BIOMETRICAL GENETIC ANALYSIS OF A THARPARKAR HERD

Analyse biométrique génétique d'un étable Tharparkar

Análisis biométrico genético de un establo Tharparkar

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Periodic evaluation of the realised improvement in economic value, due to suitable breeding and management program, of pure-bred or Cross-bred dairy cattle, over a period of time, is an essential pre-requisite to formulation of efficient program of cattle improvement. Higher level of milk production and concomitantly lewer age at first calving contribute towards increasing the economic value of a dairy cow.

In the present paper the results of the preliminary genetic analysis of the available normal records on age at first calving (months) and first lactation milk production (Kg) of 1031 Tharparkar cows, located at National Dairy Research Institute farm at Karnal (North-West India), over a period of 35 years (1936-70), are reported and briefly discussed.

Results

The average age of the cows, when their daughters were born, was 6 years. An average selection differential per generation of 6 years was + 86 Kg in first lactation production and + 0.095 months in age at first calving. The average superiority of daughters over their contemporaries, per generation, was found to be + 54 Kg in first lactation production and − 0.114 months in age at first calving. With herd average of 2128 Kg for first lactation production and 42 months for age at first calving, the genetic gain per year was 0.42 percent in first lactation production and − 0.047 % in age at first calving. The regression of daughter on dam, for first lactation production and age at first calving was estimated to be 0.18 and 0.32 respectively. The expected genetic gain per generation in daugh-

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ters, due to selection of their dams was therefore, + 15 Kg in first lactation production and + 0.03 months in age at first calving. Thus the larger portion of genetic gain per generation, of + 39 Kg in first lactation production and – 0.145 months in age at first calving occurred due to genetic contribution from the sires.

The yearly trend measured as the regression of the trait on year of calving, was estimated to be – 26.4 Kg for first lactation production and + 0.31 months for age at first calving. The overall regressions and within sire regressions of actual records and deviations of records from their contemporaries, on year of calving gave the estimate of genetic thend of + 166.8 Kg per year for first lactation production and – 0.28 months per year for age at first calving. The estimate of the environmental trend therefore was – 193.2 Kg per year for first lactation production and + 0.582 months per year for age at first calving.

The phenotypic and genetic correlations between age at first calving and first lactation production were estimated to be – 0.021 and + 0.394 respectively. The former is, however, statistically not different from zero.

SUMMARY

The two independent analysis reveal that there has been positive genetic trend for increasing milk production and decreasing age at first calving, which is a desirable feature in any herd improvement programme. The selection differential due to female selection was positive for first lactation milk production as well as for the concomitant trait age at first calving. This occurred on account of the intrinsic positive relationship between the two traits as revealed by the positive nature of the genetic correlation between them. The result, however, indicates that selection of females was predominantly based on milk production. The desirable result of realized genetic gain to be positive for milk production and negative fo rage at first calving indicates that the genetic contribution from the sires has been + 39 Kg per generation in first lactation milk production and – 0.145 months par generation in age at first calving. Such inverse behaviour, in realized genetic gain in the two traits, has resulted in negative phenotypic correlation between the two traits. The extent and undesirable nature of the environmental trend for both the traits emphasizes the need for greater study of the role of environment in livestock improvement under tropical management.

RESUME

Deux analyses indépendantes révèlent qu'il existe une tendance génétique positive pour l'augmentation de la production laitière et la diminution de l'âge au premier accouchement, trait désirable dans n'importe quel programme d'amélioration de la production laitière. La sélection différentielle due à la sélection féminine fut positive dans la première lactation pour la production de lait, ainsi que pour le caractère concomitant de l'âge au premier accouchement. Cela arrive comme conséquence de la relation intrèsèquement positive existente entre les deux caractères, ainsi que le démontre la corrélation génétique existante entre eux, de nature positive. Le résultat, cependant, indique que la sélection des

femelles était surtout basée sur la production laitière. Le résultat désirable du gain génétique obtenu s'il est positif pour la production laitière et négatif pour l'âge au premier accouchement indique que la contribution génétique des parents a été de plus 39 Kg par génération dans la production laitière à la première lactation et de moins 0,145 mois par génération quant à l'âge au premier accouchement. Une telle conduite inverse dans le progrès génétique obtenue dans les deux caractères procède de la corrélation phénétypique négative existant dans les deux. L'extension et la nature non désirable des caractères ambiants en relation avec les deux caractères suggère la nécessité d'une étude plus approfondie sur le rôle du milieu ambiant dans l'amélioration du bétail bovin laitier sous des conditions tropicales.

RESUMEN

Dos análisis independientes revelan que existe tendencia genética positiva para el aumento de la producción lechera y la disminución de la edad al primer parto, rasgo deseable en cualquier programa de mejora de la producción láctea. La selección diferencial debida a la selección femenina fue positiva en la primera lactación para la producción de leche, así como para el carácter concomitante de la edad al primer parto. Ello sucede como consecuencia de la relación intrínsecamente positiva existente entre los dos caracteres, tal como lo demuestra la correlación genética existente entre ellos, de naturaleza positiva. El resultado, no obstante, indica que la selección de las hembras estaba predominantemente basada sobre la producción láctea. El resultado deseable de la ganancia genética obtenida, de ser positiva para la producción láctea y negativa para la edad al primer parto, indica que la contribución genética de los padres ha sido de + 39 Kg por generación en la producción lechera en la primera lactación, y de — 0,145 meses por generación en cuanto a la edad al primer parto. Tal conducta inversa en el progreso genético obtenido en ambos caracteres procede de la correlación fenotípica negativa existente entre ambos. La extensión y la naturaleza no deseable de los caracteres ambientales con relación a ambos caracteres sugiere la necesidad de un estudio más profundo sobre el papel del medio ambiente en la mejora del ganado vacuno lechero bajo condiciones de manejo tropical.