

Development of the Mafriwal Dairy Cattle of Malaysia

Panandam, J.M¹ and A.K. Raymond²

¹Department of Animal Science, Faculty of Agriculture, Universiti Putra Malaysia,
43400 UPM Serdang, Malaysia

²Department of Veterinary Services, Wisma Tani, Precinct 4,
62630 Putrajaya, Malaysia

Introduction

The dairy market in Malaysia is mainly dependent on imported milk and milk products. The demand for milk has increased over the years and is expected to continue to rise with the increase in population and change in lifestyle. In 1990 the self-sufficiency for milk products was 4.66% (DVS, 2005a). Malaysia had, under the 7th Malaysian plan (1999-2000), targeted to achieve 10% self-sufficiency in liquid milk by the year 2000, and 30% by the year 2010. Although it would be unrealistic to expect the local production to meet the total demand, there is need for an increase in production in order to ensure food security and save foreign exchange. This paper reviews one of the many attempts to improve the dairy industry in Malaysia, through development of the Mafriwal dairy cattle by crossbreeding of the Friesian and the Sahiwal breeds.

Historical development in cattle breeding

The main dairy cattle population in Malaysian was initially the Local Indian Dairy (LID) cattle, which originated from a mixture of Indian zebu breeds, imported into Malaysia in the late 19th century. These animals expressed excellent adaptability to the local climate and thrived well on low nutritional inputs (Sivarajasingam and Wan Zahari, 1985; Raymond and Ratnakumar, 1997). They, however, had low milk yields averaging 502 kg/lactation (Sivarajasingam *et al.*, 1983). An attempt was made to improve the local dairy industry by importing purebred dairy cattle, like Friesian and Jersey. However, this effort failed due to their low production as a result of the environmental stresses in Malaysia. In the 1950s, the Department of Veterinary Services (DVS) attempted to upgrade the LID cattle by crossing with Red Sindhi and Sahiwal from India and Pakistan (Osman, 1984). These latter breeds lacked dairy qualities and as such the attempt produced crossbreds that were only marginally better than the LID (Raymond and Ratnakumar, 1997). Crossbreeding of *Bos taurus* dairy breeds and zebu dairy breeds was considered the best alternative to improve the productivity in the local dairy industry. Subsequently in the 1960s, *B. taurus* breeds, mainly Friesian and to a lesser extent Jersey, were used to upgrade the LID.

The Sahiwal-Friesian crossbreeding project

In 1974, the National Dairy Development Programme was started under the New Economic Policy. The programme involved the establishment of milk collection centres, creation of market outlets for fresh milk and importation of dairy crossbred cattle (Osman, 1984). In order to organise the breeding of dairy cattle, DVS embarked on a crossbreeding programme involving the Sahiwal and Friesian cattle breeds. A large number of Sahiwal × Friesian crossbred (F₁) calves and heifers and purebred Friesians were imported from Australia and New Zealand (Sivarajasingam *et al.*, 1983). The crossbreeding programme aimed to develop Sahiwal-Friesian crossbred cattle that were adapted to the hot and humid local environment. In addition, it was hoped that the high yields from the improved cattle would encourage more local farmers to participate in dairy cattle production and, thereby, boost the industry.

Between 1978 and 1991, over 20,000 Sahiwal-Friesian crossbred heifers were imported for the dairy programme. The imported animals were inseminated mostly with imported Friesian semen and semen from imported and locally bred crossbred bulls (DVS, 1980; Osman, 1984). Animals with 50% Friesian genes were distributed to smallholder farms and *inter se* mating encouraged to maintain the gene proportions of the Friesian breed. Breeding herds were kept on the government farms and were subjected to crisscrossing and grading up resulting in various crossbred genotypes (Raymond and Ratnakumar, 1997). Data on production and reproduction performance and health were collected and stored using the DairyChamp computer database system.

The performance of the crossbred genotypes with various gene proportions of the Friesian breed is shown in Table 1. The F_1 crossbred animals showed improved milk production, however, the F_2 animals exhibited tremendous reduction in lactation and breeding performance (Sivarajasingam and Kumar, 1989). Furthermore, 60-70% of the F_2 cows failed to milk on the machine. This led to the recommendation of the use of Sahiwal-Friesian crossbred animals with 60-75% Friesian genes. Consequently, a breeding programme to produce these crossbreds was designed by DVS (Figure 1). The product of this programme was the "Mafriwal" dairy cattle of Malaysia, a tropicalised synthetic dairy breed.

The Mafriwal breeding animals were selected for their good dairy production characteristics, based on pedigree records. The influence of the local environmental factors on performance was taken into consideration. The desired characteristics of the Mafriwal include improved milk production, easily manageable, able to withstand the local hot and humid climate, resistant to local diseases and adaptable to the local feed resources (DVS, 2005b). The Mafriwal breeding population has an average milk yield of 2337 kg/lactation and a lactation length of 260 days. The Mafriwals are currently the most popular dairy cattle in Malaysia for intensive and semi-intensive management systems in medium sized farms.

Implications and lessons learned

- The crossbreeding project produced the Mafriwal dairy cattle with improved productivity as desired. The high producing animals helped increase the income of smallholders and served as an impetus for the growth of medium scale dairy farms.
- During the developemt of the Mafriwal, selection of the bulls was given emphasis, but minimal cow selection was practised. The Mafriwal herd has high potential for further improvement through intensive selection of bulls and with practice of some selection among the cows.
- The desired improvement of a livestock species can only be achieved through proper breeding programmes with well-defined breeding objectives. In countries like Malaysia where large ruminant farms are absent, only with national development policies and organised effort among agencies and institutes involved in research and development of livestock would we be able to develop the livestock industry to meet self-sufficiency.
- The initial strategies adopted to improve the local dairy animals did not produce the desired progress. One of the reasons was the choice of breeds. Success in improving the per animal milk production was achieved only when one of the breeds used in the crossbreeding programme was a high milk producer.

Questions for discussion

- The dairy cattle population and the number of smallholder farms in Malaysia have decreased despite the efforts to stimulate the industry. One reason for the latter would be the increased number of medium farms (more than 20 animals). However, involvement of farmers in the dairy industry is low. What should be the strategy to ensure more farmers are involved in the dairy industry to increase self-sufficiency in milk and its products?
- The recommended gene proportion of the Friesian breed in the crossbred genotypes is 60-75%. How can we ensure that this proportion is maintained at farm levels?
- The Mafriwal has been distributed by the Department of Veterinary Services to many small and medium farmers. However, there are many other dairy breeds and crossbreeds kept by farmers. How can we ensure that the Mafriwal is not adulterated with genes from these other breed types?
- The major limiting factor to livestock improvement in Malaysia is lack of proper recording schemes at farmer level, especially pedigree information. What are the major constraints to getting farmers to adopt a livestock recording programme?

Gaps in knowledge

The performance of the Mafriwal under intensive and semi-intensive management systems should be evaluated in comparison to other popular breed types. Since the Mafriwal has 60-75% Friesian genes and is still being improved, it is important that its genetic make-up and performance be monitored.

The Mafriwal was developed under semi-intensive management system. The Malaysia livestock industry, however, is currently moving towards intensive management system. There is a lack of studies comparing the performance of Mafriwal under the two production systems. It is, therefore, necessary that the performance of the Mafriwal be compared under the two systems. Whether the 60-75% Friesian gene proportion is optimal for both production systems should also be investigated.

References

- Cheah P.F. and Kumar R.A. 1984. Preliminary observations on the performance of Sahiwal $\times$ *Bos taurus* dairy cattle. *Kajian Veterinar* 16(1):1-7.
- DVS. 1980. Report and recommendation on the policy and system for cattle breeding, Department of Veterinary Services, Malaysia.
- DVS. 2005a. Livestock/livestock products statistics, Department of Veterinary Services, Malaysia, <http://agrolink.moa.my/jph/dvs/statistics/stsara-all.html> (updated 1 June 2005, accessed 2 September 2005).
- DVS. 2005b. Dairy cattle farming, Department of Veterinary Services, Malaysia, <http://agrolink.moa.my/jph/dvs/commodities/index.html> (updated 1 June 2005, accessed 2 September 2005).
- Kumar R.A. and Cheah P.F. 1985. Performance of Sahiwal $\times$ *Bos taurus* crossbreed in a milk collection centre. *Kajian Veterinar* 17(2):97-101.
- Osman A. 1984. Dairy Production. In: Vijchulata, P., Bongsu T.A. and Dahan M.M. (eds.), *Animal Industry in Malaysia*. Faculty of Veterinary Medicine & Animal Sciences, Universiti Pertanian Malaysia, Serdang. pp. 41-49.
- Raymond A.K. and Hawari H. 1996. Milk yield and lactation length of various grades of Mafriwal dairy cows. The 8th Veterinary Association Malaysia, Scientific Congress, 23-25 August 1996, Ipoh, pp. 201-204.
- Raymond A.K. and Ratnakumar D. 1997. Genetic improvement of cattle, buffalo and small ruminants in Malaysia. In: *Report on breeding programmes for ruminants in Asia. Expert discussion held in Kandalama (Matale), Sri Lanka, 31 March – 4 April 1997*. MLD & RI, Sri Lanka and GTZ, Germany. pp 77-91.
- Sivarajasingam S. and Kumar R.A. 1989. Distribution and production characteristics of Friesian crossbred cattle in Malaysia. *MARDI Res. J.* 17(1):91-106..
- Sivarajasingam S. and Wan Zahar M. 1985. Breeds of dairy cattle and their performance in Malaysia. *Livestock Technology (MARDI)* 1(2):145-153..
- Sivarajasingam S., Yusoff S., Mohamad N., Sivasupramaniam G., Abas M.O. and Eusof J. 1983. Dairy cattle production in Peninsular Malaysia. In: *Malaysian Livestock Industries: Status and Potential, proceedings of the Sixth Annual Conference of the Malaysian Society of Animal Production, held on 10 – 11 August 1982 at Genting Highlands, Malaysia*. pp. 73-87.
- Talukder M.A.I. 2002. *Characterisation of the productivity traits of Sahiwal-Friesian breed groups*. PhD thesis, Universiti Putra Malaysia, Malaysia. 209 pp.

Table 1. Performance of Sahiwal-Friesian crossbred genotypes with various gene proportions of the Friesian breed

Genotype (% Friesian)	Trait ^a			Remarks	Source
	MY	LL	CC		
50%	1859 ± 64 ^a 1406 ± 74 ^b			hand milking machine milking	Cheah & Kumar, 1984
50%	2214 ± 90 ^a 1859 ± 64 ^b			smallholder government farm	Kumar & Cheah, 1985
50% (F ₁)	1501 ± 42 ^a			Lactation 1-5	Raymond & Hawari, 1996
50% (F ₂)	1486 ± 56 ^a				
56%	1596 ± 92 ^a				
63%	2270 ± 67 ^b				
75%	1611 ± 97 ^a				
25%	1125 ± 47	148.5 ± 0.8	156.9 ± 7.9		Raymond & Ratnakumar, 1997
38%	1247 ± 102	169.2 ± 5.8	168.2 ± 18.5		
50% (F ₁)	1470 ± 17	164.4 ± 2.1	156.2 ± 2.6		
50% (others)	1206 ± 21	165.7 ± 2.6	173.7 ± 4.2		
56%	1255 ± 137	164.0 ± 16.7	177.9 ± 12.0		
63%	1309 ± 57	172.7 ± 7.0	163.8 ± 9.3	Specially bred animals	Talukder, 2002
63%	2337 ± 87	259.6 ± 10.6			
75%	1528 ± 62	194.9 ± 7.6	188.4 ± 8.7		
50% (F ₁)	1024 ± 32 ^a	174.4 ± 4.2 ^a	118.8 ± 3.3 ^a	Lactation 1-4	
50% (F ₂)	1339 ± 35 ^b	205.6 ± 4.9 ^b	98.4 ± 3.6 ^b	Government farm	
50% (F ₃)	1413 ± 38 ^{bc}	227.1 ± 5.0 ^b	121.7 ± 3.7 ^a		
56%	1535 ± 57 ^c	243.0 ± 8.3 ^c	119.9 ± 6.1 ^a		
63%	1375 ± 90 ^{bc}	222.9 ± 11.2 ^{bc}	125.3 ± 8.5 ^a		
75%	1677 ± 62 ^c	244.2 ± 23.4 ^c	134.5 ± 18.4 ^a		

^aMY – milk yield (kg/lactation), LL – Lactation length (days), CC – calving to conception (days)

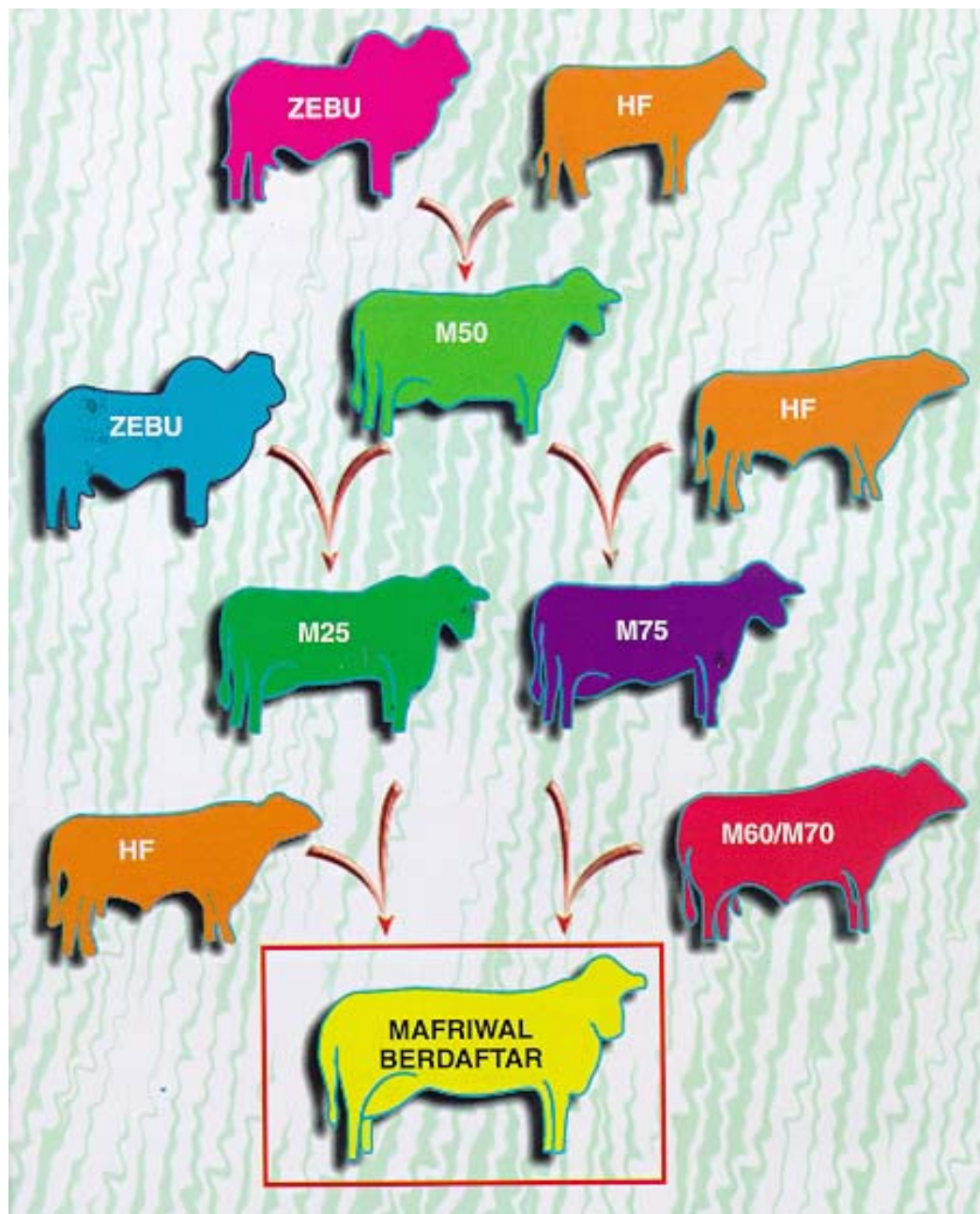


Figure 1. Schematic diagram of the crossbreeding programme
 (Source: [Mafriwal, superior tropical breed for dairy and beef, Department of Veterinary Services Malaysia])

Figure is from a brochure which is in local language, Bahasa Malaysia.