

## SIMULATIONS ON COOPERATIVE BREEDING BETWEEN NORDIC RED DAIRY CATTLE POPULATIONS WITH DIVERSE OBJECTIVES

J.N. Jørgensen<sup>1</sup>, M.K. Sørensen<sup>2</sup>, and P.H. Petersen<sup>1</sup>

<sup>1</sup>*The Royal Veterinary and Agricultural University, Department of Animal Science and Animal Health. Grønnegårdsvej 3, DK-1870 Frederiksberg C. Denmark. Phone: +45 3528 3000.*

*Fax: +45 3528 3042. E-mail: php@kvl.dk. Web: www.ihh.kvl.dk*

<sup>2</sup>*Danish Institute of Animal Sciences, Department of Animal Breeding and Genetics. P.O.Box 50, DK-8830 Tjele, Denmark. Phone: +45 8999 1264. Fax: +45 8999 1300. E-mail:*

*Morten.Kargo@agrsci.dk. Web: www.agrsci.dk*

**Abstract.** Small or limited population sizes of four Nordic red and red-and-white dairy cattle breeds restrict the rate of genetic improvement and make them less competitive as compared to the Holstein-Friesian populations. A simulation study was undertaken in order to evaluate opportunities for improvement of the competitiveness through cooperative breeding plans. A deterministic model based on the gene flow method was used. Progeny testing schemes were evaluated on the basis of genetic gain for the four populations of different sizes. Each breed was assumed to adopt three breeding objectives, i.e. milk yield, calving performance and mastitis resistance (MR). Three alternative economic weights for MR (500, 1410 and 2000 per phenotypic standard deviation) were used to differentiate slightly the populations. The schemes with the highest gains were used to evaluate the effect of cooperation on bull sire selection among all progeny tested bulls in the populations. It was found that the population with the lowest weight on MR obtained the lowest benefit from the cooperation whereas the three others obtained similar genetic progress, indicating that cooperation should be regarded as the first step towards uniting populations into one breeding unit.

**Keywords:** Geneflow, deterministic simulation, multitrait evaluation.