

Using Different Methods of Progeny Testing for Breeding Value Estimation of Damiatta Sires

Anwendung verschiedener Methoden der Nachkommenschaftsprüfung zur Abschätzung des Zuchtwertes von Damiatta-Bullen

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1. Introduction

Progeny testing as one of the most efficient methods of selection is gaining ground very slowly in practice. This is due to the fact that progeny testing involves a number of error sources, represents a complex breeding process and, in addition, is very expensive and lengthy. This is why solutions are searched for all over the world to increase test reliability and reduce costs as well as the period required.

The highly advanced animal breeding countries carry on progeny testing against tremendous costs, and the extensive research activity has not been ceased to continue in this field. The establishment of any method or data promoting the improvement of breeding value estimation by progeny testing is still an important task.

With these ideas in mind, comparative study had been carried out to most reliable and simple method to study the genetic transmitting ability of Bulls.

2. Experimental

The 305-day milk production records of 91 Damiatta Cows, the daughters of 6 sires in El Gemesa Dairy Herds Station during 1965—1970 were analysed. The harmonic mean of dams per sire was 15.2. For heritability estimates analysis of variance based on the formula given by Falconer (1960) was used. The breeding value of Damiatta sires with respect to milk yield their daughters was established by using the following methods:

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a) Hungarian Standard method: (Mouktar, 1968a and 1968b)

$$\text{Breeding value of the sire} = \frac{\bar{X}_1 - \bar{X}_2}{\bar{X}_2} \times 100$$

where \bar{X}_1 = average production of the daughters

\bar{X}_2 = average production of the contemporaries

b) Lauprecht method: (Lauprecht, 1950 and 1955)

$$ZW = U + h^2 (X - U_H) + h^2_H (U_H - U)$$

where ZW = breeding value

U = breed average

\bar{X} = average of the daughters

U_H = average production of the farm

h^2 = heritability estimate of the trait

h^2_H = heritability estimate of trait in the farm

c) Siler — Váchal method: (Váchal, 1961)

$$ZW = 2b(\bar{X} - AY) + A$$

where \bar{X} = daughters average

AY = contemporaries average

A = breed average

b = regression coefficient.

Statistical comparison among milk production means were made according to multiple range test of Duncan (Steel and Torrie, 1960).

3. Results and Discussion

Data presented in Table 1 show breeding value estimates according to the three equations by 305 day milk. The ranking of the six Damiatta sires, used in the experiment, according to their breeding value (Table 1) showed that changes in the sire order, established on the basis of progenies production gave almost the samtrend. Classification of sire, according to Hungarian Standard method was made to four classes:

Class I: where the production of progenies of the sire is over 150% as compared to that of the contemporaries.

Class II: where the above figure is 91—150%.

Class III: where the production of the progenies is equal to 65—90% as compared to that of the contemporaries.

Class IV: where the above figure is less than 65%

Table 1: Breeding value of Damiatta sires according to the 305 day milk of their progenies, using different methods of estimation.

Sire Number	N = 91	Hungarian Standard	Lauprecht	Siler-Vachal	ranking of sires
1	16	- 56	964	502	VI
2	7	- 29	1076	786	V
3	20	127	1721	2420	I
4	18	- 22	1107	866	IV
5	11	- 18	1125	912	III
6	19	1	1205	1114	II

According to this classification, sire 3 are ranked in grade I, where sire 6 are in grade II, and sires 5 and 4 were in grade III while sires 2 and 1 were in grade IV.

It was noticed that the superior sire 3 and the inferior sire 1 differed significantly from all the other sires. The differences among the sires within each category were not significant (Table 2). It was also observed that the superior sire 3 had milk yield more than five times as large as of the last sire 1 (i. e. 3138 vers. 614 kg). This difference may be a reflection of the genetic variation, since all the progenies were reared under the same environmental conditions. However, no selection had been made before on this Herd. This genetic variation gives a chance to carry out selection for milk yield according to progeny testing.

Table 2: Comparisons between every two means of milk yield by multiple range test of Duncan.

Sires:	3	6	5	4	2	1
N	20	19	11	18	7	16
Means :	3138	1420	1154	1094	989	615

These results indicate that, it is possible to apply any one of the three equations, used in the experiment, to predict the breeding value of Damiatta Bulls according to the early informations of their progenies.

It is clear that the ranking of the sires was the same according to the different equations used and classification mentioned before (Tables 1, 2 and Figures 1, 2 and 3).

It can be concluded from our results, that it is possible to assess the breeding value of sires with a relatively simple method "Hungarian Method". This particular method is of great importance for practical application (especially pertaining to Egypt), because the required information can be easily obtained by selectionning first within a comparatively limited breeding area. A repetition with extended data is of course required.

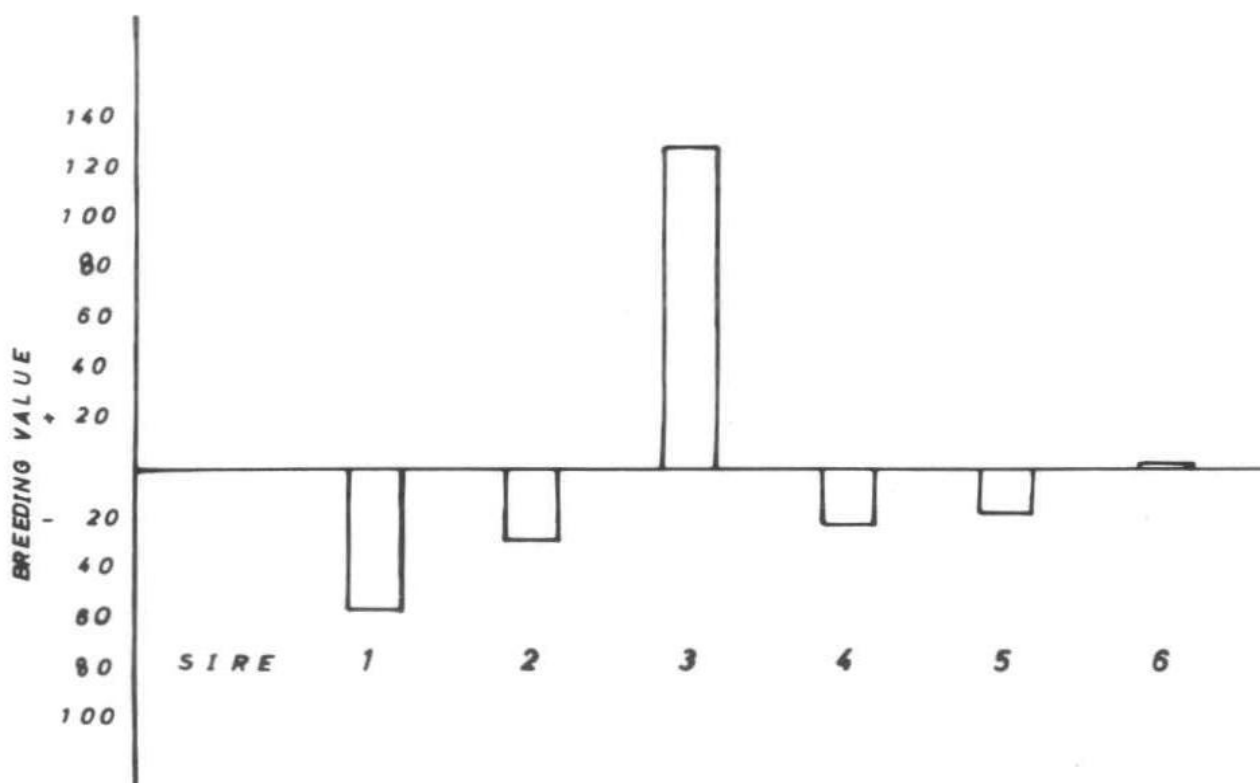


Figure 1: Breeding value of sires by 305 day milk according to the Hungarian Standard method.

4. Summary

During recent years, there has been an increase in the rate of application of progeny test to improve livestock production. Comparative study was done to detect the most reliable and simple method to study the genetic transmitting ability of Damiatta Bulls using different methods of progeny testing equations. It was clear that the ranking of the sires was almost the same according to the different equations used. It is possible to apply any one of the three equations to predict the breeding value of Damiatta Bulls according to early information of their progenies.

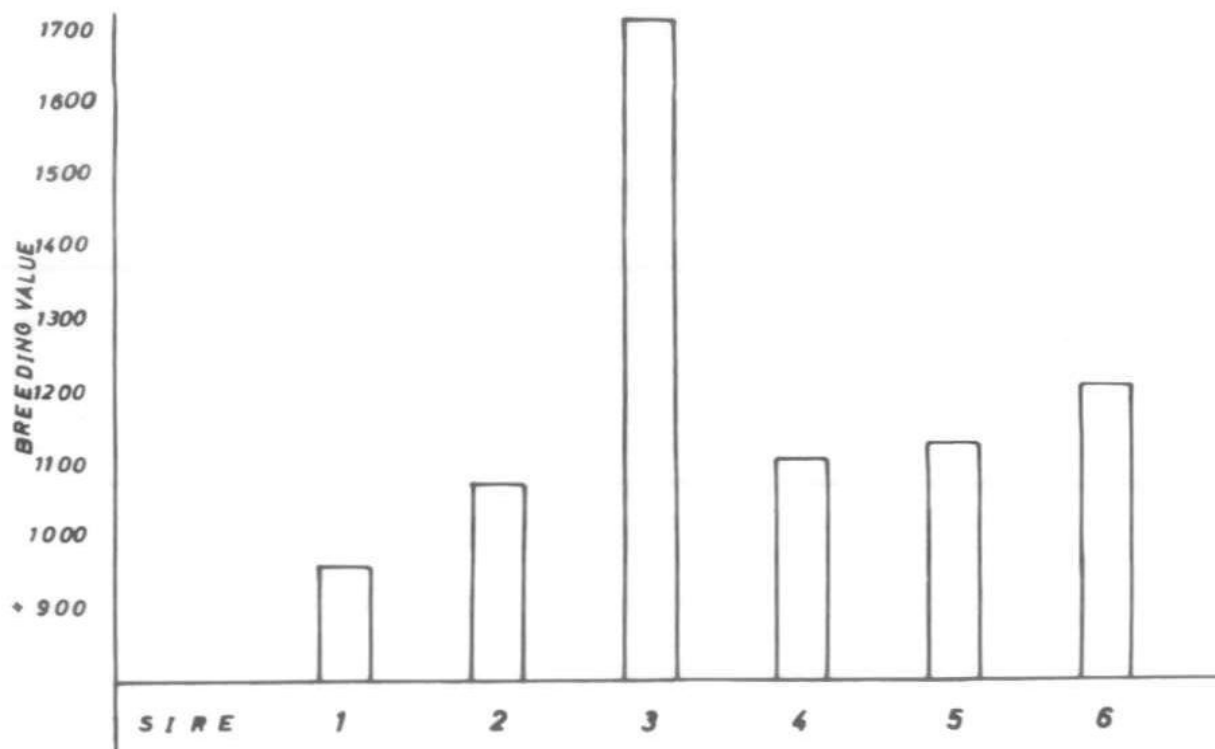


Figure 2: Breeding value of sires by 305 day milk according to Lauprecht method.

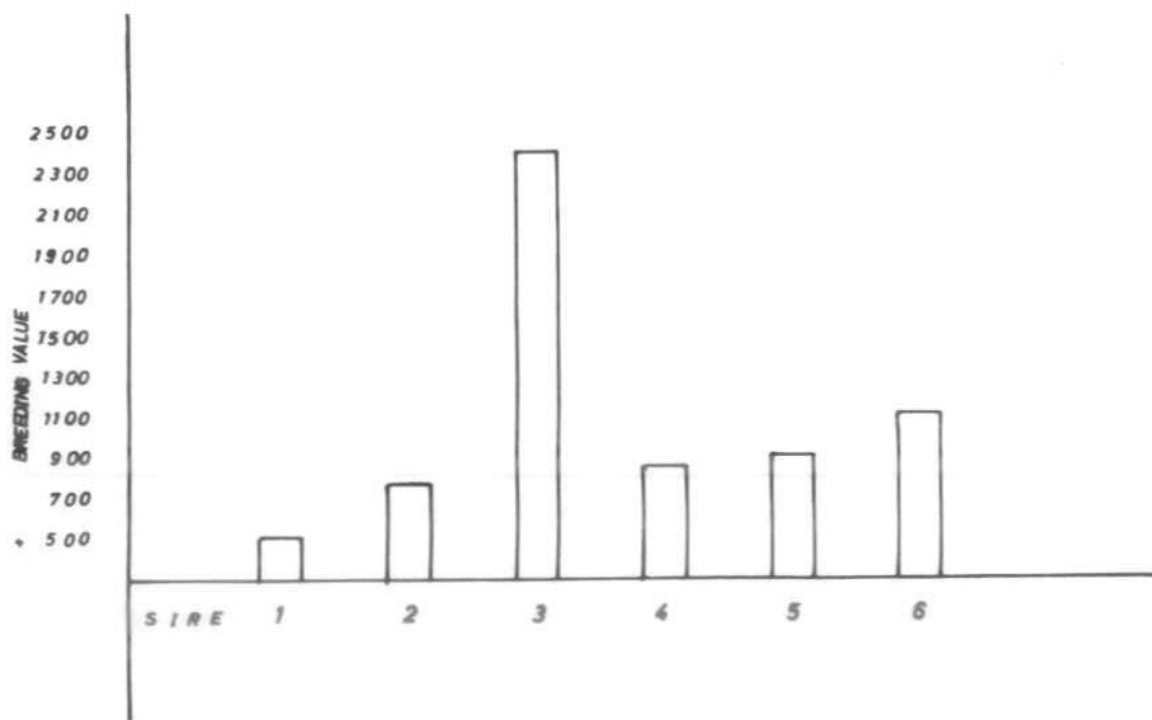


Figure 3: Breeding value of sires by 305 day milk according to Siler-Vachal method.

Zusammenfassung

In den letzten Jahren ist auch in Ägypten eine zunehmende Anwendung von Nachkommenschaftsprüfungen in Verbindung mit den Bemühungen zur Steigerung der tierischen Produktion festzustellen. In der vorliegenden Arbeit wird über vergleichende Untersuchungen berichtet, deren Ziel die Auswahl einer geeigneten Methode zur Ermittlung der Vererbungseigenschaften von Damiatta-Bullen ist. Die drei untersuchten Methoden brachten vergleichbare Ergebnisse und werden damit gleichermaßen als geeignet für die Abschätzung des Erbwertes von Damiatta-Bullen gehalten.

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