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Short communication

Inbreeding of Red Chittagong Cattle in a nucleus breeding herd

M. Hadiuzzaman, A. K. F. H. Bhuiyan and M. A. Habib*[1]
Department of Animal Breeding and Genetics, Faculty of Animal Husbandry, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

Animals inherit a random sampling of the genetic make-up of each parent. If the parents are related, some of the genes from each parent will be copies of the genes found in the common ancestor(s). In conservation genetics, attention has been given to prevent loss of founder alleles (Chevalet and Derochambeau, 1985; Maccluer *et al.,* 1986; Lacy, 1989; Boichard *et al.,* 1997). In circular mating schemes, males are exchanged between groups of females (Kimura and Crow, 1963; Chevalet and Derochambeau, 1985). In modern dairy and poultry industry, inbreeding is applied to form pure-bred male and female lines to create a new breed. (*Bangl. vet*. 2010. Vol. 27, No. 1, 43 – 45)

Inbreeding coefficient (IC) is a measure of the closeness of the relationship between individuals. It measures the increment in homozygous gene pairs in an individual relative to the average of the population. In general the IC of any individual is half the additive relationship between the parents of the individual (F×= ½ a). IC can have any value from 0 to1. If a bull has an IC of 0.25, he has 25% more homozygous gene pairs than the average of the population. IC probably should not be more than 0.10 in any case. If IC is 0.25, it may be due to brother-sister or father-daughter or mother-son mating.

Increased relationships are a natural consequence of using only a few sires in an AI programme. Optimum method of controlling inbreeding is to choose the sire with highest genetic merit adjusted for inbreeding in a specific mating. Complete pedigree data for cows and sire will be a necessary part of such decisions.

Selection for higher production and improved type of dairy cattle has reduced genetic diversity. An example could be quoted here in this context by Cassell (2008). He said that Young and Seykora looked at inbreeding changes in Holsteins throughout the 20th Century. Holstein cows were first imported to the United States in 1884. Young and Seykora's work showed that today's Holstein cow was about 5% inbred relative to that original importation date. The average relationship (percent of genes in common between any two animals) increased from about 3.4% in 1928 to approximately 10% (twice the average inbreeding value of 5%) in 1990. This increased relationship indicates the effects of selection for more productive,

* Correspondence *E-mail* :- ahsan.rony@yahoo.com

functional cattle and reflects a narrowing of the genetic base. A limited number of animals in each breed serve as parents of highly influential sires in each generation.

The present communication aims to determine the inbreeding status in a small nucleus herd of Red Chittagong Cattle (RCC) at Bangladesh Agricultural University, Mymensingh, Bangladesh.

Recorded data on pedigree of each animal from the nucleus herd were collected. IC was measured using the formula by Gowe *et al*. (1959). Since, the number of breeding males and females of the herd were unequal, the formula used for calculating rate of inbreeding was :

$F = \frac{3}{32N_m} + \frac{1}{32N_f}$ where, N_m and N_f are the number of male and female parents, respectively, taking part in the breeding programme. Now putting N_m and N_f values as 5 and 43 (5 males and 43 females were used for breeding in the nucleus herd), respectively on the above equation, then IC = 0.019 per generation.

The estimated IC of RCC herd to be 0.019, whereas Wiggans e*t al*. (1995) found 0.047 in Ayrshire, 0.030 in Guernsey, 0.026 in Holstein, 0.033 in Jersey and 0.03 in Brown Swiss. Vasconcelos *et al*. (2005) studied Portuguese dairy cattle, where the population of inbred animals was 0.086 with an average IC of 0.018, similar to the present finding. The result of this study is slightly higher than the result of Potocnik *et al.* (2007) who reported 0.013 IC in inbred cows of Slovenian Holstein population.

From the result of IC, it is clear that the IC of RCC herd was much less than that of other cattle populations as well as far below the risky level.

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