

December 2019

Annual Enhancements to Angus BREEDPLAN

A number of enhancements have been implemented in the December 2019 Angus BREEDPLAN analysis.

These changes are part of the ongoing maintenance and improvement to the Angus BREEDPLAN genetic evaluation, and have resulted in the calculation of EBVs that better predict the genetic merit of Australian Angus animals.

Improved Calving Ease EBVs

Considerable modifications have been implemented into the software that is used to calculate the Calving Ease Direct and Calving Ease Daughters EBVs.

Calving Ease Direct and Calving Ease Daughters EBVs are calculated in a separate sub-analysis to the main component of the Angus BREEDPLAN analysis, and the modifications that have been implemented modernise the calving ease analysis software so that it is largely consistent with the software used in the main component of the genetic evaluation.

- **New EBV SOLVER** – The “solver” program is the statistical software behind the BREEDPLAN analysis that calculates the EBVs. The “solver” program that is utilised in the calving ease analysis is now the same as the “solver” program that is utilised in the main component of the analysis.
- **Modelling of genetic groups** – Genetic groups are used to assign a starting EBV value to animals whose sire and dams do not have EBVs. For example, imported sires or base animals. Previously animals were placed in a single genetic group within the calving ease analysis, whereas different genetic groups are now formed based on the animal’s year of birth, country of origin and breed. This improved modelling of genetic groups is consistent with the methodology used in the main component of the analysis, and ensures that animals are assigned a starting EBV value that is reflective of the origin of their genetics and the expectation of these genetics, as determined by other similar animals in the calving ease analysis.
- **Handling of performance information** – Improvements have been made to the manner in which contemporary groups are formed when analysing calving difficulty score information within the calving ease analysis. These improvements include the introduction of age slicing, as opposed to the utilisation of a fixed season, and consideration of breeder defined management

group. These improvements have resulted in the contemporary groups within the calving ease analysis more closely aligning with the contemporary groups in the main component of the analysis.

- **Handling of genomic information** – Considerable modifications have been made to the manner in which genomic information is incorporated into the calculation of Calving Ease EBVs. Consistent with changes implemented into the main component of the analysis in December 2017, genomic information is now incorporated into the calculation of Calving Ease EBVs using single step methodology, rather than a multi-step approach. Single step methodology simultaneously utilises the raw genotype of the animal, along with pedigree and performance information, placing appropriate emphasis on all available sources of information, to generate the best possible estimate of an animal’s breeding value.
- **Data included** – The modified manner in which performance and genomic information is handled has resulted in changes to whether a calving difficulty score or genomic profile is included in the Angus BREEDPLAN analysis for some individual animals. For example, the revised methodology for forming contemporary groups has resulted in a larger number of “single-score” contemporary groups, being contemporary groups where all animals were born unassisted, and the subsequent removal of these calving difficulty scores from the analysis.

The considerable modifications that have been implemented into the software used within the calving ease analysis have resulted in changes to the Calving Ease EBVs, and subsequently to the selection index values, for a large number of animals.

Of particular note is the considerable increase that has been observed in the standard deviation, or spread of Calving Ease EBVs. This is illustrated by an increase in the 1% percentile band for the Calving Ease Direct EBV increasing from +5.0 to +12.2. Similarly, the 99% percentile band for the Calving Ease Direct EBV has decreased from -7.6 to -13.9.

The increase that has been observed in the spread of EBVs has meant that while the Calving Ease EBVs for individual animals has changed considerably, their ranking by comparison to other Angus animals is very similar.

Revised Software for Preparing Analysis Files

A revised process has been implemented in the preparation of extracts of pedigree, performance and genomic information from the Angus Australia database for use in the BREEDPLAN analytical software. This includes the implementation of revised software for preparing the extract files, and associated changes in data extract handling procedures. The revised process, developed as part of Angus Australia's transition to the use of in-house database management software, rather than relying on third party generic software, has resulted in changes to the EBVs for some individual animals, but in general, has not affected the EBVs that are calculated within the Angus BREEDPLAN analysis.

Improved Gestation Length EBVs

When analysing the differences that are observed in the performance of animals within a contemporary group, the BREEDPLAN software attempts to remove as many of the differences that can be attributed to non-genetic effects as possible. For some traits, particularly those measured early in an animal's life, this includes making an adjustment to each animal's performance measurement to account for any differences in performance that can be attributed to differences in the age of each animal's dam.

While age-of-dam adjustments have been made for traits like birth weight and 200 day growth for some time, improvements have been made to the software that is used to calculate Gestation Length EBVs to now include an age-of-dam adjustment.

Modifications to Accuracy Values

The software that is utilised to calculate the accuracy value of each EBV has been updated. The new software is more efficient than the previous version, resulting in a considerable decrease in the computing time taken to calculate the EBV accuracy values.

Importantly, the new software will not result in any changes to the EBVs that are calculated for an animal, but rather the accuracy value that is published in association with the EBVs may change, particularly for those animals with genomic information, or those animals who are closely related to animals with genomic information.

Updated EPD Information for Overseas Animals

Angus BREEDPLAN incorporates EPDs for American Black and Red Angus, Canadian Black and Red Angus, and American Brangus animals in order to improve the calculation of EBVs for North American genetics that have been imported into Australia.

A revised set of EPDs has been included in the December 2019 Angus BREEDPLAN analysis for imported American and Canadian Black and Red Angus animals, which has resulted in some changes to the EBVs for these animals, and their relatives.

Inclusion of Additional Abattoir Carcase Data

A significant amount of new abattoir carcase data has been included in the December 2019 Angus BREEDPLAN analysis, with the inclusion of the carcase weight, eye muscle area, rib fat, rump fat and MSA marbling score information from Cohort 7 steers in the Angus Sire Benchmarking Program (ASBP), along with boned out, retail beef yield data for a considerable portion of these steers.

The inclusion of this data has resulted in some changes to the carcase EBVs for the cohort 7 sires, and their relatives.

Removal of DNA Sire Verification Requirement for Angus HeiferSELECT

The requirement for a heifer to be DNA verified to a sire registered with Angus Australia for the provision of Angus HeiferSELECT genetic predictions has been removed.

Angus HeiferSELECT is a genomic selection tool to help inform the selection of replacement straight-bred Angus heifers. Genetic predictions are provided for nine traits; calving ease, weaning weight, yearling weight, milk, mature cow weight, carcase weight, eye muscle area, rib fat and intramuscular fat, plus total breeding value.

Revised Presentation of Analysis Results

A number of considerable improvements have been made to the manner in which EBVs are presented to Angus Australia members. From the January 2020 Angus BREEDPLAN analysis onwards, members will be provided with a new Herd EBV Report, Genetic Benchmarking Report, and Exclusion Report, while a new EBV_EXTENDED csv file will enable members to easily import EBVs into spreadsheet programs like Microsoft Excel, or compatible herd recording software programs. Further details will be circulated about these changes when the results from the January 2020 analysis are released.

Further Information

To further discuss any of the enhancements that have been implemented in the December 2019 Angus BREEDPLAN analysis, please contact Andrew Byrne, Angus Australia's Breed Development & Extension Manager, on (02) 6773 4618 or andrew@angusaustralia.com.au.

