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A NOTE ON THE MAINTENANCE OF HETEROSIS IN CROSS-BRED CATTLE IN THE COCONUT TRIANGLE OF CEYLON

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There is a growing body of evidence today, which suggests that a system of rotational crossbreeding of a given number of breeds of cattle is likely to be more fruitful in the coconut triangle of Ceylon, than grading up to any existing breed, or new breed development. In rotational crossbreeding, females of succeeded generations are crossed with bulls of the different breeds until one cycle is completed, a second cycle is then begun with the same order of bull breeds as used previously. The advantages of this system of breeding are due to the high level of heterozygosity maintained and the continuing opportunities that it provides for the favourable joint-effects of non-allelic genes which had been fixed by selection in the parent breeds. It also allows for the retention of cross-bred females as parents and thus takes advantage of any hybrid vigour for traits which are more dependent on the genotype of the dam than on the individual's genotype.

The preliminary results (Buvenendran, 1969), of the crossbreeding experiments at Karagoda-Uyangoda between Sinhala and Jersey cattle, and between Sinahala and Friesian cattle (Mahadevan, 1953), are set out in Table 1. They subscribe to the thesis that there is marked heterosis in crosses between *Bos taurus* and *Bos indicus* cattle in productivity characteristics and to a limited extent in fitness characteristics. When these results are considered in conjunction with those obtained from crossbreeding Red Sindhi and Jersey cattle at the Government Dairy, Undugoda (Fonseka, 1969), the conclusion is inevitable that in areas of medium agricultural potential in Ceylon, a three-breed rotational crossbreeding programme for milk, involving Zebu, Jersey and Friesian cattle, has the greatest chances of success at the present time.

On a national scale, a three-breed rotational crossbreeding programme, such as the one suggested here, has many advantages. The programme would not be confined to experimental state farms. Instead, the whole of the national herd in a selected region would become involved, and would be used for rotational breeding. The state farms would confine their breeding activities to the provision of superior sires of the three chosen breeds for the entire programme. In this way, the project can operate at a very high level of efficiency with a maximum of immediate benefit to the national herd.

This approach would call for serious re-thinking on the role of state cattle farms. Their traditional role insofar as breeding is concerned, has been one of providing opportunities for the experimental evaluation of breeds and breeding systems, and for the multiplication of male and female breeding stock for sale or supply to the farming community. In the new approach that is proposed, the whole of the

national herd would in effect become the experimental herd; the state farms would breed, select and supply superior sires to the national herd; and multiplication of female stock would cease to be a prime function of state cattle farms.

TABLE I

Comparative performance of F_1 and F_2 generation cows in cross-breeding experiments at Karagoda-Uyangoda
(Buvenendran, 1969)

	Jersey × *Sinhala*			*Friesian* × *Sinhala*		
Trait	F_1	F_1 - F_2	W*	F_1	F_1 - F_2	W*
Milk yield	2620 lbs.	+774 lbs.	33.8	3360 lbs.	+1083 lbs.	35.1
Age at first Calving	36.4 mths.	− 1.2 mths.	5.7	39.9 mths.	− 7.5 mths.	4.4
Calving interval	381 days	− 7 days	27.0	412 days	−21.6 days	24.3

W* = *Weighting factor, calculated on the basis of the number of animals in the two groups, F_1 and F_2.*

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