ROMPS: RANKING OBJECTIVELY MEASURED PROGENY-TESTED SIRES ON INDEX

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SUMMARY

An integrated relational database/spreadsheet/breeding value estimation software package (ROMPS) has been developed to facilitate the management of data and report generation for Merino sire evaluation. Microsoft Office® software has been used for flexibility of use. Progeny-tested rams can be ranked on the basis of a wide range of selection indices, so that the search for superior sires is made easier. Examples of its use with Merino sires tested at New England sites are given.

Keywords: Merino sire evaluation, database, selection indices.

INTRODUCTION

Estimated progeny values (EPVs) of sires (Cottle *et al.* 1996) have been routinely calculated from Merino central test progeny data by using the program BVEST (Gilmour 1993). A Progress® database of progeny data from all tested Merino sires is kept at CSIRO, Armidale (Swan *et al.* 1992). This software is not commonly used by scientists and advisers and is relatively expensive to maintain.

To facilitate the management of data from wool laboratory and farm for BVEST analysis and reporting or transfer to the CSIRO database, an integrated relational database/spreadsheet/BVEST system (ROMPS) has been developed at UNSW, using Microsoft Office® software. Within the Access database there are a series of queries which calculate 20 different index values based on the estimated breeding value (EBV) output from BVEST. The sire's name, number of progeny, estimated progeny value (EPV) for individual traits and selected index values are automatically output to Excel spreadsheets, enabling rapid report generation. There is no necessity to rerun BVEST each time a different index is required as the calculation of different index values is done within the database, based on the imported EBV values and appropriate economic weights. This paper describes the operation and output of ROMPS. It is assumed the reader is familiar with relational database and spreadsheet terminology.

MATERIALS AND METHODS

As the spreadsheet and database run under Windows®, the 'switch to' function is used to move easily around the ROMPS system. The steps in the operation of ROMPS are as follows:

1. Data from wool laboratories and the field are usually received as ASCII text or spreadsheet files. These are imported into Excel with the addition of columns containing site/flock code, year,

sire code, progeny number (id), sex and birth status data for each progeny. Another Excel file is updated to contain new sire names, sire codes and sire owners' details, such as address and phone number.

2. A data entry form in the database is used to import the spreadsheet data into either the lamb phenotype, hogget phenotype, adult phenotype, ramcode or ramaddress tables. Field headings are used in the spreadsheet/database so the order of fields does not matter. The phenotype tables are 'one to one enforced' linked by the id field. The sirecode field in the ramcode table is 'one to many enforced' linked to the sirecode field in the lamb phenotype table. Thus progeny are only accepted into the database tables when there is a matching sirecode in the ramcode table.

3. Data from a chosen site and year for BVEST analysis are selected by query and output to a BVEST subdirectory. Fields are output in a preset order, so the BVEST control file needs very little modification for each new analysis. If multiple subsets of data are output the Windows File Manager is used to rename files with the name indicating the site and year for the data. BVEST is run (with a 15% index) and the EBV output file (*.r01) is edited by removing report headings and excess spaces between columns, before entry into the database.

4. The breeding value entry form in the database is used to import the sirecode, number of progeny and EBVs into a breeding values table which is 'one to many enforced' linked by sirecode field to the ramcodes table. Site/flock and year are entered for subsequent selection and retreival. EBVs from earlier runs are deleted from the table before entry of new EBVs.

5. The print report form is used to select the site/flock(s) and year(s) for reporting, if multiple indices are not required. This report can be for a linked analysis from a number of sites and years.

6. Index values are generated by the use of a series of queries. The economic weights used to generate the 1% micron premium (MP) index are: 0.87*HCFW + 0.99*ACFW + -0.912*HFD + -0.912*AFD + -0.182*HFDCV + -0.182*AFDCV + 0.32*HBW + 0.06*ABW; where HCFW= EBV hogget clean fleece weight %, ACFW= EBV adult clean fleece weight %, HFD= EBV hogget fibre diameter, HFDCV= EBV hogget fibre diameter coefficient of variation % and HBW= EBV hogget body weight %. The economic weights for the 0-20% MP indices are calculated by multiplying the above coefficients of HFD, AFD, HFDCV and AFDCV by the appropriate factor and leaving the CFW and BW coefficients constant. For example, the economic weight for HFD and AFD for the 10% MP index is calculated as -0.912*10 = -9.12.

The responses to selection per generation (gen) per standardised selection intensity (i), based on the indices, were calculated using the INDEX program (Cottle 1994). These values are shown graphically (Figure 1) on the index report form of ROMPS.

7. The ram name, ramcode, EPVs (= EBVs/2) and sorted index values are automatically sent to a spreadsheet for ease of report generation. The final reports are generated by reformatting the Excel spreadsheets before printing

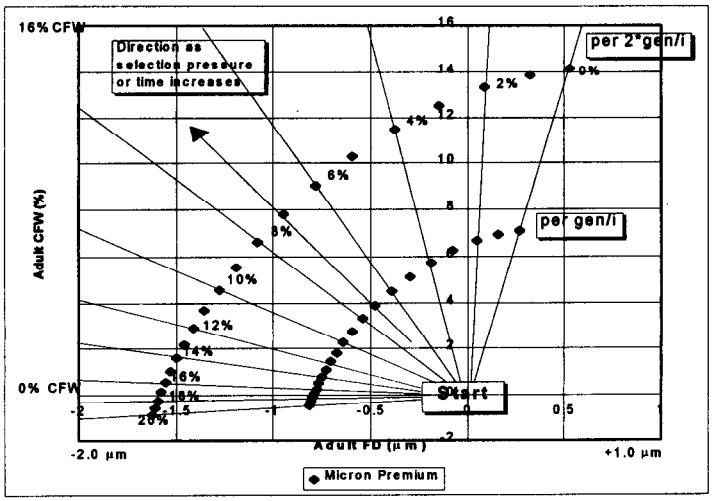

Figure 1. The direction of genetic response on index for unit increases in micron premium.

RESULTS AND DISCUSSION

The choice of index by each site committee varies between sites. Figure 1 shows the consequences of ranking on different indices on direction of flock average genetic change. Rams with the same %MP index value lie on a line perpendicular to the %MP index 'direction of selection' line and thus can have vastly different combinations of CFW and FD. Thus the line does not necessarily reflect the combination of CFW and FD in the top individual rams (or ewes) selected on index. The choice of individual rams on the basis of desired combinations of EPVs is probably better made by plotting EPVs, eg. ACFW versus AFD, and finding the rams closest to the desired combination of gains.

An example of a report showing the top ten out of eighty-two progeny tested rams for a variety of indices is shown in Table 1 for the New England central test schemes (1990-1995). Choice of index is important as only four of the top ten rams on 1% MP index are in the top ten rams on 20% MP. However only sixteen rams make up the top ten rams from 0-20% MP. Breeders choosing sires with this information could use some sires with confidence, in terms of FD and CFW, no matter what their perception of future wool prices, eg. Nerstane 697, Hazeldean 7.1048 and Yalgoo 644. Presentation of the top rams on a range of indices should give breeders a better feel for which rams are the superior sires.

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Table 1. The top 10 rams on index. Consistently high ranking rams shown in bold or italic. (Permission of the NE sire evaluation group to use their data is gratefully acknowledged).

Index 1%	Index 2%	Index 3%	Index 4%	Index 5%
Nerstane 225	Nerstane 225	Nerstane 225	Nerstane 225	Nerstane 225
Nerstane 52	***Nerstane 697***	***Nerstane 697***	***Nerstane 697***	***Nerstane 697***
Nerstane 697	Nerstane 52	Nerstane 52	Nerstane 52	Nerstane 52
Nerstane 286	Nerstane 286	Nerstane 286	Nerstane 286	Nerstane 286
Roseville Park 44	*Hazeldean 7.1048*	*Hazeldean 7.1048*	*Hazeldean 7.1048*	*Hazeldean 7.1048*
Hazeldean 7.1048	Roseville Park 44	Roseville Park 44	Roseville Park 44	Roseville Park 44
East Roseville 88-90	East Roseville 88-90	Nerstane 27	Nerstane 27	Nerstane 27
Nerstane 27	Nerstane 27	East Roseville 88-90	**Yalgoo 644**	**Yalgoo 644**
Nerstane 275	**Yalgoo 644**	**Yalgoo 644**	East Roseville 88-90	East Roseville 88-90
Yalgoo 644	Nerstane 275	Nerstane 275	Nerstane 275	Nerstane 275
Index 6%	**Index 7%**	**Index 8%**	**Index 9%**	**Index 10%**
Nerstane 225	Nerstane 225	Nerstane 225	***Nerstane 697***	***Nerstane 697***
Nerstane 697	***Nerstane 697***	***Nerstane 697***	Nerstane 225	Nerstane 225
Nerstane 52	Nerstane 52	Nerstane 52	*Hazeldean 7.1048*	*Hazeldean 7.1048*
Nerstane 286	*Hazeldean 7.1048*	*Hazeldean 7.1048*	Nerstane 52	Nerstane 52
Hazeldean 7.1048	Nerstane 286	Nerstane 286	Nerstane 286	Nerstane 286
Nerstane 27	Nerstane 27	Nerstane 27	Nerstane 27	**Yalgoo 644**
Roseville Park 44	**Yalgoo 644**	**Yalgoo 644**	**Yalgoo 644**	Nerstane 27
Yalgoo 644	Roseville Park 44	Roseville Park 44	Roseville Park 44	Mirani 214.5
Nerstane 275	Nerstane 275	Nerstane 275	Nerstane 275	Roseville Park 44
East Roseville 88-90	East Roseville 88-90	Mirani 214.5	Mirani 214.5	One Oak 00/B55
Index 11%	**Index 12%**	**Index 13%**	**Index 14%**	**Index 15%**
Nerstane 697	***Nerstane 697***	***Nerstane 697***	***Nerstane 697***	***Nerstane 697***
Nerstane 225	*Hazeldean 7.1048*	*Hazeldean 7.1048*	*Hazeldean 7.1048*	*Hazeldean 7.1048*
Hazeldean 7.1048	Nerstane 225	Nerstane 225	Nerstane 225	Nerstane 225
Nerstane 52	Nerstane 52	**Yalgoo 644**	**Yalgoo 644**	**Yalgoo 644**
Nerstane 286	**Yalgoo 644**	Nerstane 52	Nerstane 27	Lorelmo 1733
Yalgoo 644	Nerstane 286	Nerstane 27	Nerstane 52	Europambela Blue 308
Nerstane 27	Nerstane 27	Nerstane 286	Lorelmo 1733	Nerstane 27
Mirani 214.5	One Oak 00/B55	One Oak 00/B55	One Oak 00/B55	One Oak 00/B55
One Oak 00/B55	Mirani 214.5	Lorelmo 1733	Nerstane 286	Mirani 214.5
Lorelmo 1733	Lorelmo 1733	Mirani 214.5	Mirani 214.5	Nerstane 52
Index 16%	**Index 17%**	**Index 18%**	**Index 19%**	**Index 20%**
Nerstane 697	***Nerstane 697***	***Nerstane 697***	*Hazeldean 7.1048*	Europambela Blue 308
Hazeldean 7.1048	*Hazeldean 7.1048*	*Hazeldean 7.1048*	***Nerstane 697***	Lorelmo 1733
Lorelmo 1733	Lorelmo 1733	Europambela Blue 308	Europambela Blue 308	*Hazeldean 7.1048*
Yalgoo 644	Europambela Blue 308	Lorelmo 1733	Lorelmo 1733	***Nerstane 697***
Europambela Blue 308	**Yalgoo 644**	**Yalgoo 644**	One Oak 00/B55	Moutere Silky
Nerstane 225	One Oak 00/B55	One Oak 00/B55	Moutere Silky	One Oak 00/B55
One Oak 00/B55	Mirani 214.5	Moutere Silky	**Yalgoo 644**	**Yalgoo 644**
Nerstane 27	Nerstane 27	Mirani 214.5	Europambela Blue 742	Europambela Blue 742
Mirani 214.5	Europambela Blue 742	Europambela Blue 742	Mirani 214.5	Mirani 214.5
Europambela Blue 742	Nerstane 225	Nerstane 27	Nerstane 27	Nerstane 27