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ESTIMATES OF GENETIC PARAMETERS OF REPRODUCTIVE TRAITS OF BROWN SWISS RAISED AT REGIONAL AGRICULTURAL SCHOOL IN VAN

(Van Tarım Meslek Lisesi İşletmesinde Yetiştirilen İsviçre Esmeri Sığırlarda Döl Verim Özelliklerine İlişkin Genetik Parametre Tahminleri)

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SUMMARY

The genetic parameters of reproductive traits of Brown Swiss cattle, raised at Regional Agricultural School in Van, were estimated. The data from 123 Brown Swiss cows sired by 29 bulls for a period of 25 years (1968 -1992), were used in this study.

The heritability estimates were obtained by the method of half-sib analysis on sire groups. The heritability estimates were 0.071 ± 0.104, 0.063 ± 0.098 and 0.142 ± 0.03, for calving interval, service period and gestation period respectively.

The repeatability estlmates were obtained by intraclass correlation obtained from the anlysis of variance. The repeatability estimates were 0.143 ± 0.039, 0.306 ± 0.058 and 0.462 ± 0.174 for calving interval, service period and gestation period respectively.

Key Words: Brown Swiss Cattle, Heritability. Repeatability, Service period, Calving interval, Gestation pertod.

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ÖZET

Bu çalışmada Van Tarım Meslek Lisesi İşletmesinde Yetiştirilen İsviçre Esmeri Sığırlarda dölverim özelliklerine ilişkin genetik parametreler tahmin edilmiştir. Çalışmada 25 yıllık (1968 - 1992) bir peryodu kapsayan 29 boğanın 123 kızına ait veriler kullanılmıştır.

Kalıtım dereceleri baba-bir üvey kardeşler korelasyonuyla tahmin edilmiştir. Buzağılama aralığı, servis peryodu ve gebelik süresine ait kalıtım dereceleri sırasıyla 0.071 ± 0.104, 0.063 ± 0.098 ve 0.142 ± 0.038 olarak bulunmuştur.

Tekrarlanma dereceleri grup içi korelasyon katsayısıyla tahmin edilmiştir. Buzağılama aralığı, servis peryodu ve gebelik süresine ait tekrarlanma dereceleri sırasıyla 0.143 ± 0.039. 0.306 ± 0.058 ve 0.462 ± 0.174 olarak tahmin edilmiştir.

Anahtar Kelimeler:İsviçre Esmeri Sığır, Kalıtım derecesi, Tekrarlanma derecesi, Buzağılama aralığı, Servis peryodu, Gebelik Süresi.

INTRODUCTION

Reproductive problems cause economic losses for dairy farmers in many ways. Prolonged calving intervals decrease production per cow when measured by lifetime. Infertility results in fewer calves born per cow per year and increases culling. These two factors together increase replacement costs and also reduce potential genetic gain due to selection for high milk production (4).

Knowledge of genetic and phenotypic parameters is necessary for the utilization of modern animal procedures in selection programs (10).

Two important concepts together with the statistical methodology and the principles of population genetics are heritability and repeatability (6).

Heritability must be learned for determination of selection and breeding and estimating of genetic changes for teh traits in a population.

Repeatability is a concept closely allied to heritability and is useful for those traits which is expressed several times during the animal's lifetime, such as lactation milk yield for dairy cows, number farrowed and weaned, weight of lambs or calves for sheep and beef cattle (6).

The purpose of this study is to determine the genetic parameters of reproductive traits of the Brown Swiss cows raised at the Regional Agricultural School in Van.

MATERIALS and METHODS

The 531 reproduction records pertaining to 123 Brown Swiss cows, sired by 29 bulls for a period of 25 years (1968 -1992), were studied.

Reproductive traits were corrected for some environmental factors. Thus, the estimated heritability and repeatability data were classified according to the year, lactation number, season of birth, sex of calf, sire (or cow) and analysed by least squares technique (1) for gestation period;

$$Y_{ijkmn} = \mu + a_i + b_j + c_k + s_m + e_{ijkmn}$$

for calving interval and service period;

$$Y_{ijmn} = \mu + a_i + b_j + s_m + e_{ijmn}$$

where; μ is means of population, a_i is effect of i^{th} year, b_j is effect of J^{th} lactation number, c_k is effect of k^{th} sex of calf, s_m is effect of m^{th} sire (or cow), e_{ijkmn} is random error, assumed normally and independently distributed with zero mean and variance σ^2 (NID) $(0, \sigma^2)$.

Genetic parameters obtained were anlysed according to the methods given by Harvey. The heritability estimates were obtained by the method of half-sib analysis on sire groups: $h^2 = 4\ (\sigma^2 s/\sigma^2 s + \sigma^2 e)$

where; σ^2 s are the sİre component of variance, σ^2 e are error component of variance.

The repeatability estimates were obtained by intraclass correlation obtained from the anlysis of variance : $r = (\sigma^2 s/\sigma^2 s + \sigma^2 e)$

where; σ^2 s are the cow component of variance, σ^2 e are error component of variance.

RESULTS and DISCUSSION

Estimates of Heritability

Estimates of heritability with standard errors for traits are presented in Table 1.

Table 1. Estimates of heritability of reproductive traits

Traits	Heritability
Calving interval	0.071 ± 0.104
Service Period	0.063 ± 0.098
Gestation Period	0.142 ± 0.038

The heritability estimate of calving interval was 0.071 ± 0.104 which is in agreement with those reported by İnal (2), Soldatov and Kusanova (9), 0.07 and<0.098 respectively. On the other hand, this finding is greater than 0.037 reported by Juma et al. (3) but less than 0.12 reported by Mejia et al. (5).

The heritability estimate of service period was 0.069 ± 0.098 which is in agreement with those reported by Soldatov and Kusanova (9), Schnberger (8) < 0.098 and 0.052, whereas the lower estimate of 0.58 was reported by İnal (2). On the other hand, this finding is also greater than 0.023 reported by Juma et al (3).

The heritability estimate of gestation periods was 0.256 ± 0.058 which was lower than the estimates of 0.45, reported by İnal (2), whereas the higher estimate of<0.098 was reported by Soldatov and Kusanova (9).

Estimates of Repeatability

Estimates of repeatability with standard errors for traits are presented in Table 2

Table 2. Estimates of repeatability of reproductive traits.

Traits	Heritability
Calving interval	0.143 ± 0.039
Service Period	0.306 ± 0.058
Gestation Period	0.462 ± 0.174

The repeatability estimate of calving interval was 0.143 ± 0.039 which is Iower than those reported by İnal (2), Mejia et al. (5), 0.19 and 0.32 respectively.

The repeatability estimate of service period and gestation period were 0.306 ± 0.058 and 0.462 ± 0.174. The lower estimates were reported by İnal (2), Soldatov and Kusanova (9) and Roman et al (7).

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