

**AGE at FIRST CALVING in ANATOLIAN BUFFALOES
(Short communication)**

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Anadolu mandalarında ilkine malaklama yaşı

SUMMARY

The data on 106 Anatolian Water Buffaloes from Afyon Kocatepe Agricultural Research Institute over 33 years (1965 – 1998) were used to investigate the effects of the birth and calving periods and seasons on the age at first calving, and to estimate the heritability of the trait for revealing the possibilities of improvement.

The analysis of variance showed that the effect of birth period was significant ($p<0.01$). The average age at first calving was found to be 1127 ± 30.34 days. The heritability calculated with the adjusted data was estimated as 0.46 ± 0.45 .

KEY WORDS: Anatolia, buffalo, age at first calving, heritability.

ÖZET

Bu çalışmada Afyon Kocatepe Tarımsal Araştırma Enstitüsünde 1965-1998 yılları arasında yetiştirilen 106 Anadolu Mandası'nın doğdukları ve malakladıkları dönem ve mevsimlerin ilkine malaklama yaşına etkilerini belirlemek ve bu özelliğin kalıtım derecesini tahmin ederek ıslah imkanlarına ışık tutmak hedeflenmiştir.

Varyans analizleri manda ineğinin doğduğu periyodun bu özelliği önemli ($p<0.01$) düzeyde etkilediğini ortaya koymuştur. Ortalama ilkine malaklama yaşı 1127.90 ± 30.34 gün bulunmuştur. Kalıtım derecesi veriler etkisi önemli görülen doğum periyoduna göre düzeltildikten sonra 0.46 ± 0.45 olarak tahmin edilmiştir.

ANAHTAR KELİMELER: Anadolu, manda, ilkine malaklama yaşı, kalıtım derecesi.

INTRODUCTION

Reducing the generation interval through early maturity and reproduction can extend the productivity of cattle and buffaloes. Early calving has a positive direct effect on genetic progress, as the generation interval decreases and the progeny test of sampling bulls is carried out earlier (Misra *et al.* 1986, Danev 1991, Deokar and Ulmek 1999, Prio *et al.* 2000). Direct observations in a herd may lead to incorrect genetic conclusions. Therefore, partitioning the total variation into the genetic and environmental components and then estimating the genetic parameters with the data adjusted for significant environmental effects are essential (Reddy and Taneja 1984, Dhara and Chakravarty 1996). Age at first calving is influenced by various factors such as period of birth and calving season and the heritability of this trait were reported between -0.18 and 0.61 in previous

studies (Misra *et al.* 1986, Alexiev *et al.* 1987, Dhara and Chakravarty 1996, Peeva 1997).

In the present investigation, an attempt was made to study the effect of non-genetic and genetic factors affecting the age at first calving in Anatolian buffaloes.

MATERIAL and METHODS

Data pertaining to 106 Anatolian buffaloes maintained at the Afyon Kocatepe Agricultural Research Institute were collected for a period of 33 years (1965 – 1998). The entire period of 33 years was divided into 3 periods. Each year was sub-divided into 4 season viz. winter (December – February), spring (March – May), summer (June - August), and fall (September – November). The data were analyzed by least – squares method (Harvey 1987) using the following model:

$Y_{ijklm} = \mu + BP_i + BS_j + CP_k + CS_l + e_{ijklm}$
where,

Yayına Kabul Tarihi: 04.03.2002

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Y_{ijklm} = the m th observation in the l th calving season, k th calving period, j th birth season and i th birth period.

μ = over all mean;

PB = effect of birth period ($i = 1, \dots, 3$);

SB = effect of birth season ($j = 1, \dots, 4$);

PC = effect of calving period ($k = 1, \dots, 4$);

SC = effect of calving season ($l = 1, \dots, 4$);

e_{ijklm} = random error component assumed to be normally distributed with mean zero and variance σ^2 .

The heritability and its standard error were computed by the method as described by Van Vleck (1993) from the data corrected for non-genetic significant effects (Yalçın 1966, Vanlı *et al.* 1993).

RESULTS and DISCUSSION

The results of analysis of variance and least-squares means ($\mu + c$, where c is the least-squares constant for the effect considered) are presented in Table 1. The over all least squares-means for age at first calving in Anatolian buffaloes was 1127.90 ± 30.34 days (36.98 months). This result is in the range of literature (Eltawil *et al.* 1976, Misra *et al.* 1986, Alexiev *et al.* 1987, Danev 1991, Kawthar *et al.* 1991, Sethi and Nagarcenkar 1992). Analysis of variance revealed that the influence of period of birth was highly significant ($p < 0.01$), whereas the effects of birth season, calving period, and calving season were not significant statistically. These results are in accordance with the findings of Kawthar *et al.* (1991) and Deokar and Ulmek (1999). The gradual increase for period of birth might be due to variation in the managerial and environmental conditions. Misra *et al.* (1986) and Danev (1991) were also reported that the effects of calving period and calving season were significant. The differences might be too small to detect in our data.

The heritability of age at first calving was computed by the data on 81 progenies of 10 sire. The progenies ranged 5 to 16 per sire. This value was 0.46 ± 0.45 and higher than that reported by Misra *et al.* (1986) in Murrahs (-0.18 ± 0.06) and Bhadawaries (0.24 ± 0.15), and Peeva (1997) in Bulgarian and Murrah X Bulgarian crosses (0.26), and lower than that reported by Kawthar *et al.* (1991) in Egyptian buffaloes (0.61). Although the heritability value calculated in this study were based on a small sample and thus had large standard error, it indicates that wide variation in the age at first calving is a hereditary character, and therefore genetic improvement of the trait can be achieved through mass selection in this herd.

ACKNOWLEDGEMENTS

The authors are grateful to Afyon Kocatepe Agricultural Research Institute for the facilities provided.

Table 1. Least-squares Means for Age at First Calving.

Age at first calving (days)			
Factors	n	Mean	S.E.
Overall mean	106	1127.90	30.34
Birth period			
1965-75	24	0965.37 ^b	51.67
1976-85	38	1096.43 ^b	47.18
1986-98	44	1321.90 ^a	64.58
Birth season			
Winter (Dec. – Feb.)	11	1117.18 ^a	62.70
Spring (March – May)	14	1158.29 ^a	56.49
Summer (June – August)	55	1124.11 ^a	33.06
Fall (Sep. – Nov.)	26	1112.02 ^a	48.42
Calving period			
1965-75	14	1123.99 ^a	80.05
1976-85	26	1162.78 ^a	45.49
1986-98	66	1096.93 ^a	41.71
Calving season			
Winter (Dec. – Feb.)	13	1125.43 ^a	59.82
Spring (March – May)	29	1202.01 ^a	44.83
Summer (June – August)	44	1099.49 ^a	37.96
Fall (Sep. – Nov.)	20	1084.67 ^a	48.60

^{a, b}: Different superscripts differ significantly ($p < 0.01$).

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