

学 位 論 文 要 旨	
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題 目	GENETIC STUDY OF FEMALE REPRODUCTIVE TRAITS IN ARTIFICIAL INSEMINATION RECORDS OF JAPANESE BLACK CATTLE
<p>Genetic parameter for reproductive traits in artificial insemination record were estimated from total 7,941 record of 2,161 heifers and three parities of 2,078 cows. The animals were daughters of 171 sires and whose ancestors were traced back to five generations using pedigree information. The total number of animals in the pedigree was 15,600. Reproductive traits included 56 days non-return rate (NRR), success in first insemination (SFI), number of insemination (IN), days from first to successful insemination (FS), gestation length (GL), age at calving (AC), days from calving to first insemination (CF), days open (DO), pregnancy rate (PR) and calving interval (CI). Reproductive traits for heifers were coded as NRR-h, IN-h, FS-h and GL-h, respectively. Reproductive traits for cows were four traits same as in heifers, which were coded as NRR-c, IN-c, FS-c, GL-c, and CF, DO, PR and CI. AC has individual traits at each parity such as AFC, ASC and ATC. Our study focused on determining reproductive trait which can be measured early, has high heritability and favorable genetic relationship with important traits</p> <p>The genetic parameters of five reproductive traits in heifers were estimated by restricted maximum likelihood (REML) with the use of univariate animal model. The genetic parameters of reproductive traits in cows were estimated with multiple-trait and repeatability model. Then two-trait animal model was used to estimate genetic correlation between reproductive traits of heifers with reproductive traits of cows.</p> <p>Heritability of AC was higher than that of the other traits, although it was lower in later parities; 0.158, 0.107 and 0.088 for AFC, ASC and ATC, respectively. The genetic correlations between the same traits across parities were generally high, ranging from 0.72 to 0.99. The highest repeatability was observed for CF (0.142) and the lowest for FS (0.036). AFC showed high genetic correlations with IN-c and FS-c (0.661 and 0.634, respectively) and moderate genetic correlations with NRR-c, GL-c, CF, DO, PR and CI.</p> <p>Study of penalty methods for FS indicated that C4 was the best penalty method for missing records because it had the lowest MSE and average standard errors of heritability. It also demonstrated the highest accuracy for EBV and consistent results for all the percentages of missing records. Then study of different model for binary traits using Bayesian approach via Gibbs sampling resulted that values of Geweke criteria and MCE indicated that chain size for the particular Bayesian analyses for either linear or threshold models was confirmed to reach their convergence. Whereas narrow interval of CIH and smaller value of DIC suggested that threshold model is more appropriate than linear model for estimating genetic parameters of binary traits.</p>	

AFC is considered a key trait in the reproductive cycle of and as an indicator of sexual maturity in female cattle. Improvement of AFC will play an important role for increasing reproductive performance in subsequent parities. Based on favorable genetic correlations with important traits such as IN and FS, AFC can be used as an early indicator of ability of cows to maintain regular reproductive cycle. Selection by AFC will provide consistent genetic improvement in reproductive performance of Japanese Black cows.