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# AGE AND DAYS OPEN CORRECTION FACTORS AND REPEATABILITY ESTIMATES FOR YIELD AND INTERVAL TRAITS IN EGYPTIAN BUFFALOES

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## SUMMARY

Data of 2673 records of 653 Egyptian buffaloes (calving from 1970 to 1985) obtained from three farms belonging to the Ministry of Agriculture was used in this study. Means of total (TMY), 305-day (305 MY) and annualized (AMY) milk yield were 1687, 1576 and 1011 Kg, respectively. Means of days in milk (DIM), days dry (DD) and calving interval (CI) were 301, 226 and 524 days, respectively.

Least squares analysis of variance showed that the effects of cow within farm, year and month of calving, age at calving (the quadratic term) and days open on most of different traits studied were significant ($P<0.05$ or $P<0.01$), while the farm and age at calving (the linear term) were not significant ($P>0.05$). Results showed curvilinear relationships of yield and interval traits on age at calving and on days open. Age and days open correction factors were calculated and tabulated.

The estimates of repeatability for TMY, 305 MY, AMY, DIM, DD and CI were 0.35, 0.33, 0.30, 0.30, 0.30 and 0.08, respectively.

**Keywords:** Buffalo, correction factors, repeatability, production (yield traits), management (interval traits)

## INTRODUCTION

Productive performance and reproductive efficiency are important components of profitability in dairy cattle.

For sire evaluation and selection of buffalo cows for such traits, adjusting lactation records for non-genetic factors such as month and year of calving, age and days open effects are necessary.

Schaeffer and Henderson (1972) reported that the effect of days open (DO) on milk yield is largely environmental. Abdel-Aziz and Hamed (1979b) showed that the adjustment of milk records for age at calving (AGC) is necessary to compare the genetic merits of buffalo cows in different ages. Also, Ashmawy (1991) indicated that adjusting lactation for AGC and DO effects seem necessary for sire evaluation. The ultimate aim of an evaluation of animals is to enable dairy breeders to rank their cows depending on their breeding values or on their producing abilities (PA). Repeatability estimate is an important component in estimating (PA). From the economic stand point, the annualized milk yield is considered as a good measure of yield.

The main objectives of this study were 1- establishment of age and days open correction factors in Egyptian buffaloes and 2- estimation of repeatability for some productive and reproductive traits.

## MATERIALS AND METHODS

Records of Egyptian buffaloes were obtained from three farms belonging to the Ministry of Agriculture at Mehallet Mousa area, Kafer El-Sheikh governorate. The total number useable of records were 2673 produced by 653 buffaloes during the period from 1970 to 1985. Records with lactation periods shorter than 150 days and/ or abnormal ones affected by diseases or by disorders were excluded. Annualized milk yield (AMY) was computed as 365 times the ratio of total milk yield over calving interval in days.

Data were analyzed using Harvey's (1987) mixed model computer program. The following mixed model was used:

$$Y_{ijknm} = \mu + F_i + C_{ij} + A_k + M_n + b_{L1}\,(X_{1ijknm} - \bar{X}_1) + b_{Q1}\,(X_{1ijknm} - \bar{X}_1)^2 + b_{L2}\,(X_{2ijknm} - \bar{X}_2) + b_{Q2}\,(X_{2ijknm} - \bar{X}_2)^2 + e_{ijknm}$$

where: $Y_{ijknm}$ was the ijknm th observation for days in milk (DIM), days dry (DD), calving interval (CI), 305-day milk yield (305 MY), total milk yield (TMY), or annual milk yield (AMY); $F_i$ was the effect of the ith farm; $A_k$ was the effect of the kth year of calving, $M_n$ was the effect of the nth month of calving. All the previous factors were considered as fixed effects; and $C_{ij}$ was the random effect of the jth cow within the ith farm; $b_{L1}$ was partial linear regression coefficient of dependent variable (Y) on age at calving ($X_1$) and $b_{Q1}$ was partial quadratic regression coefficient of Y on $X_1$; $b_{L2}$ was the partial linear regression coefficient of dependent variable Y on days open ($X_2$) and $b_{Q2}$ was the partial quadratic regression coefficient of Y on $X_2$; $X_1$ and $X_2$ were the average of age at calving and days open, respectively.

Age at maximum milk yield was obtained by equating the first derivative of the regression equation with zero, and solving for x. Then, maximum production ($Y_m$) was calculated by substituting the value of $X_m$ back into the predicated regression equation. Multiplicative age correction factors were computed by dividing maximum milk yield ($Y_m$) over the yield at a given age ($Y_i$).

The multiplicative DO correction factors for 305 MY and AMY were computed on the basis of 120-129 class of DO (arbitrary) as: $C_i = \mu_m / \mu_i$, where $C_i$ = the DO correction factor, $\mu_m$= the least-square mean of a given milk yield at the basis class and $\mu_i$= the predicted average of milk yield at each class of DO.

Components of variance ($\sigma^2_c$ and $\sigma^2_e$) were estimated from interaclass correlations using the previous model for different traits. Cows that had less than two records were excluded. Repeatability estimate equaled the ratio $(\sigma^2_c / (\sigma^2_c + \sigma^2_e))$. Standard error of repeatability was computed according to the approximate formula given by Swiger et al. (1964).

## RESULTS AND DISCUSSION

Actual means, standard deviations (SD) and coefficients of variation (CV%) for different traits are given in Table 1. Means of TMY, 305 MY and AMY were 1687, 1576 and 1011 Kg, respectively. The means for DIM, DD and CI were 301, 226 and 524 days, respectively. The present estimate of TMY is lower than the estimate of 1968 Kg/ 365 d adjusted (Abdel-Aziz and Hamed, 1979a).

Alim (1978) reported that average TMY was 2025 Kg with lactation period of 311 days. While, Ashmawy (1991) found that average TMY was 1564 Kg with DIM of 322 days. When no animals were excluded because of low production of milk, Mostageer et al. (1981) obtained a low average TMY of 1227 Kg produced in 217 days. Kotby et al. (1989) found that TMY was 1292 Kg produced in 279 DIM. Sadek et al. (1993) reported that actual mean of TMY was 1394 Kg in 219 DIM. Ashmawy and Hamed (1988) found that TMY was 2035 Kg obtained in 339 DIM. However, Abdel-Aziz (1993) reported that TMY per Buffalo in Egypt ranged from 1200 to 2160 Kg in an average lactation period of 8-12 months. As expected, AMY mean was lower than TMY (Table 1) due to delayed breeding. Ashmawy (1991) found that average AMY was 1137 Kg, while Ashmawy and Hamed (1988) reported that AMY was 1289 Kg in another herd of Egyptian buffaloes.

Table 1. Means [+], standard deviations(SD), coefficients of variations (CV) and repeatability estimates (t) for different traits in Egyptian buffaloes

| Trait | Mean | SD | CV% | t% [++] |
|---|---|---|---|---|
| Yield traits,Kg: | | | | |
| Total milk (TMY) | 1687 | 633 | 27 | 35 |
| 305-day milk (305 MY) | 1576 | 503 | 23 | 33 |
| Annual milk (AMY) | 1011 | 447 | 32 | 30 |
| Interval traits,day: | | | | |
| Days in milk (DIM) | 301 | 86 | 18 | 30 |
| Days dry (DD) | 226 | 108 | 24 | 30 |
| Calving interval (CI) | 524 | 123 | 6 | 8 |

+ Number of records used = 2673

++ Standard errors for estimates less than 2%.

Mean of DD of 226 days was longer than that for cattle (Schaeffer and Henderson, 1972). Kotby et al. (1989) found that DD was 333, while , Ashmawy and Hamed (1988) reported that DD was 176 days for buffaloes.

Mean of CI was 524 days. Abdel-Aziz (1993) reported that CI ranges from 442 day to 650 days of Egyptian buffalo. Delaying CI may be due to the breeder's decision, selection policy, some problems of reproductive traits, failure of heat detection in buffalo and shorter heat period and the number of bulls may not be adequate to service the buffalo cows.

The CV's (Table 1) were ranged between 23-32% for yield traits and between 6-24% for interval traits. The CV of CI was the lowest.

**Non-genetic effects**

Least squares analysis of variance of yield traits and interval traits are presented in Table 2. Results showed that the effects of cow within farm, year of calving, month of calving, age at calving (as quadratic term) and days open on most of different traits studied were significant ($P<0.05$ or $P<0.01$), while, the effects of farm and age at calving (linear term) were not significant ($P>0.05$). Ashmawy (1991) found that the effects of season of calving, year of calving and age at calving (expressed as parity) on each TMY and AMY were significant ($P<0.05$ or $P<0.01$). Abdel-Aziz and Hamed (1979a) reported that the effects of region, season and year of calving and interaction between region and season on TMY were significant. Ashmawy and Hamed (1988) reported that year of calving had a significant effect on TMY and AMY, while DIM and DD did not. They found that season of calving had insignificant effect on TMY, AMY, DIM and DD. Kotby et al. (1989) found that TMY and DIM were affected significantly by season and year of calving. Therefore, these non-genetic factors will be considered in any statistical analysis to remove their effects.

Least-squares analysis of variance (Table 2) indicated that age at calving (AGC) and days open (DO) are considered the major factors influencing ($P<0.01$ or $P<0.05$) most of the studied traits. Therefore, it is necessary to adjust the lactation records for AGC and DO for sire evaluation and selection of buffalo cows. Abdel-Aziz and Hamed (1979b) reported that the adjustment of milk records for AGC is necessary to compare the genetic merits of buffalo cows in different ages. Also, Ashmawy (1991) indicated that adjusting lactations for AGC and DO effects seem necessary for sire evaluation.

Table 2. F-ratios of least-squares analysis of variance for different traits

| Source of variance | d.f. | F-ratio | | | | | |
|---|---|---|---|---|---|---|---|
| | | Yield trait+ | | | Interval trait+ | | |
| | | TMY | 305 MY | AMY | DIM | DD | CI |
| Farm | 2 | 0.31 | 0.59 | 0.32 | 1.22 | 1.24 | 0.19 |
| Cow/farm | 650 | 3.10** | 2.95** | 2.72** | 2.70** | 2.75** | 1.36** |
| Year of calving | 15 | 3.51** | 3.97** | 3.63** | 10.53** | 10.59** | 1.20 |
| Month of calving | 11 | 3.38** | 2.80** | 1.85* | 4.44** | 4.38** | 1.09 |
| Age at calv. linear | 1 | 3.65 | 1.74 | 0.31 | 1.74 | 1.82 | 0.12 |
| Age at calv. quadratic | 1 | 17.85** | 9.58** | 3.47 | 3.80 | 3.97* | 1.50 |
| Days open linear | 1 | 214.97** | 92.24** | 120.51** | 571.72** | 985.24** | 13746.58** |
| Days open quadratic | 1 | 27.94** | 22.48** | 1.20 | 56.04** | 57.84** | 1040.01** |
| Remainder df | 1990 | | | | | | |
| Remainder mean squares | | 204769 | 135308 | 107027 | 3066 | 3047 | 874 |

+ See Table (1).
* = P<0.05, **= P<0.01, otherwise f-ratio are not significant at P>0.05.

**Regression coefficients**

Polynomial regression analysis of the second degree yielded, in most cases, significant (P<0.05 or P<0.01) partial linear and quadratic regression coefficients of traits on AGC and DO. The estimates of regression coefficients are given in Table 3. The partial regression coefficients showed curvilinear relationships (P<0.05 or P<0.01) of yield or interval traits on age at calving. Most yield traits increased in a curvilinear shape with the increase of AGC. Also, DIM showed the same trend, while DD or CI showed a trend opposite to that shown by DIM.

Significant partial linear and quadratic regression coefficients showed that 305 MY & TMY and interval traits increased in a curvilinear fashon (P<0.01) with the increase of DO. The partial regression coefficient of AMY on DO was significant (P>0.01) while the quadratic term was not. Increase of DO lead to an increase in DIM and CI in a curvilinear relationship, while DD showed a trend different to that shown by DIM or CI. Ashmawy (1991) found that TMY increased with increasing DO, While AMY decreased in Egyptian buffalo. Ashmawy and Hamed (1988) reported that DO (Linear and quadratic) had a highly significant effects on TMY, DM and DD. The partial linear regression coefficient of AMY was highly significant, while the quadratic term was not significant. The curvilinear relationship of TMY, 305 MY or AMY on AGC or DO is similar in trend to those results reported for dairy animals (e.g. Schaeffer and Henderson, 1972; Ashmawy and Hamed, 1988; Khattab and Ashmawy, 1988; Ashmawy 1991; Khalil et al., 1992 & 1994).

Table 3. Regression coefficients (b) with standard errors (SE) for different traits on age at calving and days open

| Trait+ | Age at calving (mo.) | | | | Days open | | | |
|---|---|---|---|---|---|---|---|---|
| | Linear | | Quadratic | | Linear | | Quadratic | |
| | b | SE | b | SE | b | SE | b | SE |
| Yield trait, Kg: | | | | | | | | |
| TMY | 6.7002 | 3.4636 | -0.0795** | 0.0185 | 2.1649** | 0.1459 | -0.0024** | 0.0004 |
| 305 MY | 3.7623 | 2.8089 | -0.0471** | 0.0150 | 1.1528** | 0.1183 | -0.0017** | 0.0004 |
| AMY | 1.4212 | 2.4956 | -0.0253 | 0.0133 | -1.1718** | 0.1051 | 0.0004 | 0.0003 |
| Interval trait, days: | | | | | | | | |
| DIM | 0.5659 | 0.4257 | -0.0045 | 0.0023 | 0.4321** | 0.0179 | -0.0004** | 0.0001 |
| DD | -0.5769 | 0.4244 | 0.0045* | 0.0023 | 0.5654** | 0.0179 | 0.0004** | 0.0001 |
| CI | -0.0783 | 0.2291 | 0.0015 | 0.0012 | 1.1315** | 0.0097 | -0.0010** | 0.0003 |

+ See Table (1)
* P=<0.05, ** = P<0.01 , otherwise (b's) are not significant at P>0.05

Smith and Legates (1962) attributed such curvilinear trend to the competition between milk production of the cow and the nutrition of her fetus especially at the 5th month of pregnancy. They also, added that it might be due to the negative association between the milk secretion hormones and the stage of pregnancy. However, Funk et al. (1987) reported that lactation yield increased rapidly as current DO increased up 100 days, the yield increased at a slower rate for longer period.

Results showed that 305 MY increased rapidly as current DO increased up 120-129 days, then yield increased, but, at a slower rate for longer periods (Table 6 & Fig. 2). While, from the economic stand point AMY decreased with increasing DO, therefore, reduction of DO is a desirable goal of dairymen. Buffalo cows should be mated early as possible for maximum production. Also, DO may be reduced by good managerial practices such as success in heat dection and insemination at an optimum time during heat period using good quality of semen and skilled inseminators. El-Fouly et al. (1976) adviced that preparing the buffalo cows to have the full chance for conception during the season of full ovarian activity (October - March) could reduce DO considerably.

**Age correction factors**

Least-squares analysis of variance for the data showed insignificant effects (P>0.05) of farm on milk yield (Table 2). Therefore, the three farms were considered as one region. So, one set of multiplicative age-correction factors for adjusting milk records to mature basis was established for usage in Mehallet-Mousa area. These factors were obtained by using 305 MY and AMY records, which corrected for effects included in the model and produced by buffaloes milked twice per day.

Abdel-Aziz (1993) found that average productive life of females buffalo was reported to be five lactations where animals are disposed when they are about ten years old. The factors herein included the age from 30 to 179 months.

The regression coefficients of milk yield on AGC are given in Table 3. The partial regression coefficients of 305 MY and AMY on AGC showed curvilinear relationships (P<0.01) between MY and AGC.

Second degree polynomial regression equations used in establishment of the correction factors were:

$$Y = 1023.89 + 10.8273\ X - 0.0471\ X^2 \text{ .. for 305 MY}$$

$$Y = 803.0975 + 5.2162\ X - 0.0253\ X^2 \text{ .. for AMY.}$$

A set of multiplicative age correction factors for 305 MY was given in Table 4. The magnitude of factors for milk yield of young buffalo cows (Less than 47 months) were higher than older ones (more than 112 months). Also, results showed a rapid decline for ages of the younger buffalo cows relative to the gradual decline for ages of the older buffalo cows, i.e. factors did not exhibit large differences between consecutive classes of calving at older ages while they showed relatively large differences between consecutive classes at younger ages. These higher increments at younger ages may be due to that culling of buffalo cows at younger ages was mainly performed on the basis of fertility and health.

Age correction factors for AMY are given in Table 5. As expected, the numerical values of these factors were smaller than those factors for 305 MY before the age of maximum production. After the mature age was reached, the factors became larger. However, the differences between these factors were very small. (Tables 4 and 5 & Fig. 1).

Table 4. Multiplication factors (CF) for adjustment of 305-day milk yield for age at calving

| Age (mo) | CF | Age (mo) | CF | Age (mo) | CF | Age (mo) | CF | Age (mo) | CF |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 1.260 | 60 | 1.094 | 90 | 1.018 | 120 | 1.001 | 150 | 1.036 |
| 31 | 1.253 | 61 | 1.091 | 91 | 1.017 | 121 | 1.001 | 151 | 1.038 |
| 32 | 1.245 | 62 | 1.087 | 92 | 1.015 | 122 | 1.001 | 152 | 1.041 |
| 33 | 1.238 | 63 | 1.084 | 93 | 1.014 | 123 | 1.002 | 153 | 1.043 |
| 34 | 1.230 | 64 | 1.080 | 94 | 1.013 | 124 | 1.002 | 154 | 1.046 |
| 35 | 1.224 | 65 | 1.077 | 95 | 1.012 | 125 | 1.003 | 155 | 1.048 |
| 36 | 1.217 | 66 | 1.074 | 96 | 1.010 | 126 | 1.004 | 156 | 1.050 |
| 37 | 1.210 | 67 | 1.071 | 97 | 1.009 | 127 | 1.004 | 157 | 1.053 |
| 38 | 1.204 | 68 | 1.067 | 98 | 1.008 | 128 | 1.005 | 158 | 1.056 |
| 39 | 1.197 | 69 | 1.064 | 99 | 1.007 | 129 | 1.005 | 159 | 1.059 |
| 40 | 1.191 | 70 | 1.061 | 100 | 1.006 | 130 | 1.007 | 160 | 1.062 |
| 41 | 1.185 | 71 | 1.059 | 101 | 1.005 | 131 | 1.008 | 161 | 1.065 |
| 42 | 1.179 | 72 | 1.056 | 102 | 1.005 | 132 | 1.009 | 162 | 1.067 |
| 43 | 1.174 | 73 | 1.053 | 103 | 1.004 | 133 | 1.009 | 163 | 1.071 |
| 44 | 1.168 | 74 | 1.050 | 104 | 1.004 | 134 | 1.010 | 164 | 1.074 |
| 45 | 1.162 | 75 | 1.048 | 105 | 1.003 | 135 | 1.012 | 165 | 1.077 |
| 46 | 1.158 | 76 | 1.045 | 106 | 1.002 | 136 | 1.013 | 166 | 1.081 |
| 47 | 1.152 | 77 | 1.043 | 107 | 1.002 | 137 | 1.014 | 167 | 1.084 |
| 48 | 1.147 | 78 | 1.041 | 108 | 1.001 | 138 | 1.015 | 168 | 1.088 |
| 49 | 1.142 | 79 | 1.038 | 109 | 1.001 | 139 | 1.017 | 169 | 1.092 |
| 50 | 1.137 | 80 | 1.036 | 110 | 1.001 | 140 | 1.019 | 170 | 1.095 |
| 51 | 1.132 | 81 | 1.034 | 111 | 1.001 | 141 | 1.020 | 171 | 1.099 |
| 52 | 1.127 | 82 | 1.032 | 112 | 1.001 | 142 | 1.022 | 172 | 1.102 |
| 53 | 1.123 | 83 | 1.030 | 113 | 1.000 | 143 | 1.023 | 173 | 1.107 |
| 54 | 1.119 | 84 | 1.028 | 114 | 1.000 | 144 | 1.025 | 174 | 1.111 |
| 55 | 1.114 | 85 | 1.026 | 115 | 1.000 | 145 | 1.027 | 175 | 1.115 |
| 56 | 1.110 | 86 | 1.024 | 116 | 1.000 | 146 | 1.029 | 176 | 1.120 |
| 57 | 1.106 | 87 | 1.023 | 117 | 1.000 | 147 | 1.030 | 177 | 1.124 |
| 58 | 1.102 | 88 | 1.021 | 118 | 1.000 | 148 | 1.032 | 178 | 1.128 |
| 59 | 1.098 | 89 | 1.020 | 119 | 1.001 | 149 | 1.035 | 179 | 1.133 |

Table 5. Age correction factors (CF) for annualized milk yield of Egyptian buffaloes

| Age (mo) | CF | Age (mo) | CF | Age (mo) | CF | Age (mo) | CF | Age (mo) | CF |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 1.144 | 60 | 1.046 | 90 | 1.004 | 120 | 1.007 | 150 | 1.055 |
| 31 | 1.140 | 61 | 1.044 | 91 | 1.004 | 121 | 1.008 | 151 | 1.057 |
| 32 | 1.136 | 62 | 1.042 | 92 | 1.003 | 122 | 1.008 | 152 | 1.060 |
| 33 | 1.131 | 63 | 1.040 | 93 | 1.003 | 123 | 1.009 | 153 | 1.062 |
| 34 | 1.127 | 64 | 1.038 | 94 | 1.002 | 124 | 1.010 | 154 | 1.066 |
| 35 | 1.123 | 65 | 1.036 | 95 | 1.002 | 125 | 1.011 | 155 | 1.068 |
| 36 | 1.119 | 66 | 1.034 | 96 | 1.001 | 126 | 1.012 | 156 | 1.071 |
| 37 | 1.116 | 67 | 1.032 | 97 | 1.001 | 127 | 1.014 | 157 | 1.074 |
| 38 | 1.111 | 68 | 1.030 | 98 | 1.001 | 128 | 1.015 | 158 | 1.076 |
| 39 | 1.107 | 69 | 1.028 | 99 | 1.000 | 129 | 1.016 | 159 | 1.080 |
| 40 | 1.104 | 70 | 1.027 | 100 | 1.000 | 130 | 1.017 | 160 | 1.083 |
| 41 | 1.101 | 71 | 1.025 | 101 | 1.000 | 131 | 1.019 | 161 | 1.086 |
| 42 | 1.097 | 72 | 1.023 | 102 | 1.000 | 132 | 1.020 | 162 | 1.089 |
| 43 | 1.093 | 73 | 1.022 | 103 | 1.000 | 133 | 1.022 | 163 | 1.093 |
| 44 | 1.089 | 74 | 1.021 | 104 | 1.000 | 134 | 1.023 | 164 | 1.096 |
| 45 | 1.086 | 75 | 1.019 | 105 | 1.000 | 135 | 1.025 | 165 | 1.099 |
| 46 | 1.083 | 76 | 1.018 | 106 | 1.000 | 136 | 1.026 | 166 | 1.103 |
| 47 | 1.080 | 77 | 1.016 | 107 | 1.000 | 137 | 1.028 | 167 | 1.106 |
| 48 | 1.077 | 78 | 1.015 | 108 | 1.001 | 138 | 1.030 | 168 | 1.111 |
| 49 | 1.074 | 79 | 1.014 | 109 | 1.001 | 139 | 1.032 | 169 | 1.114 |
| 50 | 1.071 | 80 | 1.013 | 110 | 1.001 | 140 | 1.034 | 170 | 1.118 |
| 51 | 1.069 | 81 | 1.011 | 111 | 1.002 | 141 | 1.035 | 171 | 1.123 |
| 52 | 1.066 | 82 | 1.010 | 112 | 1.002 | 142 | 1.037 | 172 | 1.126 |
| 53 | 1.063 | 83 | 1.009 | 113 | 1.003 | 143 | 1.039 | 173 | 1.131 |
| 54 | 1.060 | 84 | 1.008 | 114 | 1.003 | 144 | 1.041 | 174 | 1.134 |
| 55 | 1.058 | 85 | 1.008 | 115 | 1.004 | 145 | 1.043 | 175 | 1.139 |
| 56 | 1.055 | 86 | 1.007 | 116 | 1.004 | 146 | 1.046 | 176 | 1.143 |
| 57 | 1.053 | 87 | 1.007 | 117 | 1.005 | 147 | 1.048 | 177 | 1.148 |
| 58 | 1.050 | 88 | 1.006 | 118 | 1.006 | 148 | 1.050 | 178 | 1.153 |
| 59 | 1.048 | 89 | 1.005 | 119 | 1.006 | 149 | 1.052 | 179 | 1.158 |

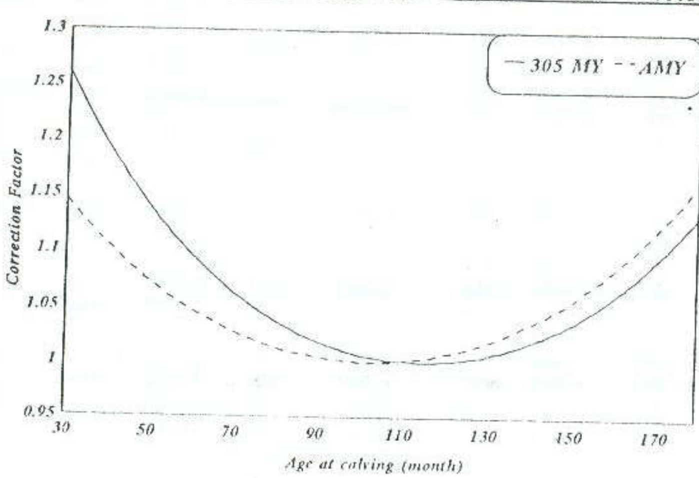


Fig. 1 : A comparison of age correction factors for annualized (AMY) and 305 milk yield (305 MY).

**Days open correetion factors.**

Schaeffer and Henderson (1972) reported that correction factors for DO could be computed to any arbitrary base. The base, in the present study, was considered as 120-129 days. Agjustment factors for DO across all lactations are shown in Table 6. These factors indicated that DO correction factors (DOCF) for 305 MY decreased with the increase of DO. While, the corresponding factors for AMY increased by increasing of DO (Table 6. and Fig 2). Second degree polynomial regression equations used in calculation of the correction factors were:

$$Y = 1246.4476 + 1.8804\ X - 0.0017\ X^2 \text{ for 305 MY}$$

$$Y = 1321.0836 - 1.343\ X + 0.0004\ X^2 \text{ for AMY}$$

Table 6. Days open correction factors for 305-day and annualized milk yield (ANY) of Egyptian buffaloes[a]

| Days open class | Factor 305 MY | Factor AMY | Days open class | Factor 305 MY | Factor AMY |
|---|---|---|---|---|---|
| 30 - 39 | 1.111 | 0.909 | 170 - 179 | 0.955 | 1.056 |
| 40 - 49 | 1.096 | 0.919 | 180 - 189 | 0.947 | 1.067 |
| 50 - 59 | 1.082 | 0.929 | 190 - 199 | 0.940 | 1.079 |
| 60 - 69 | 1.069 | 0.938 | 200 - 209 | 0.933 | 1.090 |
| 70 - 79 | 1.056 | 0.948 | 210 - 219 | 0.926 | 1.103 |
| 80 - 89 | 1.044 | 0.958 | 220 - 229 | 0.919 | 1.115 |
| 90 - 99 | 1.032 | 0.968 | 230 - 239 | 0.912 | 1.127 |
| 100 - 109 | 1.021 | 0.979 | 240 - 249 | 0.907 | 1.141 |
| 110 - 119 | 1.010 | 0.989 | 250 - 259 | 0.901 | 1.153 |
| 120 - 129 | 1.000 | 1.000 | 260 - 269 | 0.895 | 1.167 |
| 130 - 139 | 0.990 | 1.010 | 270 - 279 | 0.890 | 1.180 |
| 140 - 149 | 0.981 | 1.021 | 280 - 289 | 0.885 | 1.194 |
| 150 - 159 | 0.972 | 1.032 | 290 - 299 | 0.880 | 1.207 |
| 160 - 169 | 0.964 | 1.044 | 300 - 309 | 0.875 | 1.221 |

a = Days open class of 120 - 129 was used as base for construction the correction factors

The numerical values of the factors were larger in shorter DO periods than longer ones. The decreasing rate of the magnitude of DO Factors for shorter DO periods were higher than those for longer ones (Schaeffer and Henderson, 1972, Schaeffer <u>et al</u>., 1973, Khattab and Ashmawy, 1988, Khalil <u>et al</u>., 1992 and 1994).

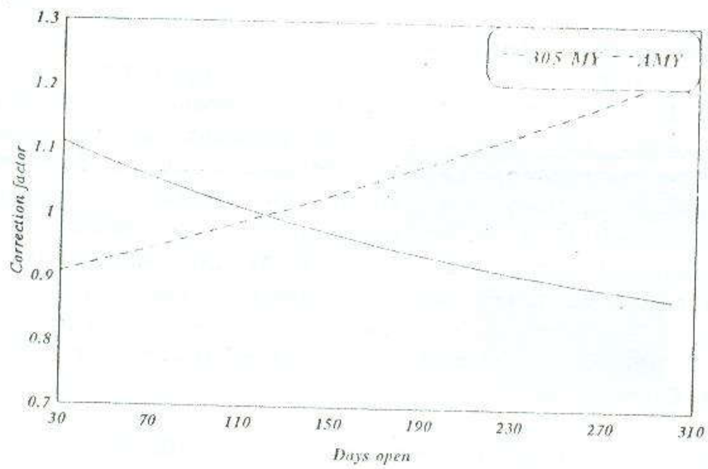


**Fig. 2 : A comparison of days correction factors for annualized (AMY) and 305 milk yield (305 MY).**

**Repeatability estimates**

Estimates of repeatability (t) and their standrad errors for defferent traits are presented in Table 1. The estimates of repeatability for yield traits studied (0.30-0.35) are in the range of values obtained by asker <u>et al</u>. (1965); white <u>et al</u>,(1981); Kaushik <u>et al</u>. (1984), Abubakar <u>et al</u>, (1986); Ashmawy,(1991) and sadek <u>et al</u>. (1993). The estimates for interval traits were slightly lower than those of yield traits. While, the estimate for CI was the lowest value (0.08±0.02). This means that CI is to a great extent under the control of management and it can have, at best, little genetic component (Ashmawy, 1991) .

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**REFERENCES**

Abdel-Aziz, A.S., 1993. Characteristics of the Egyptian buffalo. Proceedings of International Symposium on Prospects of Buffalo Production in the Mediterranean and the Middle East, Cairo, Egypt. 9-12 November, Pudoc Scientific Publishers

Abdel-Aziz, A.S. and M.K. Hamed, 1979a. The effect of region, season and year of calving on complete milk records of Egyptian buffaloes. Egypt. J. Anim. Prod. 19:227.

Abdel-Aziz, A.S. and M.K. Hamed, 1979b. Region by season age correction factors for adjusting milk records to mature basis in buffaloes. Egypt. J. Anim. Prod. 19:241.

Abubaker, B.Y., R.E. MicDowell, K.E. Wellington, L.D. Van Vleck, 1986. Estimating genetic values for milk production in the tropic. J. Dairy Sci., 69:1087.

Alim, K.A., 1978. The productive performance of Egyptian buffalo in dairy herd. World Rev. Anim. Prod. 15:57.

Ashmawy, A.A., 1991. Repeatability of productive traits in Egyptian buffaloes. J. Anim. Breed. Genet. 108:182.

Ashmawy, A.A. and M.K. Hamed, 1988. Effect of days open on lactation yield characteristics in Egyptian buffaloes. J. Agric. Sci., Mansoura Univ. 13:723.

Asker, A.A., L.H. Bedeir and A.A. El-Itriby, 1965. The inheritance and relationships between some dairy characters in the Egyptian buffaloes. J. Anim. Prod. U.A.R. 5:119.

El-Fouly, M.A., E.A. Kotby and H.E El-Sobhy, 1976. The functional reproductive peak in Egyptian buffaloes cow as related to day length and ambient temperature. Archivio Veterinario.27:123.

El-Itriby, A.A., 1974. <u>The buffaloes of Egypt. The husbandry and health of the domestic buffalo</u>, W.R. Cockrill (editor),chapter 18,FAO. Rome. Italy.

Funk, D.A., A.E. Freeman and P.J. Berger, 1987. Effects of previous days open, previous days dry and present days open on lactation yield. J. Dairy Sci., 70:2366.

Harvey, W.R., 1987. Mixed model least-squares and maximum likelihood computer program PC-1.Ohio state Univ. Columbus-USA (Memograph).

Kaushik, S.K., B.D. Gupta, and M.M. Saxena, 1984. Estimates of producing ability in Hariana - taurus crossbreds. Indian vet.Med.J.8:26 (Dairy Sci., Abstr. 47:12,1985).

Khalil, M.H, M. Abd El-Glil and M.K. Hamed, 1994. Genetic aspects and adjustment Factors for lactation traits of friesian cattle raised in Egypt. Egypt. J.Anim. Prod.31:65.

Khalil, M.H., E.A. Afifi, and M.A. Salem, 1992. Evaluation of imported and locally-born friesian cows raised in commercial farms in Egypt. Egypt. J.Anim.Prod.29:43.

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. Genet.105:300.

Kotby, E,A., H.E. El-Sobhy, Kawther, A. Mourad and L.N. Eid, 1989. Milk yield in two herds of Egyptian buffaloes in different locations. Proceedings of the international symposium in ruminant production in the dry subtropics : constraints and potentials, Cairo. Egypt, 5-7 november 1988,Pudoc Wageningen, 1989.

Mostageer, A., M.A. Morsy and R.R. Sadek, 1981. The production characteristics of a herd of Egyptian buffaloes. Z. Tierzücht, Zühtsbiol, 98:220.

Sadek, R.R., Kawthar, M. Mourad, M.A.M. Ibrahim, S. Abu-Baker and A.S. Abdel-Aziz, 1993. Genetic parameters of milk yield of Egyptian buffaloes calculated from daily and monthly test-date records. Proceedings of International Symposium on Prospects of Buffalo Production in the Mediterranean and the Middle East, Cairo, Egypt. 9-12 November, Pudoc Scientific Publishers Wageningen, 1993.

Schaeffer, L.R. and C.R. Hendrson, 1972. Effects of days dry and days open on Holstein milk production. J. Dairy Sci., 55:107.

Schaeffer, L.R., R.W. Everett and C.R. Hendrson, 1973. Lactation records adjusted for days open in sire evaluation. J. Dairy Sci., 56:602.

Smith, J.W. and J.E. Legates, 1962. Relation of days open and days dry to lactation milk and fat yield. J. Dairy Sci., 45:1192.

Swiger, L.A., W.R. Harvey, D.O. Everson and K.E. Gregory, 1964. The variance of intraclass correlation involving groups with one observation. Biometrics., 20:818.

White, J.M., W.E. Vinson and R.E. Pearson, 1981. Dairy cattle improvement and genetics. J. Dairy Sci., 64:1305.

**معاملات التعديل للعمر عند الولادة والأيام المفتوحة ومعامل التكرار للصفات الإنتاجية والبيئية فى الجاموس المصرى**

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استخدمت فى هذه الدراسة ٢٦٧٣ سجلا أنتجتها ٦٥٣ جاموسة مصرية ولدت فى الفترة ١٩٧٠ – ١٩٨٥ ، جمعت هذه السجلات من ثلاث مزارع تابعة لوزارة الزراعة فى منطقة محلة موسى بمحافظة كفر الشيخ ، وتم تحليل البيانات بإستخدام طريقة الحد الأدنى للمربعات لتحليل التباين ، وحساب معاملات الإنحدار بهدف إستخراج معاملات التعديل للعمر عند الولادة ومعاملات التعديل للأيام المفتوحة للجاموس المصرى لإستعمالها فى تصحيح السجلات فى منطقة محلة موسى ،

<u>وتلخصت النتائج فيما يلى :</u>

١– متوسط الإنتاج الكلى للبن والإنتاج فى ٣٠٥ يوم والإنتاج السنوى هو ١٦٨٧، ١٥٧٦، ١٠١١ كجم على الترتيب ،

٢– متوسط أيام الحليب والجفاف والفترة بين الولادتين كان ٣٠١، ٢٢٦، ٥٢٤ يوم، على الترتيب ،

٣– تأثير الجاموسة داخل المزرعة وسنة وشهر الولادة والأيام المفتوحة كان معنويا ( ٥٪ ، ١٪ ) على معظم الصفات المدروسة، تأثير المزرعة كان غير معنويا على هذه الصفات المدروسة،

٤– تأثير العمر عند الولادة (الجزء الخطى) كان غير معنويا على هذه الصفات بينما كان تأثير الجزء المربع معنويا على معظم الصفات المدروسة.

٥– أوضحت نتائج تحليل الإنحدار وجود علاقة غير خطية ( منحنية ) بين صفات محصول اللبن والصفات البينية على كل من العمر عند الولادة والأيام المفتوحة ،

٦– تم حساب معاملات التعديل للعمر عند الولادة واحتوت نتائج جداول التعديل على المعاملات إبتداء من عمر ٣٠ شهر وحتى عمر ١٧٩ شهر ، وذلك لإستعمالها فى تعديل السجلات للجاموس المصرى ،

٧– حسبت معاملات التعديل للأيام المفتوحة وذلك للإنتاج فى ٣٠٥ يوم والإنتاج السنوى لإستعمالها لتعديل السجلات لهذا العامل عند إجراء المقارنة بين أفراد الجاموس ،

٨– قيم المعامل التكرارى (ك) لكل من صفة الإنتاج الكلى والإنتاج فى ٣٠٥ يوم ، الإنتاج السنوى هى ٠,٣٥ ، ٠,٣٣ ، ٠,٣٠ على الترتيب، قيم المعامل التكرارى لأيام الحليب والجفاف هى ٠,٣٠ ، ٠,٣٠ ، على الترتيب وكانت قيمتة أقل للفترة بين الولادتين حيث بلغت ٠,٠٨ .