SHORT NOTES:
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REPEATABILITY OF REPRODUCTIVE TRAITS AMONG KEDAH–KELANTAN CATTLE

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RINGKASAN

Kekerapan masa diantara dua peranakan, masa mengandung dan masa perkawinan telah dijangkakan masing–masing 0.35 ± 0.10, 0.05 ± 0.09 dan 0.19 ± 0.10 untuk lembu Kedah–Kelantan. Kegunaan jangkaan ini untuk cara-cara pemilihara dibincangan.

INTRODUCTION

The Kedah–kelantan (KK) cattle is the indigenous breed of beef cattle in Malaysia. The description of the KK cattle has recently been reported by DEVENDRA *et al.* (1973). This breed of cattle is a heterogenous population with wide variation in growth rate, reproductive traits, colour and conformation. Planned selection based on the genetic parameters will enable a certain amount of improvement and uniformity within the breed.

Repeatability is calculated as an intra-cow correlation between records made by same cow at different ages within a herd. The estimates of multiple measurements enable reliable assessment of later performance based on the initial measurements. Genetic improvement is proportionally related to the time taken to accumulate sufficient reliable data. Thus with high repeatability estimates, early selection could be made without waiting for the accumulation of all measurements.

Except for a few reports, repeatability of reproductive traits are low. The estimate for calving interval was reported by EL–ITRIBY and ASKER (1956) in Egypt and GALYKANDE *et al.* (1962) in India. They ranged between 0.137 and 0.080 for native, European and crossbred cattle. The former authors also reported low repeatability of 0.103 for calving interval among buffaloes. A few higher estimates were also reported (AMBLE *et al.* 1967). Repeatability for other traits like gestation period and conception rate reported in literature are consistantly low.

The present paper reports on the repeatability of calving interval, gestation period and service period for the Kedah–Kelantan cattle. The purpose of the estimates is to aid selection procedures.

MATERIALS AND METHODS

The feeding and management of the animals have already been reported (DEVENDRA *et al.* 1973)

Repeatability is measured for unequal number of multiple measurements per individual. The statistical model is

$$Y_{km} = u + a_k + e_{km}$$

where, Y_{km} is the m th measurement on the k th individual,

u is the population mean of the trait,

a_k is the between animal component,

e_{km} is the error.

To estimate the standard error of repeatability, normality was assumed (SWIGER *et al.* 1964).

RESULTS AND DISCUSSION

The mean performance and repeatability of calving interval, gestation period and service period are given in *Table 1*.

TABLE 1. MEAN PERFORMANCE AND REPEATABILITY OF REPRODUCTIVE TRAITS

Trait	Number of observations	Mean (days)	C.V. (%)	r
Calving interval	115	470.6 ± 13.1	30.9	0.35 ± 0.10
Gestation period	149	278.3 ± 14.5	6.2	0.05 ± 0.09
Service period	96	199.0 ± 13.7	67.3	0.19 ± 0.10

C.V. = Coefficient of variation
r = Repeatability

The results show long calving intervals with wide variation for all the traits among the KK cattle. The rather low repeatability values for gestation and service periods show that the environmental factors such as the nutritional status of the cows are important in determining their durations. This refers particularly to the service period where the coefficient of variation is 67 percent. Thus in a herd of KK cattle the service period will be quite different from the service period in the first or second lactations. The low repeatability of gestation period may be contributed by the variation in the length of gestation caused by differences in sex of calf in the various calvings and dam parity.

The repeatability of calving interval is a little higher. This is similar to those reported by AMBLE *et al.* (1967) which ranged between 0.37 and 0.54 for various breeds of *Bos indicus* cattle. However, the temperature *Bos taurus* breeds gave lower estimates. For example, LEGATES (1954) estimated 0.133 for Holstein–Friesian cattle. Unlike the *Bos taurus* cattle, the KK cattle will have less variation in calving intervals due to special environmental variance. This means that the duration of the earlier calving periods will be repeated in the subsequent lactations.

Additional measurements for calving interval will not improve the accuracy as compared to the multiple measurements necessary for gestation and service periods. Additional records of the latter two traits from at least three or four lactations are necessary to assess genetic merit of the animal. Further studies estimating heritability, genetic and phenotypic correlations of these and other related traits will enable breed improvement through appropriate methods.

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SUMMARY

Repeatability of calving interval, gestation period and service period have been estimated to be 0.35 ± 0.10, 0.05 ± 0.09 and 0.19 ± 0.10 respectively for Kedah–Kelantan cattle. The use of these estimates for selection procedures were discussed.

REFERENCES

AMBLE V.N., KRISHNAN, K.S., and SONI, P.N. (1967). Analysis of breeding data of some Indian herds of cattle. *I.C.A.R. Tech. Bul.* (Anim. Hus.) No. 6 New Delhi, India.

DEVENDRA C., NORDIN, M.H., HODGE, R., LEE, T.K.C. and PATHMASINGAM, M. (1973). Kedah–Kelantan cattle of Malaysia. *Malaysian Agric. J. 49* : 25 – 47.

EL–ITRIBY, A.A. and ASKER, A.A. (1956). Repeatability and heritability of some dairy characters in cattle and buffaloes in Egypt. Indian *J. Dairy Sci., 9* : 157 – 163.

GALYKANDE, E.B., MAHADEVAN, P. and BLACK, J.G. (1962). Milk production in East African zebu cattle. *Anim. Prod., 4* : 329 – 336.

LEGATES, J.E. (1954). Genetic variation in service per conception and calving interval in dairy cattle. *J. Anim. Sci., 13* : 81

SWIGER, L.A., HARVEY, W.R., EVERSON, D.D. and GREGORY K.E. (1964). The variance of intraclass correlation involving groups with one observation. *Biometrics, 20* : 818 – 826.

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