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STUDIES ON CERTAIN REPRODUCTIVE ASPECTS OF FRIESIAN HOLSTEIN COWS UNDER FARM CONDITIONS IN LIBYA

2. Factors affecting the lifetime performance

BY

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INTRODUCTION

Considerable research has been done to evaluate the role of management factors on reproductive efficiency of dairy cows (Bearden and Faugy, 1980). Reproductive efficiency of approximately 100% is not possible even with good managemental programes. Poor management can result in drastic decrease in reproductive efficiency. Many studies demonestrated the effects of breeding age, age at first calving and lifetime (Bearden and Faugy, 1980 and Esslemont et al., 1985), Climate (Yeck and Stewart, 1959, Thatcher, 1974 and Esselemont et al., 1985) on reproduction and production.

Several reviews have been published on the influence of season and temperature on reproductive performance (Thibault et al., 1966; Waites, 1988 and Vincent, 1972). However there is a little information on this subject. Objectives of our report are to study the effect of managemental factors on the lifetime performance under local environment.

MATERIALS AND METHODS

The breeding records of 277 locally produced pure bred Frisian Holstein cows maintained on a governmental dairy farm 10 km from tripoli during the period from 1980-1990 were included in this study. The farm were kept under good feeding programe.

The milking was carried twice daily, while dryness was done 8 weeks before the expected date of delivery. The dams fed the newborns for the 1st 24 hrs. after delivery then twice milked as usual. Lactating cows were devided into recently delivered cows and the older ones were distributed in different yards according to the level of lactation where the feeding was carried accordingly.

Heat detection was observed through the whole day and the insemination was carried artificially by trained inseminators (12 hrs after the begining of heat). Heifers were firstly inseminated when they reached 350 kg. live body weight.

The data concerning age at first calving, gestation length were collected. The correlation between gestation period and the sex of born calves, age of the dam and gestation period within the seasons as well as the average weight of the born calves through the 5th calvings were statistically analyzed according to snedecor and Cochran (1978).

RESULTS AND DISCUSSION

Management plays an important role in the reproductive efficiency fo both males and females. The parameters by which success can be measured in dairying are diverse but the prime objective is to reach the high milk yeild/cow at a lower economic cost.

Table [1]: The average of the age of the animals (months) at calving at 1st, 2nd, 3rd, 4th and 5th calvings (±S.E.)

No. of animals	Average age at 1st calving	No. of animals	Average age at 2nd calving	No. of animals	Average age at 3rd calving	No. of animals	Average age at 4th calving	No. of animals	Average age at 5th calving
271	30.31 ±5.16	251	43.99 ±5.83	140	56.54 ±6.36	80	69.68 ±7.51	34	89.28 ±44.73

Age at first calving:

The interval from birth to first calving is a non - productive stage. Therefore heifers calving at 24 month require less costs than those calving at 26 month (Esslemont et al., 1985).

The overall mean of age at first calving was 30.31 mo. **(Table, 1)** Maynard and Loose (1969) reported that Friesian Holstein heifers kept under low, medium and high levels of nutrition delivered at 32, 28-5 and 27-9 months respectively. A slightly higher age of F.H. herters at calving of 34.2 month was recorded by El-Itriby and Asker (1958) in Egypt and 34.3 month in Iraq by Asker et al. (1965). On the other hand younger age at first calving of 28.5 mo. in F.H. heifers was reported in northern Iraq Issa (1979) and 24 months in U.S.A. by Morrow (1986).

The differences in age at first calving may be due to different planes of nutrition, systems of suckl- ing the calves during the calfhood period, weaning age as well as the size and weight at which the heifer (350 kg nearly) at 15th months of age, so that they can calve at approximately 24 months (Bearden and Faugy, 1980 and Morrow, 1986).

Herd life (lifetime production):

The calculated data in **(table, 1)** was obtained from a few number of cows (34) which gave 5th parities. They are the best cows kept in the farm as they still produce and reproduce. So the data were obtained from the ideal cows. The mean average of the hardl- ife as shown in **(table, 1)** was 89.28 month. This was higher than the standered data reported by F.A.O. (1982) as (72-84 months). The increase in the incr- ease in herdlife obtained was due to the increases in calving to first service, calving to conception

Table - 2 : Gestation period (in days) through the fifth calvings.

Criteria	No. of cases	Ist	No. of cases	e 2nd	No. of cases	3rd	No. of cases	4th	No. of cases	5th
Average length of G.P.	* 198	277.43 ±4.62	146	278.80 ±4.57	87	279.39 ±4.69	39	280.02 ±6.12	17	281.74 ±5.04
Average length of G.P.	99	278.25 ±5.03	81	278.99 ±4.91	45	279.26 ±4.36	18	280.08 ±7.44	9	283.11 ±3.51
Average length of G.P.	99	276.80 ± 6.20	65	278.06 ± 3.42	42	279.29 ± 5.01	21	280.12 ± 6.93	8	279.88 ±4.86

* The No. of observation is less than the total reported. This was due to the lack of birth date in the record.

period, increased number of services/conception as will as prolonged calving interval.

Gestation period:

The gestation period length is of little concern to dairymen except when calves are carried an extreemely longtime and calving difficulty results (Gregory et al. 1951) or when calves are born prematurely. At present dairymen know the role of gestation periods in selection programs.

Gestation period length on the other hand varies among different animal species and breeds. This length is also controlled by heriditary, environmental and pathological factors (Gregory et al., 1951 and Morrow, 1986).

The data recorded in **(Table, 2)** revealed that, the average gestation period in heifers was 277.43 days with slight increase in subsequent parities from the 2nd to the 5th respectively (278.80, 279.39, 280.03 and 281.74 days). Simillar averages were recorded by other workers (Kinacaid and Touchberry, 1966 and Touchbery and Bereskin, 1966).

Effect of the Newborn sex on the length of G.P.

It is observed from **Table, 2** that, in heifers, male calves were carried longer by 1.42 days than females. This remains constant after wards during the subsequent calvings. Exceptionally the 5th calvings cleared longer gestation 3.23 days in male calves than females. This may be due to smaller number included in the data. The results were in agreement with Touchberry and Bereskin (1955) and Tylor et al. (1984). They recorded an increase in the gestation period of the male calves than females by 1.2, and

Table - 3: Correlation between the length of gestation and the weight of the born foeti within the different seasons of the year.

Season	Sex of born fetus	1st Calving	2nd Calving	3rd Calving	4th Calving
Winter	Male	r = 0.48	r = 0.44	r = 0.44	r = 0.69*
	Female	r = 0.17	r = 0.84**	r = 0.48	r = 0.41
Spring	Male	r = 0.53	r = 0.45	r = 0.08	r = 0.11
	Female	r = 0.02	r = 0.41	r = 0.30	r = 0.11
Summer	Male	r = 0.13	r = 0.43	r = 0.05	r = 0.23
	Female	r = 0.18	r = 0.47	r = 0.14	r = 0.87**
Autumn	Male	r = 0.49	r = 0.24	r = 0.03	r = 0.99**
	Female	r = 0.36	r = 0.10	r = 0.48	r = 0.32

0.32 days respectively. On the other hand controversial results were reported by Tylor et al. (1984). They stated that the gestation period of the calves delivered for the first time was longer than the subsequent male calves.

Correlation between gestation period length and the weight of the born calves (males and females) with in seasons:

In herds which have planued calving season, heifers idealy calve down shortly before or at the commencement of the calving season. The objective is that the cow can produce the maximum amount of milk from the quantity and quality of feed available to her and she, therefore can calve at the same time next year. On the other hand, the location curve varies according to parity and month of calving but the level of production depends on the available forage and concentrate feeding (Esslemont et al., 1985). In our desert environment, there is no differences between seasons regarding the availability of the forages. So planned calving seasons is of low importance regarding the productivity of the animal as it depends mainly on the concentrate rations. But the most obvious effect in this locality is the climatic or thermal effect on the C.R. The same was recorded by Ingraham et al. (1974). They added also that, thermal stress affects reproduction, physiology, endocrinology and animal performance. Therefore, the correlation between gestation period length, the weights of the born facti (males and females) was analysed.

It's observed from **(Table, 3)** that during the 1st calving spring season represents the higher significant correlation ($r = 0.53$) between the male calves weight and the gestation period length. Insignificant correlation was obtained during Autumn and

Table - 4: Correlation between age (days) and gestation period (days) within the seasons.

Season		Ist Calving	2nd Calving	3rd Calving	4th Calving	5th Calving
Winter	Age	911.91 ±114.51	1371.29 ± 110.18	1704.41 ±156.39	2143.89 ±245.02	2406.00 ± 261.65
	G.P.	276.10 ± 3.64	277.11 ± 5.10	279.33 ± 4.73	278.65 ± 5.79	280.25 ± 3.83
	r	0.11	0.31	0.10	0.37	- 0.13
Spring	Age	924.97 ±126.01	1289.85 ±154.26	1730.5 ±244.44	2133.56 ±201.21	2503.90 ±101.09
	G.P.	277.09 ± 5.30	280.58 ± 7.98	279.44 ± 6.04	280.72 ± 5.38	283.90 ± 1.46
	r	- 0.09	- 0.07	0.03	- 0.29	0.07
Summer	Age	878.57 ±79.53	1281.92 ±95.88	1676.65 ±118.96	2020.39 ±111.58	2558.5 ±232.72
	G.P.	278.28 ± 4.99	282.5 ± 9.44	278.42 ± 3.83	282.28 ± 7.58	283.83 ± 2.78
	r	- 0.02	- 0.17	0.53	0.14	- 0.03
Autumn	Age	908.27 ±97.35	1328.22 ±126.20	1696.36 ±175.86	2059.75 ± 95.11	2444.67 ±188.71
	G.P.	277.81 ± 5.31	278.42 ± 5.62	277.28 ± 12.99	282.13 ± 4.44	280.08 ± 4.05
	r	0.03	0.02	- 0.19	0.18	- 0.44

winter seasons. Regarding the born female calves insignificant correlation was also shown during spring, winter, summer and finally Autum.

The differences between the born male and female calves correlation during the different seasons may be due sex managemental factors.

Regarding the 2nd calving, seasons showed insignificant correlation in both male and female calves with exception of Autumn months where clear -ve correlation was obtained. On the other hand strong +ve correlation was clear during winter delivers of the male calves and during Autumn and Winter of the delivered female calves through the 3rd occasion. A strong correlation was also clear during the 4th occusion between the born male calves and seasons except during spring one. In addition no correlation was found between the born females and the seasons.

Effect of age on gestation period length within the season:

From the known facts that, the age and size of the female were related to the uncomplicated parturitions and productivity of the female (life time production).

Bearden and Faugy, (1980). In this respect we tried to study the effect of the dam's age on the length of gestation within the particular seasons. (Table, 4) revealed insignificant +ve and -ve correlation regarding the age of the dam and the length of gestation. The Summer months on the other hand cleared only strong +ve correlation during the 3rd calving only at this age. The age of the dams observed were young age if compared with the other dams in the other seasons. Age of the dams are close together in the 1st calving during winter and Autumn months

Table - 5: Average weight (Kg.) of the delivered male and female calves through the 5th calvings or parities.

Criteria	1st	2nd	3rd	4th	5th
No. of observation	121	91	51	30	13
Male calves	41.46 ±5.06	44.48 ±6.11	44.59 ±4.54	45.00 ±5.74	45.77 ±6.53
No. of observation	118	90	44	30	9
Female calves	39.72 ±4.07	42.01 ±3.94	40.98 ±4.56	42.70 ±4.66	43.33 ±2.93

and showing very weak +ve correlation but the degree of correlation is higher in Winter than in Autumn.

The -ve correlation noticed among the calculated data was due to breeding of older females so reverse correlation was obtained. This was very clear also during the 4th calving inspite of older females delivered in Winter months than females delivered in Summer and Autumn but correlation was stronger in Winter than the other 2 seasons. So we can conclude that, Winter season showing the good correlation between the recorded age and the length of gestation.

The body weights of the born calves were influenced by genetic or sire factor (Martin, 1956). Breeds as well as crossing between breeds has also and effect on the birth weights (Gregory et al., 1951).

It is clear from (Table, 5) that the frequency of parity has effect on the birth weight, although the number of cases involved were few during the 4th and 5th parities. The effect of parity was clear among sex so the male off springs are heavier than the females. This was in accordance with Touchberry and Bereskin 1966. Other studies of parity and birth weight were reviewed and in general, all concluded that first parity animals weighed less than the subsequent ones Dickinson et al., 1962.

SUMMARY

The factors affecting the reproductive performance of local Friesian-Holstein dairy herd near Tripoli on the north-west of Libya were evaluated with respect to age at first calving, herd life, gestation period length, throughout the 5th parities. In addition, the correlation between the gestation period and both the calves's weight and dam's age within

the different seasons as well as the average weight of the born calves during the 5th parities was also studied. The first calving age and the herd life averaged 30.31 and 89.28 month respectively. The average gestation period length during the first parity was the shortest (277.43 days) in comparison with the subsequent parities. The averages of the 2nd, 3rd, 4th and 5th parities were 278.80, 279.39, 280.03 and 281.74 days, respectively.

Investigation of the relationship between the length of gestation period and the weights of the new borns within-season basis showed unclear pattern, Exceptionally, the weight of the male calves of the 4th parity in winter, 1st parity in spring and during the 5th parities of summer and autumn showed positive strong correlations. The female calves weights showed also strong positive correlations during 2nd parity of winter and the 4th parity of summer only. Neither positive nor negative correlation between gestation period length against the dam's age was obtained in this data.

Males were consistently heavier than females for all parities.

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