



DAIRY HERD FERTILITY
CHALLENGE NOTE 1D - Conception Rate

Achieving a high conception rate to both artificial insemination (AI) and natural service is a key requirement of a successful breeding programme and overall herd fertility performance. Recent evidence has indicated that only 40% of cows produce a calf following insemination, representing considerable reproductive and financial loss to the dairy industry, though conception rates between herds vary from around 20% to 65%. The aim of this Challenge Note is to identify ways to assess the conception rate of your herd throughout the breeding season so that prompt action can be taken to rectify the situation if it falls below target.

Contents

- What is conception rate?
- How can conception rate be measured?
- Factors affecting conception rate
- How do I measure the conception rate of my herd?
- Target conception rates

What is Conception Rate?

Conception rate is the number of cows that become pregnant as a proportion of the total number of services. The calculation must include all cows that are served including those that are sold for failure to become pregnant (that is culled not in-calf). It must also include inseminations in cows culled for other reasons (for example, lameness, mastitis, etc) together with an indication of pregnancy status based on either non-return or pregnancy diagnosis.

$$\text{Conception Rate (\%)} = \frac{\text{No. pregnant cows} \times 100}{\text{Total No. of Services}}$$

How can Conception Rate be Measured?

Conception rate (CR) can be measured using various methods as the breeding season progresses, although the accuracy varies with both method and time. The methods used to assess conception rate are:

1) Non-return Rate

The absence of repeats (or non-returns) for a period equivalent to approximately three cycles or 60 days is an indicator of pregnancy. The 60-day non-return rate can therefore be used to give an early indication of conception rate as the breeding season progresses. However, the main disadvantage is that missed heats in non-pregnant cows give an over-estimate of the number of pregnant cows. Further details on how to calculate the non-return rate for your herd are given later in this Challenge Note.

$$\text{CR\%} = \frac{\text{No. of non-returns} \times 100}{\text{No. cows} > 60 \text{ days since last service}}$$

2) Pregnancy Rate

Pregnancy diagnosis can be conducted with reasonable accuracy by ultrasound scanning approximately 30 days after service, or by rectal palpation approximately 40 days after service (see Challenge Note 4H: **Pregnancy Diagnosis**). Regular scanning of eligible cows, for example, at 6-8 week intervals from 10-12 weeks into the breeding season, allows non-pregnant cows to be identified quickly, allowing appropriate action to be taken. This also presents an opportunity for apparently non-cycling/problem cows to be examined by the veterinary practitioner.

$$CR (\%) = \frac{\text{No. of cows with +ve prg diag} \times 100}{\text{Total No. of Services}}$$

3) Calving Rate

The most accurate assessment of conception rate can only be calculated when all cows have subsequently calved, with the assessment also taking account of services in cows subsequently culled, for whatever reason. This assessment of conception rate can account for non-recorded services (for

example, by the bull at the end of the breeding season), but the main disadvantage is that in most herds it will take approximately 18 months from the initial calving to calculate due to the spread of calving – too late for any appropriate action to be taken!

$$CR (\%) = \frac{\text{No. of cows with subsequent calving} \times 100}{\text{Total No. of Services (including culls)}}$$

Factors Affecting Conception Rate

There is a wide range of factors affecting conception rate in dairy herds including:

- Poor A.I. technique and semen handling (see Challenge Note 6a: **Insemination Management**);
- Uterine infection (endometritis) and serving too soon after calving (see Challenge Note 4e: **Conception Failure and Embryonic Death**);
- Under-nutrition, where the energy demand for milk production exceeds intake, causing excessive negative energy balance and body condition loss (Challenge

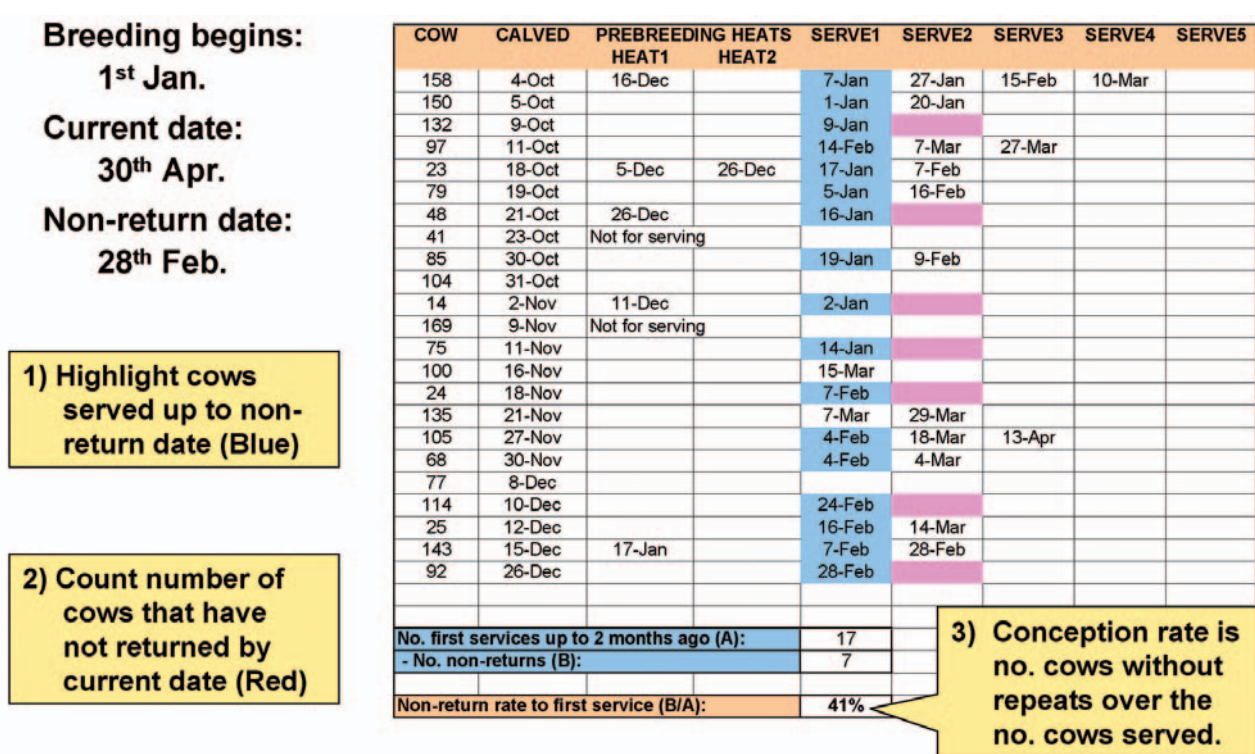


Figure 1: Example of how to calculate non-return rate from a paper-based herd-recording system. Assuming that the current date is 30 April, non-return rate is the proportion of cows served more than two calendar months (that is, served before 28 February).

Note 3C: Body Condition Score and Fertility in Dairy Cows) Recent research results from the dairy herd fertility study conducted by the Agricultural Research Institute at Hillsborough have shown that each 1000 litre increase in 305-day yield, decreases the conception rate to first service by almost 14%.

How to I Measure the Conception Rate of my Herd?

Regular fertility visits by your veterinary practitioner are recommended and pregnancy diagnosis is a key element of this. In the absence of pregnancy diagnosis, an estimate of the conception rate in your herd can be calculated by non-return rate using well laid out herd records such as those developed for the Dairy Herd Fertility Challenge. An example of how to do this is shown in Figure 1.

Target Conception Rates

While results from ARINI’s 19-herd fertility study found an average calving rate to first insemination of 40%, the average calving rate to first insemination in the top five herds was 55%, which could be considered as an appropriate target for most Northern Ireland dairy farmers.

Table 1: Target conception rates for the various methods of assessment

	Mean	Target
Non-return rate	50%	65%
Pregnancy rate	45%	60%
Calving rate	40%	55%

Calving rate gives the lowest but most accurate assessment of conception rate, so target conception rates based on the other methods must be higher as shown in Table 1. It is possible to achieve a high submission rate and reach the target set for your type of herd by using a high voluntary waiting period in your calculation (for example, 70 days or more). While this approach may give the impression of achieving targets, it can be detrimental to overall fertility performance as measured by 100-day In-Calf Rate or 400-day Re-appearance Rate (see Challenge Note 1B: **Evaluating Fertility Performance**).

Table 2: Target submission rates for each three-week period in dairy herds with varying calving patterns.

Calving pattern	Target submission rate
Seasonal calving	85% in each 3-week period
Spread calving	80% in each 3-week period
Year-round	75% in each 3-week period

Summary

- Submission rate is the proportion of cows eligible for service and intended for rebreeding that have been seen on heat and served within a given period of time.
- Having a high submission rate is a key element of good fertility performance.
- Good heat detection and service of cows seen on heat is required to achieve a high submission rate.
- The submission rate of your herd can be calculated using a good paper-based herd recording system throughout the breeding season.
- Before calculation, you need to establish your voluntary waiting period and the start date of your breeding season.
- Submission rate is measured in three week periods and can be monitored throughout the entire breeding season.
- Target submission rates vary with calving pattern.