Minufiya J. Agric. Res. Vol. 32 No.2: 379 - 389 (2007)

GENETIC STUDY ON SOME PRODUCTIVE AND REPRODUCTIVE TRAITS USING RECORDS PRIMIPAROUS FRIESIAN COWS IN EGYPT

K. Hussein and H. El-Matarawy
Animal Production Research Institute, Agriculture Research Center,Giza,Egypt.

(Received: Mar. 12, 2007)

ABSTRACT: *A total number of 1927 first lactation records of Friesian cows sired by 146 bulls and collected from Sakha Farm, Ministry of Agriculture, Egypt covering 31 years from 1968 to 1999 were used in this study. Genetic parameters and breeding values for productive and reproductive traits were analyzed using multiple-trait animal model analysis of total jointly with some reproductive traits;e.g., age at first calving (AFC, month), days open (DO, day) and number services per conception (NSPC, service). Unadjusted means of TMY, AFC, DO and NSPC were 3651 kg, 31.7 month, 204.2 day and 2.1 service, respectively Estimates of heritability for such traits were 0.21±0.17, 0.25±0.39, 0.06±0.07 and 0.14±0.21, respectively.*

The genetic and phenotypic correlations between TMy and the reproductive traits as well as between the reproductive traits studied revealed positive highly significant values (p<0.01). The genetic correlation between TMY with AFC, DO and NSPC were 0.39±0.91, 0.42±0.87 and 0.91±0.18, between AFC with DO and NSPC were 0.92±0.28 and 0.42±0.98, and between DO with NSPC was 0.90±0.68,respectively. The phenotypic correlations between TMY with AFC,DO and NSPC were 0.09, 0.32 and 0.09, respectively,and between AFC with DO and NSPC were 0.09 and 0.37, respectively and DO with NSPC was 0.33.

The range of breeding values obtained from multiple-trait analysis of all pedigree animals for TMY, AFC, DO and NSPC were 5297.10 kg, 4.90 month, 15.03 day and 1.83 service.

Key words: *Genetic,Phenotypic correlations,Breeding values,Primiparous Friesian cows.*

INTRODUCTION

High economic return is the main goal of dairy farm breeders. There is no dought in the roles of productive and reproductive performance of dairy cattle to attain this goal. Thus, knowledge of the relationships between the productive and reproductive traits as well as several environmental factors are represent one of the fundamental basis to reach this objective.

The economic importance of fertility traits in dairy cattle is well established (Dijkhuizen and Stelwagen, 1985). Good fertility in cows is important for keeping the calving interval within acceptable limits, reducing the number of inseminations and minimizing the culling rate owing to reproductive failure.

Estimates of the relationship between production and fertility from field data might be difficult to interpret owing to confounding of management decisions with biological effects (Jansen, 1985). If farmers inseminate high-producing cows later than low-producing cows, apparent genetic variation for interval from calving to first postpartum breeding would be inflated. In addition, high-producing cows are likely to get more opportunities to conceive than low producers. Milk yield on one hand and age at first calving, days open, number of services per conception and dry period on the other hand are probably the most often used indices for evaluating productive and reproductive efficiency. Kubik (1992) stated that an average of 20 to 25 percent of good dairy producing cows are culled every year due to poor reproductive performance.

The aim of this study were to estimate the effects of genetic factors affecting total milk yield, reproductive traits and breeding values of Friesian cows in the first lactation under Egyptian condition.

MATERIALS AND METHODS

In this study a total number of 1927 normal first lactation records for Friesian cows were used. The animals were raised in Sakha farm, located in the Northern Nile Delta, Kafr El-Sheikh, Egypt. The productive and reproductive records covered the period from 1968 to1999 were records. The cows were sired by 146 bulls and they were fed Egyptian clover (*Trifollum alexandrinum*) through grazing *ad libitum* for 6 months from December to May. During this period, cows were supplemented with extra dry concentrate feed mixture(CFM) proportional to their bodies weight and milk production. During the remaining period of the year, cows were fed on (CFM) along with rice straw and limited amount of clover hay when being available. The feeding allowances were offered according to the Production Research Institute recommendation.

Heifers were serviced for the first time when they reached 18 months or 350 kg live body weight. Cows in estrus were usually serviced on the 1st estrus exhibited two months after calving. Rectal palpation for pregnancy diagnosis was performed 60 days after the last service. Cows were machine milked twice daily.

Total milk yield (kg), age at first calving(month), days open(day) and number of service per conception (service)were studied.

Statistical analysis was performed using the MTDFREML(multivariate derivative free restricted maximum likelihood) program (Boldman et al.1995).In this study, age at first calving was analyzed separately. Model for days open and number service per conception was as follows:

$$Y_{ijklm} = \mu + A_i + YR_k + M_l + bL_l(x_1 - \bar{x}_1) + bQ(x_1 - \bar{x}_1)^2 + bL_2(x_2 - \bar{x}_2) + bQ_2(x_2 - \bar{x}_2)^2 + e_{ijklm}.$$

Where,

Y_{ijklm} = observation of the days open and number service per conception,

μ = overall mean,
A_i = the random additive genetic effect of i^{th} animal,
YR_k = the fixed effect of k^{th} year of calving,
M_l = the fixed effect of l^{th} month of calving,
bL_1 & bQ_1 = partial linear and quadratic regression coefficients, respectively for days open and number of services per conception on age at first calving,
bL_2 & bQ_2 = partial linear and quadratic regression coefficients respectively for days open and number service per conception on total milk yield,
$x_1 - \bar{x}_1$ = x_1 age at first calving of cow, $\bar{x}_1$ average AFC,
$x_2 - \bar{x}_2$ = x_2 total milk yield, $\bar{x}_2$ average TMY and
e_{ijklm} = the residual effect for each observation.

The same models for total milk yield were used with replace age at first calving and days open as a covariate.

Mixed-model equations in the analyses were solved iteratively. Based on the variance of the log-likelihood function values, the convergence criterion was 1×10^{-9}. In addition, several restarts were necessary until changes in the log-likelihood function values were less than 1×10^{-5}. Estimated breeding values (EBV) were obtained by back-solution using the MTDFREML program for all animals in the pedigree file for Multiple-trait animal model genetic analyses.

RESULTS AND DISCUSSION

Means, standard deviation and coefficient of variation for total milk yield (TMY), age at first calving(AFC), days open (DO) and number of service per conception (NPSC) are presented in Table 1. The tabulated data show that the means of TMY, AFC, DO and NSPC were 3651kg, 31.7 month, 204.2 day and 2.1 service, respectively.

Table (1): Means, standard deviation (SD) and coefficient of variation (CV%) for total milk yield and reproductive traits.

Traits	Mean	SD	CV %
Total milk yield (kg)	3651	1972.3	54.0
Age at first calving (month).	31.7	4.9	15.4
Days open (day)	204.2	89.4	43.8
Number service per conception(service)	2.1	1.2	56.8

The value of total milk yield (3651 kg) was higher than 2461 kg reported by Abdel-Glil (1996), 2828 kg by Badawy and Oudah (1999), 3103 kg by Alemam (2002), 3391.9kg by Hussein (2004)and 3490 kg by shalaby(1999) but it was lower than those reported by El-Awady (1998) being 5032 kg, Marzouk (1998) being 3698 kg, Hussein (2000) being 4765 kg, Abdel-Glil et al.,(2004) being 4467 kg, Shalaby (2005) being 6733 kg and Hussein and Salem (2005) being 4337 k g.

The overall means of age at first calving (AFC) was 31.7 months (Table 1). It is close to that obtained by several authors working on dairy cattle in different countries in this respect, Rade *et al.* (1986) found it to be 953 days, Abdel-Glil (1996) 30.9 months and Hussein (2004) 31.75 month. Lower AFC values were reported by Mokhtar (1993) 28.7 months, Oudah *et al.* (2001) 27.0 months and Shalaby (2005) 27.7 month,versus higher values were recorded by Mostagger *et al.* (1987) (34.4 months) and Khattab and Sultan (1990)(34.0 months)

The overall means of days open (DO) (204.2 days) (Table 1) are higher than that obtained by Afifi *et al.* (1992) being 190 days, Khattab and Ashmawy (1988) being 171 days, Abdel-Glil (1996) being 132 days, Marzouk (1998) being 152 days, Alemam (2002) being 151.7 days, Hussein (2004)being 190.7 days and Shalaby (2005) being 162.7 days, in this respect, Khattab and Ashmawy (1988) pointed out that the DO length between 60-90 days will be desirable for reducing calving interval to be in the range of 12-13 months. El-Keraby and Aboul-Ela (1992) reported that the longer DO in dairy cows may be caused by several factors (e.g. silent estrus, missed estrus due to weak symptoms, frequency and timing of estrus detection feeding season and level of milk production.

The overall mean of number of service per conception (NSPC) was 2.1 services (Table 1). Nearly similar results were obtained by Mantysaari and Van Vleck (1989), 1.9; Abdel-Bary *et al.* (1992), 2.0; Oudah *et al.* (2001), 1.95; Alemam (2002), 2.05 services and Hussein (2004), 2.14 services. On lower NSPC values were also found by Raheja *et al.* (1989) being 1.55 and Moore *et al.* (1990) being 1.58 services.On the contrary, higher NSPC were recorded by Kumar (1982) 2.36, Juma *et al.* (1988) 2.27, Mokhtar (1993) 3.3 and Ganah (2000) 2.5 services.

The coefficient of variation for TMY was 54% as shown in Table 1. This value is higher than that reported by Abdel-Glil (1991) 33.7%. Badawy and Oudah (1999) 44.0%., Abdel-Glil et al., (2004) 46%, Hussein (2004) 42.8%, Shalaby (2005) 44.9% and Hussein and Salem (2005) 46%.

The coefficient of variations of reproductive traits (AFC, DO and NSPC) were 15.4%, 43.8% and 56.8%, respectively, the wide variations reflected cow individual effect in this concern, due to poor management leading to such higher variation in NSPC and DO compared with AFC (Table 1). In this respect, Oudah *et al.* (2001) found that coefficient of variation of DO, NSPC and AFC was 56.9%, 61.0% and 12.7%, respectively.

The differences between the present estimates of TMY, AFC, DO and NSPC and those reported by different authors may be attributed to different climate, breeds, management conditions, number of used animals, different methods of model analysis, the accuracy of estrous detection and/or the time of insemination.

The estimates of heritability for TMY, AFC, DO and NSPC in the present study ranged between 0.06.and 0.25 These values are in accordance with the estimates of different authors for the same traits on different dairy cattle breeds in various countries. El-Awady (1998) showed that h^2 for TMY was 0.43 Farrag *et al.* (2000b) was 0.05, Alemam (2002) was 0.184, Abdel-Glil et al. (2004) was 0.45, Hussein (2004) was 0.15 and Shalaby (2005) was 028. Kumar (1982) observed that h^2 for DO, NSPC and AFC were 0.04, 0.07 and 0.38, respectively. Smith *et al.* (1989) found that h^2 of AFC was 0.01. Abdel-Glil (1996) found that h^2 of DO and AFC were 0.12 and 0.78, respectively. Salem and Abel-Raouf (1999) found that h^2 of DO and NSPC were 0.01 and 0.10, respectively. Oudah *et al.* (2001) found that h^2 of DO, NSPC and AFC were 0.168, 0.105 and 0.163, respectively, Alemam (2002) found that h^2 for DO and NSPC were 0.176 and 0.036, respectively, Hussein (2004) found that h^2 for DO,NSPC and AFC were 0.25, 0.10 and 0.05, respectively and Shalaby (2005) found that h^2 for AFC and DO were 0.19 and 0.11, respectively.

The low estimates of heritabilities for the productive and reproductive traits under consideration indicated that the major part of the variation in these traits was due to environmental factors, so selection may not prove as an effective target in bringing about genetic improvement of these traits. Therefore, better management can play a major role in improving these traits. Mokhtar (1993) came to the same conclusion.

The genetic correlations between total milk yield and reproductive traits as shown in Table 2 are positive and highly significant (P< 0.01). These results are in accordance with Abdel-Glil (1996), who found the genetic correlation between DO and AFC was -0.21, Oudah *et al.* (2001) and Alemam (2002) found that genetic correlation between Do and NSPC were 0.099 and 0.650, respectively. Hussein (2004), demonstrated that genetic correlation between DO with NSPC and AFC were 0.17 and 0.25 respectively, versus -0.37 between NSPC and AFC. Shalaby (2005) indicated that the genetic correlations between TMY with AFC and DO were 0.85 and 0.82, respectively, mean while it was 0.74 between AFC and DO. It seems that the relationship between milk production and AFC depends on the level of production means and variation in AFC.

Table (2): Heritability ± SE, (on diagonal), genetic correlation ± SE (above diagonal) and phenotypic correlation (below diagonal) for traits under consideration.

Traits	AFC	TMY	DO	NSPC
AFC	0.25±0.39	0.39±0.91	0.92±0.28	0.42±0.98
TMY	0.09**	0.21±0.17	0.42±0.87	0.91±0.18
DO	0.09**	0.32**	0.06±0.07	0.90±0.68
NSPC	0.37**	0.09**	0.33**	0.14±0.21

The phenotypic correlations between total milk yield and reproductive traits are shown in Table 2. they positive and highly significant (P< 0.01). Similarly, Oudah *et al.* (2001) also found high and significant phenotypic correlation between DO and NSPC was 0.50, meanwhile, Alemam (2002) found that between DO and AFC to be 0.55. Hussein (2004) reported that the corresponding values between DO with NSPC and AFC were 0.54 and 0.23, respectively, and between NSPC with AFC to be 0.35, Shalaby (2005) found the phenotypic correlations between TMY with DO and AFC to be 0.49 and 0.25, respectively, versus -0.19 between AFC and DO. The present result suggesting that an older heifer at first calving was genetically associated with higher per TMY in the first lactation. However, Muir et al. (2004) concluded that early maturing heifers with a lower age at first insemination also had better persistency and later peak yields in first lactation.

From the previous results, it could be noticed the low estimates of heritability for the studied productive and reproductive traits. This indicated that the major part of the variation in such traits are caused by environmental elements and thus selection may not prove on effective rate in bringing about genetic important in these traits. Therefore, better management (environmental influence) can play a major role in improving these traits.

Estimated breeding values:

Summary of estimated breeding values, standard deviations (S.D) and range of the estimated breeding values from Multiple-trait analyses of total milk yield and reproductive traits studied are presented in Table 3. Regarding the breeding values obtained from Multiple-trait analyses, the range of all pedigree animals for TMY, AFC, DO and NSPC were 5297.10 kg, 4.90 month, 15.03day and 1.83service, respectively. Shalaby (2005) found that the range of all pedigree animals for AFC and DO were 5.02 month and 99.71 days, respectively. The present study indicated that the wide range of breeding values for total milk yield and all reproductive traits suggested that selection would be followed to improve the total milk yield and all reproductive traits studied in the next generation as a goal of dairyman. Togashi et al. (2004) concluded that multiple-trait evaluation appears desirable because it takes into account the genetic and environmental variance-covariance of all traits evaluated. For these reasons, multiple-trait evaluation would reduce bias from selection and achieve a better accuracy of prediction as compared to single-trait evaluation. They add that the number of traits included in multiple-trait evaluation should depend upon the breeding goal. Also, Pollak and Quaas (1983) found that the multiple-trait model is usually preferred over the multiple-trait model as the former uses the covariance structure among traits and the records with missing information, both of which are ignored by the latter. For these reasons, BLUP multi-trait model is able to remove bias from selection on correlated traits and give a better accuracy of evaluation.

Table (3): Standard deviation (S.D), range of estimated breeding Values of total milk yield and reproductive for all pedigree animals.

Traits	S.D	Min	Max	Range
TMY	390.1	-1737.10	3560	5297.10
AFC	0.55	-2.47	2.43	4.90
DO	8.74	-35.18	39.86	15.03
NSPC	0.21	-0.64	1.19	1.83

Moreover, Lin and Lee(1986) stated that the evaluation of genetic values and estimation of genetic parameters are conditional on what traits are included in multi-trait analyses. Genetic values of economic traits vary depending upon whether two-traits, three-traits or other multi-traits analyses are used. They suggested that the inclusion of traits in a multi-trait analyses should depend upon the breeding goal. If the breeding goal is to improve one trait, single-trait model analyses should be used. If the breeding goal aims to improve three traits, then three-traït simultaneous analyses should be used.

REFERENCES

Abdel-Bary, H.T., M. M. Mahmoud, H.I. Zaky and M.M. Mohamed (1992). Effect of season and month of calving on estrous performance, services conception and milk yield of Friesian cows in Egypt. Egypt. J. Anim. Prod., 29(2):229-253.

Abdel-Glil, M.F. (1991). Sire differences of milk production traits in Friesian cattle. Ph.D. Thesis, Fac. of Agric., Moshtohor, Zagazig Univ.

Abdel-Glil, M.F. (1996). Estimation of genetic parameters and trends for some milk traits in herd of Friesian cows in Egypt. J. Agric. Sci. Mansoura Univ., 21(10):3479-3492.

Abdel-Glil, M. F., K. Hussein and M. A. Tag El-Dein (2004). Sire évaluation for milk production traits of Friesian cows in Egypt. J. Agric. Sci. Mansoura Univ., 29 (10) 5539-5548.

Afifi, E. A., M. H. Khalil, M. F. Abdel-Glil and Z. A. Sultan (1992). Estimation of genetic parameters and sire values for milk production of Friesian cattle raised in Egypt. Egypt J. Anim. Prod., 29(2):197-214.

Alemam, M. A. Z. (2002). Evaluation of reproductive performance of dairy cattle under different production systems. M.Sc. Thesis, Fac. of Agric., Mansoura Univ., Egypt.

Badawy, L. A. and E. M. Oudah (1999). A comparison between two different methods of estimating sire transmitting ability of some milk traits in a herd of Friesian cattle in Egypt. J. Agric. Sci. Mansoura Univ., 24(9):4613-4624.

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

Dijkhuizen, A. A., J. A. Stelwagen (1985). Economic aspects of reproductive failure in dairy cattle. I Fanancial loss at farm level. Prve. Vet. M ed., 3: 265-276.

El-Awady, H. G. (1998). Genetical analysis of reproductive and productive performance of Friesian herds. Ph.D. Thesis, Fac. of Agric., Kafr El-Sheikh, Tanta Univ., Egypt.

El-Keraby, F. and M. B. Aboul-Ela (1992). A study of some non-genetic factors affecting post partum reproductive performance in Friesian cows. Trop. Anim. Prod., 7:307-314.

Farrag, F. H. H., A. S. A. El-Barbary, M. F. Abdel-Glil and K. Hussein (2000). Studies on Friesian cattle in Egypt. 2. Genetic factors affecting milk production. J. Agric. Sci. Mansoura Univ., 25(10):6105-6115.

Ganah, H. A. B. (2000). Effect of improved management systems on productivity of Friesian cattle. M.Sc. Thesis, Fac. of Agric., Mansoura Univ., Egypt.

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

Hussein, K. (2004). Genetic and non-genetic factors affecting total milk yield, days open, number of service per conception and age at first calving of Friesian cows in Egypt. J. Agric. Sci. Mansoura Univ., 29 (12): 6843-6851.

Hussein, K. and M. A. Salem (2005). Environmental and genetical factors affecting milk production traits on Friesian cows in first lactation. J. Agric. Sci. Mansoura Univ., 30 (8): 4461-4468.

Juma, K.H.; Loae, M. Al-Ani and S. T. Rasheed (1988). Factors affecting number of services per conception in purebred Friesian and its crosses with native Iraq cattle. Indian J. Anim. Sci., 58:94-97.

Jansen, (1985). Genetic aspects of fertility in dairy cattle based on analysis of I.A. data-A review with emphasis on areas for further research. Livest. Prod. Sci., 12: 1-12.

Khattab, A. S. and A. A. Ashmawy (1988). Relationships of days open and days dry with milk production in Friesian cattle in Egypt. J. Anim. Breed. and Genet., 105:300-305.

Khattab, A. S. and Z. A. Sultan (1990). Estimates of phenotypic and genetic parameters for first lactation traits of Friesian cattle in Egypt. Egypt. J. Anim. Prod., 27(2):147-160.

Kubik, D. (1992). Minimizing dairy herd performance failure through programmed veterinary service rice. The National Dairy Database (NDB), 1992, NDB, Reproduction, Text 2, RF 108700, TXT Nebraska, 1992) (Internet file).

Kumar, S. (1982). Sources of variation in reproductive traits of Hariana and Tharparker cows. Indian J. Anim. Sci., 52:203-209.

Lin, Y. C. and A. J. Lee (1986). Sequential estimation of genetic and phenotypic parameters in multivariate mixed model analyses. J. Dairy Sci., 69: 2696.

Mantysaari, E. and L.D. Van Vleck (1989). Estimation of genetic parameters for production and reproduction in Finnish Aryshire cattle. J. Dairy Sci., 72:2375-2386.

Marzouk, K. M. (1998). A comparison between imported and locally born Friesian cows in Egypt. J. Agric. Sci. Mansoura Univ., 23(12):5853-5861.

Mokhtar, S. A. (1993). A genetic analysis of reproductive traits in Holstein cows imported to Egypt. J. Agric. Sci. Mansoura Univ., 18:2939-2946.

Moore, R. K., B. W. Kennedy, L. R. Schaeffer and J. E. Moxley (1990). Relationships between reproduction traits, age and body weight at calving and days dry in first lactation Ayrishire and Holsteins. J. Dairy Sci., 73:835-842.

Mostageer, A., M. A. Morsy, A. A. Nigm and R. R. Sadek (1987). The performance of some European cattle in adverse environments. J. Anim. Breed. Genet., 104:206.

Muir, B. L., J. Fatehi and L. R. Schaeffer (2004). Genetic relationships between persistency and reproductive performance in first-lactation Canadian Holsteins. J. Dairy Sci., 87: 3029.

Oudah, E. Z. M., N. A. Shalaby and M. A. Mostafa (2001). Genetic and non-genetic factors affecting days open, number of service per conception and age at first lactation in a herd of Holstein Friesian cattle. Pakistan J. Biol. Sci., 4:740-744.

Pollak, E. J., and R. L. Quaas (1983) Definition of group effects in sire evaluation models. J. Dairy Sci., 66: 1503.

Rade, K., S. Dozo and A. Dunay (1986). Effect of the level of milk production on the relationship between some of the traits of Hemgarian Fleckviek, Hungarian Fleckvich x Holstein Friesian (F_1) and Holstein Friesian cattle populations. Rep. of the Res. Cent. For Anim. And Nutr. Göddölö, 83-90.

Raheja, K. L., E. B. Burnside and L.R. (1989). Relationship between fertility and production in Holstein dairy cattle different lactations. J. Dairy Sci., 72:2670-2678.

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

Shalaby, N. A. (1996). Studies on Friesian cows, sire evalution for lifetime milk yield and longevity traits. Ph.D. Thesis, Fac. of Agric., Mansoura Univ., Egypt.

Shalaby, N.A. (2005). Genetic evaluation for milk production, reproduction traits and persistency of lactation using single- and two-trait animal model analyses for Friesian cows in commercial herds in Egypt. J. Agric. Sci. Mansoura Univ., 30(7): 3637 -3645.

Smith, B. A., J. S. Brinks and G. V. Richardson (1989).Estimation of Genetic Parameters among reproductive and growth traits in yearling heifers. J.anim.Sci.,67:2886-2891.

Togashi, K., C. Y. Lin and K. Yokouchi (2004). Overview of genetic evaluation in dairy cattle. J. Anim. Sci., 75: 275.

دراسة وراثية لبعض الصفات الإنتاجية والتناسلية باستخدام سجلات موسم الحليب الأول لأبقار الفريزيان في مصر.

كمال الدين حسين – حمدي المطراوى دياب
معهد بحوث الإنتاج الحيواني -مركز البحوث الزراعية- وزارة الزراعة – مصر

الملخص الغربي

استخدمت في هذه الدراسة السجلات الإنتاجية والتناسلية لعدد ١٩٢٧ بقرة فريزيان في موسم الحليب الأول وجمعت البيانات للصفات الإنتاجية والتناسلية من مزرعة سخا بكفر الشيخ التابعة لمعهد بحوث الإنتاج الحيواني خلال الفترة من ١٩٦٨ إلي ١٩٩٩ وتم تقدير المعالم الو راثية والقيم التربوية للصفات الإنتاجية والتناسلية باستخدام نموذج multiple-trait لتحليل الصفات.

بلغت متوسطات إنتاج اللبن الكلي ٣٦٥١ كجم والعمر عند أول ولادة ٣١,٧ شهر وطول الفترة المفتوحة ٢٠٤,٢.يوم وعدد التلقيحات اللازمة للإخصاب ٢,١ تلقيحة وكانت قيم المكافئ الو راثي لنفس الصفات ٠,٢١ ± ٠,١٧ ، ٠,٢٥± ٠,٣٩ ، ٠,٠٦± ٠,٠٧ ، ٠,١٤± ٠,٢١ علي التوالي .

وجد أن الارتباطات الو راثية والمظهرية بين صفة إنتاج اللبن الكلي والصفات التناسلية موجبة وعالية المعنوية (P<0.01) وكذلك بين الصفات التناسلية بعضها البعض والتي كانت موجبة وعالية المعنوية (P<0.01) وكانت قيم الارتباطات الو راثية بين صفة إنتاج اللبن الكلي وكلا من العمر عند أول ولادة وطول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٣٩± ٠,٩١ ، ٠,٤٢ ± ٠,٨٧ ، ٠,٩١ ± ٠,١٨ علي التوالي وكذلك بين العمر عند أول ولادة مع طول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٩٢ ± ٠,٢٨ ، ٠,٤٢ ± ٠,٩٨ علي التوالي وبين طول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٩٠ ± ٠,٦٨ وكانت قيم الارتباطات المظهرية بين صفة إنتاج اللبن الكلي والعمر عند أول ولادة وطول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٠٩ ،

٠,٣٢ ، ٠,٠٩ علي التوالي وبين العمر عند أول ولادة وطول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٠٩ ، ٠,٣٧
علي التوالي وبين طول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٠,٣٣ .

بلغ مدي القيم التربوية لكل الحيوانات الناتجة من التحليل الفردي لكل من إنتاج اللبن الكلي والعمر عند أول ولادة وطول الفترة المفتوحة وعدد التلقيحات اللازمة للإخصاب ٥٢٩٧,١٠كجم ، ٤,٩٠ شهر ، ١٥,٠٣ يوم ، ١,٨٣ تلقيحة علي التوالي .

أوضحت النتائج أن عند تقييم الحيوان للصفات التناسلية يجب أن تحسب وتوضع في الأدلة للصفات المتعددة وهذا سيساعد المزارعين لاختيار أفضل الحيوانات علي أساس توليفة من الصفات الإنتاجية والتناسلية.