

## Days to Calving in BREEDPLAN

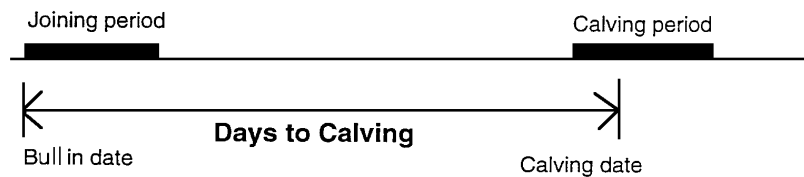
David Johnston

**Days to calving is an important trait** One of the most economically important traits in a beef cattle operation is the ability of a cow to get in calf every year, preferably early in the season. Days to calving is one of the fertility traits available in BREEDPLAN that enables breeders to select for fertility. Days to calving is a genetic indicator of fertility that is easy to measure under paddock mating in a beef herd. The trait is relatively easy to record on a total female inventory system and its value in a breeding program has been shown to be high (see AGBU TECH NOTE 1/1994). In general, days to calving EBVs can be used to identify sires whose daughters are more fertile and tend to calve earlier in the season.

The following note describes recent enhancements in the analysis of days to calving in BREEDPLAN and also some points on what information breeders need to record to ensure high quality data.

**How do we measure days to calving ?** Days to calving is the time interval, in days, between when a cow is first exposed to a bull, under paddock mating, to when she subsequently calves (see Figure 1). Cows or heifers that conceive shortly after they are exposed to the bull will have shorter days to calving records than those that conceive late in the joining period.

Figure 1: Calculation of days to calving



**Days to calving EBV** Estimated breeding values (EBVs) for days to calving are calculated using only paddock joining records. Importantly cows that don't calve are assigned a penalty days to calving record. Up to 6 records for days to calving on an individual cow are used to increase the accuracy of the EBVs. A low or negative days to calving EBV is desirable.

**Resent research Modelling** It is important to identify and account for non-genetic effects that affect days to calving so that genetic differences between animals can be determined. A series of analyses were undertaken to investigate the best way of defining the joining management group and to account for the effects of age and lactation prior to the prediction of EBVs.

The final joining management group definition includes all cows in a herd joined to the same bull in the same year and month. In addition, maiden (one year olds) heifers are grouped separately as are 2 year olds (second calf heifers) which are further split according to their lactation status (wet versus dry). The effects of differences in age and lactation status (in older cows) on days to calving are adjusted.

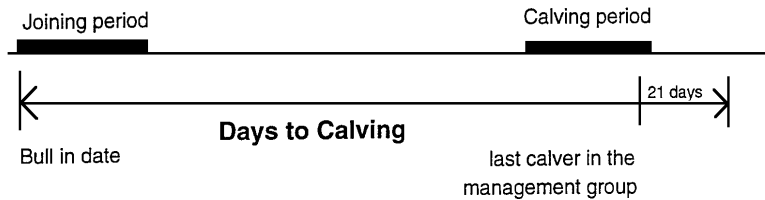
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### Inclusion of non-calvers

What do we do with cows that don't calve? These cows represent potentially the poorer fertility

animals and therefore it is important to include these in a genetic evaluation. To include them requires giving them a penalty days to calving record. In the past BREEDPLAN simply gave all these animals a days to calving record of 380 days. However a better method has now been developed where BREEDPLAN assigns non-calvers a penalty record on an individual joining management group basis (see Figure 2). The new method has more desirable statistical properties and also allows for differences in the length of the joining period between groups.

Figure 2: Calculation of days to calving for non-calvers



### Genetic correlations

The heritability and repeatability of days to calving is 8% and 19%, respectively. These parameters indicate that benefits exist from including several records in the prediction of days to calving EBVs. However it is important that repeat measures are in fact the same trait. Recent AGBU research has shown the genetic correlation between days to calving records from different parities is close to unity. This means that a days to calving record from heifers is the same trait as days to calving at a later parity. This is very important as it means firstly, that days to calving records can be obtained early from maiden heifers and secondly, repeat days to calving records of a cow increase the accuracy of the EBVs.

The genetic correlation between days to calving and calving success (1=calved, 0=didn't calve) is also very high. This is encouraging as it shows that days to calving is a measure of calving success but has the added benefit of being able to distinguish between early and late calvers. The very low heritability of calving success means that culling open cows will make less progress than using days to calving EBVs.

### What makes good data ?

Record all joinings of every cow in your herd, especially maidens (even if joined to another breed). Details listed below are required for each joining event for a cow in a mating season.

(Note: there could be more than one joining event eg. AI followed by mop-up):

- Type of mating: natural, hand, AI or ET.
- Accurate bull-in or AI date and birth dates - *approximates* are no good.
- Identification of the joining sire.
- Correct *disposal* and *transfer* codes - particularly cows culled for infertility eg. PTNIC or didn't calve this is recorded as *culled infertile* even if not sold for slaughter.
- Record cows leaving the inventory eg. those deregistered to commercial herd.

### Other considerations

- It is important for breeders to also measure scrotal circumferences on all yearling bulls. This provides data for culling and will also contribute to the accuracy of days to calving EBVs.
- Selection for increased fertility in your herd will be relatively slow however with repeat calvings the benefits will be cumulative over time.
- Accuracy's on the days to calving EBVs will be low until a large number of daughters have records.
- Other fertility tests (eg. serving capacity) can be important to lift your phenotypic calving rate.