Examination of New Zealand sport horse performance records and their suitability for the calculation of breeding values

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Frances Emily Creagh

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Abstract

Currently, there is no system for genetic evaluation of sport horse sires in New Zealand; however, the implementation of such a system would be beneficial to the sport horse industry. Official performance data for the 2008/09 and 2009/10 competition seasons were obtained from Equestrian Sport New Zealand. Initially data were examined using descriptive statistics. There were 1123 and 1472 horses registered for dressage, 902 and 1255 horses registered for eventing and 1326 and 1331 horses registered for show jumping during the 2008/09 and 2009/10 seasons respectively. 13.2% and 14.2% of horses registered for dressage, 15% and 3.8% of horses registered for eventing and 16.3% and 17.2% of horses registered for show jumping had no sire recorded. Between 63.6% and 75% of sires had only 1 progeny record. For dressage and eventing points and number of starts were recorded. Zero points were recorded for 1.8% and 1.1% of horses in dressage and 64.6% and 13% of horses in eventing. For show jumping, prize money was recorded and records were usually only available for horses which placed in competition.

Data on points, number of starts and prize money was skewed but approached normality under $\log_{10}$ transformation for all 3 disciplines. EBVs were calculated for these variables. 11.8%, 11.3 % and 14.2% of sires had 5 or more progeny records available for genetic analysis. Estimated breeding values for points per start ranged from -0.066 to 0.158 and -0.076 to 0.182 for dressage and eventing. Estimated breeding values for number of starts ranged from -0.117 to 0.232 and -0.101 to 0.168 for dressage and eventing respectively and from -0.523 to 0.993 for prize money in show jumping.

In conclusion, the use of estimated breeding values could lead to increased genetic gain and improved performance of New Zealand sport horses on the international stage. However, the current data recording has some limitations as records have not been kept for the purpose of genetic evaluation. Hence, there is a need for greater listing and reliability of pedigree data in order to effectively utilise estimated breeding values for selection of New Zealand sport horse sires.

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List of Abbreviations

BLP	Best Linear Prediction
BLUE	Best Linear Unbiased Estimates
BLUP	Best Linear Unbiased Prediction
dnst	log(number of starts) for dressage
dpps	log(points per start+1) for dressage
EBVs	Estimated Breeding Values
enst	log(number of starts) for eventing
epps	log(points per start+1) for eventing
ESNZ	Equestrian Sport New Zealand
FEI	Federation Equestre Internationale
GLM	General Linear Model
HHANZ	Holsteiner Horse Association of New Zealand
LSE	Least Squares Equations
MME	Mixed Model Equations
MSI	Missing Sire Information
NZHS	New Zealand Hanoverian Society
NZWBA	New Zealand Warmblood Breeders Association
REML	Restricted Maximum Likelihood
Sib(s)	Sibling(s)
SPT	Stallion Performance Test
SQRT	Square Root
tpm	log(total prize money+1)
UELN	Unique Equine Life Number
VCE	Variance Components Estimator
WBFSH	World Breeding Federation for Sport Horses
WSI	Wrong Sire Information

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