BREEDS – A DECISION SUPPORT TOOL FOR BEEF BREED AND BREEDING SYSTEM EVALUATION

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OBJECTIVES

BREEDS (Beef Replacement Enterprise Evaluation Decisions Support) predicts changes from current beef enterprise economic performance (profitability), following changes of breeds or crosses and replacement breeding systems over a twenty year planning horizon, encompassing up to eight generations. Results are presented in both physical and economic terms to allow the strengths and weaknesses of alternative systems to be compared. The software uses an underlying database of breed differences in basic biological traits including mature size, growth rate, milking ability, carcass conformation, carcass fatness, calving ease, age at puberty and fertility (based on a meta- analysis by Roughsedge *et al.*, 2001). A detailed description of current beef enterprise performance, and the genetic make-up of the current cow herd is entered by the user. This information is used to implicitly parameterize the model without the user having to interpret and modify complex bio-economic model parameters. For subsequent generations, parameters are scaled by the breed differences stored in the breed parameter database. A large degree of interdependence exists among aspects of performance. For example, fertility is based on a distribution of calvings over an underlying conception liability index influenced by cow weight and calving difficulty.

COMPUTING METHODS

BREEDS is a new program written in Visual Basic. An overview of the program structure can be seen in Figure 1. Biological sub-models are parameterized with a combination of user inputs and calls to a database of breed parameters and other model constants. They predict weekly performance results for groups of animals characterized by a unique genotype and environmental circumstance in the enterprise, *e. g.* a first calving cow with a 1 year calving interval, a spring calving date, and suckling a male calf. The cow/calf sub-model is based on an energy partitioning model (Bruce, 1984) previously implemented in NOSCOW, a program for predicting cow/calf performance for different genotypes under contrasting nutritional regimes. BREEDS iteratively determines the feed energy available to cows using the inputted performance and genotype descriptions of the current farm system. The post-weaning model is based on the ruminant growth model of Amer *et al.,* (1997). The calving ease model is based on threshold model principles. The population dynamics predictions of numbers of animals in each genotype and environmental circumstance subgroup are described in more detail by Amer *et al.* (2002). The economic sub-model integrates population dynamics and biological sub-model results into economic outputs based on user defined constraints and economic parameters.
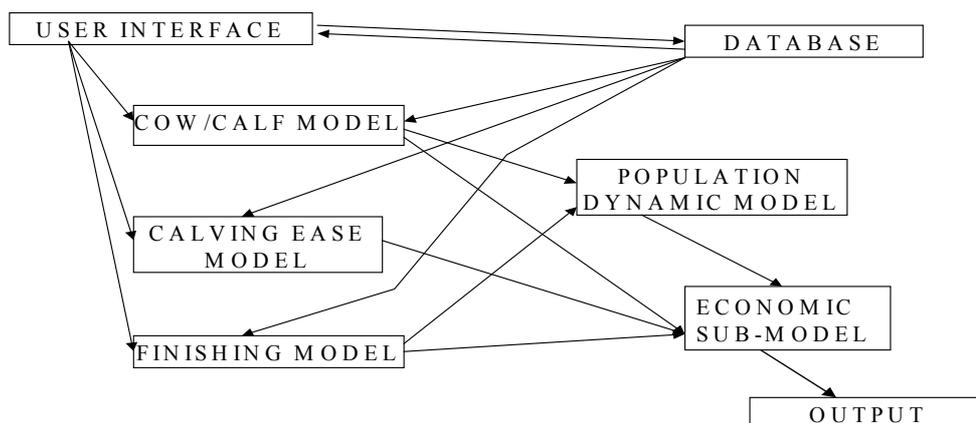
Figure 1. Overview of BREEDS algorithm

USE
The software is in its first field trial from Dec 2001 to March 2002. The software is being field tested by a selected group of 20 consultants in the British beef industry.

AVAILABILITY
The program is available to consultants and educators following a short training course. There is a modest charge to cover the costs of production and training. Further details can be obtained from http://www.sac.ac.uk/beef_BREEDS.

COMPUTING ENVIRONMENT
The application runs on PC's with Win95 or above installed. A minimum of a Pentium 2 processor and 128kb RAM with 200Mb hard disk space free are required.

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