

Interbull Proofs are a Reasonably Unbiased Prediction of Future Performance in Australia for Imported Bulls

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Abstract

The EBVs of imported bulls ranked using the 2000 Interbull predictions for Australia were compared with their EBVs in 2003. Bulls were selected on the basis that they had no daughters in Australia in 2000 but now have at least 150 Australian daughters. Those with an Interbull reliability that was less than 65% in 2000 were excluded. The EBVs that were used in this study were the “Australian Selection Index” (ASI) which is $(3.8 \times \text{Protein Kg EBV}) + (0.9 \times \text{Fat Kg EBV}) - (0.048 \times \text{Milk yield EBV})$.

For the 62 bulls that met these criteria, the squared correlation between their 2000 (overseas) Interbull proof and their 2003 Australian proof was 56%. Their average Interbull Reliability in 2000 was 72%. The discrepancy (72% - 56%) can be partly explained by pre-selection in their countries of origin. The regression equation for predicting 2003 ASI was $1.27 \times (\text{Interbull ASI in 2000}) - 16$. This intercept indicates that there was a slight tendency to fall (on average a drop of 4 ASI units was observed) and the slope of the line indicates that the predictions for better bulls tended to be underestimated while those for the poorer bulls were overestimated.

Introduction

Users of Interbull proofs would like to believe that they can predict the eventual bull proofs in another country with perfect accuracy. In reality of course, this is most unlikely. The extent to which their Interbull proof, based on their “overseas” progeny test, was able to predict their proof in Australia some years later, was checked.

The index used to rank the bulls used in this study was the “Australian Selection Index” (ASI) which is:-

$$\begin{aligned} &+ (3.8 \times \text{Protein Kg EBV}) \\ &+ (0.9 \times \text{Fat Kg EBV}) \\ &- (0.048 \times \text{Milk yield EBV}). \end{aligned}$$

Australian EBV's are known locally as Australian Breeding Values (ABVs).

Materials and Methods

The 62 bulls used in this analysis were mainly tested in the United States and their semen exported to Australia following their US progeny test. In the year 2000 these bulls had progeny tests in the United States but had no daughters in Australia. Bulls were included in this analysis if:

- their Interbull Reliability in Australia in the year 2000 was $\geq 65\%$
- they had no daughter records in Australia in 2000
- they have at least 150 daughters in Australia in 2003

Results

The mean EBV for ASI in 2000 using Interbull predictions was 40 Index units while the mean EBV in 2003 was 36 ASI units for the same 62 bulls.

The regression analysis results are shown below.

$$\text{ASI}_{2003} = -15.7 + 1.27 \text{ ASI}_{2000}$$

Predictor	Coef	SE Coef	T	P
Constant	-15.684	6.508	-2.41	0.019
ASI_2000	1.2711	0.1444	8.80	0.000

$$S = 22.81 \quad R\text{-Sq} = 56.4\% \quad R\text{-Sq(adj)} = 55.6\%$$

Discussion

This simple look at the efficiency of the Interbull ranking system could be developed for routine use as part of the Interbull system as a Quality Assurance check. It would be most efficient if these checks were done centrally using a standard procedure, and the results could then be used by each country to promote the Interbull rankings.

A QA check of this sort could provide early warning of any problems and thereby avoid the embarrassment of discovering problems at a much later stage.

Conclusions

- An Interbull proof was a reasonably unbiased predictor of the Australian proof 3 years later, for imported bulls.

- This intercept indicates that there was a slight tendency for bull proofs to fall between 2000 and 2003 for the 62 bulls studied. The slope of the line (1.27) indicates that the predictions for better bulls tended to be under-estimated, while those for the poorer bulls were overestimated.
- The Interbull average reliability in 2000 was 72%, however, the Interbull proofs in 2000 explained only 56% of the variance in Australian proofs in 2003; ideally we would expect 72% providing that the bulls had been a random sample of all bulls tested in the United States.
- It is suggested that a QA check of this sort is routinely run as part of the Interbull service. If problems are detected, they can be dealt with quickly. If no problems are detected, the results can be used to promote the usefulness of the Interbull rankings.

Figure 1. Scatter-plot showing the 'expected' line with a slope of 1.0.

