

USE OF DIFFERENT TYPES OF RECORDS FOR ESTIMATION
OF HERITABILITY

SY-2-5

El uso de los tipos diferentes de los registros
para la estimación de la herencia (h^2)

C.E. REDDY *
V.K. TANEJA **

INDIA

Unbiased estimates of sire and error variance are needed for estimation of heritability from half-sib groups. With high speed electronic computers being available, the least squares procedure to estimate the sire and error variance may be preferable. However, the computational difficulties of analysing records according to complex models have led many investigators to express records as deviation from some function of contemporary average. These deviated records are then analysed according to simple models. In this paper we have tried to estimate heritability using records deviated from herd average and herdmate average.

A total of 784 records of Murrah buffaloes from Jabalpur military dairy farm were used for estimation of heritability of 300 days first lactation milk yield. These records were spread over a period of 37 years (1941 to 1977). A definite policy of culling and selection was followed at this farm. Bulls used were selected on the basis of their dam's records. Male calf was retained in the herd when his dam's milk yield for 300 days was more than 2700 kg. For female calf to be retained, the dam's milk yield must not be less than 2400 kg. Natural service was practised at this farm. Bulls were used in rotation every third day. Culling in the middle of lactation, abortion and other pathological causes which affected the lactation were considered as abnormalities. Hence, all such records were discarded.

In order to account for year to year variation and confounding of sires with years, the records were expressed as deviations from herd average as well as herdmate average. Herd average was the average of all records made in a year while the herd mate average was the average of all records made in the year, excluding the record of the animal and its paternal half-sibs. These deviated records were then analysed for estimation of sire and error variance using half-sib correlation method.

A comparison of sire variance for 300 days first lactation milk yield from two types of deviated records revealed that sire variance for milk yield was comparatively higher in case of herdmate average deviations (5071) compared to herd average deviations

* College of Veterinary Science and Animal Husbandry, Rajendra Nagar-500030, Hyderabad, India.

** National Dairy Research Institute, Karnal-132 001, Haryana, India.

(1311). Comparatively large component of sire variance in case of herd-mate deviations was due to the exclusion of paternal half-sibs from contemporary average which increased sire to sire variation. Van Vleck *et al.* (1961) indicated that the procedure based on deviations from stablemate average gave unbiased ranking of sire effects while the estimate based on herd average deviations was biased by a factor which depends on the number of stablemates. It was suggested that unbiased estimates may be obtained by multiplying each observation by the reciprocal of the bias. Eikje (1974) pointed out that in flockmate average there was an increment in sums of squares for sires since each sire in the analysis occurred for other sires. The author concluded that the heritability estimates based on flock average deviations seemed to be under-estimated to the same degree as the heritability based on flockmate average deviations was biased upward.

The heritability estimate of milk yield in the present study using herdmate average deviations (0.13 ± 0.08) was higher than that from herd average deviations (0.04 ± 0.06). However, for precise estimates of heritability from deviation records, the expectations of the effects for the given model need to be worked out and these be used for estimation of sire and error variance. The estimated variance components using the expectations for these two types of deviations should be almost equal and agreement between the estimated heritability would then be fairly good.

SUMMARY (1) (3)

The heritability estimates for milk yield in Murrah buffaloes were computed using records deviated from herd average and herdmate average. The sire variance estimated from herdmate average deviations (5071) was higher than that from herd average deviations (1311). The herdmate average deviations over-estimated the heritability (0.13) while the herd average deviations under-estimated it (0.04).

ZUSAMMENFASSUNG (2) (3)

Die Erbliehkeitschätzungen in Murrah Büffeln wurden für Milchleistung berechnet, indem man die von Durchschnittswerten der Herde und Herdgatten abgewichenen Registerie benutzte. Die von Herdgatten geschätzten durchschnittliche Abweichung der Zuchtbullenvarianz (5071) war höher als die von der Abweichungen der Herden-durchschnittswerte (1311). Die Abweichungen der Herdgattendurchschnitte überschätzen die Erbliehkeit (0.13), aber die Herddurchschnittsabweichungen unterschätzten sie (0.04).

REFERENCES

- Eikje, E.D. (1974) Studies on sheep production records. III. Expectations of genetic parameters for lamb weights expressed as deviations from contemporary averages. *Acta Agr. Scand.*, 24 : 260-266.
- Van Vleck, L.D., Heidhues, T. and Henderson, C.R. (1961) Analysis of deviations of dairy records from different contemporary averages. *J. Dairy Sci.*, 44 : 269-281.