POSSIBLE EFFECTS OF INBREEDING ON SIMULATED HOLSTEIN POPULATIONS

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The heavy use of a small number of sires and the artificial insemination practice on breeding programs have been increasing the dairy cattle inbreeding. Nevertheless, these high levels has been incriminated in reduced fitness and reproductive performance. Therefore, the aim of this study was to evaluate the effect of selection on inbreeding depression of four simulated dairy cow populations scenarios. Using the QMSim software, populations were simulated based on forward-in-time process. The parameters were chosen to try and generate a population with similar characteristics of two different breeds of dairy cattle. Were simulated 840.0 QTLs randomly distributed on 29.0 autosomal chromosomes of *Bos taurus.* To create high and low level of initial linkage disequilibrium were made a bottleneck in the historical population, 100.0 or 108.0 generations were simulated starting from an effective population of 30.0 to 20,600 animals in the end of the cycle. To found 10.0 generations of a population with positive assortative mating, and mimic artificial insemination and natural mating system, a proportion of 0.1% and 2.0% of sires per female were selected from the last generation of historic population, respectively. The selection was based on breeding values estimated with BLUP method. Each generation inbreeding mean was estimated by QMSim and associated with levels of inbreeding depression of milk yield found on literature. The inbreeding mean in the tenth generation was higher for the groups with low LD level in both scenarios with different proportion of sires, 0.13 ± 0.04 and 0.41 ± 0.05. The inbreeding depression reduces 370.29 and 529.41 kg the milk yield per lactation in the scenarios of 0.1% of sires, with high and low LD levels respectively. The intense use of a few number of sires in ten generations of selection may cause a loss between 3.94 and 5.64% on milk yield in both scenarios.

Keywords: Inbreeding depression, QMSim, linkage disequilibrium, *Bos taurus*