J. Anim. and Poultry Prod., Mansoura Univ., Vol.8 (7): 195 – 202 , 2017

Epigenetics TREND for some Productive and Reproductive Traits of Friesian Cattle Raised in Egypt

Safaa S. Sanad and M. G . Gharib
Animal production research Institute – Research center – Egypt.

ABSTRACT

The objectives of this study were to estimate the genetic parameters and Epigenetics TREND (EP) of milk traits of herd of Friesian in Egypt. The studied traits were 305 day milk yield (305d-MY, kg),total milk yield (TMY, kg), Lactation period (LP, day), days open (DO) and number of services per conception (NSC, services).The data included 1794 records of 704 cows daughters of 86 bulls and 439 damduring the years 2007to 2016 were collected from Alkarda farm (Government farm) located in Kafr El-Sheikh, Egypt. Single-Trait animal model was used to estimate genetic parameter; overall means of 305-dayMY, TMY, LP, DO and NCS were 2935Kg, 3320 Kg , 310 day, 151 day and 1.7 services, respectively, Additive heritability (h_a) estimated for 305d-MY, TMY, LP DO and NSC were 0.34, 0.31, 0.29, 0.06 and 0.26,respectively. While maternal heritability (h_m) were 0.03, 0.07, 0.05, 0.01 and 0.002, respectively , The environmental impact of the permanent lower corresponding values were 0.0031, 0.0027, 0.0037, 0.0062 and 0.0038, respectively.Indicating that the effect of animals' genetic performance is affected by the surrounding environmental conditions where full care through the mother leads to improvement of the studied traits.The genetic and phenotypic correlations of most of the studied traits were highly significant ($p < 0.001$) and ranged from -0.22 to 0.46for geneticcorrelationbetween traits whilephenotypic correlation ranged from -0.11 to 0.65.Genetic trends were positive for all studied traits except for days open and NSC. Range of breeding value (BV)for all studied traits of cows (2800.8, 3297.6, 304.8, 50.7 and 0.91) respectively were higher than those of sires (1515.5, 1687.9, 152.8, 40.6 and 0.66) and dam (1123.7, 2248.5, 179.4,38.3 and 0.66) respectively. Therefore, the selection of cows for the productive traits studied on the basis of the BV of the cow is more efficient to produce a significant genetic improvement of the milk production traits in the cows by selection, as well as the attention to good care for the improvement of reproductive traits studied (DO and NCS). The impact of the genetic performance of cows on surrounding environmental conditions, such as the effect of the year ,season ofbirth and parity , has been shown to have a negative effect at some of these levels, We conclude from the study that the selection of cows on the basis of BV with increased care and good nutrition will result in the herd to show its full genetic capacity, which will increase the productivity of the herd and contribute to the future using this herd leading to increased production.

Keywords: Friesian, Heritability, Additive, Maternal effects, Environmental effects, Epigenetics TREND (EP)

INTRODUCTION

Genetic changes may vary among different livestock populations. Within the prevailing environment of condition, factors that influence genetic trends may vary across environmental situations. On the field of rabbit breeding classification of farms according to the genetic trend of their individuals would help identify factors that contributed to higher or lower litter traits performance. (Hassan *et al*. 2010 and 2013).

Milk production is economically important trait with a large economic impact on effect in livestock production.It is quite necessary to develop new strategies to cover the global food demand, which is expected to double by 2050.

Epigenetic mechanisms play a significant part in the development, growthand behaviour of livestock hence provide a means of understanding how environmental factors may result in heritable changes in gene expression. Genetic and epigenetic controls influence genetic expression and should be taken into account when formulating breeding programs for changing environmental conditions(Scholtz *et al* 2014). The currently livestock industry has developed, in which farmers benefited from the available traditional breeding and selection schemes based on phenotypic measurements of economically important traits and pedigree information (Field, 2007).

The epigenetic theory considers evolution as a process of environmentally-controlled transformation of ontogeny (Grodnitskii,2001).

Epigenetic inheritance allows environmentally induced phenotypes to be transmitted between generations (Pal and Miklos, 1999). If a quantitative trait is far from the optimum, it is advantageous to induce inheritable phenotypic variation. As the genotype gets closer to the peak, it is more favour able to canalize the phenotypic expression of the character, and this process leads to genetic assimilation.

Thus, the objectives of this study were to estimate additive and maternal heritability and covariance between of them in addition to estimate the permanent effects of the productive and reproductive traits in Friesian herd raised under Egyptian farm conditions. Moreover, The present study aimed to estimate the phenotypic correlations and genetic trends for different productive and reproductive traits of dairy cattle EpigeneticsTREND(EP).

MATERIALS AND METHODS

Animals

A total number of 1794 lactation records of 704 cows sired by 86 bulls and 439 dam during the period from 2007 to 2016 in Karada farm located in Kafr El- sheikh , Egypt. Animal feeding depends on concentrate feed mixture plus with rice and straw, milking cows were subjected to machine milking twice. Heifers were served for the first time when they reach 18 mo and 305 kg. Cows were inseminated artificially.

Data

Following is an explanation of the data to be analyzed (Table.1)

Data analysis:

The data for milk traits (TMY, kg; 305d-MY, kg; LP,d ; DO,d and NSC services) were analyzed using single trait animal model (STAM). Multi-trait derivative-free restricted maximum likelihood MTDFRAML program of (Boldman *et al* 1995) obtained by REML method of VARCOMP procedure (SAS, 2003).

The initial values were used to calculate variance components and to perform analysis according to the following animal model:

$$y = Xb + Z_{aUa} + Z_mU_m + Z_pU_p + e,$$
$$Cov\ (a,m) = A\ \sigma_{a,m}$$

where,

y= vector of observations on animal, b= vector of fixed effect peculiar to year, season and parity, Ua= vactor of random additive genetic effects, Um= maternal genetic effect , Up= permanent environmental effect (dame – parity combination) and e = vectors of random error; X, Za, Zm and Zpare incidence matrix relating individual records to b, a, m and p, respectively.

Table1. Data for Friesian herd raised under Egyptian farm condition in Alkarda farm.

Item	Number
Records	1794
Bulls	86
Dams	439
Cows	704

Realized association (correlation) effect study between BLUP values:

Another sort of genetic correlation that differs from that resulted from single-trait animal model analysis in that the former expresses realized association between animals breeding values Best Linear unbiased predictor (BLUP) estimated by MTDFREML as well as their estimated ranks are used to estimate the product moment (correlation) coefficients among the studied traits of animals was done.

Environmental Trend (ENV)

ENV are estimated as the result of subtracting Transmitting ability BV of productive traits values of an animal from its observed phenotypic values of the same traits, all as deviations from the overall means, the resultant gain (ENV) values are regressed matching their respective year, season and parity effects as done with EGT. Thereafter, they evaluated by the same way done with EGT.

Epigenetic Trend (EP):

EP was estimated using the method reported by Legates and Myers (1988). After regressing the (BLUP) values of the engaged animals across the different classes of the insinuated environmental situations using (SAS, 2003), The resultant output was then plotted in graphs to represent the general trend of the behavior of a specific trait under changeable classes of the fixed effect under consideration (year, season and parity).

RESULTS AND DISCUSSION

Means and coefficients of variation:

Table 2. Shows actual means, standard deviation (SD) and coefficients of variation (CV%) for some milk traits of Friesian cow . From this table it can be observed that the overall means of 305-dayMY, TMY, LP, DO and NCS were2935Kg, 3320 Kg, 310.1day, 151.4dayand 1.7 services, respectively.

Mean of 305-dayMYwas lower than those obtained by (Mostafa *et al* 2013), (Hammoud 2013) and (Sanad and Afifi 2016) on Friesian cattle raised in Egypt, ranging from 3630 to 8455 kg. While it was higher than those reported by (Awad and Afifi (2003) 2680 kg. The present estimate of 305-day MY was nearest to estimates observed by Ezz El-Arab (2012) and (Sanad 2016) on Friesian cows in Egypt.

Table 2 . Actual means, (SD) and (CV%) for some milk traits of Friesian cows in Alkarda farm.

Traits	Mean	SD	CV%
305-dayMY(kg)	2935	1030	35.1
TMY(kg)	3320	1284	38.7
LP(kg)	310.1	117.5	37.9
DO(kg)	151.4	32.0	21.2
NCS(kg)	1.7	0.5	29.3

Mean of LP found in the present study is longer than reported by was lower than those obtained by Awad and Afifi (2003) ,Ezz El-Arab (2012), Hammoud (2013) and Sanad (2016)on Friesian cattle raised in Egypt , ranging from 315 to 345 .While it was higher than those reported by (Hussein 2000).

Mean of days open (DO) was 151 day ; which is much higher than most values , reported in the literature for same breed which ranged from 96 and 165 by (El-Gharbawy1999) , (Awad and Afifi 2003) and (Allam2011).

The average number of services per conception (NSC was 1.7 this values is similar to (Ihlam *et al* 2012) was found to be 1.9 .Mean of NSC found is less than a study by (Osman *et al* 2013) estimate were 2 in the first lactation while 3.5 on the second lactation.

Coefficient of variation in 305-dayMY, TMY, LP, DO and NCS are presented in Table 2.Ranged between 21.2 to 38.7%. The relatively high Coefficient of variation for some traits in his study may lead to the fact that selection for traits and improvement the managerial. The differences between the present values of the traits under this study and those reported in the literature may be due to the number of records used, differences in management and genotype.

Genetic parameters

Estimates of heritability

Table 3 presents estimates of Heritability (h^2_a) and (h^2_m) for productive and reproductive traits ,heritability (h^2_a) estimates obtained in the present study were generally high estimates may be due to the trait in breeding programs .From this Table 3. It can be observed that the heritability (h^2_a) of 305-dayMY, TMY, LP, DO and NCS were 0.34, 0.31, 0.29, 0.06 and 0.26 respectively. While (h^2_m) were 0.03, 0.07, 0.05, 0.01 and 0.002 respectively. In this results agreement with those reported by Awad and Afifi (2003), (El-Bayoumi 2015) and (Sanad 2016).Differences in h^2_a estimates among various studies for the same traits of the same breed may be due to differences in the number of records used.

Low h2for NCS in the present study due to the low percentage of the genetic effect of the h2, as this is affected by environmental factors through improvement managerial strategy procedures and nutritional. The same result were report by (Ihlam *et al* 2012) and (Osman *et al* 2013).

It is concluded from the present study that short days open will increase milk production , also low heritability for reproductive traits (DO and NCS) indicate that little improvement for reproductive traits for Friesian cattle in Egypt can be expected by using breeding selection programs but could be improved by environmental conditions improving.

Table 3. Estimates (h^2_a) ,(h^2_m) , (P^2) , Cove $h_{a,m}$ and (e^2) for milk traits of Friesian cows in Alkarda farm.

Traits	h^2_a	h^2_m	Cove $h_{a,m}$	P^2	e^2
305d-MY	0.34	0.03	0.91	0.0031	0.54
TMY	0.31	0.07	0.86	0.0027	0.49
LP	0.29	0.05	0.054	0.0037	0.53
DO	0.06	0.01	0.66	0.0062	0.91
NSC	0.26	0.002	0.002	0.0038	0.19

h^2_a = additive heritability ,h^2_m = maternal heritability Cove $h_{a,m}$= covariance between additive and maternal heritability,p^2 = Direct permanent environmental variance effect, e^2 = direct environmental effect., 305-dMY = 305 day milk yield days;TMY = Total milk yield;LP = Lactation period; DO= days open ;NSC = number of services per conception.

Heritability h^2_a estimates of NSC : As 0.26while h^2_m was 0.002 . These results disagree with the finding of *(*Ghiasi *et al.* 2011*)* and *(*Osman *et al.* 2013*)* (Table.3) who found the heritability of services per conception within the range from 0.02 to 0.08. The results indicate that genetic improvement of these traits can be achieved through selection for these traits in breeding programs.

Heritability estimates of DO: Heritability estimates for days open were found to be (h2a) 0.06 and (h2m) 0.01(Table.3). The present estimates of days open (DO) in early lactations were similar to the findings (Behmaram 2010) .

Estimates of (P^2)

Seems to be less than direct environmental effects (e2)which also indicate the importance of direct environmental effects, Permanent environmental effects were generally low while the highest estimate obtained were 0.0031, 0.0027,0.0037,0.0062 and 0.0038(Table.3) of 305-dayMY, TMY, LP, DO and NCS, respectively. These effects may be due to effect of the uterine environment on milk production of cows.

Genetic and phenotypic correlation

Estimation of genetic correlations among various dairy characteristics is required to formulate efficient selection index. Table 4 shows estimates of phenotypic correlation above the diagonal and genetic correlation below the diagonal among the studied milk production and reproductive traits. All estimates were positive except DO. The highest phenotypic correlation were obtained between 305d-MY and TMY (0.65). Phenotypic correlation between DO and each305d-MY, TMY and NSC were negative and highly significant, being -0.088,-0.11 and -0.0063 respectively. Table 4. High negativer$_p$ was detected between DO and NSC non-sig being (-0.0063).

The estimates obtained genetic correlation (r_g) between 305d-MY, TMY, LP, NSC and DO highly significant and ranged from 0.46 to -0.33 (Table 4). Similarly by in this results agreement with those reported by (Awad and Afify 2003).

The (rg) between DO and TMY was negative being (-0.33) and highly significant (p<0.001) .Table 4 .While, (rg) between DO and NSC was highly significant (-0.18) Genetic correlation between TMY and LP being (0.06).Table.4.

Table 4. Phenotypic correlation (above), genetic correlation, BLUP (below), for 305d-MY, TMY, LP, NSC and DO traits of Friesian cows in Alkarda farm.

Traits	305d-MY	TMY	LP	NSC	DO
305d-MY			0.005 ^{ns}	0.12*** 0.19***	-0.088***
TMY	0.46***	0.65***	0.14***	0.19***	-0.11***
L.P	-0.011 ^{ns}	0.06 ^{ns}	-0.041 ^{ns}		0.001 ^{ns}
NSC	0.003 ^{ns}	0.15***			-0.0063 ^{ns}
DO	-0.22***	-0.33***	0.05 ^{ns}	-0.18***	

(Sanad 2016) found that positive genetic associations were estimated between TMY and LP(0.22). While genetic correlation among milk traits studied were in most cases negative and small. Similar results are reported by (Mostafa *et al* 2013) and (Sanad 2016).

The predicted breeding values (BV) of cows, sire and dams:

As shown from Tables 5 . Shows Maximum and Minimum breeding valuesfor305d-MY, TMY, LP, NSC and DO. Estimates of breeding values of cows(CBV),sires (SBV)and dams (DBV)for all study traits are presented in (Tables 5, 6 and 7). The BV for 305d-MY, TMY, LP, NSC and DO of cows ranged between 2045.5 and -755.3 Kg,2586 Kg and -711.6Kg, 217.3 days and -87.5 days ,18.1 and -32.6 days,0.65 and -0.26 service , respectively in herd . The ranges of CBV were higher than those for CBS and CBD for305d-MY, TMY, LP, NSC and DO. The range is higher than (Sanad 2016) of Cows, Sires and Dams.

Range BV estimated of cows for 305d-MY, TMY, LP, NSC and DOwere2800.8, 3297.6, 304.8, 50.7 and 0.91day, respectively and the BV of sire traits were 1515.5 kg, 1687.9kg ,152.8 day, 40.6 and 0.66 day respectively (Table 5 and 6) while the range of dam BV was 1123.7 kg, 2248.5kg , 179.4 day , 38.3 days and 0.66 service, respectively(Table 7).Also high differences were found between the BV of cows, sires and dams for all traits of the study. The same trends were obtained by (Amr 2013).

The accuracy of minimum and maximum estimates of cow breeding values (Table 5) for all traits of the study ranged from 0.51 to 0.81. (Ismail 2006) showed that accuracy of those traits ranged from 0.43 to 0.80. The range of the CBVfor gives an idea about the genetic variation among these cows. Accordingly the higher range of genetic variation that gives the chance for improvement through selection of superior cows in BV.

Table 5 . Range for Cows breeding values (CBV) for milk traits in Karada farm

	305d-MY(kg)	TMY(kg)	LP(day)	DO(day)	NSC
(Max)					
CBW	2045.5	2585.9	217.3	18.1	0.65
(SE)	280.6	499.8	46.6	9.7	0.12
Accuracy	0.85	0.63	0.79	0.60	0.70
(Min)					
CBW	-755.3	-711.6	-87.5	-32.6	-0.26
SE	320.0	385.8	46.2	9.0	0.14
Accuracy	0.8	0.8	0.78	0.67	0.51
Range	2800.8	3297.6	304.8	50.7	0.91

Range = (CBW^{Max}- CBW^{Min})

Table 6 . Range for Sire breeding values (SBV) for milk traits in Karada farm .

	305d-MY(kg)	TMY (kg)	LP(day)	DO(day)	NSC
Max					
SBW	996.9	1172.3	103.0	15.16	0.42
SE	484.5	617.4	53.1	7.61	0.11
Accuracy	0.40	0.29	0.70	0.78	0.76
Min					
SBW	-518.7	-515.6	-49.9	-25.43	-0.24
SE	352.8	529.4	66.5	7.7	0.11
Accuracy	0.76	0.57	0.45	0.77	0.73
Range	1515.5	1687.9	152.8	40.6	0.66

Range = (SBW^{Max}- SBW^{Min})

Table 7. Range for Dam breeding values (DBV) for milk traits in Karada farm.

	305d-MY(kg)	TMY (kg)	LP(day)	DO(day)	NSC
Max					
DBW	605.5	1551.7	138.3	12.9	0.42
SE	490.4	596.4	65.06	10.1	0.11
Accuracy	2.42	0.38	0.48	0.89	0.76
Min					
DBW	-518.2	-696.8	-59.1	-25.4	-0.24
SE	352.8	551.8	65.9	7.7	0.11
Accuracy	0.76	0.52	0.46	0.77	0.73
Range	1123.7	2248.5	179.4	38.3	0.66

Range = (DBW^{Max}- DBW^{Min})

Environmental trend (ENV):

Milk production and reproduction traits as affected by year, season and parity Figures 1-6 show that the milk production traits of the herd of the study have a clear trend for changes in the year, season and Parity.

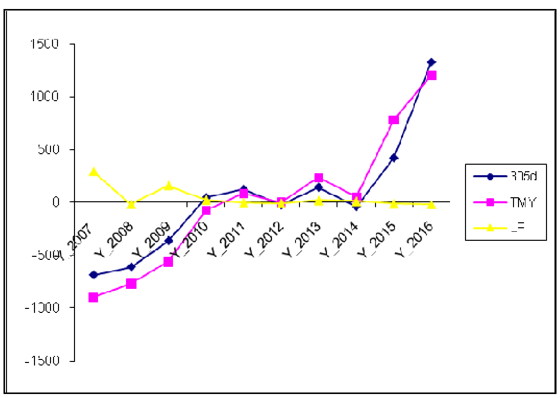

Fig.1. ENV ofproductive traits as regressed against year

Milk production traits were found to be affected by year This is due to environmental differences of the years , there was a negative trend during the 1th, 2^{t}h , 3th , 6th and 8th years of 305d MY and TMY, the 2th , 6th, 9th and 10th years for LP. While, NSC and DO gave negative environmental trend at all year's figure (1).

(Canaza-Cayo *et al.* 2016) found that designed genetic program has had a positive impact on. The high productive traits performance of the most population versus environmental trend are evidenty comprehensible as the animals are in these period .

It was found that of milk production traits affected the season where the study showed that the productive and reproductive traits have a negative ENV during the autumn , this means that the environmental effect was against the animal.

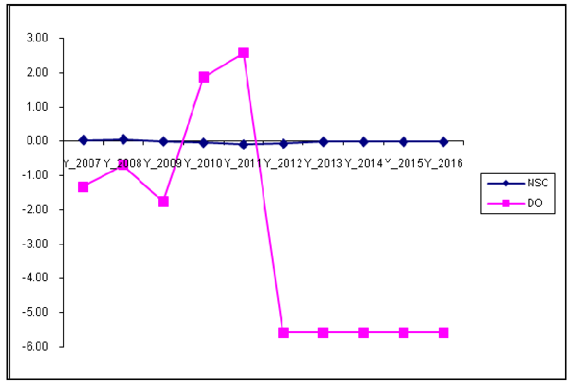

Fig . 2. ENV of reproductive traits as regressed against year

During these season figures (3, 4). The high productive traits performance of the most population versus environmental trend are evidenty comprehensible as the animals are in these period, exploiting the favorable proximate conditions and also the favorable abundant fodder diets like alphalpha.. However, such detected adverse or undesirable environmental effect during autumn and winter (positive environmental effect) may be due to the lack of green fodders. (Abdel-Gader *et al.* 2007) found that milk production was higher in winter. While he was higher in the spring and autumn seasons and less in the summer due to the weather is hot (Javed *et al.*2004).

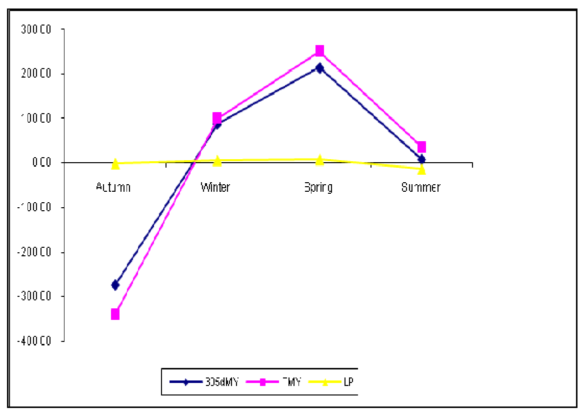

Fig. 3. ENV of productive traits as regressed against season

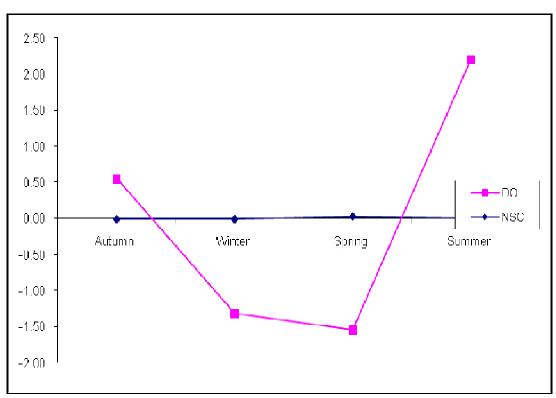

Fig.4. ENV of reproductive traits against season

As for environmental parity interaction , data of ENV in figures (5, 6) , the environmental effects was negative for productive traits in the 1st , 2nd and 5th parity , that animals are in their first production and having is adequate rearing , otherwise , it started to have a postive trends in the 2nd and 5th .This positive ENV seems to conceentrate in the 2nd and 5th parity , seemingly because does may have an inadequate reaing and managerial condition Similar results were obtained by (Sanad and Afifi 2016).

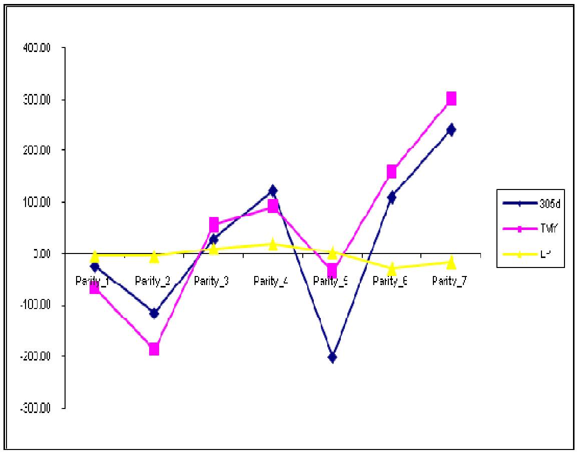

Fig. 5 . ENV of productive traits as regressed against Parity

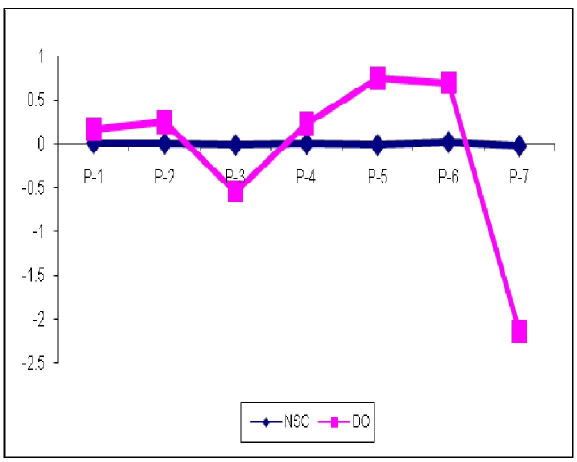

Fig. 6 . ENV of reproductive traits as regressed against Parity

Epigenetic trend (EP):

The figures of 7-12 showed the effect of EP , which was estimated as a deviation from the overall BLUP values mean of the whole Friesian herd for study traits, which affected by year (Y), season (SE) and parity (P).

Results in figure (7, 8). The 6th, 7th, 8th and 9th years of 305d MY and TMY, the 8th and 9th years for LP and NSC gave positive (+) trends. While, DO gave positive (+) trends at The 1th, 2th, 3th and 4th years. (Canaza-Cayo et al. 2016) found that designed genetic program has had a positive impact on milk yield and age at first calving and negative or no impact on first calving interval for 28 years in Girolando cattle. Due to differences in the genotype by environmental interactions and which cause different genetic expressions between environments, using superior genetic materials more suited to the management systems and environmental conditions. (Nilforooshan and Edriss, 2007).

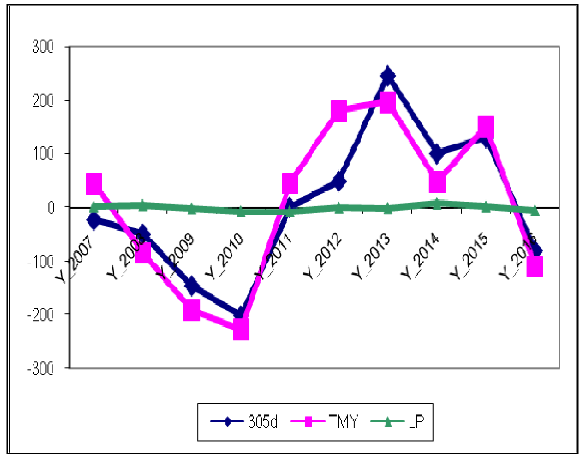

Fig .7. EP of productive traits regressed against year

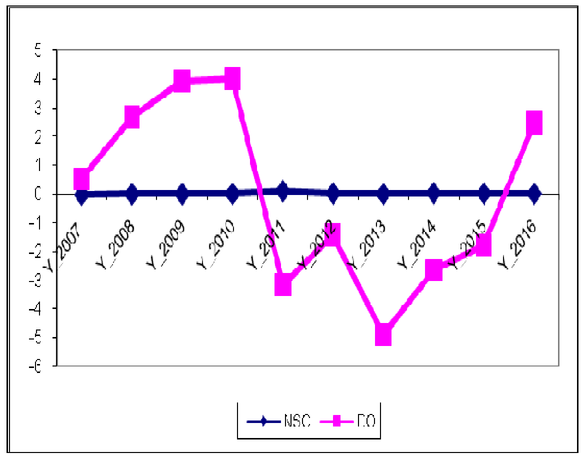

Fig .8 . EP of reproductive its regressed against year

Results in figure 9 and 10 revealed that all milk traits (305d_MY, TMY,LP and NSC) genetic change with season (SE) effects gave a comparable and positive trend in spring and winter that gave a step by step progressive positive trends while, Summer gave approximately negative trends . The expected explanation for the former situation which may due to hot stress in these months. The positive (high) milk traits' EP during spring and winters .

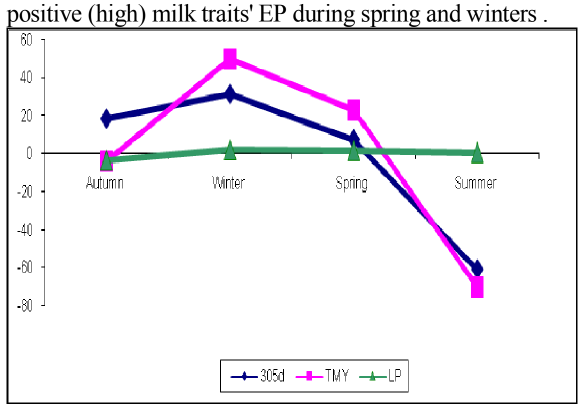

Fig.9 . EP of productive traits regressed against season

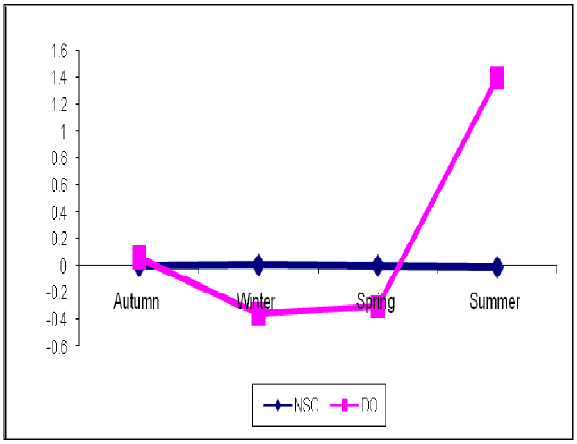

Fig.10. EP of reproductive traits regressed against season

Figure (11, 12). revealed that the 3th, 4thand 7th parity of 305-day MY, TMY, LP and NSC gave positive (+) trends while the remainder parities gave negative trends.While, DO gave positive (+) trends at The 4th, 5^{t} , 6th and 7th parity. Which may generally reveals analogous related (as an example of genotype-environment interaction) in Friesian cattle parities.

The high milk traits EP at the 7th parity is apparently due to peak production the lower peak milk yield and greater persistency in the first parity than the subsequent parity. The observed in (Figure.11) indicate the reverse relationship between persistency and peak milk yield according to age within parity. The same trend agreement (Usman *et al* 2012) the 7th parity was the highest. Al-Samarai (1988) stated that "increasing of age at first calving and lead the cow to reach high milk yield with lower parity. The negative effect of early calving on milk yield could have been due to different factors, such as higher body weight gain before puberty. Milk yield decreased after 7 years of age. As reported in the literature (Cilek and Tekin 2005), observed that milk yield increases with age up to maturity and decreases there after (M'hamdi *et al* 2012). The significant effect of parity on milk traits may be due to the physiological (age of calving) or changes in environmental conditions.

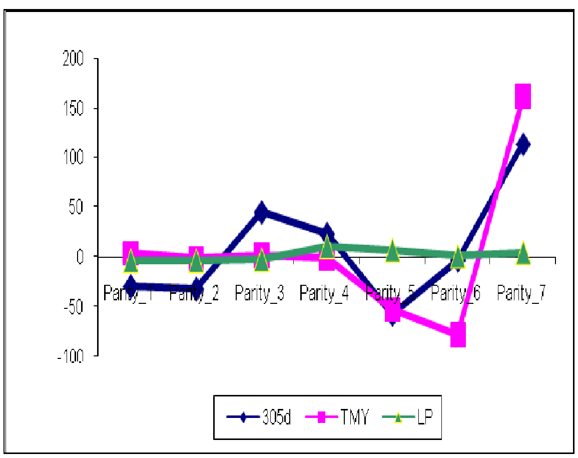

Fig .11 . EP of productive traits regressed against parity

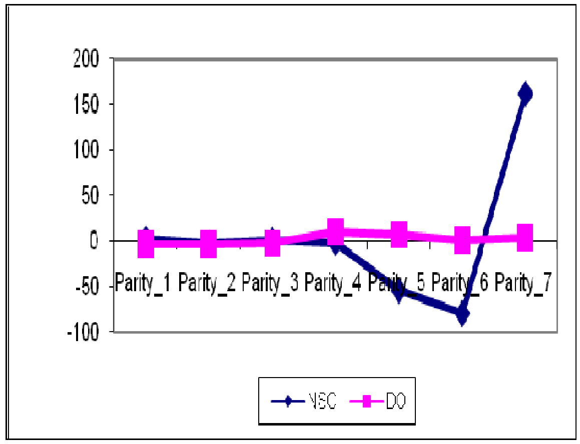

Fig.12. EP of reproductive traits regressed against parity

CONCLUSION

Results of the present study indicated estimates of productive and reproductive traits indicated estimates coefficients of variation (CV%) ranged between 21.2 to38.7% which reflex possibility of genetic improvement by selection.

The current results showed genetic improvement of most of traits that reflect the efficiency of selection programs. In general, Also low habitability for only days open (DO) as reproductive traits which resulted in negative genetic and phenotypic correlation between DO and milk productivity, indicate that little improvement for reproductive traits for Friesian cattle in Egypt can be expected by using breeding selection programs but could be improved by environmental conditions improving.

The range of breeding value (BV) for all traits of cows was higher than that for sire or dam which means that is recommended to use BV of cows in selection programs aiming to improve Friesian herds under Egyptian condition.

Figures of environmental trends showed that the effect of successive years of production upon reproductive traits was negative denoting the significant effects of birth season and parity on these traits.

The impact of the genetic performance of cows on eenvironmental conditions such as the effect year, season and parity have a negative effect sometimes which means the need for more good care. In addition, estimated epigenetic trends (EP) .We conclude from this study that with increase the care and improve the environmental conditions surrounding the animals in addition to the selection of cows on the basis of BV, resulting in herds of high production.

REFERENCES

Abdel-Gader AZ, Khair M, Ahmed A, Lutfi MA, Peters KJ. 2007. Milk yield and reproductive performance of Friesian cows under Sudan tropical conditions. Arch Tierz Dum. 50:155-164.

Allam, A.A.F.(2011). Evaluation of productive and reproductive performance of Friesian cattle under Egyptian condition. M.Sc. Thesis, Fac. Of Agric. Damanhur Univ.Egypt

Al-Samarai, F.R. (1988). Genetic evaluation of some productive and reproductive performance of Friesian cows in two farms 7th of April and Abu-Gharib.AM.SC.ThesisCollege of Agriculture, Univ. of Baghdad. Iraq. (In Arabic).

Amr .M . A. (2013) Evaluation of performance of some dairy herds in Egypt PhD .Thesis Face .Agaric . Alexandria Universe . Egypt.

Awad, S. H. and Afify. A. A. (2003) relationships between milk production and some reproductive performance in Friesian cows Egypt .J .Appl.Sci , 18(6) .

Boldman, K.G., Kriese, L.A., Van Vleck, L.D., Van Tassell, C.P. and Kachman, S.D., (1995).A manual for the use of MTDFREML.ARS, USDA, Clay Center, N.E., USA.

Behmaram, R. (2010): Genetic parameters of productive traits in Montbeliarde and Sarabi cows. Research Journal of animal sciences, 4 (1): 40-44.

Canaza-Cayo,A.W. Jaime ,A.C and Paulo.S L.(2016) Genetic trend estimates for milk yield production and fertility traitsof the Girolando cattle in Brazil . Livestock Science 190 (2016) 113-122.

Cilek, and M.E. Tekin (2005). The environmental factors effecting milk yield and fertility traits of Simmental cattle raised at kazova state farm and phenotypic correlations between these traits. Turk. J. Vet. Anim. Sci. 29: 987-993.

El-Bayoumi,K.M; El-Tarabany M.S; Abdel-Hamid, T.M. and Mikaeil,O.M.(2015) Heritability, genetic correlation and breeding value for some productive andreproductive traits in Holstein cows .Res. Opin. Anim. Vet. Sci., 5(2): 65-70.

El-Gharbawy,M.A.(1999). Study on production and reproduction traits of Friesian cattle in Egypt .M.SC. Thesis Fac.Agric.,Kafr El-Sheikh, Tanta Univ. Egypt.

Ezz-El-Arab, W.F.A.(2012) . Effect of steaming up on some productive and reproductive traits in dairy cows, Ph.D. Thesis Fac of Agric . Alex .univ.Egypt

Field, T. G. (2007): Beef production and management decisions. 5th Ed. Prentice Hall.Grodnitskii, 2001, 99-109). Cached Thee epigenetic theory considers evolution as a process of environmentally-controlled transformation of ontogeny (This theory is.www.collegetermpapers.com/viewpaper/1304123 610.html.

Ghiasi, H., A. Pakdel, A. Nejati-Javaremi, H. Mehrabani-Yeganeh, M. Honarvar, O. Gonzalez-Recio, M.J. Carabaño and R. Alenda (2011): Genetic variance components for female fertility in Iranian Holstein cow. Livest. Sci., 45:1245-1249.

Grodnitskii, (2001) Cached The epigenetic theory considers evolution as a process of environmentally-controlled transformation of ontogeny (This theory is .www.collegetermpapers.com/viewpaper/1304123 610.html

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

Hassan, N.S.; Farid A.; Abdel-Ghany, A.M; Ghali, Mona; Sabri, H. M.(2010)“Epigenetic Trend of Milk Yield and Litter Gain Traits in Californian Rabbits”. The 6thInternational Conference on Rabbit Production in Hot Climates: Assiut, Egypt.

Hassan NS, Abdel-Ghany AM and Sabri HM.(2013) “Genetic Evaluation of the Native Baladi Black Rabbits under North Delta Weather of Egypt Using Animal Model Procedure. A: Doe Litter Traits”. Journal of Animal, Poultry & Fish Production 1 (2013) 13-22.

Hussein,K.E.(2000).Environmental and genetically factors affecting milk production of Friesian breed.Ph.D.Thesis, Fac.of Agric., Mansoura Univ., Egypt.

Javed K, Afzal, M, Sattar.A;andMirza R.H. (2004) Environmental factors affecting milk yield in Friesian cows in Punjab, Pakistan. Pak. Vet. J. 24:58-61.

Ihlam,I.E; Mohmed,O.E. and Ibrahim,S.Y.(2012). Estimation of genetic and non-genetic parameters of Friesian Cattle under hot climate Journal of Agricultural Science Vol. 4, No. 4.

Ismail (2006) .Phenotypic and Genetic parameters of milk production and reproductive performance of Holstein cattle under the intensive production system in Egypt . Ph.D. Thesis , Fac. Agaric . Banha Univ. Egypt.

Legates,J.E. and Myers, R.M (1988).Measuring Genetic change in a Dairy herd using a control population. Dairy Sci., 71(4):1025-1033.

M’hamdi, N.; BouallegueM.; FroujaS.; RessaissiY.; BrarS. K. and amoudaM. (2012).Effects of Environmental Factors on Milk Yield, Lactation Length and Dry Period in Tunisian Holstein Cows.licensee In Tech. Ch.8 (http://creativecommons.org/licenses/by/3.0)

Mostafa, M. A. ;Enas A. Bader and khattab, A. S. (2013) variances of direct and maternal genetic effects for milk yield and its composition in a herd of Friesian cows in Egypt J. Animal and Poultry Prod., Mansoura Univ., Vol.4 (8): 493 - 499

Nilforooshan, M. A.; and Edriss, M. A. (2007). Comparison of Holstein bull semen sources on milk traits in Isfahan province in Iran. Tiers.,Dummerstorf 50 (2007) 1, 71-83

Osman M. M., Khairy M. El-Bayomi1 and Sherif A. Moawed(2013) Estimation of heritability's, genetic correlations, phenotypic correlations and genetic trends for production and reproduction traits of Holstein-Friesian dairy cattle using sire model SCVMJ, XVIII (1) 2013

Similar . (1999) . Epigenetic inheritance, genetic assimilation and speciation .Pál C (1), www.ncbi.nlm.nih.gov/pubmed/10479537 Sep 7 ; 200 (1) : 19 - 37.

SAS. (2003) . Statistical Analysis System: User’s guide (Ver9). North Carolina (US): SAS Institute Inc., Cary

.

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 .

Sanad,S.S.I and Afify, A.A (2016) Comparing genetic parameters of Friesian milk production traits in commercial and state farms in Egypt .J .Agricultural Research Center. No. 4.Under publication.

Scholtz, M.M., Van J.P. Zyl1 and Theunissen. A (2014)The effect of epigenetic changes on animal production Applied Animal Husbandry & Rural Development 2014, Volume 7 7 Citation of this paper: Appl. Anim. Husb. Rural Develop.,vol. 7, 7-10: www.sasas.co.za/aahrd/

Usman. T., G.Guo ,S.M.Suhail , Ahmed , S. Qiaoxiang , L . Qureshi , M. S. and Wang, Y. (2012)Performance traits study of Holstein Friesian cattle under subtropical conditions.The Journal of Anim and Plant Sciences, 22(2 Suppl.):, Page: 92-95 ISSN: 1018-7081 .

اتجاه التعبير الجيني لبعض الصفات الانتاجية والتناسلية لماشية الفريزيان المرباه في مصر

صفاء سند و محمود غريب
معهد بحوث الانتاج الحيواني ، مركز البحوث الزراعية ، مصر .

الهدف من الدراسة تقدير المعالم الوراثية والاتجاه الجيني للاستفادة من Epigenetics في برامج الانتخاب للصفات الانتاجية والتناسلية لماشية الابقار الفريزيان المرباه في مصر. الصفات المدروسة كانت تشمل (أنتاج اللبن الكلي ، ٣٠٥ يوم أنتاج اللبن ، طول فترة الحليب ، فترة الايام المفتوحة و عددالتلقيحات اللازمة لحدوث اخصاب) .تم استخدام عدد ١٧٩٤ سجل إنتاجي خلال الفترة من ٢٠٠٧ إلى٢٠١٦ من قطيع محطة القرضا(مزرعة حكومية) بكفر الشيخ ، ، مصر بهدف معرفة الجوانب والخصائص الوراثية لأبقارالفريزيان والتي تختلف باختلاف البيئة السائدة التي تعيش فيها هذه السلالة وأدراج هذه العوامل في نماذج التقييم الوراثي تؤدى إلي تحسين دقه التنبؤات الوراثية. تم تقدير المعايير باستخدام برنامج نموذج الحيوان single TDFREML لحساب المعالم الوراثية .كان متوسط قيم صفات ٣٠٥ يوم أنتاج لبن ، أنتاج اللبن الكلي ، طول فترة الحليب، فترة الايام المفتوحة ،عدد التلقيحات اللازمة لحدوث اخصاب،كانت ٢٩٣٤.٨كجم ، ٣٣٢٠ كجم ، ٣١٠يوم ،١٥١.٤يوم و ١.٧مرة على التوالي وكانت قيم (h^2_a)للصفات٠.٣٤, ٠.٣١, ٠.٢٩ ، ٠.٠٦، ٠.٢٦ على التوالي في حين كانت (h^2_m) منخفضة ٠.٠٣ ، ٠.٠٧ ، ٠.٠٥ ، ٠.٠١ ، ٠.٠٠٢ علي التوالي للصفات المدروسة، هذا بينما كانت القيم المناظرة للتأثير البيئي الدائم أكثر انخفاضا حيث تراوحت ٠.٠٠٣١، ٠.٠٠٢٧ ، ٠.٠٠٣٧ ، ٠.٠٠٦٢ ، ٠.٠٠٣٨ للصفات المدروسة علي التوالي مما يدل علي أن الاداء الوراثي لقطيع الدراسة يتأثر بالعوامل البيئية مثل التغذية، الرعاية من خلال الام مما يؤدي لتحسين وراثي للصفات المدروسة. كانت الارتباطات الوراثية والمظهرية لمعظم الصفات المدروسة معنوية ($p<0.001$)وتراوحت من -٠.٢٢ الي ٠.٤٦ بالنسبة للارتباط الوراثي بين الصفات بينما كان الارتباط المظهري يتراوح ما بين-٠.١١ الي ٠.٦٥و كانت الاتجاهات الوراثية موجبة لجميع الصفات المدروسة ما عدا صفتي فترة الايام المفتوحة وعدد التلقيحات اللازمة للأخصاب . كان مدي القيم التربوية للصفات (أنتاج اللبن والصفات التناسلية) المدروسة للبقرة ٢٨٠٠.٨كجم ، ٣٢٩٧.٦كجم ، ٣٠٤.٨يوم و ٥٠.٧ يوم و ٠.٩١ مرة علي التوالي وهي أعلي من نظائرها للأب ١٥١٥.٥، ١٦٨٧.٩، ١٥٢.٨، ٤٠.٦ و ٠.٦٦ وللأم ١١٢٣.٧ ، ٢٢٤٨.٥ ، ٣٨.٣،١٧٩.٤ و ٠.٦٦ علي التوالي لذلك فإن الانتخاب للأبقار للصفات الإنتاجية المدروسة علي أساس القيمة التربوية للبقرة يكون أكثر فاعلية لأحداث تحسين وراثي للصفات الانتاجية والتناسلية لقطيع الدراسة وذلك عن طريق الانتخاب بالإضافة لتوفيرالرعاية والتغذية الجيدة مما يؤدي لتحسين الصفات التناسلية المدروسة (فترة الايام المفتوحة و عدد التلقيحات اللازمة لحدوث اخصاب) .ويتضح من الدراسة أن الاتجاهات الوراثية المقدرة من EP تتأثر بالعوامل البيئية المحيطة والتي تتمثل (تأثير سنة الميلاد ، موسم الولادة وترتيب البطن) فقد أظهرت الدراسة بعض التأثيراتالسالبة في بعض هذه المستويات وعليه يمكن استنتاج أن قطيع الدراسة يحتاج الي رعاية أفضل عن طريق تحسين العوامل البيئية المحيطة حتي يتمكن من التعبير عن قدرته الوراثية الكاملة.نستنتج من الدراسة إنه الانتخاب للأبقار علي أساس القيم التربوية لها مع زيادة الرعاية والتغذية الجيدة سوف يؤدي ذلك لإظهار القطيع لقدرته الوراثية الكاملة مما يتبعه زيادة الكفاءة الانتاجية لقطيع الدراسة والمساهمة في المستقبل باستخدام هذا القطيع مما يؤدي إلى زيادة الانتاج .