in the study that reported the milk production potentials of Friesian cattle in the tropics. The cows were stall-fed with supplementary concentrates and forage within the 306-day study period. Their milk records showed production levels ranging from 0.00 to 14.92 ± 0.83 kg milk per cow per day. Individual cow milk yield as high as 15.77 kg/day ($P < 0.05$) was obtained in June. Production dwindled with the onset of the dry season while milk production levels decreased significantly ($P < 0.05$) as lactation progressed. During the period, the environmental temperature varied between $23.08 \pm 1.90^{\circ}\text{C}$ and $38.35 \pm 0.75^{\circ}\text{C}$ while the average relative humidity was between 26% and 95%. The main disease problem encountered was mastitis. Lactation levels were still fair up to 214th day of Lactation.

Keywords: Holstein-Friesians, Milk, savanna zone.

INTRODUCTION

With the ever rising human population, there is the need to improve on the production level of our farm products. At present, in Sub-Saharan Africa, Nigeria inclusive, the protein consumption from animal sources is lower than 20% of the recommended level for adult human beings. Factors such as availability, cost, etc. are adduced for this shortfall. Milk production by Friesian cattle is high under temperate conditions with attendant low milk fat percentage (Schmidt and Van Vleck, 1974). Low plane of nutrition has been known to affect the birth weight of

Friesians (Adeneye, *et al*, 1976) as well as their milk yield (Ibeawuchi and Akinsoyinu, 1989) in the tropics. This is worse in the dry season when forage is scarce and of low nutritive quality. Exotic cattle breeds had been studied previously in Nigeria (Adeneye and Adebajo, 1978; Adeneye *et al*, 1976; and Ibeawuchi, 1987).

This study was therefore designed to monitor the milk performance of some exotic friesian cattle in the derived savanna zone of Nigeria.

MATERIALS AND METHODS

Animals and their Management:

78 Holstein-Friesian cows imported from Germany were used for this study. They were divided into 6 groups of 13 animals each kept in open sided shades. They were fed concentrates *ad libitum* and confined to their stalls. Fresh grass (cut-and-carry) and hay were fed respectively on alternate days. Fresh clean water was provided daily to the animals.

Milking of the cows:

The cows were milked twice daily from 6.00 - 7.30 hrs. and 17.00 hrs. to 18.30 hrs. daily. Milk production data were collected between March and December. Milking was done in the Herringbone parlour with the milking machines set up later in the farm. Good pre-milking hygiene measures were taken. The milk was collected in jars, records taken (in kg) and was then transferred to the cold room for storage.

RESULTS AND DISCUSSION

The supplementary diet (Table 1) fed to the lactating cows supplied 16 g of Crude Protein per 100 g DM. The cows were allowed to feed

ad lib, as a back-up to the relatively poorer grass and hay fed on a cut-and-carry basis. The environmental temperature and relative humidity (R.H.) conditions are shown on Table 2. The region is a dry and hot one and the temperatures between February and May could be very high. (up to 38.330 in march). The rains usually start in April and that explains the subsequent progressive fall in temps. The RH ranged from 26% in March to

levels went further down and, for all the groups, an all time low was recorded by October. This shows decreasing milk yield as lactation progressed. Interestingly though, the highest individual milk yield of 15.77 kg/day was obtained in June. Cows in groups E and F had reasonably high yield of milk, the heat stress notwithstanding. These values are higher than the yields reported by Adeneye (1989) with White Fulani cows but comparable

TABLE 1: CHEMICAL COMPOSITION OF CONCENTRATES FED AS SUPPLEMENTS TO HOLSTEIN-FREISIAN COWS AT THE FARM (g/100g DM)

Parameters	Calf Ration (6 wks. - 6 mths.)	Grower Ration (6 mths. - 18 mths)	Dry Cows Ration (After 18 mths)	Lactating Cows Ration	Hay	Grass
Crude Protein	16.00	14.00	12.00-14.00	16.00	8.10	7.03
Crude Fibre	15.00	15.00	17.00	17.00	22.30	27.60
Ether Extract	6.00	4.00	2.50	2.50	1.90	1.52
Calcium	0.50	0.75	1.00	1.00	0.80	1.034
Available Phosphorus	0.35	0.40	0.40	0.20	0.30	0.34
Metabolizable Energy (Kcal/kg)	2900	2850	2800	2800	3.06	3.61

TABLE 2: AVERAGE MONTHLY RELATIVE HUMIDITY (RH) AND TEMPERATURE OF THE LOCATION (MARCH - DECEMBER)

MONTHS										
TIMES	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
RH										
7.00 am.	69	88	92	NA	NA	95	95	93	93	89
10.00am	51	71	81	NA	NA	87	84	81	81	76
1.00 pm	33	58	68	NA	NA	78	73	70	67	60
4.00 pm	26	55	62	NA	NA	72	70	66	61	55
7.00 pm	32	67	76	NA	NA	83	84	83	76	71
Mean Temperature (°C)										
min.	23.08	23.71	22.70	NA	NA	23.21	22.39	22.68	23.49	23.57
Max.	38.33	34.96	32.85	NA	NA	29.62	30.42	31.17	31.81	32.68

NA = Not Available
Source: Meteorological Station, Ogoja C.R.S.

95% in August and September. the low temp and high R.H. could mean better environmental conditions for livestock performance.

The average milk levels/yield by the understudied Friesians are shown in Table 3. Their initial production levels from March to April (Late dry season) ranged from 1.96 ± 1.75 kg to 14.92 ± 0.83 kd/d. This is quite a wide range and at a time that the cows were just adjusting to the environment. During the early rainy season, however, their production

to values obtained by Shimada *et al* (1989) with Japanese Black and Poll cows (4.2-5.9 kg/day). They are lower than the 20 kg/d level reported for Friesian cattle in their native Holland. (Schmidt and van Vleck, 1974)

More milk was produced by the cows in the mornings than in the evenings. This might be due to the lower morning temperatures, and the values compared well with the result of Adeneye (1976, 1989). Milk production during the early dry season months (Nov. - Dec.) ranged from 0.00 to 5.82 ± 0.73 kg/day. This is

MILK YIELD BY FRIESIAN CATTLE

TABLE 3: SUMMARY OF MILK PRODUCTION BY HOLSTEIN - FRIESIAN CATTLE FROM MARCH -DECEMBER (kg/day)

Month	COW GROUPS							No of days in Lactation
	A	B	C	D	E	F	G	
March	7.25±1.28 ^b	13.17±0.97 ^d	9.96±0.75 ^c	10.63±0.41 ^c	14.92±.83 ^e	13.10±1.18 ^d	4.92±0.58 ^a	31
April	6.00±0.75 ^b	11.63±0.94 ^{de}	9.89±0.56 ^c	10.13±0.42 ^{cd}	12.17±1.30 ^e	13.06±0.49 ^e	1.96±1.75 ^a	61
May	5.42±1.16 ^b	4.34±3.17 ^b	8.82±0.41 ^c	8.32±1.02 ^c	11.62±1.73 ^d	14.11±1.21 ^d	0.00±0.00 ^a	92
June	7.81±0.71 ^c	4.34±3.17 ^b	8.82±0.41 ^c	8.32±1.02 ^c	11.62±1.73 ^d	14.11±1.21 ^d	0.0±0.00 ^a	122
July	4.27±4.93 ^b	8.31±0.36 ^c	8.22±0.45 ^c	5.67±0.93 ^{bc}	6.39±0.27 ^{bc}	113.66±0.41 ^d	0.00±0.00 ^a	153
Aug.	0.00±0.00 ^a	8.06±0.50 ^b	7.00±1.10 ^b	6.90±0.51 ^b	7.62±0.41 ^b	11.28±1.56 ^c	0.00±0.00 ^a	184
Sept.	6.67±2.79 ^b	7.96±0.78 ^b	1.07±2.14 ^a	6.53±0.41 ^b	6.07±0.97 ^b	7.28±0.75 ^b	0.00±0.00 ^a	214
Oct.	1.53±0.58 ^{ab}	5.99±0.69 ^c	0.00±0.00 ^a	6.53±0.18 ^c	5.71±0.73 ^c	5.92±1.10 ^c	2.43±3.11 ^b	245
Nov.	0.82±0.64 ^a	5.21±1.88 ^c	-	5.64±1.15 ^c	4.78±0.63 ^{bc}	5.82±0.73 ^c	2.43±3.30 ^{ab}	275
Dec.	-	4.96±0.83 ^a	-	4.78±0.47 ^a	4.75±0.91 ^a	-	-	306

a,b,c,d,e = Means within a row with same superscripts are not significantly different (P>0.05)

a decline relative to the earlier season's production level. At this period, cows were belaboured by environmental stress and were seen to breathe as such. However, according to Castle and Watkins (1984), with good management, exotic cattle breeds should be able to adapt themselves to produce in that condition. Although Schmidt and Van Vleck (1974) had contended that milk levels of 20kg/day could be obtained in its native home, the production level of 15.77 kg/d recorded here for the Friesian cattle in Group F is quite commendable. The overall milk production was still fairly reasonable up to the 214th lactation day. In fact, up to the 306th day in lactation, most of the cows did not dry up although there was that progressive decline in milk levels with advancing lactation. Although relatively high hygienic measures were practiced on the farm, these were still the need to improve on this and forestall loss of milk.

The performance of exotic milk animals in a tropical environment has been reported. The production of these Holstein-Friesian cows under this relatively harsh environment is quite commendable and can contribute in no small measure in filling the animal protein gap which exists at present in Nigeria.

From the work of Adeneye (1989) Dehmers and Williams (1978) a follow-up breeding of the Friesian with white Fulani could also help upgrade the milk production potentials of the local breeds. To further douse the effects of the extreme temperatures, trees could be planted within the complex to provide shade and also serve as a feed resource.

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