

Milk Production and Reproduction Performance of the Mafriwal Dairy Cattle of Malaysia

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Introduction

The dairy market in Malaysia is mainly dependent on imported milk and milk products. The demand for milk has increased over the years (DVS, 2002) and is expected to continue to rise with the increase in population and change in lifestyle. There is a need to increase milk production in order to reduce importation, ensure food security and reduce loss of foreign exchange. Malaysia had, under the 7th Malaysian plan, targeted to achieve 10% self-sufficiency in liquid milk by the year 2000, and by the year 2010 to achieve 30% self-sufficiency. Among the efforts to achieve this were the development of the Mafriwal dairy cattle of Malaysia, a tropicalised composite synthetic breed type with varying Friesian genes gene content, and the adoption of modern management practices. Mafriwal was the result of selectively breeding for adaptation to the hot and humid local environment and improved milk production and growth performance. Since Mafriwal is a new breed type and has a varying Friesian gene content, it is essential that its performance be evaluated regularly. The objective of this study are to evaluate the productive and reproductive performance of the Mafriwal dairy cattle with Sahiwal-Friesian gene base and 50-75% Friesian genes at the nucleus herd at Institut Haiwan Kluang, Johor.

Materials and Methods

Retrospective data on milk production and reproduction traits of 1058 Mafriwal cows of four genetic groups (M-50, M-56, M-63 and M-75, having 50, 56, 63 and 75% Friesian genes, respectively) with Sahiwal-Friesian gene base, born and raised at Institut Haiwan Kluang, Johor, of the Department of Veterinary Services Malaysia, over a period of 14 years (1982-1996) were collected, validated and analysed. Data from animals with unknown parents (unknown gene content) and incomplete information were excluded from the study. The data was confined to the first four lactations and the first four parities. Data were analysed by generalized least square procedure.

Results and Discussion

Lactation number x Friesian gene percentage had no significant interaction effect on the milk production traits investigated: total milk yield (LTDM), projected 305 days milk yield (P305M), days in peak milk (PM), lactation length (LL), average daily milk yield (ADMY) and dry period length (DP). The percentage of Friesian genes too had no effect on these milk production traits. The year of birth and lactation number had significant ($P<0.05$) effects on projected 305 days milk yield, peak milk yield, and average daily milk yield. The milk production performance was significantly ($P<0.01$) lower in the first lactation than in the subsequent lactations (ADMY: 5.72 ± 0.25 L per day in first lactation versus 6.36 ± 0.25 and 6.45 ± 0.39 L per day in second and third lactations). The year of birth had a significant ($P<0.05$) effect on lactation total milk yield and lactation length. However, both effects were non significant for dry period. Age at calving had a significant ($P<0.05$) effect only on peak milk yield.

The significant effects of year of birth are expected as the environment was not constant and the system of management was continuously being improved. The lack of significant difference in the milk production traits of the four genetic groups is as reported by Raymond and Hawari (1996) and Raymond and Ratnakumar (1997). The improved milk production performance with lactation number may be attributed to the increased maturity of dam (Schmidt, 1971); similar trends were also observed by Van Duc and Taneja (1983) and Misra *et al.* (1979).

Calving year had significant ($P<0.01$) effect on the reproductive traits: number of services to conception (NSC), days from calving to first heat (CFH), days from calving to first service (CFS), days from calving to conception (CCON) and calving interval (CI). Friesian gene percentage of the cows had significant ($P<0.05$) effect on NSC and CFS. NSC was significantly ($P<0.05$) lower for the M-50 (2.50 ± 0.16) and M-63 (2.87 ± 0.25) cows than for M-56 (3.37 ± 0.26) and M-75 (3.30 ± 0.32) cows. The M-50 cows exhibited significantly ($P<0.05$) longer CFS than M-56 cows (83.63 ± 3.51 versus 68.71 ± 5.74 days). Parity had significant ($P<0.05$) effect on CFH and CFS (service was done at the onset of the next heat). CFH and CFS were significantly ($P<0.01$) longer for the first parity (70.81 ± 4.29 and 98.84 ± 5.17 days, respectively) than the other parities (54.92 ± 4.73 and 70.83 ± 5.68 days for third and 47.41 ± 6.95 and 65.97 ± 8.37 days for fourth parity, respectively). Age at calving had no significant effect on the reproductive traits investigated.

The significant ($P<0.05$) longer CFH and CFS after the first parity may be attributed to the cows being young mothers and requiring longer time for recovery after parturition. However, it must be remembered that NSC and CFS are traits generally

influenced by management. The first is also influenced by the proficiency of the inseminator and the latter by the heat detection practices on the farm.

Calving year, Friesian gene percentage, parity and calf sex had significant ($P < 0.01$) effects on calf birth weight. M-50 had significantly ($P < 0.05$) lower calf birth weight (25.04 ± 0.27 kg) than M-56 (26.62 ± 0.52 kg) and M-63 (26.28 ± 0.46 kg). Calf birth weight was significantly ($P < 0.05$) lower in the first parity (24.33 ± 0.40 kg) than the later parities (25.89 ± 0.38 , 26.32 ± 0.60 and 26.86 ± 1.29 kg for second, third and fourth parities, respectively).

The higher calf birth weights of M-56 and M-63 were in accordance to the observation by Shamsuddin *et al.* (1998). The heavier calves in the later parities may be due to the cows having attained full growth being able to use their energy for the growth of their young.

Conclusions

The Mafriwals of Sahiwal-Friesian base and with 50 – 75% Friesian genes, generally, appeared to perform similarly. They only differed in terms of their calf birth weights and days from calving to first heat and first service. This is one of the reasons why the Department of Veterinary Services Malaysia has decided to allow these genetic groups to interbreed to produce a composite synthetic breed for the country. However, because of the diverse gene pool of the mafriwal, the selective breeding should be continued for the nucleus herd, if not at the farmers' level, and the performance of the animals, both at the nucleus herds and the farmers' herds, should be monitored.

Benefits from the study

The Mafriwal has been decided as the dairy breed for Malaysia. It is still in the development stage. In addition, its gene pool is constantly changing especially since it is a composite breed type with varying percentage of Friesian genes. It is, therefore, vital that its performance be continuously monitored. This would reflect not only the improvement achieved through management and selection and also the changes in the genetic variability of the populations.

Patent(s), if applicable :

Nil

Stage of Commercialization, if applicable :

Nil

Project Publications in Refereed Journals:

Nil

Project Publications in Conference Proceedings

1. Kalaiselvi P, Panandam JM, Tan SG and Yusoff K. 2002. Association between microsatellite markers and milk production traits in Mafriwal dairy cattle. Proceedings of the 12th Scientific Meeting and 13th Annual General Meeting of the Malaysian Society for Molecular Biology and Biotechnology, 2002; p 39 (abstract).

Kalaiselvi P, Panandam JM, Yusoff K and Tan SG. 2002. Microsatellite polymorphism in Mafriwal dairy cattle of Malaysia. Proceedings of the 25th Malaysian Society of Animal production Annual Conference, 1-3 August 2003, Melaka, pp. 93-94.

Graduate Research

Name of Graduate	Research Topic	Field of Expertise	Degree Awarded	Graduation Year
Kalaiselvi Palani	Genetic characterisation of the Mafriwal dairy cattle of Malaysia using quantitative and molecular methods	Animal Genetics	Ph.D (working towards)	Anticipated 2004

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