

## Physiological Aspects in Milk Production, in Semi-arid Conditions of Graded Cattle in Iraq

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**E**XAMINATION of 277, 268 and 276 records of lactation periods, dry periods and calving intervals respectively, given by 120 graded cattle of 1/2 to 15/16 Friesian and Janubi reared at Animal Production Centres of Basrah, Emmara and Baghdad was carried out for the effect of certain physiological characters on milk yield under semi-arid conditions, as a reflection of variable atmospheric temperature, humidity and feed availability.

Lactations were explored under different parameters. These results revealed that :-

1. A preceding dry period of 121-150 days caused most suitable conditions in animal body to produce maximum milk.
2. A calving interval of 391 - 420 days allowed the cows to secrete more milk than any other period.
3. Winter calving followed by Spring led to production of milk more than Summer and Autumn, although Autumn gave more calving percentage than Summer and Spring.
4. Lactation period was highly significantly correlated with milk yield, but preceding dry period calving intervals were not significant. The characters studied were positively correlated but some of them did not show statistical significance.

Grading of local cattle in many developing countries has been practised for improving milk yield. In Iraq, this programme was initiated at Animal Production Farm Baghdad, in 1942 with Friesian bulls imported from Palestine. It was necessary to extend such programmes to other parts of the country like Basrah and Emmara which presented semi arid zone conditions as far the animal husbandry situation, are concerned. After the upgrading operations are set into action, the examination of records become active for formulation of a sound and permanent policy for livestock breeding work

The records of Baghdad Station were examined by Asker *et al.* (1965) for certain factors affecting milk yield. No attempts have so far been made to analyse records of Basrah and Emmara and evaluate the important physiological factors as correlated with milk yields. Thus an investigation was instituted into the data of these stations besides those from Baghdad for testing the influence of certain factors, or their correlations with milk yield of graded cattle with 1/2 to 15/16 ratio of Friesian germ plasm, reared under semi arid conditions of this part of the country. Such a study envisages to bring light the possibility of improvement in conditions at these farms for maximum production.

### Material and Methods

Records of 120 Janubi graded, Janubi cows with Friesian bulls from 1/4 to 15/16 Friesian germ plasma, were procured from Animal Production Centres at Basrah, Emmara and Baghdad. These records contained 277, 268 and 276 lactation periods, dry periods and calving intervals, respectively. They were analysed by the methods of Snedecor (1956) for milk production. Under the influence of such factors like dry period, calving intervals, lactation period, and season. Ten groups on dry periods with 30 days interval were formed, and eight groups of calving intervals were composed with an interval of 30 days. The seasons were recognised as usual depending upon the common system, *i.e.* Winter, Spring Summer and Autumn. The atmospheric temperatures and relative humidity.

Values used by Asher *et al.* (1965) were utilized. All lactations available free of disease and over 180 days duration were used for analysis. The correlation between lactation period, dry period and calving intervals were calculated. Normal distribution of data on lactation period and milk yield tested in different seasons and individual month of calving was arranged.

### Results and Discussions

The relations between milk yield were studied with the following characters :

#### *Dry period*

Milk yield as influenced by dry period preceding to lactation is presented in Table 1. It ranged from 1987.3 kg (241—270 days period) to 3217.6 kg (121—150 days dry period group). It is evident that 121—150 days of dry period is best suited for the graded cattle to develop physiological process for maximum milk production. Asker *et al.* (1965) like other workers in the tropics suggested 167 days of this period as suitable one. Further reduction of dry period to 30—60 days does not improve the milk yield. Thus the results agree in general with the findings of these workers except that the milk yields were superior in the present investigation. There was, however, no significant correlation between dry period duration and milk yields. Results of Ragab *et al.* (1954) and Asker *et al.* (1958) are upheld fully. As the dry periods were observed to be quite high and involved a large number of lactation, the reduction in the length is necessary to 121—150 days for maximum yields of milk for such graded cattle.

#### *Calving intervals*

Milk yield as affected by calving intervals is given in Table 2. It is apparent that an interval of 391—480 days is most conducive for maximum yield of milk (3173 kg/lactation). After a substantial fall in milk yield (2490 kg) in cows of calving intervals of 421—450 days, a reasonably good in-

TABLE 1. Milk yield of graded cattle as influenced by dry period.

No. of dry periods	Groups (days)	Milk yield per lactation (kg)
30	30—60	2810.8
90	61—90	2778.7
52	91—120	2774.3
23	121—150	3217.6
21	151—180	2621.9
14	181—210	2182.2
9	211—240	2819.1
6	241—270	1987.3
4	271—300	2722.7
19	More than 300	2807.7

TABLE 2. Milk yield as affected by calving intervals.

No. of calving intervals	Groups (days)	Milk yield per lactation (kg)
19	Less than 330 days	2360
59	331—360	2566
44	361—390	2440
38	391—420	3173
29	421—450	2490
28	451—480	2597
29	481—510	2884
30	more than 511	2753

TABLE 3. Correlation coefficient between milk yield and the studied characters.

Characters correlated	No.	Correlation
Lactation period . . . . .	277	0.71**
Dry period . . . . .	268	0.21
Calving intervals . . . . .	276	0.17

\*\* Highly significant ( $P < 0.01$ ).*Egypt. J. Anim. Prod.*, 16, No. 1 (1976)



crease (2884 and 2753 kg) was observed in cows having calving intervals of 481—510 days or more. Analysis of date (Table 3) did not reveal any significant correlation between the two characters. The results are in close agreement with those of Lecky (1951), Asker *et al.* (1958) and Asker *et al.* (1965) who found just apparent and low positive correlations between calving intervals and milk yields. Thus, it would be alright if a statement to the effect that a calving interval of 421—450 days is enough to cause maximum development of these cows for higher milk yields.

TABLE 4. Seasonal variation in milk production and lactation period.

Seasons	No. of calvings	Milk yield per lactation	Lactation period days
Winter . . . . .	90	2668	286
Spring . . . . .	57	2656	286
Summer . . . . .	44	2639	285
Autumn . . . . .	86	2537	277

#### Season of calving

Season exerted no significant influence on the average milk yield (Table 4). When these observed figures were plotted for calvings percentage, calving and milk yields for each month of the year and then cumulative numbers for season as a whole, the results appear to be somewhat interesting. More calvings occurred in November-January and least during May—June, leading thus to more calving percentage in Winter and least in Summer season. The milk yield remained between 2537 and 2668 kg with only slight differences between seasons. The results obtained by Asker *et al.* (1965) on milk yield under these seasonal regimes with same atmospheric temperature and relative humidity were lower than found in the present investigation. Thus cows at Basrah, Emmara and Baghdad together showed better performance than those of only Baghdad station. In the present study the trends and relations but not the levels of production were like those observed by other investigations in other localities (Mahadevan 1956 and Sikka 1956). The variation in the calving number and milk yield seems to go along with the environmental conditions of temperature, humidity and feed available in these seasons. The breeding operations in South Iraq if arranged according to the conditions prevalent, maximum performance from these graded cattle is possible. Lactations period exerted a definite influence on milk yield as revealed by a highly significantly positive correlation between it and milk yield (Table 3). The results are in close agreement with those of Asker *et al.* (1965) and substantiate the findings of Branton *et al.* (1966), El-Itribi and Asker (1958) and Sen *et al.* (1953).

TABLE 5. The distribution and percentage of lactation period tested in different months and seasons.

Season	Winter			Spring			Summer			Autumn		
	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.
No. of calvings . . .	26	36	28	29	16	12	15	12	17	19	30	37
Calvings % . . . . .	9.38	13	10	10.46	5.7	4.33	5.41	4.33	6.13	10.85	10.83	13.35
Calving % per season	32.5			20.6				15.9			31	
Av. Milk yield/season	2668 kg			2656 kg				2639 kg			5237 kg	
Average air temp.	54.0°F			75.0°F				94.6°F			75.4°F	
Average humidity .	69.5			42.1				26.0			42.1	

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## تأثير بعض الظواهر الفسيولوجية على إنتاج الحليب من الأبقار المدرجة بالعراق

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أجريت هذه الدراسة بغرض تقرير بعض العوامل التي تؤثر على إنتاج الحليب بالنسبة للأبقار المدرجة ( فريزيان x جنوبى ) في العراق ، وتحت ظروف الجو والرطوبة الموجودة في هذه المناطق شبه الحارة وقد فحصت سجلات الأبقار الموجودة من محطات الإنتاج الحيوانى التابعة لوزارة الزراعة في كل من بغداد والسامرا والبصرة .

وقد تبين أن فترة الجفاف السابقة لموسم الحليب والتي مدتها ١٢١-١٥٠ يوماً هي أحسن الفترات المناسبة لحالة الحيوان لإنتاج حليب . وبالنسبة للفترة بين ولادتين ، وجد أن أكبر إنتاج من الحليب كان في الفترة التي مدتها ٣٦١ - ٤٢٠ يوم . وكانت هناك فروق في إنتاج الحليب في فصول الولادة المختلفة ، فكان الإنتاج في الشتاء والربيع أكثر من الصيف والخريف مع أن نسبة الولادات في الخريف أكثر من الصيف والربيع .

وظهر من الدراسة أن هناك علاقة مؤكدة بين طول موسم الحليب وإنتاج اللبن ولكن العلاقة بين طول فترة الجفاف السابقة وكذلك الفترة بين ولادتين وإنتاج الحليب كانت موجبة ولكنها ليست مؤكدة .