MILK AND CALF PRODUCTION AS AFFECTED BY CALVING INTERVAL AND SERVICE PERIOD IN PUREBRED AND CROSSBRED FRIESIAN COWS IN EGYPT

by

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I. INTRODUCTION

In Egypt, food production is much lagging behind the requirements of the fast growing human population. The gap between production and consumption is widening. Animal production could have an important role in bridging this gap. It is ecognised that milk and meat production from native cows in Egypt is very low as compared to that of temperate breeds. Genetic improvement of native cattle through selection alone is a long process. A faster to increase production is to introduce the highly productive breeds and grade up native stock with the most adaptable ones.

The importation of the Friesians started in limited numbers about the early thirties of this century. Early studies (Sidky, 1950; El-Itriby and Asker, 1958; Fahmy et al., 1963 and Morad, 1967) indicated that Friesian is an adaptable breed breed in Egypt for both milk and meat production. Many workers (Ragab and Asker, 1959; El-Shiekh and El-Fouly; 1964 and Ragab et al.,1973) investigated the economic traits of Friesian in Tahreer Province (a newly reclaimed area) and reported satisfactory results for Friesian in that area. A large numbers of Friesian cows were imported in the seventies and were kept mainly in the newly reclaimed areas especially in West Nubaria, North Tahreer and South Tahreer. Native cattle, Baladi, were crossed to the Friesian in those areas.

Although Friesian and other temperate breeds are being used ncreasingly to raise milk and meat production in Egypt, no serious attempt has hitherto been made with national selection programmes to improve the dairy merit of indigenous cattle. This is partly due to the small scale of most previous breeding experiments and because there are other constraints. The major constraints are the small herd average size, poor communication and lack of incentives for recording. Other possible reasons are inadequate appreciation of the value of progeny tested sires, low educational level of farmers and lack of qualified and motivated recorders. Moreover, AI services are relatively undeveloped. It is true that improved breeds need more feed but the justification is that feed requirement per unit of product is less than in the low producing breeds. Also, to maximize efficiency of cattle performance, an understanding of both reproductive and productive efficiency is required.

This study aims at measuring reproductive and productive traits of imported Friesian cows and investigating non genetic factors affecting these traits such as farm, season of year, parity, and possible interactions. The relationship between reproductive and productive characters will be studied and growth performance of pure Friesian, Baladi and crossbreds evaluated.

II. REVIEW OF LITERATURE

1. Dairy and Dairy-Related Traits

Dairy and dairy-related traits are affected by genetic and nongenetic factors. The nongenetic factors will be the main concern in the present investigation. Management factors such as accuracy of heat detection, use of proper inseminating techniques , proper semen handling and appropriate herd health policies can directly influence reproductive and productive performance of dairy animals. In addition to these important factors, other factors which, to a large extent are beyond the immediate control of management, may have an impact on fertility and production. These factors include farm, age of cow, season and year of calving.

Factors reviewed are: breed, season and year of calving, parity and farm.

1.1. Age at first calving (AFC).

A reduction in the AFC will minimize the cost of raising the heifers, shorten the generation interval and maximize the number of lactations of each cow.

1.1.1. Effect of breed. Many workers gave average AFC for various cattle breeds under various environmental conditions (Table 1). El-Itriby and Asker (1958) studied AFC for 1/2 and 3/4 Friesian in Egypt. Their estimates were 32.2 and 33.7 mo, respectively. El-Itriby et al.(1963) working on Jersey and their crosses in Egypt, reported that the average AFC for the pure Jersey was 28.2 mo but it increased significantly as the amount of Jersey blood increased till it reached 35.7 mo for the 7/8 Jersey heifers.

AFC was found to be reduced through crossbreeding local breeds with dairy breeds. D'Souza et al.(1979) showed a significantly longer AFC for Red Sindhi as compared with Red Sindhi x Friesian crosses. Bhat et al.(1979) also worked on data from crossbred Sahiwal heifers with 3/64 and 63/64 Friesian breeding. They reported that AFC's were significantly different for the two groups, being 1242 and 997 d, respectively. Kwaku and Nkhonjera (1986) however, found that heifers with 50% Friesian inheritance calved for first time three months earlier than cows with 75% Friesian inheritance. This finding agreed with that reported by Kiwuwa et al.(1983), who found that heifers with 87.5% Friesian blood calved for the first time later than heifers with a lower percentage of Friesian inheritance. Asker et al.(1965a) analyzed records of pure Friesian and crossbred dairy cattle in Iraq. They reported that AFC ranged between 45 mo for the native cattle and 34 mo for the Friesian. They also found that Ayrshire was very closed to Friesian in AFC while heifers were about four months older than their European parents, and that increasing the blood of imported stock was, accompanied by an increase in AFC of crossbred animals. Menendez et al.(1979) reported significant effect due to breed of sire on AFC. Gregory and Trail (1981) also reported significant ($P<0.01$) effect of breed of sire on AFC. They also found that Ayrshire sired females averaged 23 d younger ($P<0.05$) at first calving than Sahiwal sired females. Negron et al.(1980), Basu et al.(1979), Kiwuwa et al.(1983) and Kwaku and Nkhonjera (1986) reported significant breed group effect on AFC while Galal et al.(1981) reported a nonsignificant effect. Galal et al.(1977) found that inbreeding had no effect on AFC, but breed effect was significant.

1.1.2. Effect of season. Season of birth was found to have a significant effect on AFC as reported by Kiwuwa et al.(1983). Galal et al.(1981) also reported significant effect due to month of birth on AFC, while Gregory and Trail (1981) reported nonsignificant effect due to month of birth on AFC. Kwaku and Nkhonjera (1986) also reported nonsignificant effect of season of birth on AFC and found that heifers born during April-May calved later than heifers born in other seasons (41.9 versus 37.5 mo, respectively).

1.1.3. Effect of year of birth. The influence of year of birth on AFC was found to be significant by Gregory and Trail (1981), Kiwuwa et al.(1983) and Kwaku and Nkhonjera (1986) and was nonsignificant by Galal et al.(1981).

1.1.4. Effect of farm. Significant farm effects were found by Galal et al.(1977 and 1981) and Dangi (1980) in their work on crossbred dairy cattle.

1.2. Number of services per conception (NSC).

This trait is defined as the number of services, be it natural mating or artificial insemination, required for successful conception.

1.2.1. Effect of breed. Matsoukas and Fairchild (1975) found that Jerseys required fewer services per conception than Holsteins (P<0.05). Slama et al.(1976) found that while 90% of the Holsteins and Jerseys had conceived by three services only 80% of the Guernseys and Ayrshires had conceived by the same number of services. McDowell et al.(1974) studied reproductive efficiency among purebred Ayrshire, Brown Swiss, Holstein and Jersey and crossbred females. They found that females bred to sires of their breed required similar NSC as when bred to sires of different breeds. However, later studies on reproductive efficiency of Jersey, Red Sindhi and their crosses by McDowell et al. (1976) showed that a significant breed effect was found in NSC. Jerseys and crossbreds required fewer NSC when bred to Red Sindhi and crossbred sires.

Basu and Ghai (1980), Hollon et al.(1967) and Negron et al. (1980) found a significant breed effect on NSC. On the other hand, Basu et al.(1979) and Azage Tegegn et al.(1981) working on zebu and European x zebu crossbreds, found nonsignificant effect due to breed on NSC. Many other researchers reported different results of NSC for different places (Table 1).

1.2.2. Effect of season of calving. Season of calving was found to affect NSC as reported by El-Sheikh and El-Fouly (1964a), Basu and Ghai (1980), Azage Tegegn et al.(1981) and .aben et al. (1982). On the other hand, Hillers et al.(1984) and 1atsoukas and Fairchild (1975) reported nonsignificant effect due to season of calving on NSC.

Basu and Ghai (1980) working on records of Holstein x Sahiwal crossbred cattle in India, indicated that animals calving in the rainy and autumn seasons were equally good and had the least NSC (1.69 and 1.75, respectively) while, winter calvers required the maximum because their inseminations were made in summer. Basu et al.(1979) working on Indian zebu cattle, reported that NSC was significantly affected by month of calving. They also found that cows calving in August required 3.8 inseminations, the highest, as compared to cows calving in November which required the minimum (1.0).

1.2.3. Effect of year of calving. Basu and Ghai (1980) and Bhatnagar et al.(1982) reported that the influence of the year of calving on NSC was significant. Matsoukas and Fairchild (1975) also reported significant differences among year of calving ($P<0.05$) for NSC in Jersey cows but not for Holstein cows. However, Azage Tegegn et al.(1981) reported nonsignificant effect of the year of conception on NSC.

1.2.4. Effect of parity. Basu and Ghai (1980), Hillers et al. (1984) and Spalding et al.(1975) noticed that, as age advanced beyond 4 years, fertility declined. El-Sheikh and El-Fouly (1964a) found a significant ($P<0.01$) parity effect on NSC, since heifers required significantly 0.46 less services than cows. This finding was supported by Basu and Ghai (1980). They noticed that heifers required only 1.48 inseminations for conception, in contrast to the cows which required 1.88 inseminations. However, Ragab et al.(1956) using Egyptian cattle, reported that