J. Animal and Poultry Prod., Mansoura Univ., Vol.9 (5):253 - 258, 2018

Genetic Evaluation of some Productive and Days Open Traits in a Commercial Friesian Herd in Egypt Using Different Animal Models

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ABSTRACT

Estimates of covariance component and some genetic parameters were evaluated by using multi traits animal models, for Total milk yield (TMY),Lactation length (LL)) ,Dry period (DP) and Days open(DO). In this study the normal lactation records(4758) of Friesian cattle collected during the period from (2002 to 2010) from the farm of Investment Company Dairy Products Kilo 80 Cairo Alexandria Desert Road (Dina farm) were used .In the three mixed model used the analysis included the non genetic effects of month and year of calving and the random effects of additive direct genetics, maternal effect and residual. The overall means for TMY, LL,DP and DO were 10224 kg, 413d, 108d and 221d,respectively.However,the coefficient of variation (C.V%) were ranged from (32%) TMY to (82%) DP during the first lactation. The large coefficient of variation, would be important indicative leaders in this study. The results showed the estimates of covariance components and heritability for different studied traits.The obtained results showed that, Additive genetic variances were higher; in model(2)for total milk yield, in model(3) for lactation length, in model(1) for dry period and in model(3)for days open. In the other side maternal genetic variances was higher in model(3) for the studied traits. However, residual and phenotypic variances were higher mostly in model (2)and model(3)than their corresponding values in model(1).The estimates of heritabilities using the three models for TMY,LL, DP and DO were ranged from (0.48±0.04) to (0.59±0.03), (0.01±0.00) to (0.06±0.3) , (0.03±0.07) to (0.08±0.03) and(0.01±0.0) to (0.12±0.03), respectively. However, the obtained estimates of maternal heritabilities were very low in the three models for TMY, LL, DP and DO. It ranged from (0.00 ±0.00) to (0.19±0.02),(0.00 ±0.00)to (0.01±0.01),(0.01±0.01) to (0.07 ±0.02) and(0.00 ±0.00)to (0.01±0.01),respectively.The results recorded different estimates of phenotypic and genetic values between examined traits ,The experimental results lead to concluded that, the influence of the maternal genetic effect for traits were the lowest, thereby no relative efficiency of improvement .vice-versa, direct heritability for TMY and DO would be efficiency.

Keywords: Total milk yield, Lactation length, Dry period, Days open, direct additive heritability , maternal heritability and Holstein Friesian, Egypt.

INTRODUCTION

Recently in Egypt ,many private dairy cattle farms were established through introducing Holstein Friesian cattle .Some genetic aspects of productive and reproductive performance of this breed under the Semi-arid Conditions in Commercial herds were reviewed by Abdel-Salam *et al*.,(2001),Afifi *et al*., (2002) ,El-Arian *et al*.,(2003),Nigm *et al*.,(2003) ,Zahed *et al*.,(2003). Milk yield and fertility traits are the principal factors affecting profitability of a dairy herd. Early postpartum breeding of dairy animals for high fertility, short dry period and early maturity are resulted in more calves and high milk yield per unit of time throughout the herd life (Britt,1975).Nevertheless, genetic improvement of productive and reproductive traits is almost non-existent in Egypt. Even some improvement programs for increasing dairy yield have been implement ,they have not survived due to the lack of financial resources, Garcia *et al*.,2002;Grajales *et al*.,2006)

The objective of this study were to determine the genetic, phenotypic parameters for Total milk yield (TMY),Lactation length (LL), Dry period(DP) and Days open(DO) using different animal models in Friesian cattle in Egypt.

MATERIALS AND METHODS

Data used in the present study was obtained from the milk records of Friesian cows maintained at Investment Company Dairy Products(Dina farm) Kilo 80 Cairo Alexandria Desert Road ,Egypt. The nucleus of this herd was imported to Egypt from the United States of America (USA) as pregnant heifers in (1968).A Total of (4758) normal lactation records spread over the period from (2002-2010). First ,The milk records used were from 996 Holstein Friesian cows, daughters of 695 dams and 98 sires . Abnormal records of cows affected by diseases(such as mastitis and udder troubles) or reproductive disorders were excluded.

The data were edited with wrong and missing information excluded from the data set. All cows had their sire and dam identified for the analysis of genetic value and based on this information in the farm .The heifers were served for the first time when reached 18 month or 350 kg of weight. Traits studied were total milk yield (TMY), lactation length (LL), dry period(DP) and days open(DO).

Animals were kept under Semi-open asbestos sheds. All cows were fed concentrate mixture with Egyptian clover and rice straw during the year. Grasses during the dry season (cold or hot), were usually insufficient because of the lack of irrigation. Thus, rice straw, hay and silage were used as supplements. The concentrate mixture used was composed of 45% cotton seed cake. 26 %wheat bran, 17% yellow maize,7.5% rice bran, 2%molasses,1%sodium chloride and 2% calcium carbonate. The concentrate was offered twice daily before milking according to animal body weight and its milk production . Cows In general, were artificially inseminated during the first two heats after 60 days postpartum using important frozen semen from USA. Heifers were artificially inseminated for the first time once they attained 350 kg of live body weight or 18 month of age. The cows were machine milked three times a day at 4.00,12.00 and 19.00h .The born calves were artificially suckled from birth to weaning excluding colostrums' period. Water and minerals mixture were also available freely all time.

The collected data were analyzed using multi-traits animal model of VCE-6 computer package (Groeneveld et al.,2008) for estimate genetic parameters by restricted Maximum Likelihood procedures (REML) using multi-traits animal modesl. The following three models were used:-

Model 1:-y=xb+z $_1$a+e

Model 2:-y=xb+z $_1$a+z $_3$ m+e, Cov(a,m)=0

Model 3:-y=xb+z $_1$a+z $_3$ m+e , Cov(a,m)=Aσ(a,m)

The models of statistical analysis used for studying factors affecting some productive traits ,i.e. Total milk yield (TMY/kg) ,Lactation length(LL/d), Dry period (DP/d) and one of reproductive traits ;i.e., Days open (DO/d).in the first lactation.

Where:

y = is being the vector of observations for the traits(TMY,DP,LL and DO on the animal
x = is being incidences matrix of fixed effects
b = is being the vector of fixed effects (e.g year-season)..including lactation number, breed group and year –season of calving
z = are incident matrix of fixed and random effect to the observation
I= is identity matrix
a = is the vector of random direct additive genetic effect of the animal
za = is incidence matrix of animals random direct additive effects
zm = is being incidence matrix of maternal random additive effects
m = maternal genetic effect.
e = is being the vector of random the residual effects.
x,z$_1$ and z$_3$ are corresponding design matrices associating the fixed effects
The assumptions about the variances of the random effects were:
Var(a) = A σa where A is the numeration relationship matrix(NRM)
Var(e) = 1σe where 1 is the identity matrix.
$σ_{a\,m}$=is the additive direct and maternal genetic.
A = is the additive numerator of the relationship matrix.

RESULTS AND DISCUSSION

The overall means, standard deviations (SD) and coefficient variabilites (C.V%) for different studied traits at the first lactation are present in Table(1).The overall means for TMY,LL,DP and DO were 10224kg,413day,108day and 221day respectively.

Total milk yield in this study (Table1.) was 10224kg,. was much higher than the estimates of Friesian cattle in Egypt 2737Kg by Oudah and Zainab (2010),3639Kg by El-Awady and Oudah(2011) and5387kg by Shalaby, *et al*., (2013). However, it was lower than estimated by Rushdi *et al*., (2014)10718 kg .The high milk yield usually indicated to genetic and environment mainly the good nutrition program.

The present lactation length (413days) was higher than that 327 days obtained by Shalaby,*et al*.,(2013).,(392 days by Hammoud and Salem.,(2013). , (291 days) by Sattar *et al*., (2005) and 315 days by Ayalew, *et al*.,(2017).The obtained overall mean of DP was 108 day at first lactation, It was longer than that (65 days) of Kattab and Atill (1999) 63 days, of Salem *et al* ., (2006)79 days, of Oudah *et al*.,(2001) using Friesian cattle in Egypt. However, Shalaby,*et al*.,(2013) recorded shorter mean of DP (72 days). In other studies Shalaby *et al*.,(2001) obtained141 days and Abo Elfadi and Radwan.,(2016) obtained 185 days.

Table 1. Estimate of overall means, standard deviations (±SD) and coefficient variabilities (C.V%)for Total Milk yield (TMY),Lactation Length (LL), Dry period (DP)and, Days Open(DO), during the first lactation

Traits	Mean	±SD	C.V%
TMY/kg	10224	3280	32
LL/day	413	155	38
DP/day	108	89	82
DO/day	221	153	69

Table (1) shows that mean of DO of Holstein Friesian cattle was 221days.The present DO were longer than that found by Shalaby *et al*., (2013)(121 days), Ayalew,*et al*.,(2017) 184 days and Abo Elfadi and Radwan.,(2016) 185 days at first lactation. Generally, under the reflection of high daily milk, the farmer prefer longest days open in one hand and shortest dry period in the other hand .In spite of ,the farmer know that the days open is considered as a good indicator for reproductive performance. The length of DP is high and unfavorable indicating that high producing cows might have been exposed to negative energy balance at re-breeding time.

The coefficients of variations (C.V %) ranged from 32% in TMY to 82% in (DP) for the first lactation. The variations in coefficients of variations may be resulted from differences between traits of breed, climatic condition and differences in statistical models and feeding systems. However, the coefficients of variation are good opportunities for improving the examined traits.

Table 2. Estimates of covariance components and heritabilities for different studied traits.

Traits	Model	$σ^2_a$	$σ^2_m$	$σ_{a\,m}$	$σ^2_e$	$σ^2_p$	h^2_a±SE	h^2_m±SE	R_m ±SE
	1	227.7±27.3	---	---	246.6	474.3	0.48±0.04	---	---
TMY	2	275.3±11.2	0.17±0.39	---	286.6	561.9	0.49±0.02	0.00±0.00	
	3	241.2±17.4	79.3±8.5	-155.2±13.4	398.3	408.8	0.59±0.03	0.19±0.02	-0.94±0.04
	1	136.5±66.9	-----	---	2138.5	2275	0.06±0.3	---	---
LL	2	291.0±75.3	1.46±3.63	---	28801.5	29100	0.01±0.00	0.00±0.00	
	3	535.1±208.9	158.9±158.5	-254.0±133.7	2389	2675	0.02±0.00	0.01±0.01	-0.87±0.21
	1	611.8±233.9	----	---	7035.7	7647	0.08±0.03		
DP	2	269.8±57.87	96.9±11.7	---	8626.3	8993	0.03±0.07	0.01±0.01	
	3	298.0±157.7	559.1±169.0	21.6±77.7	6571.3	7450	0.04±0.02	0.07±0.02	0.05±0.18
	1	278.6±893.6	----	---	2042	2321	0.12±0.03	---	
DO	2	263.4±66.5	2.20±5.79	---	2368.4	2634	0.01±0.0	0.00±0.00	
	3	455.1±147.0	321.5±163.4	-314.2±76.5	871	2275	0.02±0.01	0.01±0.01	-0.82±0.12

TMY=Total Milk yield ;LL=lactation length; DP=Dry period; DO =Days open ; σ2 a=direct additive genetic variance; σ2 m= maternal additive variance ; σ am = direct and maternal additive genetic co variance ; σ2 e =residual variance ; σ2 P = phenotypic variance ;h2 a =direct heritability ; h2 m = maternal heritability ;Ram =correlation between direct and maternal additive genetic effect.

Estimate of covariance components and heritabilities(h^2) for studied different traits are present in Table(2).The additive genetic variances were found to be higher in model(2)than model(1) and model(3)for total milk yield ;was higher in model(3)than model(2) and model(1)for lactation length; was higher in model(1)than model(2)and model(3) for dry period and was higher in model(3) than model(1) and model(2) for days open. Table (2) showed also that maternal genetic variances was higher in model(3) than model(1) and model (2) for the studied traits. However, residual and phenotypic variances were higher mostly in model (2)and model(3)than the corresponding value in model(1).

In a similar study, Abo Elfadi and Radwan.,(2016) applied different animal models to compare full animal model, with covariance or without covariance between direct and maternal genetic effects They obtained additive genetic variance for total milk yield of 39528.9 in model(2) at the first lactation .The previous results of Abo Elfadi and Radwan.,(2016) contradicted the present study that highest variances components in model(2) for first lactation not only depend on genetic potential of an animal but also on maternal affect plus environment either permanent temporary.

In the case of the estimates of direct heritability for TMY by the three models, it ranged from (0.48±0.04 to 0.59±0.03),the higher value of estimates was in model(3),while the lowest value was in model(1). The results indicated that most of the performance of productive traits not only depend on genetic potential of an animal but also on maternal effect plus environment either permanent or temporary. The obtained present estimate of direct heritability was higher than 0.20 obtained by Ozyurt and Akman(2009) for Friesian cattle .However the present value was near to that (0.4) found by Abdel Gill (1996) for TMY. Abo Elfadi and Radwan.,(2016) recorded direct heritability for TMY were (0.26,0.43 and 0.25)by using the three models.

The estimates of direct heritability for (LL) in the three used models ranged between (0.01±0.00 to 0.06±0.03).The higher estimate value was obtained by model(3),while the lowest value was in model(1).In this respect the estimate of (LL) was (0.14)found by Kassab ,*et al*,.(2001) to be lower than that of the present study .

The estimate of direct heritability for DP in the three models were ranged from (0.03±0.07) in model 2 to (0.08±0.03) in model 1.These values were higher than 0.05 and 0.02,by Salem ,*et al*,.(2006) and Salem and Adel Raouf .,(1999), respectively on Holstein Frisian cattle in Egypt. Nearly, similar values were given by Javed ,*et al*.,(2001) showed the estimates of heritability for DP on the basis of first lactation was 0.026±0.027 and Ahmad *et al*.,(2001) recorded 0.07±0.02 for dry period. Table (2) showed The estimates of direct heritability of DO. It ranged between 0.01±0.0 to 0.12±0.03.Similar estimate (0.11±0.033) by Birhanu *et al*., (2015) on Holstein Friesian cattle was found.

The values of direct heritability for DO in the examined three models were ranged between 0.01±0.0 in model 2 to 0.12±0.03 in model 1 ; to be similar trend of direct heritability of LL. The similar trend for LL and DO may be due to the longer days open in side of the period of lactation length.

The values of present estimates of maternal heritability Table (2) was very low in the three models for TMY, LL, DP and DO ranged from (0.00±0.00 to 0.19±0.02, (0.00±0.00) to 0.01±0.01), (0.01±0.01 to 0.07±0.02and (0.00±0.00) to 0.01±0.01)respectively. Nearly similar results were found by Khattab, *et al*.,(2005) and Mostafa *et al*.,(2013),thus it could be concluded that maternal effects not so important for milk traits in dairy cattle. In the same trend of estimates herein for maternal heritability those obtained by Lee and Han.,(2004) for DO (0.005) on Korean Holstein cows and by Berry *et al*.,(2008) was (0.01) for TMY on Friesian.

The Direct genetic correlations and maternal genetic correlations of studied traits in examined Friesian cattle were given in Table (3).From this results it could be noticed that the direct genetic correlations between (TMY and DO) in the three models were ranged from (0.15) to 0.99).However, the estimate obtained by Hammound.,(2013) on Egyptian Holstein cows was negative (-0.30).Also, Table(3)showed that genetic correlations between (TMY and LL) in the three models ranged from (0.26 to 0.99),This will be expected to be in normal to be high . Similar values in dairy animals by Mostafa *et al*.,(2012) (0.75),El-Arian *et al*.,(2012) (0.75) and Khattab *et al*.,(2003) (0.76). Shalaby *et al*.,(2013)showed also, genetic correlations between (TMY and LL) to be positive and higher. Thus, selection on the basis of length of lactation of this results lead to improve TMY and in the same time the other traits.

Table 3. Estimates of direct genetic correlations and maternal genetic correlations of studied traits for three models of Friesian cows in Egypt.

Traits	Model1	Model2		Model3		
	R_G	R_G	R_m	R_G	R_m	R_{Gm}
TMY x DO	0.15	0.99	0.16	0.79	0.33	-0.54
TMY x LL	0.26	0.99	0.24	0.79	0.65	-0.56
TMY x DP	0.11	0.09	0.19	-0.04	0.015	0.29
DO x LL	0.89	0.99	0.99	0.99	0.57	-0.88
DO x DP	0.54	0.05	-0.80	-0.11	-0.69	0.30
LL x DP	0.66	-0.07	-0.77	-0.06	0.12	0.32

Rg= direct genetic correlation; R_m = = maternal genetic correlation R_{mg} =correlations between direct and maternal additive genetic effect.

The genetic correlations between (TMY and DP) in the three models ranged from (-0.04 to 0.11).Nearly similar trend showed by Shalaby *et al* (2013)., that genetic correlations coefficients between (TMY and DP) was negative (-0.54).From table (3) it could be noticed that genetic correlations between (DO and LL) in the three models were (0.89 to 0.99)which was positive and higher than that obtained by Azizi *et al*.,(2001) (0.07).Also table (3) showed that genetic correlations between (DO and DP) in the three models were (-0.11) to (0.54).Shalaby *et al*., (2013)obtained genetic correlations between(DO and DP)was (0.58). Genetic correlations between (LL and DP) in the three models was (-0.7 to 0.66) while Shalaby *et al*., (2013) showed genetic correlations between (LL and DP) was negative (-0.44).

From table 3 it could be noticed that the estimates of maternal genetic correlation between (TMY and DO) , (TMY and LL),(TMY and DP),(DO and LL),(DO and DP) and (LL and DP) in the three models were ranged from (0.16 to 0.33),(0.24 to 0.65),(0.015 to 0.19) and (0.57 to 0.99),(-0.69 to -0.80) and (-0.77 to 0.12). Table(4)showed the phenotypic correlation by the three models for the examined traits

Table 4. Estimates of phenotypic correlations of studied traits by the three models of Friesian cattle.

Traits	Model1	Model2		Model3	
	R_p	R_p	R_m	R_p	R_{Gm}
TMY x DO	0.06	0.06	0.06	0.016	-0.74
TMY x LL	0.66	0.06	0.06	0.028	-0.73
TMY x DP	-0.01	-0.01	-0.01	0.029	0.18
DO x LL	0.74	0.73	-0.7	0.729	-0.83
DO x DP	-0.01	-0.04	-0.04	-0.045	-0.13
LL x DP	-0.19	-0.20	-0.20	0.198	0.24

RP =phenotypic correlations

The phenotypic correlations in the case of (TMY and DO) of the three models were (0.01 to 0.06).In the same trend Dematawewa and Berger(1998) obtained 0.27 value between the same traits .Also in table(4)the phenotypic correlations between (TMY and LL) was positive from (0.028 to 0.66) ,that value was similar to that estimated by Marai *et al* .,(2009) (0.77) on Egyptian buffaloes and 0.16 by Shalaby *et al*.,(2013) in Friesian .However, Phenotypic correlations between (TMY and DP) was negative and lower from (-0.01 to 0.029) .The results of Shalaby ,*et al* (2013) showed the phenotypic correlations between (TMY and DP) was negative (-0.02).Also the phenotypic correlations in the present study between (DO and LL) was ranged (0.72 to 0.74). It was positive and higher than that found by Aziz *et al* .,(2001) (0.47) on Egyptian buffaloes, and in agreement with Shalaby *et al*.,(2013) (0.73).The phenotypic correlations in table (4) between (DO and DP)was (-0.045 to -0.01). Negative and lower results than that reported by Shalaby *et al*.,(2013) was(0.4).Also the phenotypic correlations between (LL and DP) was ranged from(-0.20 to 0.19)(Table 4).

Generally, the values of genetic correlations between most of the studied traits were higher than the similar values of phenotypic correlations as shown in table 4.

CONCLUSION

The present results lead to the importance of using the animal models in raising the improvement in the examined milk production traits (Total milk yield, Lactation length, Dry period and Days open).The variations between the results of using the three models related to the examined traits which could be reflected by the additive genetic variance which was higher in model2 for milk yield, model 3 for lactation length, model1for dry period and model3 for days open. From the maternal genetic variances views, model3 was the higher .However, residual and phenotypic variances were mostly in model2 and 3.

Also, the results of the three models regarding the heritabilities of the examined traits showed clear rang in each trait .However, the estimates of the heritabilities were very low in the three models for all examined traits (TMY,LL,DP and DO).

In the same direction, the estimates of either genetic and phenotypic correlations between the examined traits were differ from model to other.

The results showed that the estimates of traits under investigation did not influence by the maternal genetic effect, thereby no relative efficiency of improvement. Vice-versa, direct heritability for TMY, LL,DP and DO were efficiency. Genetic improvement for LL lead to following improve in each of TMY and DO .However, the estimates of heritability was low for DO, this indicated that the major part of the variation in this trait, was environmental, thereby the selection may not prove to be effective in this trait than that of genetic improvement .Therefore, preferable improving the management can play a major role in this trait.

Finally, it is important to used the animal models in the ways of improving the milk traits of these herds .In the same time more studies will be needed in the same directions for the new herds of Friesian in this aria of Egypt to improve the level of milk production on the basis of using different breeding models.

REFERENCES

Abdel-Glil,M.F(1996).Estimation of genetic parameters and genetic trends for some milk traits in a herd of Friesian cows in Egypt .J. Agric.Sci. Mansoura Univ.,21:3479.In(Press).

Abdel-Salam,S.A.M., U.M.El-Said., S.Abou-bak and M.A.M.Ibrahim (2001).Phenotypic and genetic parameters of milk production traits of a Holstein Commercial herd in Egypt .Egypt. J. Anim .Prod.,38:87.,9(2):285.

ABO Elfadi ,E.A and H.A.Radwan (2016). Model Comparisons and genetic Parameters estimates of productive traits in Holstein Cows .Journal of Applied Sciences,16:380-387.

Ahmad,M; J.H.J.Van der Werf and K.Javed (2001). Heritability estimates for some economic traits in Sahiwal and crossbred dairy cattle.J.Anim.Plant Sci., II(in press)

Aziz,M.A.; Schoeman, S. J.; Jordaan, G. F.; El-Chafie, O. M.and Mahdy,A.T.(2001).Genetic and phenotypic variation of some reproductive traits in Egyptian buffalo. South African J.of Animal Sci .,31:195-199.

Afifi,E.A., M.H.Khalil,S.A.Arafa,and M.A.Salem (2002). Estimation of transmitting abilities for lactation traits using the Animal Model for Holstein cattle raised under commercial farm in Egypt .J.Agric.Sci. Mansoura Univ.,27:147.

Ayalew W., M.Aliy, and E.Negussie (2017).Estimation of genetic parameters of the productive and reproductive traits in Ethiopian Holstein using multi-trait models

Berry,D.P., P.Lonergan; S.T.Butler; A.R.Cromie; T.Fair; F. Mossa and A.C.O.Evans (2008).Negative influence of High Maternal Milk production Before and After conception on offspring survival and Milk production in dairy cattle. Journal of dairy Sciences Vol.91No.1,2008.329-337.

Britt,J.H.,(1975). Early postpartum breeding in dairy cows. A Review .J. Dairy Sci.,55:266

Birhanu, T; T. Mohammed; K. Kebede ;M.Tadesse (2015).Heritability, genetic and phenotypic correlations of milk production and reproduction traits of Ethiopian boran cattle with different levels of Friesian inheritance,J.R.Infertility,6:79-83.

Dematawewa, C.M.B and P.J., Berger(1998). Genetic and phenotypic parameters for 305-day yield fertility and survival in Holsteins. J. Dairy Sci., 81:2700 -2709.

El-Arian, M. N; H. G.El-Awady and A. S.Khattab (2003).Genetic analysis for some productive traits of Holstein-Friesian cows in Egypt through MTDFREML program. Egyptian J. Anim. Prod., 40(2):99-109.

El-Arian,M.N; N.A.Shalaby;A.S. Khattab;S.A. Darwish;R.H.Abou-Gamous (2012). Phenotypic and genetic trends for some milk yield traits of Egyptian buffaloes.J.Anim.Prod.,3:353-364.

El-Awady and Oudah (2011).Genetic and economic analysis for the relationship between udder health and milk production traits in Friesian cows Asian-Aust .J.Anim. Sci .24(11):1514-1524.

Garcia.GA; C.A.Cardenas; V.Monterrosa; L.Valencia and J.G.Maldonado (2002). Chracterization productive y reproductive de lase xplotacions ganaderas del bajo Cauca y el litol Atlantico antioquefios. Haciendas la Leyenda y la Candelaria .Revista Colombiana de Ciencias Pecuarias 15:293-301.

Garjales,H.:A.Hernandez and E.Prieto (2006). Edad y peso a la pubertad y su relacion con la efficiencia reproductive de grupos raciales bovinos en el tropico colombiano. Livestock Research for Rural Development 18(10).

Groeneveld,E., M.Kovac ,and A.Gareia-Cortez.(2008).VCE User s Guide and References Manual.Version 6.0.2.

Hammoud,M.H.(2013).Genetic aspects of some first lactation traits of Holstein cows in Egypt .Alex.J.Agric.Res.,58)3):295-300.

Hammoud,M.H. and M.MI.Salem (2013).The genetic evaluation of dome first lactation traits of Holstein cows in Egypt. Alex.J. Agric. Res.,vol 58.295-300.

Javed,K.,G.Mohiuddin and P.Akhtar. (2001).Heritability estimates of some productive traits in Sahiwal cattle.Pakistan Vet.J.21(3):114-116.

Kassab,M. S., A. Y. Salem, S. A. Kassab, and G. A. Salim (2001). Selection indices of some economic traits on Friesian cows .j.Agric., Mansoura Univ.26:1889.

Khattab A.S., H.Atil, (1999). Genetic study of fertility traits and productive in a local born Friesian cattle in Egypt. Pakistan J. Biol. Sci., 2:1178–1183.

Khattab, A. S.;El-Awady, H. G.;El-Arian, M. N. and Kawther. A Mourad.(2003).Genetic analysis of some performance traits using an animal model in a herd of Egyptian Buffaloes.Egyptian.J.Anim.Prod,40:15-26.

Khattab,A.S.,H.Atil and L.Badawy. (2005).Variances of direct and maternal genetic effects for milk yield and age at first calving in a herd of Friesian cattle in Egypt..Arch .Tierz.,Dummerstorf 48(2005)1.24-31.

Lee,D.H.and K.J.Han (2004). Genetic relationship between milk production,calving ease and days open at first parity in Holstein cows,Asian-Aust. J. Anim. Scci.,17:153-158.

Marai,I.F.M .; A.H.Daader ; A.M.Soliman and S.M.S. ElMenshawy(2009).Non-genetic factors affecting , growth and reproduction traits of buffaloes under dry management housing(in sub-tropical environment)in Egypt Livestock Research for Rural development. Volume 21,Article#30.

Mostafa,M.A.; A.S. Kattab; A. Set El-Habaeib; J. Tizser (2012). Genetic parameters for buffalo milk yield and milk quality traits using animal model. Aweth. Animal welfare ,Ethology and housing systems 8:175-181.

Mostafa,M.A.; A.B.Enas ; A.S.Khattab (2013).Variances of direct and maternal genetic effects for milk yield and its composition in a herd of Friesian cows in Egypt.J.Anim.Prod.,4:493-499.

Nigm,A.A; S.A;Attalah; S.Abou –Bakr,and R.R.Sadek (2003) . A study on applying test day model for genetic evaluation of milk yield of Holstein cattle in Egypt.J.Anim.Prod.40:89.

Oudah,E. Z. M, N.A Shalaby. and M. A Mustafa. (2001).Genetic and non-genetic factors affecting days open, number of service per conception and age at first calving in a herd of Holstein-Friesian cattle Pakistan Journal Biological Sciences,4(6):740-744.

Oudah,E.Z.M. and A. Zainab (2010).Genetic evaluation for Friesian cattle using single trait animal models .J. Animal and poultry production, Mansoure University,vol.1(9):371-381.

Ozyurt A., and N Akman. (2009). Süt sığırlarında damızlık değerinin hesaplanmasında farklı yöntemlerden yararlanma olanakları ve çeşitli parametrelerin tahmini (in Turkish). Tekirdağ, J. Agri. Sci., 6: 273– 282.

Rushdi,H.E; M.A.M.Ibrahim; N.Q.Shaddad and A.A.Nigm(2014). Estimate of genetic parameters for milk production traits in a herd of Holstein-Friesian cattle in Egypt .J. Animal and Poultry Prod., Mansoura Univ., Vol.(5):267-278

Salem,A.Y.and E.M.Abdel-Raouf .(1999).Genetic study of fertility and milk productive traits in a commercial herd of Holstein-Friesian cattle in Egypt .J. Agric. Res., Tanta Univ.,25:191-203.

Salem, M. A; H. M. Ismail ;R. R. Sadek and A. A. Nigm .(2006). Phenotypic and genetic parameters of milk production and reproductive performance of Holstein cattle under the intensive production system in Egypt. Egypt. J.Anim. Prod.43(1):1-10.

Satter A, R .H.Mirza ,A. A. K. Niazi and M. Latif,(2005). Productive and reproductive performance of Holstein-Friesian cows in Pakistan Pak Vet .J,25(2):75-81.

Shalaby,N.A.(2001).Genetic evaluation of first lactation milk yield and productive life of Friesian cattle. Agric .sci. Mansoura Univ., 26(5)2515-2527.

Shalaby,N.A; A.S.A.El-Barbary; E.Z.M.Oudah and M.Helmy.(2013). Genetic analysis of some productive and reproductive traits of first lactation of Friesian cattle raised in Egypt .J. Animal and poultry prod. Mansoura Univ,Vol.4(2):97-106,2013.

Zahed,S. M., M. A. Salem; M. H. Khalil and S.A.Arafa,(2003).Genetic evaluation of milk yield in Holsteins-Friesian raised in Egypt using single-and multi-traits animal models .J. Agric. Sci. Mansoura Univ.,28:873.

التقييم الوراثي لبعض الصفات الإنتاجية والتناسلية لقطيع فريزيان تجارى في مصر باستخدام نماذج إحصائية مختلفة

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كان الغرض من هذه الدراسة لمقارنة ثلاثة نماذج في تقدير المعايير الوراثية و التباين و مكونات التباين الوراثية والأموية والمظهرية باستخدام نموذج الحيوان المتعدد الصفات وهى إنتاج البن الكلى، ،وطول موسم الحليب،وفترة الجفاف و فترة الأيام المفتوحة، واستخدمت في هذه الدراسة (٤٧٥٨) سجل إنتاج لبن لابقارالهولشتين فريزيان من قطيع تابع لشركة تنمية الاستثمارات الزراعية (مزرعة دينا) بالكيلو ٨٠ بطريق مصر إسكندرية الصحراوي وذلك في الفترة من ٢٠٠٢-٢٠١٠ وحللت البيانات باستخدام برنامج VCE–الاصدار السادس ٢٠٠٨ لتقدير مكونات التباين لبعض الصفات الإنتاجية مثل إنتاج اللبن الكلى- فترة الجفاف وطول موسم الحليب والصفات التناسلية مثل الفترة المفتوحة حيث استخدمت في هذه الدراسة ثلاث نماذج احصائيية مختلفة لمقارنة المعايير الوراثية حيث اشتمل النموذج الاحصائى الأول على التأثيرات الثابتة (سنة –موسم (ترتيب الولادة) كتاثييرات ثابتة أما التأثيرات العشوائية فشملت التأثيرات الوراثية المباشرة والتباين المشترك بين التأثيرات الوراثية المباشرة والأمية والتأثير المتبقي واشتمل النموذج الاحصائى الثاني على التأثيرات الثابتة المذكورة في النموذج الأول والتأثيرات العشوائية والأثر الوراثي الامى والتباين المشترك بين التأثير الوراثي المباشر والامى واشتمل النموذج الاحصائى الثالث على التأثيرات المذكورة في النموذجين الأول والثاني بالإضافة إلى الأثر الوراثي الامى والتباين المشترك بين التاثيير الوراثي المباشر والامى والارتباطات بينهما وقدرت المتوسطات لكل من إنتاج اللبن الكلى بالكجم وطول موسم الحليب باليوم وفترة الجفاف باليوم و طول الفترة المفتوحة باليوم كانت (١٠٢٢٤ كجم -٤١٣ يوم-١٠٨ يوم-٢٢١ يوم) على التوالي بالموسم الأول كما قدر معامل الاختلاف (%) وكانت مابين ٣٢-٨٢% في الموسم الأول , كان تقديرات المكافئ الوراثي في الثلاث نماذج لصفات إنتاج اللبن الكلى وطول موسم الحليب وفترة الجفاف وطول فترة الأيام المفتوحة من(٠٤. ٠± ٤٨. ٠)إلى(٠٣. ٠ ±٥٩. ٠) ،(٠٠. ٠ ±٠١. ٠) إلى (٠٣. ٠ ±٠٦. ٠)،(٠٧. ٠ ±٠٣. ٠)إلى(٠٣. ٠ ±٠٨. ٠)،(٠٠. ٠±٠١ . ٠) إلى (٠٣. ٠ ±١٢. ٠) على التوالي . بينما كانت تقديرات المكافئ الوراثي الاموى منخفضة جدا في الثلاث نماذج للصفات المدروسة حيث تراوحت مابين من(٠٠. ٠±٠٠. ٠) إلى (٠٤. ٠ ± - ٩٤. ٠) لصفات إنتاج اللبن الكلى ،(٠٠. ٠±٠٠. ٠) إلى (٢١. ٠±٨٧ . ٠ -) لطول موسم الحليب ،(٠١. ±٠١.) إلى(٠٥. ٠ ±١٨. ٠)لفترة الجفاف، (٠.٠٠±٠.٠٠) إلى (١٢ .٠±٨٢. -) وكان الارتباط الوراثي بين إنتاج اللبن الكلى وطول الفترة المفتوحة في الثلاث نماذج مابين (١٥. إلى ٩٩.) –وإنتاج اللبن الكلى وطول موسم الحليب مابين(٢٦. إلى ٩٩.) وإنتاج اللبن الكلى والفترة الجفاف مابين (-٠٤. إلى ١١.). والفترة المفتوحة وطول موسم الحليب مابين (٨٩. إلى ٩٩.) ,والفترة المفتوحة وفترة الجفاف مابين (-١١. الى٥٤.) وطول موسم الحليب وفترة الجفاف (-٧. إلى ٦٦.) .وكانت التقديرات المماثلة من الارتباط المظهري لنفس الصفات تتراوح مابين (-٠٤. إلى ٧٤.) وهكذا فان التأثير الوراثي الاموى عن الصفات المدروسة منخفض جدا وبالتالي ليس له فاعلية في التحسين الوراثي والعكس بالعكس للمكافئ الوراثي المباشر لصفات إنتاج البن الكلى وطول موسم الحليب . التحسين الوراثي في طول موسم الحليب يتبعه تحسين وراثي في إنتاج اللبن الكلى وطول فترة الأيام المفتوحة .وكان تقديرات المكافئ الوراثي لطول فترة الأيام المفتوحة منخفض لذلك هناك جزء كبير من التباين لهذه الصفة يرجع إلى البيئة والانتخاب قد لا يكون فعالا في إحداث تحسين وراثي في هذه الصفة لذلك يمكن أن تقوم الرعاية بدور رئيسيا للتحسين الوراثي في هذه الصفة اى تهتم المزرعة بالعوامل البيئية والرعاية اللازمة لهذه القطعان لزيادة الإنتاج بصفة عامة . أدت هذه النتائج الحالية إلى أهمية استخدام النماذج الإحصائية في تحسين الصفات المدروسة (اجمالى اللبن الكلى –طول موسم الحليب –فترة الجفاف-الفترة المفتوحة)والاختلاف بين نتائج استخدام النماذج الإحصائية الثلاثة المتعلقة بالصفات المدروسة يمكن أن ينعكس من خلال التباين الوراثي التي كان أعلى في النموذج(٢)لحاصل الحليب والنموذج (٣) لطول موسم الحليب والنموذج(١)لفترة الجفاف والنموذج (٣) للأيام المفتوحة وبالنسبة للتباين الوراثي الامى كان النموذج (٣)أعلى ومع ذلك كانت الفروق المتبقية والمظهرية في النموذج (٢)و(٣) . كما أظهرت نتائج النماذج الثلاثة فيما يتعلق بخصائص الصفات المدروسة ،كانت تقديرات التراكيب الوراثية منخفضة جدا في النماذج الثلاثة لجميع الصفات المدروسة . وفى نفس الاتجاه كانت تقديرات الارتباطات الوراثية والمظهرية بين الصفات المدروسة تختلف من نموذج لآخر . وأظهرت النتائج أن تقديرات الصفات لم تتأثر بالأثر الجيني للام وبالتالي لا كفاءة للتحسين وبالعكس التأثير الوراثي المباشر كانت كفاءة في تحسين الوراثة يؤدى إلى تحسين الصفات ومع ذلك كانت تقديرات التوريث منخفضة لذلك هناك جزء كبيير للتباين يرجع إلى البيئة والانتخاب قد لا يكون فعال في إحداث تحسبن وراثي لذلك يمكن أن تقوم الرعاية بدور رئيسيا للتحسين الوراثي وتهتم المزرعة بالعوامل البيئية والرعاية اللازمة للقطعان لزيادة الإنتاج بصفة عامة .وفى النهاية سوف يكون هناك حاجة لمزيد من الدراسات في نفس الاتجاهات للقطعان الجديدة من الفريزيان في مصر لتحسين مستوى إنتاج الحليب على أساس استخدام نماذج تربية مختلفة.