J. of Animal and Poultry Production, Mansoura Univ., Vol 11 (12):623 - 628, 2020

Journal of Animal and Poultry Production

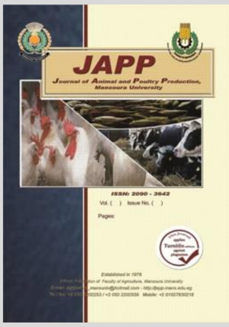
Journal homepage: www.japp.mans.edu.eg
Available online at: www.jappmu.journals.ekb.eg

Evaluation of Some Economical Traits of Commercial Friesian Cows Herd Raised in Egypt

Farrag, F. H. ; N. A. Shalaby ; A. A. Gabr* and M.A. Lahoul

Animal Production Department, Faculty of Agriculture, Mansoura University, Al-Mansoura, Egypt

Cross Mark



ABSTRACT

This study conducted to evaluate some of non-genetic and genetic parameters that affect the productive and reproductive traits. Total of 3596 records of 1021 Holstein Friesian cows in the first five parities were collected during the period from 2002 to 2016 from a commercial farm. The details values of productive traits (total milk yield (TMY, kg), lactation period (LP, day) and dry period (DP, day)), as well as, details values of reproductive traits (days open (DO, day), number of services per conception (NSC), age at first calving (AFC, months) and calving interval (CI, day)) were considered. The effects of season of calving and parity on productive and reproductive traits were also examined. The results revealed that the season of calving and parity had significant effect on all the studied traits. Heritability estimates for TMY, LP, DP, DO, CI, NSC and AFC are 0.110, 0.089, 0.071, 0.100, 0.103, 0.123 and 0.168, respectively. The phenotypic correlations of all studied traits were positive and ranged from 0.016 to 0.989, except that between TMY and all the reproductive traits as well as DP were negative. The values of genetic correlations among all studied productive and reproductive traits were positive and ranged from 0.031 to 0.998, except DP and TMY was negative. The present study is an effective way for using in improving programs for milk yield of Holstein Friesian cows in commercial farms.

Keywords: Milk production, reproduction performance, non-genetic factor, Friesian.

INTRODUCTION

In developing countries, the dairy industry is a significant agricultural subsector (Abd-El Rahman *et al.*, 2020). For dairy producers, from economic point of view, milk yield is one of the main factors affect the economic profitability (Abd-El Hamed and Kamel, 2021), and the optimal profitability can be achieved by obtaining the high level of productive performance with reproductive performance at acceptable level (Habib *et al.*, 2020). Notably, success reproduction is a fundamental indicator for the farming system sustainability, and it has a significant relationship with the milk yield (El-Tarabany and El-Bayoumi, 2015).

Generally, it is clear that both non-genetic and genetic factors affect the productive and reproductive traits of Friesian cows. Non-genetic factors proved to have a very significant impact include; herd management, environmental conditions, nutrition, number of lactations, year and season of calving (Kamal El-den *et al.*, 2020). However, successful management and adequate nutrition could lead to reach the proper animal performance target (Almasri *et al.*, 2020).

While genetically, the undesirable relationship between the productive and reproductive performance traits should be taken into consideration (Habib *et al.*, 2020). However, the direct measures of fertility and milk yield records can be used to supplement the predictions of genetic merit for fertility (Zahed *et al.*, 2019). Thus the interest has increased for including functional traits and fertility in the breeding goal for populations of dairy cattle (Zahed *et al.*, 2020). The estimation of genetic and phenotypic parameters for these traits is an important tool to define and evaluate the selection programs (Sanad, 2016).

Generally, it is necessary to be aware about the environmental variables and other factors affect the performance of dairy cows and farm economy in order to improve its productivity and profitability (Abd-El Rahman *et al.*, 2020 and Abd-El Hamed and Kamel, 2021). Thus continuous evaluations of dairy cattle management conditions, environmental parameters, genetic and phenotypic trends, are needed to monitor whether the trends and parameters are desirable for each productive and reproductive trait (Zahed *et al.*, 2020).

Therefore, this study aimed to evaluate some of non-genetic and genetic parameters that affect the productive traits (total milk yield, lactation period and dry period) and reproductive traits (days open, calving interval, number of service per conception and age at first calving) of commercial Holstein Friesian cows herd in Egypt.

MATERIALS AND METHODS

Data of milk productive and reproductive traits were collected from a commercial farm of Holstein Friesian cows. The farm is located in the Gharbia Governorate in North of Nile Delta. Egypt. Total of 3596 records of 1021 Holstein Friesian cows (sired by 188 sire) in the first five parities were collected during the period from 2002 to 2016 (14 year). Abnormal records of cows affected by diseases such as mastitis, abortion and udder disorders.

* **Corresponding author.**
E-mail address : dr.amrgabr@mans.edu.eg
DOI: 10.21608/jappmu.2020.161235

Table 1. Frequency of records classified by season of calving and parity.

Items					
Season of calving	Winter	Spring	Autumn	Summer	
No. of records	862	272	1839	623	
Parity	1	2	3	4	5
No. of records	1021	854	756	694	271

The cows of the present study were isolated into different groups as per their milk production and reproductive status. Cows were housed freely in open yards with half-concealed pens. The cows were taken care of, not obligatory, total mixed ration (TMR) kept constant around the year. The TMR composition was dependent mainly on corn silage of great quality and soybean feast. Each morning the weight of feed refusals during the previous day was measured, then the offered feed was calculated.

Cows were machine milked three times daily. For three days out of every week the milk yield was recorded separately at each milking, at that point day by day and week after week milk average were determined for individuals. Calves were isolated after they nursed colostrum from their dams for three days. At about two months before the following calving cows were milk dried.

The estrus was distinguished by visually observing cows for about thirty minutes at morning and evening for cows anticipated to go into estrus. Cows showing estrus after 60 days postpartum were mated by means of planned impregnation from a solitary discharge of a solitary Friesian sire. Insemination took around 12 h after a cow was first noticed representing mounting. Pregnancy determination was performed by rectal palpation on day 40 after the last service. After 40 days, the cows were re-palpated for pregnant detection. Non-pregnant cows were put under estrus detection system that used for fresh cows.

The productive traits studied were: total milk yield (TMY, kg) and lactation period (LP, day) and Dry period (DP, d). The accompanying conceptive attributes were: days open (DO, day), number of services per conception (NSC), age at first calving (AFC, months) and calving interval (CI, day).

Statistical analyses were done for all data using general linear model procedure (SAS, 2014). Data of productive and reproductive traits were analyzed using the following model:

$$Y_{ijl} = \mu + P_i + S_j + e_{ijl}$$

Where,

Y_{ijl} = an individual observation, μ = the overall mean, P_i = fixed effect of i^{th} parity of calving, I = (1, 2, ... and 5), S_j = fixed effect of j^{th} season of calving, j = (1, 3, ... and 4), and e_{ijl} = residual term assumed to be randomly distributed with zero mean and variance σ^2e.

Animal models were used for analyses for all data to estimate the (Co)variance components estimation (VCE), using restricted maximum likelihood method in VCE6 (Groeneveld *et al.*, 2010). Different modeling strategies of multivariate animal models were used for: productive and reproductive traits and all studied traits together.

In general, multiple traits animal model used was:

$$Y = X\beta + Za + Wpe + e$$

Where:

Y = observations vector of records, β = the vector of fixed impacts, pe = the vector of environmental impacts contributed by dams to records of their progeny (maternal perpetual environmental), and e = the vector of leftover impacts. X, Z and W, are frequency networks relating records to fixed, direct genetic and maternal lasting environmental impacts, individually.

RESULTS AND DISCUSSION

The unadjusted means, standard deviations (SD) and coefficients of variations for studied productive and reproductive traits are presented in Table (2). The TMY average of the present study (5778.15 kg) was higher (4227 kg) reported by Abosaq *et al.* (2017), 2939 kg by Shehab El-Din (2020), and 3879 kg by Badr and Amer (2020), while it was lower than the TMY values of 8315 kg stated by Salem and Hammoud (2016), 6173.5 kg by Farrag *et al.* (2017) and 8675.26 kg by Kamal El-den *et al.* (2020) for Friesian cows of commercial herds in Egypt. The recorded unadjusted mean of LP (308.5 d) was close to that reported by Zahed *et al.* (2020)(302 d) and Shehab El-Din (2020)(310 d), while it was lower than that estimated by Abosaq *et al.* (2017)(327.3 d), Farrag *et al.* (2017)(359.2 d) and Kamal El-den *et al.* (2020) (358.25 d) for Friesian cows.

Overall mean of DO (99.56 d) detected in present study was shorter than means detected in different commercial Friesian herds (113.1, 144.49, 174.4, 166.50 and 159 d) obtained by (Salem and Hammoud, 2016; Abosaq *et al.*, 2017; Farrag *et al.*, 2017, Habib *et al.*, 2020 and Zahed *et al.*, 2020, respectively). Also, the present mean of CI (377.4 d) was shorter than that of 414.43, 472.0, 433.2 and 427.72 days as presented by Abosaq *et al.* (2017), Farrag *et al.* (2017), Zahed *et al.* (2019) and Habib *et al.* (2020), respectively. Mean of NSC (1.99) was comparable to that values given by Salem and Hammoud (2016)(2.0), Sanad and Hassanane (2017)(1.93) and Abosaq *et al.* (2017)(2.16), while it was lower than the values estimated by Habib *et al.* (2020)(3.0) and Zahed *et al.* (2020)(3.1). Regarding the AFC value (26.97 mo), in present study, it was nearly similar to (27.2 mo) as recorded by Salem and Hammoud (2016). On the other hand, higher AFC values (29.4, 32.5 and 30.9 mo) were obtained by Farrag *et al.* (2017), Sanad and Hassanane (2017) and Almasri *et al.* (2020), respectively.

Generally, the variations in estimates of present study and previous results for productive and reproductive traits are acceptable, and refer to the differences in management strategies and environmental conditions, as well as the genetic potentiality and breeding value of different Friesian herds.

Table 2. Unadjusted means, standard deviations (SD) and coefficient of variation (CV%) for studied traits.

Traits	Mean	SD	CV %
Total milk yield (TMY, kg)	5778.15	1054.42	18.24
Lactation period (LP, d)	308.53	67.56	21.89
Dry period (DP, d)	68.39	9.41	13.76
Days open (DO, d)	99.56	67.48	67.77
Calving interval (CI, d)	377.44	68.42	18.12
Number of services per conception (NSC)	1.99	1.47	74.14
Age at fist calving (AFC, mo)	26.97	3.57	13.26

Statistically season of calving showed significant effects on the studied productive traits (Table 3). It could be noticed that autumn and winter seasons presented the significant highest TMY values (5968.3 and 5704.5 kg, respectively), and the significant shortest LP (298.17 and 306.52 d, respectively). The TMY in autumn was higher by about 4.42%, 7.6% and 10.7 % than in winter, summer and spring, respectively. While, LP in autumn was shorter by about 2.7%, 8.9% and 12.8% than in winter, summer and spring, respectively. The results had to prefer the winter and autumn seasons which reflected in highest TMY than other seasons. This is an acceptable results related to comfortable wither in one side and available green fodder in other side.

Table 3. Least square means (±SD) for season of calving effect on total milk yield (TMY, kg), lactation period (LP, day) and dry period (DP, day) of Friesian cows.

Season of calving	N	TMY, kg	LP, d	DP, d
Spring	272	5329.5±1310.0^{d}	342.33±95.88^{a}	69.50±11.82^{a}
Summer	623	5514.8±1298.7^{c}	327.34±69.82^{b}	68.09±9.39^{b}
Autumn	1839	5968.3±1252.2^{a}	298.17±56.13^{d}	68.33±9.30^{b}
Winter	862	5704.5±1347.9^{b}	306.52±82.05^{c}	68.39±9.02^{b}

Means in the same column having different small letters (a-d) are significantly differed (P<0.05).

These present results are in agreement with Sanad and Hassanane (2017) who found higher MY and shorter LP in winter and autumn compared to spring and summer for Friesian cows in Egypt. In the same trend, Abdel-Gader *et al.* (2007) and Mohamed *et al.* (2017) detected that TMY in winter was higher than in spring and summer. Additionally, Kamal El-den *et al.* (2020) found also that season of calving has significant effect on TMY and LP, since cows calved in winter had significantly higher TMY (8369.01 kg) than those in other seasons. With regard to DP, data in Table (3) showed no significant difference for seasons of calving, except in spring the mean of DP was the highest significant value (69.50 d) compared to other seasons. In this aspect, Sanad (2016) found also significant longer DP (80.7 d) in spring compared with other seasons.

Table 4. Least square means (±SD) for season of calving effect on days open (DO, day), calving interval (CI, day), number of serviced conception (NSC) and age at first calving (AFC, mo) of Friesian cows.

Season of calving	N	DO, d	CI, d	NSC	AFC, mo
Spring	272	134.77±92.78^{a}	412.8±93.55^{a}	2.147±1.670^{b}	27.32±3.956^{ab}
Summer	623	117.88±67.92^{b}	395.3±68.81^{b}	2.337±1.851^{a}	27.45±4.114^{a}
Autumn	1839	88.88±54.57^{d}	366.7±55.72^{d}	1.867±1.416^{c}	26.94±3.551^{bc}
Winter	862	98.04±86.50^{c}	376.3±86.92^{c}	1.964±1.434^{c}	26.62±3.400^{c}

Means in the same column having different small letters (a-d) are significantly differed (P<0.05).

Season of calving had significant effects on the studied reproductive traits (Table 4). The obtained results showed significant effects of season on the examined reproductive traits (DO, CI, NSC and AFC). The highest lengths in DO, CI and AFC as well as NSC were recorded during spring and summer seasons in relation to that at autumn and winter. No doubt that the hot wither effect had rolled in these effects. Results presented that DO was significantly longer in spring (134.77 d) than summer, winter and autumn by about 12.5%, 27.3% and 34.1%, respectively. The same trend was for CI, it was significantly longer in spring (412.8 d) than in summer, winter and autumn by about 4.2%, 8.8% and 11.2%, respectively. The NSC value was significantly higher in summer than in spring (2.34 and 2.15, respectively), and both seasons were significantly higher than in autumn and winter (1.87 and 1.96, respectively). Moreover, the AFC values was higher in summer and spring (27.45 and 27.32 mo, respectively) than in winter and autumn (26.62 and 26.94 mo, respectively) (Table 4).

In relation to present study results, Rushdi (2015) recorded that spring had significantly longer DO (281.11 d) and the shortest was in autumn (167.70 d). Faid-Allah (2015) noticed the same conclusion that DO affected significantly by season of calving, while longest DO was in winter (155.05 d). Sanad (2016) detected also highly significant effect for season of calving on CI, but the longest CI was in winter (461.0 mo) and the lowest was in autumn (448.9 mo). While, Sanad and Hassanane (2017) found that the NSC in winter (1.91) was higher than in summer (1.75) and spring (1.79). Regarding AFC, present obtained results are in agreement with Sanad and Hassanane (2017) who reported higher AFC in summer (33.74 mo) and lowest value was in winter (32.9 mo) for Friesian cows in Egypt. Faid-Allah (2015) detected the same significant effect of season of calving on AFC, but in contrast with present results, since significantly longest AFC was in winter (31.02 mo) and the shortest was in spring (28.22 mo).

Table 5. Least square means (±SD) for effect of parity on total milk yield (TMY, kg), lactation period (LP, day) and dry period (DP, day) of Friesian cows.

Parity	N	TMY, kg	LP, d	DP, d
1st	1021	4915.3±1155.8^{e}	321.26±82.14^{a}	67.61±9.33^{b}
2nd	854	5502.2±1118.1^{d}	306.61±66.18^{b}	68.52±10.29^{ab}
3rd	756	6020.0±1075.8^{c}	302.71±66.43^{b}	68.72±9.41^{ab}
4th	694	6623.6±1055.8^{b}	302.28±57.80^{b}	68.66±8.76^{ab}
5th	271	7032.9±1001.3^{a}	299.94±71.08^{b}	69.32±8.98^{a}

Means in the same column having different small letters (a-e) are significantly differed (P<0.05).

Data presented in Table (5) indicated that parity has significant effect on studied productive traits. The parity showed significant trend of effect of increasing in TMY and DP in one side, and decreasing in LP in the other side (Table 5). The increase in body weight and udder function with progressive in age lead TMY. However, the increase in LP leads to decrease in DP to be normal relation within the period of calving interval (CI). The TMY values significantly increased by parities and the highest TMY were reached in the fifth parity (7032.9 kg). Related to the fifth parity the TMY was increased by about 30.1%, 21.8%, 14.4% and 5.8% than the first, second, third and fourth parities, respectively. In contrast the significant longest LP was found in first parity (321.26 d), while no significant difference was detected between other parities. On the other hand, the fifth parity had the longest DP (69.32 d) that differs significantly with the first parity (67.61 d).

In this aspect, Faid-Allah (2015), Salem and Hammoud (2016), Sanad (2016) and Kamal El-den *et al.* (2020) concluded also significant effect of parity on TMY and LP. In agreement with present study, Faid-Allah (2015) and Sanad (2016) reported the significant highest TMY was in fifth parity (8377.69 and 3396.4 kg, respectively) and the lowest was in first parity (5220.24 kg, 2971.9 kg, respectively). But in contrast with present results, Kamal El-den *et al.* (2020) cleared that the lowest TMY was in the sixth parity (7109.18 kg), and that was by about 16% lower than the first parity (8467.55 kg). Concerning LP, contrary to present result, Faid-Allah (2015) and Sanad (2016) found the lowest LP was in first parity (283.83 and 313.8 d, respectively) with a significant difference with the fifth parity (356.37 and 334.6 d, respectively). While, result found by Kamal El-den *et al.* (2020) was in agreement with present study, since the longest LP was in first parity (364.67 d) and then LP significantly decreased at the sixth parity (305.28). As for DP, Faid-Allah (2015) found also significant increasing of DP in fifth parity (76.54 d) than the first parity (63.35 d). Contrary, Sanad (2016) found the highest DP was in first parity (80.3 d) and the lowest was in fifth parity (77.5 d).

Table 6. Least square means (±SD) Effect of parity on days open (DO, day), calving interval (CI, day), number of services per conception (NSC) and age at first calving (AFC) of Friesian cows.

Parity	N	DO, d	CI, d	NSC	AFC, mo
1st	1021	111.67±80.88^{a}	388.8±81.96^{a}	1.743±1.245^{c}	26.70±3.572^{b}
2nd	854	97.46±63.91^{b}	374.8±64.72^{b}	2.134±1.632^{ab}	26.93±3.580^{ab}
3rd	756	94.61±70.14^{b}	373.1±72.31^{b}	2.081±1.634^{ab}	27.06±3.667^{ab}
4th	694	93.34±60.44^{b}	371.7±58.73^{b}	2.001±1.546^{b}	27.24±3.702^{a}
5th	271	91.01±68.95^{b}	370.5±70.95^{b}	2.210±1.740^{a}	27.29±4.047^{a}

Means in the same column having different small letters (a-e) are significantly differed (P<0.05).

Table (6) presented that parity has significant effect on all studied reproductive traits. The number of parity showed trend of decreases in DO and CI, in the other direction increases in NSC and AFC with progressive in parity. The DO in first parity (111.67 d) was significantly longer than other parities, with no significant difference detected between them. The same trend was for CI, since first parity was the significantly longest (388.8 d) than other parities. The contrarily trend was for NSC, the highest significant value was in fifth parity (2.21) and the significant lowest was in first parity (1.74). The same was for AFC, since the fifth parity was significantly highest value (27.29 mo) and the first parity was the lowest (26.70 mo).

In agreement with present results, previous studies concluded significant effects of parity on DO (Faid-Allah, 2015; Rushdi, 2015 and Salem and Hammoud, 2016), CI (Sanad, 2016), NSC (Salem and Hammoud, 2016 and Sanad and Hassanane, 2017) and AFC (Sanad and Hassanane, 2017). Contradictory to present results, Faid-Allah (2015) and Abosaq *et al.* (2017) indicated that DO increases from the first parity (100.78 and 148.31 d, respectively) to the fifth parity (186.51 and 180.1 d, respectively). The same trend of DO was also mentioned by Rushdi (2015). Likewise, Sanad (2016) recorded that CI was also increased from the first parity (440.2 d) to the fifth parity (461.3 d). While, Abosaq *et al.* (2017) found that CI slightly decreased from 446.27 to 426.96 d in fifth parity. Moreover, Sanad and Hassanane (2017) found that NSC significantly decreased from first parity (1.97) to the fifth parity (1.71). While, no significant effect of parity on NSC was detected by Salem and Hammoud (2016). Regarding the AFC, Faid-Allah (2015) noticed that the AFC was lower in first parity (25.00 mo) than in fifth parity (33.08 mo). On the other hand, Sanad and Hassanane (2017) cleared that the AFC values were slightly decreased from first parity (33.1 mo) to the fifth parity (32.6 mo).

Table 7. Direct heritability (h2) estimates (on the diagonal), genetic correlations (above the diagonal) phenotypic correlations (below the diagonal) of the productive and reproductive studied traits for Friesian cows.

Traits	TMY	LP	DP	DO	CI	NSC	AFC
TMY	0.110±0.027	0.031±0.333	-0.182±0.294	0.043±0.313	0.048±0.313	0.293±0.187	0.236±0.130
LP	0.000	0.089±0.037	0.464±0.261	0.997±0.004	0.993±0.004	0.780±0.266	0.138±0.291
DP	-0.033	-0.069	0.071±0.028	0.515±0.236	0.555±0.235	0.438±0.297	0.629±0.235
DO	-0.006	0.988	0.016	0.100±0.038	0.998±0.002	0.771±0.261	0.156±0.278
CI	-0.002	0.989	0.052	0.989	0.103±0.037	0.782±0.257	0.207±0.277
NSC	-0.018	0.132	-0.016	0.137	0.131	0.123±0.050	0.524±0.182
AFC	-0.024	0.043	-0.013	0.039	0.043	0.501	0.168±0.049

TMY= Total milk yield, LP= Lactation period, DP= Dry period, DO=Days open, CI=Calving interval, NSC=Number of services per conception, AFC= Age at first calving.

Estimates of heritability as well as genetic and phenotypic correlations among studied productive and reproductive traits are presented in Table (7). Heritability estimates for TMY, LP, DP, DO, CI, NSC and AFC are 0.110, 0.089, 0.071, 0.100, 0.103, 0.123 and 0.168, respectively. These estimates are low to moderate and in agreement with most of the previous studies. Higher heritability estimates for TMY were 0.223, 0.33, 0.32 and 0.28 as detected by Faid-Allah (2015), Sanad (2016), Badr and Amer (2020) and Kamal El-den *et al.* (2020), respectively. While, lower and closer TMY heritability estimates were reported by Salem and Hammoud (2016), Sanad and Hassanane (2017) and Zahed *et al.* (2019) (0.065, 0.17 and 0.17, respectively). The higher LP heritability estimates for LP were 0.112, 0.17, 0.10, 0.13 and 0.11 as found by Faid-Allah (2015), Sanad and Hassanane (2017), Badr and Amer (2020), Kamal El-den *et al.* (2020) and Zahed *et al.* (2020). On the other hand, lower and similar heritability estimates for LP were 0.029, 0.08 and 0.07 as reported by Salem and Hammoud (2016), Sanad (2016) and Abosaq *et al.* (2017). The DP heritability estimated herein (0.071) was lower than that found by Faid-Allah (2015)(0.119) and higher than Sanad (2016)(0.04).

The heritability estimated for DO in present study (0.100) was in more close to the values of 0.105, 0.11 and 0.19 that recorded by Faid-Allah (2015), Rushdi (2015) and Habib *et al.* (2020), while was higher than those estimated by Salem and Hammoud (2016), Abosaq *et al.* (2017) and Zahed *et al.* (2020) as being 0.028, 0.04 and

0.044, respectively. The CI heritability estimated (0.103) was higher than those noticed by Sanad (2016), Abosaq *et al.* (2017), Zahed *et al.* (2019) and Habib *et al.* (2020) as being 0.07, 0.03, 0.04 and 0.09, respectively. Likewise, the heritability of NSC (0.123) was higher than those presented by Salem and Hammoud (2016), Abosaq *et al.* (2017), Sanad and Hassanane (2017), Habib *et al.* (2020) and Zahed *et al.* (2020)(0.006, 0.03, 0.06, 0.04 and 0.01, respectively). Contrariwise, the heritability estimated for AFC (0.168) was lower than those noticed by Faid-Allah (2015), Salem and Hammoud (2016) and Sanad and Hassanane (2017) as being 0.285, 0.264 and 0.36, respectively.

In general, the heritability explains the difference among individual cows associated with genetic variance (Ali *et al.*, 2019). Therefore, the low heritability estimates of traits indicate that the influence of herd management and other environmental factors were greater than the genetic background (Badr and Amer, 2020).

Table (7) represents the genetic and phenotypic correlation among studied productive and reproductive traits. All coefficients were positive for phenotypic correlations and ranged from 0.016 to 0.989, except that between TMY and all the reproductive traits as well as DP were negative. Additionally, the DP phenotypic correlations with NSC and AFC were negative (-0.016 and -0.013, respectively) and also with LP (-0.069). Moreover, the coefficients of genetic correlations among all studied productive and reproductive traits were positive and ranged from 0.031 to 0.998, except DP and TMY was negatively correlated (-0.182).

CONCLUSION

Nowadays a lot of commercial herd were excited in Egypt for producing milk. The importation of each herd man in his cows increases its production from milk from generation to another. In the way of reaching this aim the milk production as well as reproduction the traits affecting are very important to be evaluated. Thus, recording and then studying the relations between each trait with other represent the first step in the way of improving these traits.

Therefore, in the present study the total milk yield, lactation period and dry period as production traits as well as the days open, calving interval, number of services per conception and age at first calving as reproduction traits were recorded Table 2, then, the effect of season on either productive and reproductive traits were evaluated as shown Tables 3, 4 and the same effect on number of parity on the productive and reproductive traits shown in Tables 5 and 6.

The previous results were used to estimate the heritability of TMY, LP, DP, DO, CI, NSC and AFC as 0.027, 0.037, 0.028, 0.038, 0.037, 0.050, 0.049, respectively. All coefficients were positive for phenotypic correlations and ranged from 0.016 to 0.989, except that between TMY and all the reproductive traits as well as DP were negative. However, the genetic correlations for most of the traits were positive and ranged between 0.031 to 0.998, except for DP and TMY was negatively correlated (-0.182).

Finally, the results are important to select the environmental condition and the positive traits relations to improve the productive and reproductive performance traits of the cows in the commercial herd.

REFERENCES

Abd-El Hamed, A.M. and E.R. Kamel (2021). Effect of some non-genetic factors on the productivity and profitability of Holstein Friesian dairy cows. Veterinary World, Vol. 14(1):242-249.

Abd-El Rahman, H.A., F.A.M. Hassan, E.R. Kamel (2020). Application of linear discriminant model to evaluate the association between milk production, reproductive performance, and calving season in dairy cattle. Benha Veterinary Medical Journal Vol. 39:138-141.

Abdel-Gader, A.Z., M.K.A. Ahmed, L.M.A. Mousa, and K.J. Peters, (2007). Milk yield and reproductive performance of Friesian cows under Sudan tropical conditions. Arch Tierz., Dumnerstorf., 50: 155-164.

Abosaq, F.M., S.M. Zahranm, A.S. Khattab, H.S. Zeweil, and S.M. Sallam (2017). Improving reproductivity and productivity traits using selection indices in Friesian cows. J. Adv. Agric. Res. Vol. 22(1): 110-120.

Ali, I., S.M. Suhail, and M. Shafiq (2019). Heritability estimates and genetic correlations of various production and reproductive traits of different grades of dairy cattle reared under subtropical condition. Reprod. Dom. Anim., Vol. (54):1026–1033.

Almasri, O., S. Abou-Bakr and M.A.M. Ibrahim (2020). Effect of age at first calving and first lactation milk yield on productive life traits of Syrian Shami cows. Egyptian J. Anim. Prod. Vol. 57(2):81-87.

Badr, A.A.A. and A.A.A. Amer (2020). Genetic Evaluation for some Economically Importance Variables in Friesian Cows. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 11(4): 133-136.

El-Tarabany, M.S. and K.M., El-Bayoumi (2015). Reproductive performance of backcross Holstein×Brown Swiss and their Holstein contemporaries under subtropical environmental conditions. Theriogenology, 83:444–448.

Faid-Allah, E. (2015). Genetic and non-genetic analysis for milk production and reproductive traits in Holstein cattle in Egypt. JITV, Vol. 20(1):10-17.

Farrag, F. H., N.A. Shalaby, A.A. Gabr and M.A. El Ashry (2017). Evaluation of Friesian cattle performance at first lactation under different Egyptian conditions. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 8(1): 7-11.

Groeneveld, E., M. Kovač and N. Mielenz (2010). VCE User's Guide and Reference Manual, version 6.0. Institute of Farm Animal Genetics; Neustadt, Germany.

Habib, A.A., G.F. Gouda, A.R. Shemeis and M. El-Sayed (2020). Expected impact of selection for milk yield on reproductive performance traits in Holstein Friesian cows under Egyptian conditions. Egyptian J. Anim. Prod. Vol. 57(1):25-31.

Kamal El-Den, M.A., S.S. Sanad and A. Kh. Refaey (2020). Genetic evaluation for milk production traits a herd of Friesian Cattle raised in Egypt. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 11(10): 405-409.

Mohamed, N.I., U.E. Mahrous and S.Z. Kamel (2017). Effects of breed, calving season and parity on productive and economic indices of dairy cows. AJVS. Vol. 55(2): 68-76.

Rushdi, H.E. (2015). Genetic and phenotypic analyses of days open and 305-day milk yield in a commercial Holstein Friesian herd. Egyptian J. Anim. Prod. Vol. 52(2): 107-112.

Salem, M.M.I. and M.H. Hammoud (2016). estimates of heritability, repeatability and breeding value of some performance traits of Holstein cows in Egypt using repeatability animal model. Egyptian J. Anim. Prod. Vol. 53(3):147-152.

Sanad, S.S. and M.S. Hassanane (2017). Genetic evaluation for some productive and reproductive traits in Friesian cows raised in Egypt. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 8(8): 227-232.

Sanad. S.S. (2016). Genetic improvement using the selection indices for some productive and reproductive traits in Friesian cattle raised in Egypt. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 7(12): 475-482.

SAS (2014). Statistical Analysis System User's Guide. SAS Institute Inc., Cary, NC, USA.

Shehab El-Din, M.I. (2020). Genetic evaluation for some productive and reproductive traits of Friesian cattle raised in Egypt. Ph.D. Thesis, Fac. of Agric., Al-Azhar Univ., Egypt.

Zahed, S.M., A.A.A. Badr and A.S. Khattab (2020). Genetic and phenotypic association between productive and reproductive traits in Friesian cows in Egypt. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 11(3): 83-88.

Zahed, S.M., S.Z.M. Ebrahim and Y.M. El-Diahy (2019). Genetic and phenotypic parameters and trends for milk yield, service period and calving interval and the economic impact of extending a calving interval on-farm profitability in Friesian cows in Egypt. J. Anim. and Poultry Prod., Mansoura Univ., Vol. 10 (12):387-393.

تقييم بعض الصفات الاقتصادية لأبقار الهولشتاين فريزيان المرباه بإحدى المزارع التجارية في مصر

فايق حسني فراج ، ناظم عبد الرحمن شلبي ، عمرو أحمد جبر و محمد أحمد محمد لحول
قسم انتاج الحيوان ، كلية الزراعة ، جامعة المنصورة

أجريت هذه الدراسة لتقييم تأثير موسم الولادة وموسم الانتاج وبعض العوامل الوراثية على الصفات الإنتاجية والتناسلية لإحدى المزارع التجارية تحت الظروف المصرية. تم تجميع بيانات انتاج اللبن والتناسل من 1021 بقرة هولشتاين فريزيان (عدد 3596 سجلاً) لعدد خمس مواسم انتاجية خلال المدة من سنة 2002 إلى سنة 2016. تشمل الصفات المدروسة كلا من الصفات الإنتاجية (انتاج الحليب الكلي (كجم)، عدد أيام الحليب (اليوم) وفترة الجفاف (اليوم)، فضلاً عن الصفات التناسلية (طول فترة الأيام المفتوحة (اليوم)، والفترة بين ولادتين (اليوم) وعدد التلقيحات اللازمة للإخصاب، والعمر عند أول ولادة (أشهر). وكشفت النتائج أن موسم الولادة وموسم الحليب كان لهما تأثير معنوي على جميع الصفات المدروسة. واوضحت النتائج أنه المكافئ الوراثي لإنتاج الحليب الكلي وعدد أيام الحليب وفترة الجفاف وطول الايام المفتوحة وفترة الولادة وعدد التلقيحات اللازمة للإخصاب و العمر عند أول ولادة كانت 0.110 , 0.089 , 0.071 , 0.100 , 0.103 , 0.123 , 0.168 على التوالي. وكذلك كانت الارتباطات الظاهرية لجميع الصفات المدروسة إيجابية وتراوحت بين 0.016 إلى 0.989 ، فيما عدا الارتباط بين انتاج الحليب الكلي وجميع الصفات التناسلية وكذلك مع فترة الجفاف فقد كانت سلبية. واوضحت النتائج أن قيم الارتباطات الوراثية بين جميع الصفات الإنتاجية والتناسلية التي تمت دراستها كانت إيجابية وتراوحت بين 0.031 و0.998، باستثناء الارتباط بين فترة الجفاف وانتاج الحليب الكلي فقد كانت سلبية. هذه الدراسة تعد وسيلة فعالة توضح أهمية مراعاة الظروف البيئية المناسبة والارتباطات الوراثية الإيجابية في تصميم برامج تعمل على تحسين الاداء الانتاجي والتناسلي للأبقار الهولشتاين فريزيان في المزارع التجارية .