

Influence of pedigree depth and completeness on accuracy of relationship and inbreeding estimations in bulls

S u m m a r y

Inbreeding and relationship coefficients are commonly estimated in analyzing population genetic structure. Incomplete pedigree information used in calculations can bias in values of inbreeding and relationship coefficients. So the aim of the study was to examine the influence of pedigree depth and completeness on accuracy of relationship and inbreeding estimation in bulls. Data were pedigrees of 25 036 Black-and-White sires born from 1960 thru 2000. Inbreeding and relationship coefficients were calculated for different pedigree depth. In the next stage missing information in pedigrees was recovered according to the algorithm proposed by VanRaden [19], where the inbreeding of ancestors whose parent or parents are unknown is equal to the mean inbreeding of their contemporaries with known parents. All 3690 inbred animals were found in the basic file after 12 generations. Average inbreeding coefficient of 0.0216 for inbred animals was found after 11 generations traced, and 0.0013 for all animals after 9 generations. The number of related pairs in basic file reached its maximum for 17-generation pedigrees. Mean relationship coefficient for all pairs increased to 0.0017 in 8th generation, and for related pairs the constant value of 0.0282 was reached in 13th generation. In the adjusted file the number of inbred animals increased 10 times. Average inbreeding coefficient increased to 0.0016 for all animals, and to 0.027 for inbred animals. Mean relationship values remained constant. Correction for inbreeding of unknown ancestors seems not sufficient if the pedigree information is very incomplete. But even then, it is necessary to examine as much generations back as possible, to obtain more accurate inbreeding and relationship values.