New insights into categorising the status of milking cows on a dairy farm

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Introduction

Advisers are always seeking different, simpler ways to better understand the constraints of farm performance, especially on smallholder farms in developing countries. The following describes a very simple process of categorising milking cows on a dairy farm, large or small, to better understand two major measures of their performance, namely *the duration of their lactation and the length of their calving to conception interval.*

There are various ways to categorise milking cows on a dairy farm. Variables such as daily milk yield (for example, less than 8, 8 to 12, 12 to 16, more than 16 kg/cow/day) and stage of lactation (early, mid, late or non-lactating) are the most common categories used on all farms. There are other ways of categorising cows, which are just as easy and even more informative. This article describes two production characteristics of a herd and then explains what they can tell us about the feeding and herd management on any farm. These are lactation length and pregnancy status.

Categorising the milking herd

Adult cows are either lactating (wet) or non-lactating (dry). In the process of their full lactation they are either non-pregnant or pregnant. Pregnancy status is best determined through pregnancy diagnosis (that is an internal examination of the uterus by an experienced technician or veterinarian) but can also be ascertained by "return to service" (that is whether the cow cycles in about 21 days since she was last inseminated or serviced by a bull).

Each cow can be categorised as follows:

1. Wet and non-pregnant (W/NP) when the cow calves down and before she conceives, usually some time during early lactation.
2. Wet and pregnant (W/P), following conception and up to when the cow is dried off (either naturally or through management).
3. Dry and pregnant (D/P), between drying off and calving down; this determines the minimal length of the dry period.
4. Dry and non-pregnant (D/NP), which should not occur but unfortunately often does.

Using a range of typical scenarios on any tropical dairy farm, the following tables provide data on the minimal length of the dry period and the proportion of cows (including first calf heifers) in each category. The D/NP category is not included in this table because on any well managed farm, all cows should successfully conceive some time during their lactation. If not, they should be culled. It is assumed that the gestation period is 280 days in length. The calving interval can be as low as 360 days, but is typically more like 400 days on most well-managed farms irrespective of environment. The following tables are for year round calving herds where the data represents the proportion of the herd in any one status on any one day during the year.

These scenarios for herd averages listed in Tables 1 and 2 are for:

- Days from calving to conception; which is assumed to occur on average either at 90, 120 or 150 days into lactation
- Lactation length: this is assumed to range from 240 days to 330 days in monthly steps (of 30 days for each month)

Table 1 The influence of days from calving to conception and lactation length on the calving interval and on the length of the dry period

Lactation	Status	Calving to conception (days)		
length (days)	(% herd)	90	120	150
330	W/NP W/P D/P	24 65 11	30 52 18	35 42 23
300	W/NP W/P D\P	24 57 19	30 45 25	35 35 30
270	W/NP W/P D/P	24 49 27	30 37 33	35 28 37
240	W/NP W/P D/P	24 41 35	30 30 40	35 21 44

It is recommended that cows are dried off at least 60 days prior to parturition to allow the udder to fully recuperate in preparation for the next lactation. Therefore the dry period in cows conceiving within 90 days of calving and milking for 330 days would be too short. Cows in this category should ideally be dried off after 310 days milking. From Table 1, with calving intervals ranging from 370 to 430 days (or 12.3 to 14.3 months), the associated dry periods range from 40 to 190 days. Clearly, the earlier that cows conceive after calving, the greater proportion of time that they are pregnant during lactation, the greater will be their income from milk production.

Table 2 The influence of days from calving to conception and lactation length on the percentage of milking cows in the herd in one of three cow categories, namely wet/non-pregnant (W/NP), wet/pregnant (W/P) or dry/pregnant (D/P).

Lactation length (days)	Calving to conception (days)		
	90	120	150
	Calving interval (days)		
	370	400	430
	Dry period (days)		
330	40	70	100
300	70	100	130
270	100	130	160
240	130	160	190

There are no substantial additional feed costs of pregnancy to milking cows if they are non-pregnant or are in their first five months (150 days) of pregnancy. So the occurrence of early pregnancy is unlikely to adversely impact on the cow's milk yields and/or feed efficiency until the last few months of pregnancy, when the foetus is actively growing. This generally occurs after the animals have been dried off in preparation for their next lactation.

The important numbers in Table 2 are then the percentages of cows in the herd that are dry and pregnant because this is the period (once lactation ceases) they must go through to grow the calf *in utero* while not producing a commercial income. Cows conceiving earlier after calving and milking for longer, can comprise less than 20% of the herd. However if conceptions are delayed and/or the duration of lactation is truncated, this number can exceed 40%.

Addressing the problems of delayed conception and early drying off

To address these problems of delayed conception and early drying off, close attention to feeding management is of the utmost importance. This is essential firstly, so cows can minimise the period in which they are in negative energy balance and therefore losing live weight. Once this phase has passed, metabolic signals direct the brain to allow the ovaries to start cycling, resulting in successful ovulations and consequently viable conceptions. Secondly, it is also necessary to provide a consistent supply

of nutrients to sustain milk yields at commercial levels for as long as possible. Failure to do so will result in shorter lactations and longer dry periods in the herd. This means a reduction in financial returns for the farmer.

This is particularly relevant to many tropical smallholder dairy systems as the genetic merit of their cows is rapidly improving as a result of improved dairy genes either through the use of imported semen and/or live animals. Unfortunately, associated with this is an increasing occurrence of repeat breeding as well as short lactations arising from an inadequate knowledge of dietary energy and protein requirements for these potentially highly productive animals.

Dealing with dry/non-pregnant cows

Table 2 does not deal with the fourth category in milking herds, namely the D/NP cows. These cows will be non-productive for many months and will cost money every day for at least the next 280 days. If their poor condition is nutritionally induced, without any change in feeding management, it is likely that they will not generate any milk income until well beyond 280 days.   If the condition is due to poor animal health, then the cows will need to be examined and a diagnosis made and treatment prescribed. A decision will also have to be made as to whether such animals should remain in the herd or be sold as non-productive cull cows.

Conclusion

In summary, dairy cows within any herd of any size can be easily identified as W/NP, W/P, D/P or D/NP to provide an additional tool with which to approach improved feeding and herd management. All it requires is a good set of eyes, keeping good records, a calculator and a note book. Over time, as we collect additional data, we will be able to provide more definite herd management guidelines, such as threshold percentages of D/P and D/NP (ideally zero) when immediate action is required. In addition, with further data collection it will be possible to put monetary values on these percentages for the likely financial returns arising from investing in the required improved feeding and herd management decisions.