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ADAPTABILITY OF THE ANGLO-NUBIAN GOAT AS MEASURED BY IT'S REPRODUCTIVE PARAMETERS IN A NUCLEUS HERD.

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ABSTRACT

In recent years, the Anglo-Nubian breed of goat has been used extensively in crossbreeding work with the native Jamaican goat for improving the productivity of the native. The purpose of this study is to establish parameters of reproductive performance in the Anglo-Nubian goat in the nucleus herd at the Bodles Research Station. Forty nine (49) purebred Anglo-Nubian does were observed through 136 kiddings between April 1993 and December 1997. The parameters measured include prolificacy, kidding interval, age at first kidding, frequency of multiple births and the relationship between parity and multiple births. The seasonality of kidding was also examined.

The Anglo-Nubian does at Bodles were found to have a prolificacy rate of 1.69 ± 0.67 with a kidding interval of 355 ± 90 days (range of 185 - 688 days) and age at first kidding of 517 ± 164 days. The data shows that the Anglo-Nubian exhibits some seasonality in the pattern of kidding with 91.91 % of does kidding between November and April. This is typical of the temperate breeds, which tend to kid in the cooler and drier months.

INTRODUCTION

In September of 1992, thirty six (36) female and eight (8) male Anglo - Nubian goats ranging from 5 to 6 months old were imported into the island from England, by the Caribbean Agricultural Research and Development Institute (CARDI). This formed the basis of the present Herd Improvement programme in Jamaica. The animals have been housed at the Bodles Agricultural Research Station where their productive parameters are being evaluated. Male offspring from this nucleus herd of purebred Nubians have been disseminated to the farming community as part of the continued attempt to upgrade the "Native" stock.

One of the main indicators of environmental compatibility of a breed is it's level of reproductive performance. Heat stress is one of the adverse conditions that face temperate breeds imported into the tropics. Indeed, under heat stress, domestic animals will experience a reduction in their metabolic rate which results in extended kidding intervals, late maturity, and low milk yield (Devendra, 1970). This study attempts to establish the reproductive parameters of the Anglo-Nubian breed at the Bodles Research Station.

MATERIALS AND METHODS

The study was carried out at the Bodles Agricultural Research Station using data gathered from 49 purebred Anglo - Nubian does over the period April 1993 through December 1997. A total of 136 kiddings were observed during the period. The parameters measured included prolificacy expressed as kids per birth (litter size), kidding interval (period between two consecutive kiddings), age at first kidding, frequency of multiple births, relationship between parity and multiple births, and the pattern of kidding.

The system of husbandry employed in the management of the goats at the station is a semi-intensive one where the goats were allowed to graze pastures in rotation during the day and housed at night where they are given supplementary feed (grain and cut grass/hay). The breeding programme utilized a pen mating system where a buck was walked through the doe pen on a daily basis to deteet heat. Once identified, a particular buck as determined by the breeding programme mated the doe on heat. Accurate records were kept on all matings and subsequent births.

RESULTS AND DISCUSSION

The seasonality of kidding is shown in **Table 1**. When the data for all years are combined it is seen that although the Anglo-Nubian exhibited estrus throughout most months of the year, and kidded in every month except August (**fig. 1**), the pattern suggests an increase in sexual activity beginning in June and peaking in August to November. This is reflected in the high percentage of kiddings in November to December (11.03 %), and January to April (80.88%), with only 5.15% kidding in May to July and 2.94% in September to October (**fig. 2**). The indication that Nubians rarely kid in July and August (0.74%) is supported by work done previously by Muschette and Miller in 1988.

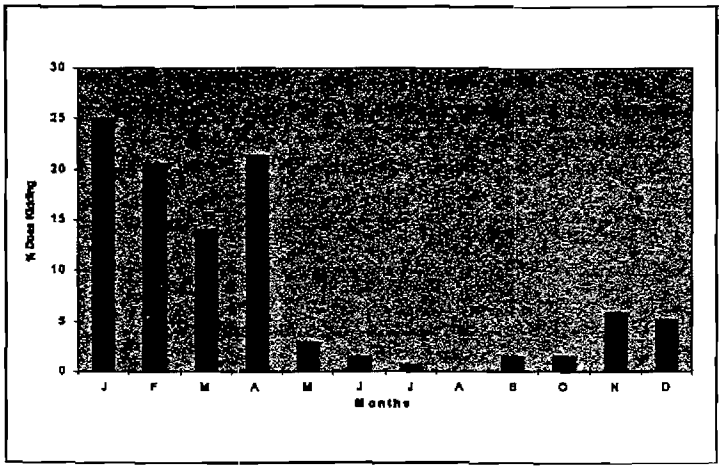

Figure 1: Kidding pattern by months

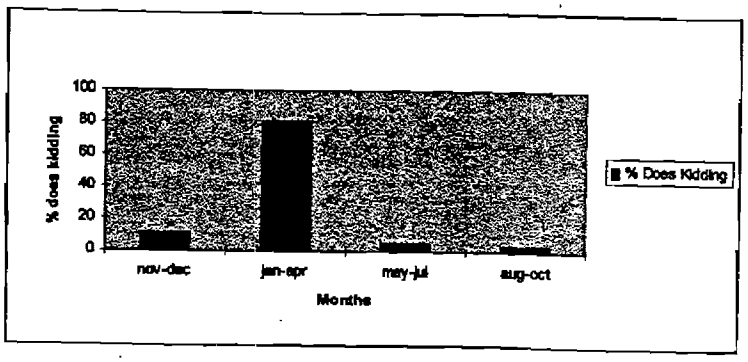

Figure 2: Kidding pattern - Nubians

Prolificacy of does by year of kidding is shown in **Table 2.** In this study prolificacy of the female goat is taken as the number of kids per birth. The mean rate over the 5 year period was found to be 1.69 ± 0.67. This figure indicates that twinning is quite common among the Anglo-Nubian does and compares well with previous work done by Muschette and Miller, 1988, at

Table 1. Seasonality of kidding.

Year	1993		1994		1995		1996		1997		All Years %Does
Month	Does Kidding	Kids born	Does Kidding	Kids born	Does Kidding	Kids born	Does Kidding	Kids born	Does Kidding	Kids born	
Jan.	0	0	9	14	13	22	11	18	1	1	25
Feb.	0	0	8	15	5	10	7	13	8	18	20.59
Mar.	1	1	4	8	3	5	5	6	6	8	13.97
Apr.	21	32	1	1	0	0	2	3	5	11	21.32
May	1	3	0	0	3	3	0	0	0	0	2.94
Jun.	0	0	0	0	0	0	1	1	1	2	1.47
Jul.	0	0	0	0	1	3	0	0	0	0	0.74
Aug.	0	0	0	0	0	0	0	0	0	0	0.00
Sept.	2	4	0	0	0	0	0	0	0	0	1.47
Oct.	2	3	0	0	0	0	0	0	0	0	1.47
Nov.	0	0	1	2	1	2	3	5	3	3	5.88
Dec.	0	0	3	5	2	4	1	2	1	2	5.15
Total	**27**	**43**	**26**	**45**	**28**	**49**	**30**	**48**	**25**	**45**	**100.00**

Table 2. Prolificacy of does by year of kidding.

Year	No. Does Kidding	No. Kids Born	Prolificacy
1993	27	43	1.59
1994	26	45	1.73
1995	28	49	1.75
1996	30	48	1.60
1997	25	45	1.80
All Years	136	230	1.69 ± 0.67

the Hounslow Station, where they found a prolificacy rate of 1.64. Estimates of litter size in Anglo-Nubian does in various countries are given in **Table 3.** Those in Malaysia (1.43) and Israel (1.75) compare favorably with the local findings but estimates in Mauritius (2.29) are greater. Although prolificacy is a good indication of the maternal ability of the doe, a measure of greater practical importance is reproductive efficiency. This is the number of kids reared to weaning. If a doe does not carry her kids to weaning then she is of little value.

The incidence of multiple births as analyzed over the five year period (1993 - 1997) involving 136 observations indicated 42.65% singles, 45.59% twins, and 11.76% triplets (**Table 4**) among the Anglo-Nubians studied.

Table 3. Comparison with other Anglo-Nubians.

Location	Prolificacy	Kidding Interval	Age at 1st Kidding
Bodles, Ja.	1.69 ± 0.67	355 ± 90	517 ± 164
Malaysia	1.43	480	
Israel	1.75		365 - 730
Mauritius	2.29	363	870

The relationship between parity and multiple births is shown in **Table 5.** The data suggests that as the level of parity increases from 1 to 5, the incidence of multiple birth (twins and triplets) increases with figures of 67.12%, 67.21%, 79.59%, 90.91%, and 92.86% for parity 1 to 5 respectively. This is supported by earlier work by Shanmugasundaram, 1957, on Malabar goats. His study showed that the proportion of twins and triplets increased from 19% at first kidding to 79% in second and subsequent kiddings.

Yarkin and Eker, 1961, studied the Kilis goats in Turkey and found the maximum number of kids per birth was produced at the 6th parturition or approximately at 5 years of age. Similar work done by Moulick et al in 1966 showed that in Black Bengal goats maximum litter size occurred at 5 to 6 years of age with a peak of 67 months. These studies suggest that fertility in goats increases up to about 5 to 6 years of age.

Table 4. Frequency of multiple births.

Type of Birth	No. Does kidding	% of Total Does	No. Kids Born	% of Total Kids
Single	58	42.65	58	25.22
Twin	62	45.59	124	53.91
Triplet	16	11.76	48	20.87
Total	136	100.00	230	100.00

Table 5. Relationship between parity and multiple births.

Parity	1		2		3		4		5	
Type of birth	No. Born	% of Total	No. Born	% of Total	No. Born	% of Total	No. Born	% of Total	No. Born	%of Total
Single	24	32.88	20	32.79	10	20.41	3	9.09	1	7.14
Twin	40	54.79	32	52.46	24	48.98	24	72.73	4	28.6
Triplets	9	12.33	9	14.75	15	30.61	6	18.18	9	64.3
TOTAL	73	100	61	100	49	100	33	100	14	100

One of the parameters of significant economic importance is age at first kidding. Goats that kid at a relatively early age will have a greater population turnover and will allow for more rapid genetic progress than goats that kid for the first time at a later age. **Table 6** shows age at first kidding in the Anglo-Nubian goats studied. Of 48 does studied the average age at first kidding was 517 ± 164 days with a range of 319 - 968 days. The findings are quite similar to that reported by Devendra, 1970, where a pattern of 12 to 24 months was established.Kidding interval or the period between two consecutive kiddings is shown in **Table 6.** The average interval for the Bodles

does is 355 ± 90 days. This is a far cry from the 240 days that's required to achieve three kiddings in two years, but compares with Anglo-Nubians in Malaysia (480 days, Devendra, 1962) and Mauritius (363 days, Delaitre, 1965).

Table 6. Age at 1st kidding and kidding interval.

Parameter	No. of Does	Average age (Days)	Range (Days)
Age at first kidding	48	538 ± 164	319 - 968
Kidding interval	39	355 ± 90	185 - 688

CONCLUSION

The findings outlined above suggest that the Anglo-Nubian goats have acclimatized quite well in Jamaica and are comparable in their reproductive performance to Anglo-Nubians in other parts of the Tropics.

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