Understanding Outliers

BREEDPLAN

TIP SHEET

As part of the on-going verification of the performance information being analysed by BREEDPLAN, a number of data checks are carried out. One of these checks is the identification of outlier records.

WHAT IS AN OUTLIER?

Every time a BREEDPLAN analysis is run, the variation between the performance information of animals within each contemporary group is examined. If correctly formed each contemporary group will only include animals of similar type that have had equal opportunity to perform under similar conditions. While a certain degree of variation in performance is expected within each contemporary group, when the difference between a performance record for an animal and the average of all animals in the contemporary group is much greater than we would normally expect for the trait measured, the record for this animal is identified as an outlier.

An example of an outlier record is provided in the graph to the right. In this example, the 200 day weight record which has been identified as an outlier is significantly lighter than the rest of the 200 day weights recorded for the other animals in the same contemporary group.

For statistical enthusiasts, a performance record will be identified as an outlier if it is more than three phenotypic standard deviations from the average of the group (after adjusting for age at measurement & age of dam).

WHY DO OUTLIERS OCCUR?

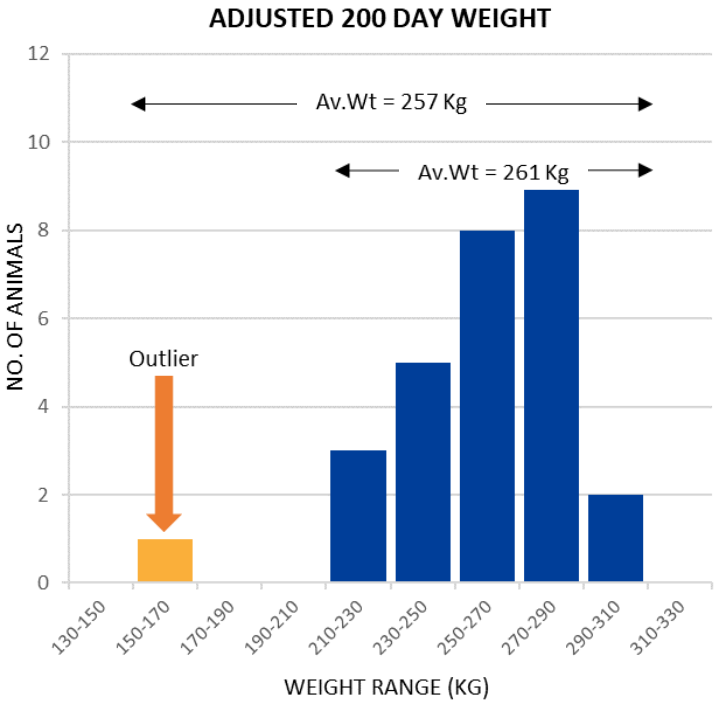
Outliers may occur for a variety of reasons. These include:

- Incorrect measurements may have been recorded (e.g. transcription errors, data collection errors, data entry errors).
- Incorrect animal details may have been recorded (e.g. date of birth, sex).
- Correct management grouping may not have been used (e.g. sick animal not placed in separate group).
- Animals may be significantly genetically superior/inferior to their contemporaries.

Once an outlier record has been identified, an outlier report is sent to the owner of the animal asking them to check the performance record in question. This report gives the owner of the animal the opportunity to review the performance data and **correct** or **verify** the outlier record.

WHAT SHOULD I CHECK UPON RECEIVAL OF AN OUTLIER REPORT?

In the outlier report, the outlier animals are marked in **bold** with the symbol **#** in both the left hand and right hand margins and adjacent to the Raw Observation. Also reported are the other animals with which the outlier animals have been directly compared within the BREEDPLAN



analysis. Different contemporary groups are separated in the outlier report by blank lines.

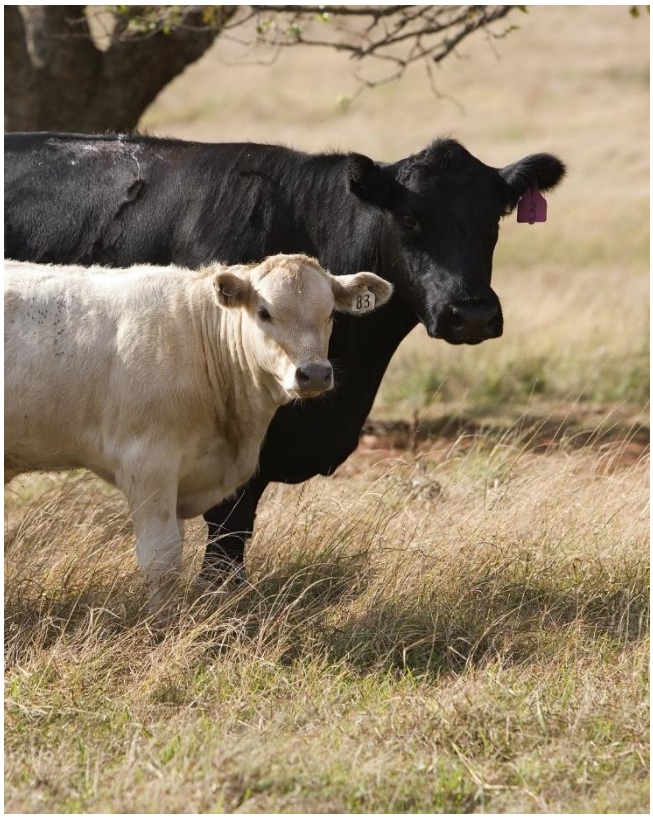
When investigating an outlier record, the owner of the animal should check that:

1. The performance information has been correctly recorded.
   - ✓ Is the measurement correct?
   - ✓ Is the measurement date correct?
   - ✓ Does the measurement refer to the correct animal?
2. The animal details have been correctly recorded.
   - ✓ Is the sex of the animal correct?
   - ✓ Is the date of birth of the animal correct?
   - ✓ Are the sire and dam of the animal correct?
   - ✓ Is the birth number of the animal correct? (i.e. twin vs single)
   - ✓ Is the birth status of the animal correct? (i.e. ET vs natural)
3. The animal is being analysed in the correct contemporary group.
   - ✓ Has the management group information been correctly recorded?
   - ✓ Has the animal had the same opportunity to perform as the other animals in the contemporary group? For example:
     - ✓ Has the animal been sick or injured?
     - ✓ Has the animal received preferential treatment? (e.g. been prepared for show/sale)?
     - ✓ Has the dam of the animal received preferential treatment? (e.g. been prepared for show/sale)?

HOW DO I CORRECT AND/OR VERIFY OUTLIER RECORDS WITH BREEDPLAN?

Once the outlier record has been checked, it is important that the owner of the animal contacts staff at their BREEDPLAN processing centre to either **correct** or **verify** the outlier record.

- If the owner has checked the outlier record and discovers an error has occurred, then the owner should contact their BREEDPLAN processing centre to **correct** the error. Where animal details have been incorrectly recorded, the owner should **also** contact their breed society. The updated performance information will then be included in future BREEDPLAN analyses.
- If the owner has checked the outlier record and concluded that the record is correct (i.e. the animal is simply genetically inferior or superior to others in its contemporary group), then the owner should contact their BREEDPLAN processing centre to **verify** the outlier record. The verified outlier record will then be included in future BREEDPLAN analyses.

Importantly, if the owner of the animal **does not correct or verify an outlier record**, then the outlier record will be **excluded from all future BREEDPLAN analyses**.

For more information regarding outliers, or for assistance in the interpretation of an Outlier Report, please contact staff at your BREEDPLAN processing centre.