



A GUIDE TO
**RECORDING
PERFORMANCE
INFORMATION**



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Recording Gestation Length Information

Gestation Length EBVs provide an estimate of genetic differences between the period from the date of conception (i.e. when the cow gets in calf) to when the subsequent calf is born. This pamphlet outlines the main points to consider when recording information for the calculation of Gestation Length EBVs.

1. Why should Gestation Length be recorded?

Shorter gestation length is generally associated with lighter birth weight, improved calving ease and improved re-breeding performance among dams. In addition, calves born with a shorter gestation length may be heavier at weaning due to more days of growth.

2. How do I record Gestation Length Information?

Gestation Length EBVs are calculated from both the joining date and date of birth records for calves conceived by either AI or Hand Mating.

Consequently, the information that needs to be recorded for the calculation of Gestation Length EBVs includes:

- ❑ the date of birth details for each calf
- ❑ the joining (or AI) date of any AI or Hand Mating joinings.

Importantly, you do not need to calculate the exact gestation length for each calf. BREEDPLAN will calculate that from the information specified above.

3. What considerations should be made when recording Gestation Length Information?

- ❑ No information from natural matings is used in the calculation of Gestation Length EBVs. Although some natural matings may be observed, they are not currently used in the calculation of gestation length as there is no guarantee that the observed mating is the one that successfully results in the conception of the calf.
- ❑ Gestation length information is currently excluded from the BREEDPLAN analysis if (a) the calf is an embryo transfer calf, (b) the calf is a twin, (c) only one animal is represented in a contemporary group, or (d) more than 2/3 of animals in a contemporary group have the same gestation length.

4. How do I submit Gestation Length Information?

Gestation length information can be submitted to your Breed Society/Association when submitting your calf registration details. Please contact your Breed Society/Association should you have any queries about how to submit this information.

For more information regarding how to record gestation length, please contact staff at BREEDPLAN.

Recording Calving Difficulty Scores

Calving Ease EBVs provide an estimate of genetic differences in the ability of calves to be born unassisted from 2 year old heifers and are calculated from three main sources of information - calving difficulty scores, birth weights and gestation length records. By far the most important of these sources are calving difficulty scores.

1. Why should Calving Difficulty Scores be recorded?

Calving difficulty has an obvious negative impact on the profitability of a herd through increased calf and heifer mortality, slower re-breeding performance and considerable additional labour and veterinary expense.

Whilst many large studies have consistently shown birth weight to be the most important genetic factor influencing calving difficulty, there are also other aspects that need to be considered. For example, calf shape, pelvic area and calving “will”. Recording calving difficulty scores allows for all these contributing factors to be evaluated and subsequently, the best possible genetic improvement made for ease of calving.

2. How do I record Calving Difficulty Scores?

Calving difficulty should be measured at birth by visually scoring females on the following scale of 1 - 6.

Score	Code	Description
1	Unassisted	Cow calved unassisted / No difficulty
2	Easy Pull	One person without mechanical assistance
3	Hard Pull	Two people without mechanical assistance One person with mechanical assistance
4	Surgical Assistance	Veterinary intervention required
5	Mal-presentation	E.g. Breech
6	Elective Surgical	Surgical removal of calf before the cow has the opportunity to calve

* Note that a blank score will not be interpreted as “unassisted”. Instead, it indicates that calving difficulty was not scored

3. What considerations should be made when recording Calving Difficulty Scores?

- ❑ If you regularly check your cows (e.g. on a daily basis), it is reasonable to assume that a cow who calves without assistance between visits can be considered as unassisted (no difficulty) even though you did not see her calve.
- ❑ Record a score for all calves rather than just difficult or easy births. Scores should be recorded for dead calves, if possible.
- ❑ If calving difficulty score is either blank or [0], it is interpreted as no score recorded rather than "no difficulty".
- ❑ There needs to be some level of calving difficulty in the herd for the scores to be used effectively by the BREEDPLAN analysis. That is, simply scoring all births in a herd with a calving difficulty score of [1] will not identify any genetic differences in ease of calving.
- ❑ As with birth weight and gestation length, a birth weight management group should be recorded if there are different treatments of the females prior to calving that may affect calving difficulty. For example, where one group of cows have had different feed availability.
- ❑ When calculating the Calving Ease EBVs, calving difficulty scores of [3] and [4] are grouped together. Calving difficulty scores [5] & [6] are excluded from the BREEDPLAN analysis as the problems are considered non-genetic in origin.

4. How do I submit Calving Difficulty Scores?

Calving difficulty scores should be submitted to your Breed Society/Association when submitting your calf registration details. Please contact your Breed Society/Association should you have any queries about how to submit this information.

For more information regarding how to record calving difficulty scores, or calving ease EBVs in general, please contact staff at BREEDPLAN.



Recording Birth Weights

Birth Weight EBVs are estimates of genetic differences between animals in calf birth weight. Birth Weight EBVs are expressed in kilograms (kgs) and are calculated from the weights of calves taken at birth.

1. Why should Birth Weights be recorded?

Calving difficulty has an obvious negative impact on the profitability of a herd through increased calf and heifer mortality, slower re-breeding performance and considerable additional labour and veterinary expense.

Many large studies have shown that the level of calving difficulty in a herd is influenced by many environmental factors and several genetic factors. These genetic factors include such things as calf weight, calf shape, pelvic size and calving “will”. Of these, calf weight is by far the most important factor.

2. How do I record Birth Weights?

Many different methods are currently used to record calf birth weight. These range from using bathroom scales through to the use of commercially available calf weighing cradles that can be attached to the tray of a utility or the front of a four wheel motorbike. A few examples of birth weighing devices are provided below.



For further advice about how to record birth weight, please contact staff at BREEDPLAN.

3. What considerations should be made when recording Birth Weights?

- ❑ Birth weight should be recorded for the whole calf crop. Without comparisons to the other calves, "occasional" measurements are of no value and can actually be misleading. Recording birth weight for dead calves is particularly important.
- ❑ There are significant fluctuations in the weight of a calf over its first week of life. Therefore, it is important to weigh calves as close to birth as possible. Ideally, measure birth weight within 24 hours of birth.
- ❑ Do not guess birth weight or use girth/chest size to estimate birth weight. Either weigh the calves or don't record birth weight.
- ❑ A birth management group should be recorded if there are different treatments of the females prior to calving that may affect birth weight. For example, where one group of cows have had different feed availability. A separate birth management group should also be assigned if the weight of the calf has been affected by special circumstances (e.g. premature calves, the dam was sick etc.)
- ❑ Some breeders have reportedly been injured by protective cows while weighing calves. It is important to take due care when collecting this information.

4. How do I submit Birth Weights?

Birth weight information can either be submitted to your Breed Society/Association when submitting your calf registration details or directly to the BREEDPLAN office. Please contact either your Breed Society/Association or BREEDPLAN should you have any queries about how to submit this information.

For more information regarding how to record birth weight information, or Birth Weight EBVs in general, please contact staff at BREEDPLAN.



Recording Weight Information

BREEDPLAN currently calculates three growth EBVs – 200 Day Growth, 400 Day Weight & 600 Day Weight. These EBVs are the best prediction of the animal's ability to grow to weaning (200 day), yearling (400 day) and later ages (600 day). The Growth EBVs are expressed in kilograms (kg) and are calculated from the live weight performance of animals when they are between 80 and 900 days of age.

1. Why should weight information be recorded?

Within the Australian commercial beef industry, the major determinant of the price received for an animal is live weight. Consequently, in most economic analyses, positive emphasis on increasing live weight is warranted, with higher live weights leading to higher profitability.

2. What weight information do I record?

The Growth EBVs are calculated from the live weight performance of animals when they are between 80 and 900 days of age.

Within this age range, BREEDPLAN will use the age of the animal at weighing to determine whether the particular weight is used in the calculation of the 200 Day Growth, 400 Day Weight or 600 Day Weight EBV.

Trait	Age Range
200 Day Growth	80 – 300 days
400 Day Weight	301 – 500 days
600 Day Weight	501 – 900 days

The live weights of animals need to be recorded to generate Growth EBVs. Ideally, 2 – 3 weights should be recorded for each animal.

3. What considerations should be made when recording weight information?

- ❑ Weights should be recorded to the nearest kilogram.
- ❑ Weights should be recorded using appropriate (and accurate) scales. Do not guess/estimate weight or use measuring tapes to calculate weight. Either weigh the calves using appropriate scales or don't record weights.
- ❑ Breeders should choose weighing dates that fit in with their management and are also reasonably close to when the average age of the group of calves is approximately 200, 400 or 600 days old (depending on the respective weight being taken). BREEDPLAN provides suggested weigh dates to assist you when making this decision.



- ❑ Do not submit weights for heifers that are more than 3 to 4 months pregnant at weighing, unless they are at a similar stage of pregnancy and have been pregnancy tested. This is particularly relevant when submitting 600 day weights for heifers that are being calved down at 2 years of age.
- ❑ BREEDPLAN can analyse up to two weights in each age range (i.e. 2 x 200 day weights, 2 x 400 day weights & 2 x 600 day weights). Generally speaking, it is only necessary to record one weight in each age range, however in some circumstances, recording more than one weight in each age range will improve the accuracy of the Growth EBVs.
- ❑ A management group should be entered for any calf or group of calves that have either been treated differently or exposed to significant non-genetic influences since the previous weighing. For example, calves given a supplement should be recorded in a different group to those without a supplement. Consideration should also be given to variations in pasture quality, stocking rates, water quality, etc. Note that blank is a unique management group.
- ❑ To ensure the maximum number of calves are analysed in the same management group, you should try to weigh all the animals from one management group on the same day. BREEDPLAN will automatically split your management groups if you weigh on different days.
- ❑ Ideally, calves should be weighed when they are in as large a group as possible. Consequently, try to weigh calves before any of the calves in the management group are treated differently. For example, weigh before you castrate some of your bull calves or before the show team is separated out from the rest of the group.

4. How do I submit weight information?

Live weight information should be submitted directly to the BREEDPLAN office at ABRI.

The main method of submitting live weight information is by completing the BREEDPLAN “performance recording forms”. Performance recording forms will be sent to you shortly after you record your calves with your Breed Society/Association or can be requested by contacting staff at BREEDPLAN.

Alternatively, live weight information can be submitted electronically via either:

- ❑ a BREEDPLAN compatible herd recording computer program
- ❑ the performance submission facility offered on some Breed Society/Association websites
- ❑ the BREEDPLAN compatible Microsoft Excel template

For more information regarding how to record live weight information, or Growth EBVs in general, please contact staff at BREEDPLAN.

Recording Mature Cow Weights

Mature Cow Weight EBVs are an estimate of the genetic difference in cow weight at 5 years of age and are based on the weights recorded for cows at the same time as the 200 day weights are recorded for their calves.

1. Why should mature cow weight information be recorded?

The weight of mature cows in a commercial beef enterprise has a considerable influence on profitability. In particular, mature cow weight will have a major effect on:

- ❑ Cow Feed Requirements – in general, lighter cows will tend to eat less and consequently have lower feed requirements and be less expensive to maintain.
- ❑ Cull Cow Values – the major determinant in the value of cull cows in a commercial herd will be live weight. Consequently, heavier cows may provide higher returns from the sale of cull cows.

Achieving an appropriate balance is an important consideration for commercial cattle producers.

2. How do I record mature cow weights?

Mature Cow Weight EBVs are calculated from the live weight performance of mature cows.

Importantly, BREEDPLAN will only analyse the weight of a mature cow if the cow has a calf with a weight recorded within 2 weeks of when the mature weight was taken and further, the calf was between 80 – 330 days of age when it was weighed.

Therefore, in layman's terms, the mature weight for a cow needs to be recorded at the same time as the 200 day weight is taken for its calf.

3. What considerations should be made when recording mature cow weight information?

- ❑ Weights should be recorded to the nearest kilogram.
- ❑ As with all weights, mature cow weight should be recorded using appropriate (and accurate) scales. Do not guess/estimate weight or use measuring tapes to calculate weight. Either weigh the cows using appropriate scales or don't record weights.
- ❑ BREEDPLAN can analyse up to 4 mature weights for each cow. Therefore, all cows with a calf at 200 days should be weighed each year. Do not try to "guess" whether a cow has had 4 weights taken previously – the BREEDPLAN analysis will sort it out for you.

- ❑ For temperate breeds, BREEDPLAN will only analyse a mature cow weight if the cow is older than 2.4 years of age (870 days) at weighing. For tropical breeds, this age is 3.0 years (1090 days).
- ❑ BREEDPLAN will only analyse the mature cow weight performance of a cow if her first valid mature cow weight has been taken before she is 6 years of age (2200 days). If not, then none of her mature weights will be analysed.
- ❑ It is essential that correct management group information is recorded with mature cow weight performance.

Management groups work slightly differently for mature cow weights. If no management group information is defined for a set of mature cow weights, the BREEDPLAN analysis will use the management groups submitted with the 200 day weights of their calves to sub-group the weights of the cows. Therefore, if you have correctly recorded the management group information with the 200 day weight performance for your calves, then you only need to assign a different management group to a cow that has experienced an effect on her weight that is different to that experienced by her calf. For example, if the cow was injured/sick or has been supplementary fed.

If both the mature cow weights and the 200 day weights for their calves are submitted without management group information, the BREEDPLAN analysis will assume all cows and calves have been run under similar management conditions.

- ❑ Optionally, cow condition score can also be submitted with mature cow weight information. Condition scores are not currently included in the BREEDPLAN analysis however they may be used in the future when determining Mature Cow Weight EBVs. If breeders wish to record condition scores, it is important that the standard fat scoring system of 1-6 be used (whole scores only; see below) and that the same person scores all cows in the herd at a particular weighing.

The condition of the cows should be scored using the following criteria:

Fat Score	Fat Depth	Fat Score Description
1	P8: 0-2 mm 12 th Rib: 0-1 mm	Animal is emaciated. Ribs and short ribs are sharp. There is no fat around the tailhead. Hip bones, tailhead and ribs are prominent.
2	P8: 3-6 mm 12 th Rib: 2-3 mm	No fat beside tailhead. Short ribs and long ribs are easily distinguished. Spines feel rounded rather than sharp. Hip bone and ribs are hard. Ribs are no longer visually obvious.
3	P8: 7-12 mm 12 th Rib: 4-7 mm	Short ribs are prominent, rounded but still easily felt. The ribs are easily felt using firm pressure to distinguish between them. Fat that is easily felt covers either side of the tailhead.



Fat Score	Fat Depth	Fat Score Description
4	P8: 13-22 mm 12 th Rib: 8-12 mm	Short ribs cannot be felt. There is some fat cover around the hip bone. Small mounds of fat which are soft to touch are present around the tailhead. Ribs are hard to feel.
5	P8: 23-32 mm 12 th Rib: 13-18 mm	Short ribs cannot be felt. Tailhead and hip bones are almost buried in fat. Ribs appear 'wavy' due to fat folds. There is fat in the brisket and udder, and squaring-off in the flank area.
6	P8: >32 mm 12 th Rib: >18 mm	Short ribs cannot be seen. Tailhead and hips are completely buried by large 'rounds' of fat. Ribs are 'wavy' due to fat folds. The brisket and udder are heavy. The flank is squared off and has a blocky appearance. The animal's mobility is reduced to a walk.

4. How do I submit mature cow weight information?

Mature cow weight information should be submitted directly to the BREEDPLAN office at ABRI.

The main method of submitting mature cow weight information is by completing the BREEDPLAN "mature cow weight" forms. These forms are similar to the normal BREEDPLAN "performance recording forms". "Mature cow weight" forms will be sent out as standard when the 200 day weight forms are sent for your calves or can be requested by contacting staff at BREEDPLAN.

Alternatively, mature cow weight information can be submitted electronically via either:

- a BREEDPLAN compatible herd recording computer program.
- the performance submission facility offered on some Breed Society/Association websites.
- the BREEDPLAN compatible Microsoft Excel template.



For more information regarding how to record mature cow weight information, or Mature Cow Weight EBVs in general, please contact staff at BREEDPLAN.



Recording Information for Milk EBVs

Milk EBVs provide an estimate of the maternal contribution of a dam to the 200 day weight of her calf. In the case of sires, this estimates the maternal influence that his daughters will have on the 200 day weight of their progeny. Milk EBVs are expressed in kilograms and indicate the expected difference in the weight of the calf at 200 days due to the maternal effect of the cow.

1. Why are Milk EBVs important?

The weight of a calf at 200 days is influenced by many factors. Research has shown that 70% of the variation between the weight of calves at 200 days can be attributed to non-genetic factors (e.g. nutrition, disease), 20% to differences between the calf's genetics for growth and the remaining 10% to differences in the maternal contribution made by the mother.

The maternal contribution of the mother is consequently an important consideration for beef enterprises. Differences in the contribution of the dam to the 200 day weight of the calf are influenced by such things as the amount of milk the calf receives, the quality of the milk received and the mothering ability of the dam.

2. What information do I record?

Milk EBVs are calculated by partitioning the difference in the 200 day weight of calves into growth and milk components. Consequently, the live weight of calves at 200 days need to be recorded for the calculation of Milk EBVs.

To a lesser extent, BREEDPLAN will also use the 400 day weights recorded for calves in the calculation of Milk EBVs (as a repeat measure). Therefore, breeders should also consider recording live weight at 400 days to enhance the accuracy of their Milk EBVs.

3. What considerations should be made when recording this information?

- ❑ Weights should be recorded when animals are between 80 and 300 days of age.
- ❑ Weights should be recorded to the nearest kilogram.
- ❑ Weights should be recorded using appropriate (and accurate) scales. Do not guess/estimate weight or use measuring tapes to calculate weight. Either weigh the calves using appropriate scales or don't record weights.
- ❑ A management group should be entered for any calf or group of calves that have either been treated differently or exposed to significant non-genetic influences since the previous weighing. For example, calves given a supplement should be recorded in a different group to those without a supplement. Consideration should also be given to variations in pasture quality, stocking rates, water quality, etc. Note that blank is a unique management group.

- ❑ To ensure the maximum number of calves are analysed in the same management group, you should try to weigh all the animals from one management group on the same day. BREEDPLAN will automatically split your management groups if you weigh on different days.
- ❑ Ideally, calves should be weighed when they are in as large a group as possible. Consequently, try to weigh calves before any of the calves in the management group are treated differently. For example, weigh before you castrate some of your bull calves or before the show team is separated out from the rest of the group.
- ❑ BREEDPLAN can analyse up to two 200 day weights on each animal. Generally speaking, it is only necessary to record one weight, however in some circumstances, recording more than one 200 day weight may improve the accuracy of the EBVs.

In addition, breeders particularly looking to optimise the quality of the Milk EBVs that are generated for their calves should also consider:

- ❑ The weights of calves should be recorded at or before weaning.
- ❑ If you are concerned that a significant number of cows are weaning calves naturally before the calves are “physically” weaned, then it may be beneficial to consider taking an early weight on all calves. That is, if you aren’t weaning calves until they are 200 days of age but some cows start to “dry off” at 150 days of age, it may improve the accuracy of your Milk EBVs if you weigh all calves when they are around 150 days of age.

4. How do I submit weight information?

Live weight information should be submitted directly to the BREEDPLAN office at ABRI.

The main method of submitting live weight information is by completing the BREEDPLAN “performance recording forms”. Performance recording forms will be sent to you shortly after you record your calves with your Breed Society/Association or can be requested by contacting staff at BREEDPLAN.

Alternatively, live weight information can be submitted electronically via either:

- ❑ a BREEDPLAN compatible herd recording computer program
- ❑ the performance submission facility offered on some Breed Society/Association websites
- ❑ the BREEDPLAN compatible Microsoft Excel template.

For more information regarding how to record information for the Milk EBVs, please contact staff at BREEDPLAN.



Recording Scanning Information

BREEDPLAN currently calculates EBVs for carcass traits based on two main sources of information – live animal ultrasound scanning & abattoir carcass data. Of these two sources, stud breeders are most likely to collect live animal ultrasound scanning information. The abattoir carcass data is generally only of value to the BREEDPLAN analysis if it is collected through structured research or progeny test trials.

1. Why should Scanning Information be recorded?

During the 1990's, the beef industry experienced a shift in emphasis from selection purely on growth and adaptation to concentrate more on the genetics of carcass and beef quality. Selection for increased carcass yield and carcass value has become an increasingly important objective for breeders of cattle. Carcass EBVs provide the best tools currently available to evaluate and select animals that will produce progeny with improved carcass quality attributes.

2. What is Live Animal Ultrasound Scanning?

Live animal ultrasound scanning is a non-invasive technology that allows the seedstock or commercial beef producer to assess the carcass merit of an individual animal whilst still alive as opposed to the collection of carcass data in the chiller. The carcass attributes most commonly measured by ultrasound scanning include:

❑ Rump Fat Depth

Rump Fat Depth is measured at the P8 rump site. The P8 rump site is located at the intersection of the line from the high bone (third sacral vertebrae) with a line from the inside of the pin bone. Rump Fat Depth will be reported to the nearest mm (eg 10 mm).

❑ Rib Fat Depth

Rib Fat Depth is measured at the 12/13th rib site. The 12/13th rib site is located on the longissimus dorsi muscle (eye muscle) between the 12th & 13th rib. Rib Fat Depth will also be reported to the nearest mm (eg 7 mm).

❑ Eye Muscle Area

Eye Muscle Area is measured as the cross sectional area of the longissimus dorsi muscle between the 12th & 13th rib. EMA is reported to the nearest cm² (e.g. 110 cm²). Eye Muscle Area is also referred to as Rib Eye Area.

❑ Intramuscular Fat (IMF)

The carcass benchmark for intra-muscular fat is the chemical extraction of all fat from a meat sample taken as a slice off the longissimus dorsi between the 12th & 13th ribs. Ultrasound scanning for IMF uses a longitudinal image of the longissimus dorsi muscle between the 12th & 13th ribs. IMF is reported as a percentage (eg 3.5%)

3. Who do I get to scan my animals?

BREEDPLAN can only accept scan information that has been recorded by an accredited scanner. A list of accredited scanners can be accessed from the “Accredited Technicians” page within the Technical area of the BREEDPLAN website (<http://breedplan.une.edu.au>) or by contacting staff at BREEDPLAN.

4. What animals do I scan?

BREEDPLAN can analyse the scanning performance from animals that are between 300 – 800 days of age when measured. Subsequently, it is important to scan your animals when they are within this age range. The majority of animals are scanned as rising 2 year olds (i.e. around 600 days of age).

While bulls are most commonly scanned, it is recommended that breeders also scan their heifers and steers if possible. Heifers provide valuable data for marbling as they mature earlier than do the males. Scanning steers will provide useful information for their sires and dams.

It is important to try and scan as many of your animals within each management group as possible. Submission of scan data for only a selection of your calves (e.g. only submitting the scanning performance of your sale bulls rather than the entire bull drop) may result in data biases and the subsequent calculation of carcass EBVs that do not reflect the true genetic merit of your animals.

5. When do I scan my animals?

Condition of stock should be the most important consideration when making a decision about when to scan your animals. To obtain effective results from scanning, it is recommended to scan your animals when they are in as good a condition as possible. This ensures that there will be sufficient variation between animals to allow genetic differences to show up.

For example, if all animals were in very poor condition it would be expected that they would all have very similar rib & rump fat depths (i.e. 1-2 mm) and negligible marbling. In this scenario, scanning would be of little benefit as a means of identifying animals that are genetically different for fat depth & genetically superior for IMF%. Effective results may still be achieved for EMA as sufficient variation is likely to exist between animals irrespective of condition.

As a rough guide, if you are particularly interested in fat depth and IMF, animals require a minimum average rump fat depth of 4–5 mm (or a minimum average rib fat measurement of 3 mm) for it to be worthwhile scanning. Results for IMF will be further optimised if the majority of animals have between approximately 2 – 8% IMF when scanned. The effectiveness of the current scanning machines decreases when measuring IMF levels outside this range.

It is important to note the above recommendations are only a rough guide. For example, if animals have been in poor condition and have put on the required 4 - 5 mm of fat in a



relatively short period, then there may still not be sufficient variation between animals to allow genetic differences to show up, particularly for IMF.

Other factors that may also influence the time of scanning (but should not be a major determinant) include:

- ❑ The availability of scanners
- ❑ The cut off date for submission of data for inclusion in GROUP BREEDPLAN analyses. Although carcass trait EBVs can be recalculated in an Interim analysis, it is preferable to submit data so it is included in the GROUP analysis. This will enable the updating of EBVs and accuracy values for the sires and dams.

If you are in any doubt as to when to scan your animals, please discuss your situation with an accredited scanner or contact staff at BREEDPLAN.

6. How do I submit my scanning information to BREEDPLAN?

Submission of scanning information to BREEDPLAN is the breeder's responsibility. The main method of submitting scanning information is by completing the BREEDPLAN "scanning forms". These forms are similar to the normal "performance recording forms" that you will be familiar with and can be requested by contacting staff at BREEDPLAN. Alternatively, the recording sheet completed by the scanner at the time of scanning can be submitted to BREEDPLAN, however it must be presented in an acceptable format. The full Breed Society/Association ident of each animal must be provided (not just tattoo) and sheets must be submitted in a clear and clean manner. It is also critical to ensure that management group information is included on the scanning sheets. Data submitted in the incorrect format will be returned to the breeder for re-submission.

Alternatively, scanning information can be submitted electronically via either:

- ❑ a BREEDPLAN compatible herd recording computer program
- ❑ the performance submission facility offered on some Breed Society/Association websites
- ❑ the BREEDPLAN compatible Microsoft Excel template

7. Will I obtain carcass EBVs after scanning my animals?

Similar criteria apply to the reporting of carcass EBVs as to the reporting of weight EBVs. In general, Interim carcass EBVs will be available for an animal following the submission of scanning information (providing either the animal or both of its parents were included in the last GROUP analysis). An exception to this would be herds with a short scanning history where carcass EBVs may not be available until the next GROUP analysis due to low accuracy of the EBVs. If you are in any doubt as to whether an animal will receive carcass EBVs, please do not hesitate to contact BREEDPLAN staff.



8. Can I submit more than one scan on each animal?

BREEDPLAN is currently analysing only one EMA, one rib fat, one rump fat & one IMF measurement on each animal. While these measurements are typically measured on the same day, BREEDPLAN can analyse the scanning performance for an animal when the individual traits have been recorded at different times.

For more information regarding how to record scanning information, or Carcase EBVs in general, please contact staff at BREEDPLAN.





Collecting Abattoir Carcase Information

Abattoir carcase information, along with live animal ultrasound scanning measurements and genomic information, is used to calculate Carcase EBVs within BREEDPLAN.

This fact sheet outlines the requirements for the collection and submission of abattoir carcase information for BREEDPLAN.

Why Collect Abattoir Carcase Information?

Traits such as carcase yield and meat quality are some of the most economically important traits in the beef supply chain.

While the collection of carcase information from ultrasound scanning and genomic tests provides useful information on live animals, abattoir carcase information is of particular value for genetic evaluation as it represents a direct measure of the attributes of a beef carcase.

Obtaining direct abattoir carcase measurements can add considerable accuracy to the Carcase EBVs calculated within BREEDPLAN, and consequently provides a valuable source of information when attempting to identify animals with superior carcase genetics for use in a beef breeding program.

How Much Effort is Involved?

Those who are considering embarking on the collection of abattoir carcase information for BREEDPLAN need to be aware that the collection of abattoir information can be challenging, expensive and time consuming.

The rewards however are significant and if useful abattoir information can be collected, the benefits can be considerable.

What Abattoir Carcase Information will be Accepted?

Abattoir carcase information must meet certain requirements in order to be accepted for inclusion in BREEDPLAN. These requirements have been put in place to ensure any abattoir carcase information that is analysed within BREEDPLAN meets appropriate data integrity standards.

The most valuable carcase data for inclusion in a BREEDPLAN analysis meets the following requirements:

- ❑ It has been collected as part of a structured progeny test program.

- ❑ Appropriate measurement collection protocols have been followed to ensure the carcase measurements that are collected are of suitable quality for genetic evaluation.
- ❑ Animals are between 300 and 1000 days of age at slaughter (i.e. 10 – 33 months).

Where carcase data is collected from a commercial slaughterer it is important that they are in a valid contemporary group. This means that they must have been reared together and have been treated the same way during backgrounding and finishing and slaughtered on the same day. It is important that animals have not been harvested from a larger group based on their weight and fatness.

Abattoir carcase information that does not meet the above criteria, such as kill sheets for small groups of steers or cull heifers, or information collected as part of a carcase competition, is not suitable for analysis in BREEDPLAN.

Establishing a Progeny Test for the Collection of Abattoir Carcase Information

It is essential that any abattoir carcase information collected for inclusion in BREEDPLAN is from a structured progeny test program in order to ensure that the amount of useful information generated is maximised.

Number of Effective Progeny per Sire

Ensuring that there are an adequate number of effective progeny by each sire is an important consideration when designing a progeny test program.

The number of effective progeny per sire (EPN) takes into account not only the number of progeny by each sire, but how useful the information collected on those progeny are for genetic evaluation.

The number of effective progeny for an individual sire can be calculated by considering the number of progeny within a contemporary group that are by the sire compared with the number of progeny in the contemporary group sired by other bulls.

A contemporary group can be considered to be animals of the same sex which are born within an individual herd in a 60 day period and are managed together as one mob under the same conditions until slaughter.

Specifically, the number of effective progeny for a sire can be calculated as follows:

$$\text{EPN} = \text{No. of Sire's Progeny} \times \frac{\text{No. of Progeny by Other Sires}}{\text{No. of Animals in Contemporary Group}}$$

For example, if a sire has 5 progeny in a contemporary group of 10 animals, then the effective progeny number would be $5 \times (5/10) = 2.5$ progeny.

Table 1 provides a guide to the impact on the effective progeny number as the number of progeny by a sire, and the number of progeny by other sires changes within a contemporary group.

Table 1 : Effective Progeny Number In Different Scenarios				
Number of Sire's Progeny	Progeny by Other Sires	Effective Progeny Number	Approx. EBV Accuracy	
			Heritability of Trait 20%	30%
5	5	2.5	0.33	0.40
10	5	3.3	0.38	0.45
15	5	3.8	0.40	0.47
20	5	4.0	0.41	0.48
25	5	4.2	0.42	0.49
30	5	4.3	0.42	0.49
5	10	3.3	0.38	0.45
10	10	5.0	0.45	0.52
15	10	6.0	0.48	0.56
20	10	6.7	0.50	0.58
25	10	7.1	0.51	0.59
30	10	7.5	0.52	0.60
5	15	3.8	0.40	0.47
10	15	6.0	0.48	0.56
15	15	7.5	0.52	0.60
20	15	8.6	0.55	0.63
25	15	9.4	0.56	0.64
30	15	10.0	0.58	0.65
5	20	4.0	0.41	0.48
10	20	6.7	0.50	0.58
15	20	8.6	0.55	0.63
20	20	10.0	0.58	0.65
25	20	11.1	0.60	0.67
30	20	12.0	0.61	0.69
5	25	4.2	0.42	0.49
10	25	7.1	0.51	0.59
15	25	9.4	0.56	0.64
20	25	11.1	0.60	0.67
25	25	12.5	0.62	0.70
30	25	13.6	0.64	0.71
5	30	4.3	0.42	0.49
10	30	7.5	0.52	0.60
15	30	10.0	0.58	0.65
20	30	12.0	0.61	0.69
25	30	13.6	0.64	0.71
30	30	15.0	0.65	0.73

Ideally sufficient females should be joined within the progeny test program to obtain a total effective progeny number of at least 10 - 15 per sire. This should give an EBV accuracy above 65-70% for a carcass trait with a heritability of 30%.

Genetic Linkage (within Progeny Test)

In progeny tests where there are multiple contemporary groups (either within a single herd or across different herds), it is important to ensure that there are adequate genetic links between contemporary groups.

Genetic linkage enables the abattoir carcase measurements collected on animals in the different contemporary groups to be compared, while also enabling adjustment for differences in the genetic merit of the females to which the bulls are joined in each contemporary group.

If it is not possible for common sires to be represented in each different contemporary group, a minimum requirement would be to ensure that at least some of the bulls used have common sires, hence creating genetic linkage between contemporary groups through common grand-sires.

Genetic Linkage (with BREEDPLAN Analysis)

If the bulls being progeny tested are largely of unknown genetics, it is important that reference sires are included in order to enable the abattoir carcase measurements to be linked to the carcase information that has been collected for other animals within the breed.

The reference sires should ideally be “proven” bulls that have Carcase EBVs with at least 80% accuracy.

Allocation of Dams

It is important to carefully consider the dams to which the bulls will be joined in any progeny test program for the collection of abattoir carcase information.

- ❑ Ideally the sires being progeny tested will be joined to dams of known carcase genetics (e.g. registered or previously registered females with Carcase EBVs).
- ❑ If dams of unknown carcase genetics are being joined (e.g. commercial females), it is important that dams are randomly allocated to each sire (i.e. no selective mating).
- ❑ Where females of several age classes are used, it is important to allocate females evenly across the age classes.
- ❑ Dams should ideally be the same breed as the bulls, but cows of another breed or crossbred cows can also be joined as part of a progeny test. It is however important that all cows joined are of the same breed (or similar cross).
- ❑ At a minimum, all dams should be individually identified (i.e. tagged), with the year of birth and breed composition of each dam recorded with the relevant breed society to account for age of dam and breed effects.

Animal Identification

It is important that all animals within the progeny test are clearly identified. This includes the dams to which the sires will be joined, plus all progeny.

Ideally, two forms of identification should be used to enable animals to be identified when tags are lost. For example, progeny may be tagged with a management tag at or shortly after birth, followed by a NLIS tag at marking.

Recording Birth Date Information

It is important that appropriate details are recorded on all progeny at birth to enable the most effective analysis of the abattoir carcass information that is collected.

- ❑ The birth date of all calves needs to be recorded as accurately as possible. BREEDPLAN will make adjustments to the abattoir carcass measurements to account for any differences in age between animals.
- ❑ The dam of each calf needs to be recorded. BREEDPLAN will make adjustments to the abattoir carcass measurements to account for differences in the age and breed of the dam.
- ❑ If any calves have been bred by embryo transfer (ET), details of the recipient dam need to be recorded. BREEDPLAN will make adjustments to the abattoir carcass measurements to account for any maternal differences between recipient dams (e.g. age, breed).
- ❑ The birth number of each calf needs to be recorded. That is, whether the calf is a single or twin calf. BREEDPLAN will not directly compare the abattoir carcass measurements of single and twin calves together, and in general, twin calves should be removed from the progeny test.

Maintenance of Contemporary Groups (On Farm)

Where practical, all animals within a contemporary group (i.e. animals of the same sex which are born within an individual herd in a 60 day period) need to be managed together as one mob under the same conditions from birth until slaughter.

Splitting contemporary groups into different mobs will reduce the effectiveness of the abattoir carcass information that is collected. Likewise, “culling” any animals from the progeny test will potentially bias the abattoir carcass information.

Maintenance of Contemporary Groups (At Slaughter)

All animals within a contemporary group should be slaughtered on the same day and at the same abattoir.

Animals within a contemporary group should not be “harvested” and slaughtered on different days as different portions of the contemporary group meet market



specifications.

Harvesting animals as they meet market specifications will bias the Carcase EBVs that are calculated from the abattoir carcase information, with the information not accurately reflecting the variation in performance within the contemporary group, while also influencing sire representation in each sub-group.

Splitting Management Groups

If it is necessary to split contemporary groups either on-farm or for slaughter on different days then it is important that each sire is equally represented in each sub-group. For example, if a contemporary group needs to be split into 3 sub-groups then 1/3 of the progeny by each sire should be randomly selected for each sub-group.

Recording Management Group Information

It is important that any animals within a contemporary group whose performance may have been affected by different non-genetic factors are clearly identified by specifying a different management group (or kill group) for the animals when submitting the abattoir carcase information to BREEDPLAN. For example, animals that may have been split into a different mob for management purposes, or animals that have been affected by injury or sickness.

It is important to record a management group if animals have been affected by non-genetic factors at any time from birth up until slaughter. If animals are being finished in a feedlot, this includes details of any animals who may have been shy feeders, or who may have been removed from the group for health treatments.

Abattoir Measurement Collection Protocols to Ensure Data Integrity

When obtaining abattoir carcase information for inclusion in BREEDPLAN, it is important to investigate how the carcasses will be processed at the abattoir and how the carcase measurements will be collected to ensure that any information collected is useful for genetic evaluation.

In reality this can be difficult when carcasses are being processed through commercially operated abattoirs, however abattoir measurements that have not been collected in accordance with appropriate measurement collection protocols can lead to considerable bias in the Carcase EBVs that are calculated for animals within BREEDPLAN.

Use of MSA Accredited Graders

Where possible, animals should be processed at a Meat Standards Australia (MSA) licensed abattoir and have measurements collected by an MSA accredited grader. A list of MSA licensed abattoirs is available from the Meat & Livestock Australia (MLA) website.

It is important that the same MSA accredited grader collects carcase measurements on all



animals within a contemporary group. Where carcase measurements are collected by different graders, a different management group (or kill group) should be specified for the carcasses assessed by each grader.

Animal Identification in the Abattoir

Loss of individual animal and carcase identification is a common problem when collecting abattoir information for genetic evaluation.

All animals will have a management tag and NLIS tag at slaughter, with abattoirs routinely recording NLIS tag and body number. It is important that all identification information is carefully cross referenced to ensure that the abattoir measurements collected are appropriately assigned to the correct animals.

Processing of Carcasses

Several carcase processing procedures routinely practiced in commercial abattoirs can lead to a reduction in the usefulness of any abattoir carcase measurements for genetic evaluation.

- ❑ Hide puller damage - Fat can inadvertently be stripped from the carcase when the hide is being removed and can considerably bias the rump and rib fat measurements subsequently collected on the carcase. Fat measurements should not be submitted to BREEDPLAN from carcasses where considerable hide puller damage has occurred.
- ❑ Trimming – Fat will routinely be trimmed from carcasses using a whizzer knife prior to carcase measurements being collected, especially from the rib fat measurement site. Rib fat measurements should not be submitted to BREEDPLAN from carcasses that have been trimmed.
- ❑ Carcase damage/Bruising - Carcasses that may have considerable damage, bruising or abscesses can have portions removed during processing. Any measurements from these carcasses should be carefully scrutinised and only submitted to BREEDPLAN if the processing of the carcase has not biased the measurements collected.
- ❑ Quarter site – Carcasses may be quartered at different sites. It is important that all carcasses from animals in a contemporary group are quartered at the same site, and ideally at the 12/13th rib site. Where carcasses have been quartered at a different site, a different management group (or kill group) should be specified.
- ❑ Spencer rolling – Some abattoirs undertake a practice known as “spencer rolling” to make the carcase easier to bone out. By design, spencer rolling changes the shape of the eye muscle and makes it difficult to accurately measure eye muscle area (EMA). EMA measurements should not be submitted to BREEDPLAN from carcasses that have been subject to spencer rolling.



- ❑ Electrical stimulation – All carcasses from animals within a contemporary group should be subject to the same electrical stimulation process. This is particularly important when meat samples will be collected for analysis of meat tenderness.

Collection of Meat Science Laboratory Results

In addition to carcass measurements collected in the abattoir, meat samples can be collected from carcasses for further analysis in the meat science laboratory for traits such as intramuscular fat (IMF), meat tenderness and meat colour.

Meat science laboratory measurements are expensive and are normally only collected in research trials; however those interested in obtaining meat science laboratory measurements should contact staff at BREEDPLAN to discuss what is involved.

Submitting Abattoir Carcass Information to BREEDPLAN

Abattoir carcass measurements should be submitted directly to BREEDPLAN using a specific Microsoft Excel template.

A copy of the template that needs to be used can be obtained from staff at BREEDPLAN.

BREEDPLAN currently includes carcass weight, rump fat, eye muscle area, MSA marble score and intramuscular fat measurements in the calculation of Carcass EBVs, however other measurements that have been collected can be submitted for storage and possible future analysis.

Prior to submission to BREEDPLAN, it is important that any abattoir carcass measurements are carefully scrutinised. Specifically, the measurements should be reviewed to ensure they fit within normal expected ranges, and that the variation between measurements reviewed to ensure that measurements follow a normal expected distribution.

For more information regarding the collection of abattoir carcass data, please contact staff at BREEDPLAN.

Recording Scrotal Circumference Measurements

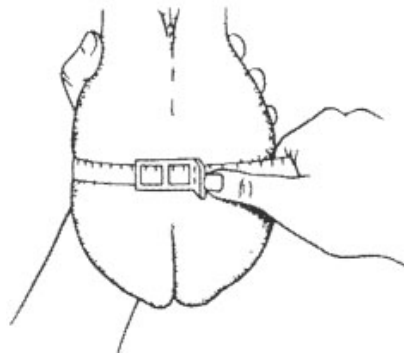
Scrotal Size EBVs are estimates of the genetic differences between animals in scrotal circumference at 400 days of age. Scrotal Size EBVs are expressed in centimetres (cm) and are calculated from scrotal circumference measurements taken on bulls between 300 and 700 days of age.

1. Why should scrotal circumference be recorded?

The scrotal circumference of a bull provides an important indication of his genetic merit for several important fertility traits. Increased scrotal circumference is associated with earlier age at puberty, increased semen production and improved semen quality. Increased scrotal circumference also has a favourable relationship with female fertility, both in terms of earlier age at puberty, earlier return to oestrous and shorter days to calving.

2. How do I record scrotal circumference information?

Scrotal circumference measurements should be recorded by pulling the testes firmly down into the lower part of the scrotum and placing a measuring tape around the widest point (as per diagram). Scrotal circumference measurements can be taken by anyone. They do not need to be taken by an accredited technician.



Measurements should be recorded in centimetres (to one decimal place).

When measuring scrotal circumference it is important to remember:

- ❑ While measuring techniques vary slightly, it is important to use a consistent technique for a whole group of cattle
- ❑ The tension applied to the measuring tape should be just sufficient to cause a slight indentation in the skin of the scrotum.
- ❑ Avoid placing the thumb of the hand holding the neck of the scrotum between the cords. This will cause separation of the testes and an inaccurate measurement.
- ❑ A variety of scrotal circumference measuring devices are commercially available from agricultural supply stores or organisations such as the Australian Cattle Veterinarians. At the time of writing, the Australian Limousin Breeders Society were also offering a measuring tape for sale. Metal scrotal measuring tapes are more reliable than cloth tapes as they are not prone to stretching.

3. What considerations should be made when recording scrotal circumference information for BREEDPLAN?

- ❑ BREEDPLAN can analyse scrotal circumference information from bulls that are between 300 – 700 days of age when measured. Subsequently, it is essential that scrotal circumference information is recorded when bulls are within this age range.
- ❑ It is recommended that you measure scrotal circumference when the bulls are reaching puberty, which will vary according to seasonal conditions and the maturity pattern of your cattle. In the majority of cases, scrotal circumference should be recorded when bulls are being weighed at 400 days.
- ❑ While more than one scrotal circumference measurement can be recorded for an individual animal, BREEDPLAN is only analysing the first measurement for each bull at this stage. Subsequently, it is only necessary to record one scrotal circumference measurement on each bull.

4. How do I submit scrotal circumference information?

Scrotal circumference information should be submitted directly to the BREEDPLAN office at ABRI.

The main method of submitting scrotal circumference information is in association with weight performance on BREEDPLAN “performance recording forms”. Performance recording forms will be sent to you automatically or can be requested by contacting staff at BREEDPLAN.

Alternatively, scrotal circumference information can be submitted electronically via either:

- ❑ a BREEDPLAN compatible herd recording computer program
- ❑ the performance submission facility offered on some Breed Society/Association websites
- ❑ the BREEDPLAN compatible Microsoft Excel template

For more information regarding how to record scrotal circumference information, or Scrotal Size EBVs in general, please contact staff at BREEDPLAN.



Recording Days to Calving Information

Days to Calving EBVs are estimates of genetic differences between animals in the time from the start of the joining period (i.e. when the female is introduced to a bull) until subsequent calving. Days to Calving EBVs are expressed in days and are presently calculated from the natural joining details of both heifers and mature cows.

Why Should Days to Calving Information be Recorded?

Reproductive performance is a key determinant of profitability in a beef cattle enterprise. Consequently, selection for improved reproductive performance should be an important consideration for all beef cattle producers.

One major component influencing a beef enterprise's reproductive performance is the fertility of the female herd. The job of a female in a beef producing herd is to conceive, preferably as early in the joining period as possible, carry a foetus during gestation, deliver a live calf and raise it until weaning, within every 12 month period of her breeding life. A female that does not do this is failing to do her job and eroding herd profitability.

While many producers manage the reproductive performance of their female herd using different management strategies, in particular the culling of females that fail to get in calf, research has shown that female fertility is influenced by the genetics of the breeding herd. Consequently, Days to Calving EBVs provide a useful tool that breeders can use to improve the genetics of their females for fertility, in association with their routine management and culling strategies.

What Information Needs to be Recorded for the Days to Calving EBV?

Breeders interested in the Days to Calving EBV need to record all 'events' associated with the natural joining of their females from the start of the mating period in each breeding season through to when the subsequent calves are born. This includes those females that have only been joined naturally within a breeding season - not those that have been included in artificial insemination/embryo transfer programs or artificially induced to cycle prior to joining with the bull outside of such programs.

Broadly, the information to be collected should include:

1. Joining details of **all** females naturally mated within the herd.
2. Details of **all** females removed from the herd, particularly those present at joining that were no longer within the herd by the time of the subsequent calving.
3. Details of **all** calves (dead or alive) that are born as a result of these joinings.

While not currently included in the Days to Calving analysis, research is now underway to determine whether details from artificial insemination (AI) and embryo transfer (ET) programs could be utilised by BREEDPLAN. Breeders interested in submitting details of their AI & ET programs to assist this research should refer to the "Collecting Better Female Fertility Data" tip sheet.

Recording Joining Details for Days to Calving EBVs

- ❑ Record each natural joining event to which a female (cow or heifer) is exposed within the breeding season whether this was the successful joining or not. For situations



where females are joined to several bulls in a mating season, record all joinings for the female, not just the first or successful joining.

- For each natural joining event within the breeding season, record the bull the female was joined to, the date she was joined ('bull in' date) and the date the bull was removed ('bull out' date). Knowing the end of the joining period is important in analysing the Days to Calving trait.
 - The joining event code to be used when recording natural joining events is 'N' (Natural/Paddock mating).
- Record management group information to identify any cow/s within a joining group whose fertility may have been affected either prior to or during the joining program due to non-genetic factors. e.g. significantly different nutrition, sickness, injury. A maximum of three characters (letters and/or numbers) can be used to describe each management group.

Recording Female Disposal Information

- Record the date and reason for any female removed from the herd, particularly those present at the start of joining that are no longer within the herd by the time of the subsequent calving. The fate/disposal code information is critical to the Days to Calving analysis and is used to determine whether females that have a joining record but no subsequent calf should be penalised for being "culled for infertility" or not penalised because they were culled for other reasons e.g. structure, performance etc. In the future, this information may also be used as part of the calculation of a Female Longevity EBV.

The codes to be used to record a female fate/disposal event are as follows:

Culled or sold

A	Cast for age
B	Sold surplus breeding female - but not code J or F
C	Calving incident
D	Disease (e.g. pesti, eye cancer, etc)
E	Eyes (pigment, hooding, etc)
F	Not in calf (i.e. failed preg test or did not calve)
G	Genetic condition (e.g. genetic carrier)
H	Horns
J	Cull unjoined heifer surplus to requirements
K	Coat Type
P	Poor performance (e.g. poor milking, low body condition, etc)
Q	Appearance (type, colour, markings, Society standards, etc)
R	Reproduction abnormality (eg freemartin, mal-formed uterus, pelvic area)
S	Structural problem (e.g. feet, legs, navel, etc)
T	Poor temperament
U	Udder or teat problems
V	Poor EBVs
W	Calved but failed to rear calf to weaning
X	Susceptible to parasites (ticks, buffalo fly, worms, etc)

Died or missing

C	Calving incident (e.g. dystocia, prolapsed)
D	Disease (e.g. pesti, bloat, 3 day, etc)
M	Missing assumed dead
X	Parasites (ticks, buffalo fly, worms, etc)
Y	Unknown cause
Z	Accident (e.g. injury, drowned, poisoned, etc)

Note: These codes are specific to BREEDPLAN for the purpose of Days to Calving and are separate to the disposal information submitted routinely to your Breed Society. Disposal information submitted to your Breed Society will not be used in the calculation of the Days to Calving EBV, and likewise the disposal codes submitted to BREEDPLAN will not be utilised by your Breed Society.

Recording Calf Details

- ❑ All calves that are born as a result of these joinings need to be recorded with the Breed Society. Not recording all calves (including dead calves) with your Breed Society will reduce the accuracy of Days to Calving EBVs.

Recording Pregnancy Test Results

- ❑ Optionally, where pregnancy test results are available, record the date and result of the test for each female joined. This information is not currently included in the Days to Calving analysis, however it may be utilised in the future to either enhance the calculation of Days to Calving EBVs, or for the calculation of other female fertility EBVs.
 - Pregnancy test results should be reported as: N = Not pregnant, P = Pregnant, or between 3-20 = Number of weeks pregnant as advised by a qualified technician. Where the foetus is over 20 weeks old, a 'P' should be used.

Important Considerations when Recording Information for Days to Calving

- ❑ Joining details for all cows in the recorded herd need to be collected in order to accurately reflect the cow fertility in the herd. Simply recording those cows that have a calf or those cows that remain on inventory in the next year is not adequate.
- ❑ Ensure that you record details for all heifers joined – not just the ones that calve or are added to inventory. Information on heifers is very important as many herds cull heifers that do not conceive in the first year of joining. The heifers that do not calve supply as much information to the analysis as those that do calve.
- ❑ Record the details of all joining events in which the female was involved even if you know the joining was unsuccessful. For situations where females are joined to several bulls in a mating season, record all joinings for each cow and heifer within the joining period, not just the first or successful joining.
- ❑ Accurately recording the fate/disposal codes of all females that leave the herd is extremely important. In the Days to Calving analysis, this fate/disposal code information is used to determine whether a female should be penalised for being

“culled for infertility” or not penalised because she was culled for other reasons (e.g. structure, performance etc.)

- ❑ Joining details for females that have been joined to multiple sire groups (rather than a single sire) should also be recorded. In this scenario, the sire ident that is specified should be the multiple sire ident, rather than the ident of the individual sire that resulted in the calf. Similarly, joining details for females mated to sires not recorded with the Breed Society (e.g. sires of another breed) should also be submitted.
- ❑ Herds with either a very wide calving spread (e.g. cows joined all year around) or several calvings each year (e.g. an autumn, winter and spring calving) may have difficulty collecting joining information that is useful for the calculation of Days to Calving EBVs. Herds in such situations should contact staff at BREEDPLAN for further advice.

Submitting Days to Calving Information

Similarly to other performance information, the joining details and fate/disposal information for your females should be submitted directly to BREEDPLAN. Note that the joinings or fate/disposal information that is submitted to your Breed Society as part of your calf registrations or cow inventory is **not** included in the Days to Calving analysis.

There are two different methods available to submit the joining details and fate/disposal information to BREEDPLAN:

- ❑ Herds that use BREEDPLAN compatible herd recording software packages (e.g. HerdMASTER, Stockbook, CattleLink) should be able to extract the joining details from their computer program and submit the details to BREEDPLAN electronically. Herds that require assistance either entering the joining details of their herd into their software program or extracting the joinings and fate/disposal information for BREEDPLAN, should contact their software supplier.
- ❑ A Microsoft Excel template is available for herds not using a BREEDPLAN compatible herd recording software package. The template can be accessed from the Technical area on the BREEDPLAN website or by contacting staff at BREEDPLAN.

Note: there is no longer a paper form available for the submission of joinings information to BREEDPLAN. Herds that are unable to submit information electronically are advised to contact staff at BREEDPLAN to discuss alternative methods of submission.

For more information regarding Days to Calving EBVs or the submission of joinings information, please contact staff at BREEDPLAN.



Recording Docility Scores

Docility EBVs are estimates of genetic differences between animals in temperament. Docility EBVs are calculated from docility scores recorded on animals when the animals are between 60 and 400 days of age.

1. Why should Docility Scores be recorded?

Docility in cattle is the way cattle behave when being handled by humans or put in an unusual environment such as being separated from the mob in a small yard. What we define as poor docility is a survival trait in the wild – fear of anything unusual and the desire to escape. In domesticated cattle it is exhibited as flightiness. Importantly, docility is a highly heritable trait and can be improved genetically.

2. How do I record Docility Scores?

Docility EBVs are calculated from docility scores recorded on animals when the animals are between 60 and 400 days of age.

The recommended time of scoring is at weaning or shortly afterwards. The advantage of scoring at weaning is that all calves should have had similar treatment so variation in handling prior to scoring should be minimised.

Animals can be scored for temperament using either a yard or crush test.

Yard Test

The calves are individually put into a small square yard and the handler should attempt to hold the animal in one corner for about 30 seconds.

Crush Test

The calves are put up a race and individually held in the crush for about 30 seconds.

When using either the crush or yard test, the behaviour of animals should be observed and animals scored using the following criteria.

Score	Code	Description
1	Docile	Mild disposition, gentle and easily handled, stands and moves slowly during handling, undisturbed, settled, somewhat dull, does not pull on headgate when in crush, exits crush calmly.
2	Restless	Quiet but slightly restless, may be stubborn during handling, may try to back out of crush, pulls back on headgate, some flicking of tail, exits crush promptly.

Score	Code	Description
3	Nervous	Manageable but nervous and impatient, a moderate amount of struggling, movement and tail flicking, repeated pushing and pulling on headgate, exits crush briskly.
4	Flighty	Jumpy and out of control, quivers and struggles violently, may bellow and froth at mouth, continuous tail flicking, defecates and urinates during handling, frantically runs fence line and may jump when penned individually, exhibits long flight distance and exits crush wildly.
5	Aggressive	May be similar to score 4 but with added aggressive behaviour, fearful, extreme agitation, continuous movement which may include jumping and bellowing while in crush, exits crush frantically and may exhibit attack behaviour when handled alone.

3. What considerations should be made when recording Docility Scores?

- ❑ There needs to be some variation in the scores for them to be used effectively by the BREEDPLAN analysis. That is, scoring all animals in a group with a docility score of [1] will not identify any genetic differences in docility.
- ❑ BREEDPLAN can accept half scores if animals exhibit behaviour which is intermediate to the above scores.
- ❑ Animals should be assigned a different “temperament management group” if they have had a different level of handling prior to scoring.
- ❑ The method of scoring used (i.e. crush or yard) should be specified when submitting the docility scores.
- ❑ When recording docility scores, it is important that both a consistent scoring method is used and the same person scores all animals that are being assessed in the herd on that particular day.

4. How do I submit Docility Scores?

Docility scores should be submitted directly to the BREEDPLAN office at ABRI.

For more information regarding how to record docility scores, or Docility EBVs in general, please contact staff at BREEDPLAN.





Recording Flight Time

Flight Time EBVs are estimates of genetic differences between animals in temperament and are calculated from flight time measurements that have been recorded on animals using specialised flight time equipment

1. Why should Flight Time be recorded?

Flight time is a simple, cost effective and easy to record objective measurement of temperament. Research has shown that in addition to the obvious benefits for ease of handling and management, animals with longer flight time (i.e. superior temperament) also have superior meat tenderness.

Importantly, flight time is a moderately heritable trait and can be improved by selection.

2. How do I record Flight Time?

Flight time measurements are recorded on animals using specialised flight time equipment. Animals are held individually in the crush for a short period and then the head bail opened. Two light beams are then used to objectively measure the time taken for the animal to travel approximately 2.0 metres at the exit of the crush (see picture below).



Two light beams measure animal's flight time

Exit to crush

3. How do I access the Flight Time Equipment?

There are a number of flight time machines located around Australia that producers can access to record flight time measurements for their animals. The easiest way to access a flight time machine is to contact staff at BREEDPLAN. BREEDPLAN will then coordinate the availability of a flight time machine for you. To ensure that a machine is available when required, it is recommended that you contact BREEDPLAN approximately 4-6 weeks prior to when you wish to record the measurements.

4. What considerations should be made when recording Flight Time?

- ❑ Flight time measurements should be recorded at a young age prior to the animals receiving significant handling. The recommended time to record flight time is at or around weaning, although measurements taken on yearlings have also been shown to be sufficient for genetic evaluation.
- ❑ Flight time measurements must be recorded using specialised flight time equipment. Detailed instructions on setting up and using the flight time machine will be provided with the machine.
- ❑ When submitting flight time measurements to BREEDPLAN, animals should be assigned a different “management group” if they have either had a different level of handling prior to recording the flight time measurements and/or experienced different management prior to recording measurements that may affect their flight time.
- ❑ When recording flight time, it is important that both a consistent method is used and the same people handle all animals that are being measured in the herd on that particular day. This is particularly important when measuring flight time on large numbers of animals.
- ❑ While not compulsory, it is recommended that animals are run through the crush once prior to recording the flight time measurements so that they are familiar with the exit route and consequently do not balk.
- ❑ It is not possible to record useful flight time measurements if animals are required to turn sharply when exiting the crush. In other words, the exit from the crush needs to be either straight ahead or at a slight angle. The crush exit should also be leading into an open yard rather than a confined area.

5. How do I submit Flight Time measurements?

Flight Time measurements should be submitted directly to the BREEDPLAN office at ABRI.

Flight Time measurements are usually submitted electronically via either:

- ❑ a BREEDPLAN compatible herd recording computer program such as Herdmaster or Stockbook
- ❑ a BREEDPLAN compatible Microsoft Excel template

If you are unable to submit the flight time information using these methods, please contact staff at BREEDPLAN to discuss the alternatives available.

For more information regarding how to record flight time measurements, or Flight Time EBVs in general, please contact staff at BREEDPLAN.



Recording Management Groups for BREEDPLAN

The recording of management group information is one of the most important aspects of BREEDPLAN. This document provides information regarding management groups and when they should be submitted to BREEDPLAN.

Introduction

BREEDPLAN analyses cattle in contemporary groups to take out the influence of as many of the non-genetic effects as possible (e.g. feeding, years, seasons). The underlying principle is that only animals that have had an equal opportunity to perform are directly compared together within each contemporary group.

If the contemporary groups are not correctly formed, the EBVs calculated will be less accurate and possibly misleading. Most of the problems that breeders encounter in “believing” their BREEDPLAN EBVs can be traced back to incorrect contemporary grouping – either calves being fragmented into isolated groups of only one or two animals (and thereby virtually eliminating those calves from any comparison with their peers) or by not differentiating between calves that have had different levels of management or feeding.

Importantly, the breeder has a major influence on deciding which animals will be directly compared within each contemporary group. This influence is through both their on farm management and the submission of management group information to BREEDPLAN. In this manner, it is vital that breeders understand the factors that influence the formation of contemporary groups to ensure they maximise the effectiveness of their BREEDPLAN recording.

Breeder Defined Management Groups

There are two different forms of breeder defined management group.

a) the “Birth Management Group” allows breeders to describe different treatments of the cows prior to the birth of the calf. For example, where one group of cows have had different feed availability that may affect the birth weight and/or calving ease and/or gestation length when the calf is born.

b) the “Post Birth Management Group” allows breeders to identify animals that have received different treatment or management following birth that has influenced their performance. This treatment may be deliberate (e.g. when some of your young bulls receive supplementary feeding and others do not) or accidental (e.g. if a calf is sick).

Providing BREEDPLAN with management group information is the responsibility of the breeder. By assigning animals into management groups, breeders are acting as “eyes” for the BREEDPLAN evaluation.



Management Groups in Practical Terms

Animals should be assigned into different management groups in any situation when either individually or as a group, they have not had equal opportunity to perform. By assigning animals into management groups, only like treated animals will be grouped together and therefore directly compared in the BREEDPLAN analysis.

Some examples of where animals should be recorded in separate management groups are:

- sickness gives some calves a permanent set back;
- some animals are fed for show or sale;
- grain fed animals versus paddock reared animals;
- some animals being given growth promotants;
- animals reared in different paddocks in which feed is of different nutritional value;
- a bull has been fighting and clearly lost weight prior to recording;
- yearling bulls used as sires compared to those not used as sires;
- different stages of pregnancy for heifers (try to weigh before joining and certainly before two months);
- spayed heifers as compared to non-spayed heifers;
- calves weighed on different scales;
- calves weighed straight from the paddock as compared to those off feed for say three hours or more.

Importantly, if you are in any doubt as to the correct management grouping of your animals, please contact staff at BREEDPLAN.

For further information regarding management groups, please contact staff at BREEDPLAN.



Methods of Submitting Performance to BREEDPLAN

The following document outlines the different methods by which breeders can submit the performance information of their animals to BREEDPLAN.

1. Paper performance recording forms

The most traditional method used by breeders to submit the performance information of their animals is by completing the standard BREEDPLAN paper performance recording forms.

Using this method, breeders will automatically be forwarded pre-printed paper performance recording forms shortly after they have recorded/registered their calves with their relevant Breed Society/Association. Each form will list all calves within the herd for a particular calving year, season & sex. Breeders will then enter the performance information of their animals into the relevant columns by hand and mail the completed form to the BREEDPLAN office at ABRI. The completed form will be processed and a new form forwarded to the breeder for use when recording the next set of performance for their animals.

A different paper performance recording form is available for recording post birth weights, mature cow weights, scanning information & abattoir carcass data. The appropriate form should be used for the type of performance information being collected.

2. BREEDPLAN compatible herd recording computer program

Many of the modern herd recording computer programs have the facility to submit performance electronically to BREEDPLAN. Using this method, breeders simply enter the performance information of their animals into their herd recording program. They can then use the facilities available within the herd recording computer program to export the performance and submit it to BREEDPLAN via either email or disk.

Examples of BREEDPLAN compatible herd recording computer programs that are currently available include Herdmaster / Herd Magic (Saltbush Software), Cattle Plus / StockBook (Practical Systems), and Herdlink / Cattlelink (Herdlink Software).

Please contact your software supplier if you are in any doubt about whether your herd recording computer program is BREEDPLAN compatible and/or if you require any assistance submitting your performance to BREEDPLAN using this method.



3. BREEDPLAN compatible standard Microsoft Excel format

A standard Microsoft Excel format has been developed which enables breeders to submit performance electronically to BREEDPLAN. Using this method, breeders simply enter the performance information of their animals into a standard Microsoft Excel spreadsheet and submit it to BREEDPLAN via either email or disk.

The standard Microsoft Excel format (+ detailed information regarding how to submit data using this method) can be obtained by contacting staff at BREEDPLAN. Please note, BREEDPLAN will not accept the submission of performance via Microsoft Excel if it is not in the correct format.

4. Internet Solutions facility on Breed Society/Association website **

Many of you will be familiar with the “Internet Solutions” services offered by several of the Breed Society/Association’s websites. These services include the ability to submit your calf registrations electronically, search the Society/Association database with member, animal & EBV enquires, and download upcoming sale catalogues, just to name a few. This service also enables the electronic submission of performance to BREEDPLAN.

Using this method, an electronic worksheet will automatically be created shortly after a breeder has recorded/registered their calves with their relevant Breed Society/Association. Each worksheet will contain preloaded information for all calves within the herd for the particular calving year, season & sex. This worksheet will be downloaded into the relevant breeder’s membership area on their Society/Association’s internet system and a notification email forwarded to them. Breeders can then access the prebuilt worksheet, complete the performance information for their calves and submit the worksheet to BREEDPLAN. When the breeder submits the completed worksheet, an email will automatically be sent to their BREEDPLAN processor notifying them that performance has been sent from that herd and is ready for processing.

*** Please note, option 4 is not available for members of all Breed Societies/Associations.*

For more information regarding the different methods available to submit the performance information of your animals, please contact staff at BREEDPLAN.