

The Effect of Estimated Breeding Dates on the Length of the Dry Period in Dairy Cows

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Introduction

Pregnancy examinations by transrectal palpation are an integral part of the management of most dairy herds. In herds utilizing artificial insemination (AI) the primary purpose is to determine which cows are not pregnant as early as possible so that increased effort can be directed towards detecting an estrus and rebreeding. However, in herds where a bull or bulls are with the cows continuously, and few or no breeding dates are recorded, pregnancy examinations are for the purpose of identification of non pregnant cows and breeding dates for pregnant cows. From the estimated breeding dates, expected parturition and dry off dates can be determined.

A dry period between lactations is necessary to maximize milk production. The length of the dry period necessary to maximize daily milk production depends on the age of the cow, calving interval, and daily milk on the 100th day before the calving which followed the dry period.¹ Fifty-one to 60 days² and 51 to 70 days³ have been recommended as the optimum number of days dry for maximum subsequent milk yield. Another author states that dry periods of less than 40 and more than 90 days are detrimental to the next lactation.⁴ The DRY COW PROFILE in the DHI herd summary is divided into: number dry fewer than 40 days, number dry 40-70 days, and number dry over 70 days. A dry period of 50-60 days is a rather universal recommendation and one that dairymen try to achieve for most cows. While dry periods of 50-60 days will maximize production in the next lactation, dry periods of 40-70 days are considered acceptable and will not significantly jeopardize production. Dry periods less than (<) 40 days or greater than (>) 70 days may affect profitability in some cows.

In bull bred herds, the two factors that will determine the length of the dry period, provided cows are dried off about 60 days prior to their projected due dates, are the estimated breeding date and the length of gestation. Estimated breeding dates are most accurate

when pregnancies are determined between 35 and 75 days of gestation. While average gestation length for Holsteins is usually listed as 279 days there is considerable variation both above and below the average. There are also breed differences, most notably Brown Swiss which have a gestation about 10 days longer than Holsteins. Therefore, if the breeding date is estimated accurately, the gestation is 279 days, and the cow dried off 60 days prior to her due date, the ideal dry period should be achieved.

Since estimating breeding dates in bull bred herds is for the purpose of determining dry off dates, data were accumulated from two bull bred herds and compared to data from four herds with known AI breeding dates. The goal was to compare the percentage of dry periods between the two groups that were: 50-60 days, 40-70 days, < 40 days, and > 70 days.

Materials and Methods

For known AI breeding dates (KBD) and gestation lengths, the breeding histories of 1,109 Holstein cows in four herds were utilized. Only the births of single calves were to be included. From the breeding date the projected due date was determined using a 279 day gestation table. The difference in days between the actual calving date and projected due date was recorded. Assuming cows were dried off 60 days before their projected due date, the actual lengths of the dry periods were determined from their calving dates.

Two bull bred Holstein herds (100 cows and 60 cows) were utilized for the estimated breeding dates (EBD). Both herds were housed in free stalls, kept in dry lots, and exposed to a bull or bulls continuously. In the larger herd, pregnancy examinations were done monthly and in the smaller herd, every six weeks. Cows were not observed for estrual activity so breeding dates were not recorded. Cows 60 days or greater postpartum were examined at each visit until they were determined to be pregnant. Amniotic vesicle (AV) size between 35

and 65 days of gestation and head size, if palpable, to 75 days were utilized as determinants of stage of gestation. The stage was recorded in increments of five, i.e., 35, 40, 45 days, etc. From the number of days pregnant an EBD was recorded. As with the KBD a due date (279 day gestation) was calculated, the actual calving date recorded, and the difference determined. Likewise, the actual length of the dry period (assuming cows were dried off 60 days prepartum) was determined from the calving date.

Results

Using the 279 day gestation table for calculating due dates for the 1,109 cows with KBD, the range in gestation length determined from actual calving dates was 265 to 296 days. The actual average length of gestation of the 1,109 cows calculated from calving dates was 283 days. For the 569 cows with EBD the range in gestation length calculated from actual calving dates was 261 to 299 days.

Since the average gestation for the KBD group was 283 rather than 279 days, dry periods were calculated for both gestation lengths. All calculations were made with the assumption that cows were dried off 60 days before their projected due date. Assuming a 279 day gestation the percentage of dry periods < 40 days, 40-49 days, 50-60 days, 61-70 days, and >70 days were 0, 1, 38, 57, and 4, respectively. With a 283 day gestation, percentages for the same categories were 0, 6, 68, 26, and <1, respectively (Table 1). Likewise, for cows with EBD and using the 279 day average gestation, the percentages were 0, 5, 44, 45, and 6, and for the 283 day gestation: 1, 12, 60, 27, and <1, respectively (Table 2).

Table 1. Percentage of Cows with KBD Within Specific Dry Periods for a Projected Gestation of 279 days and Actual Gestation of 283 Days.

Gestation (Days)	Percentage in Dry Periods Days				
	<40	40-49	50-60	61-70	>70
279	0	1	38	57	4
283	0	6	68	26	<1

Table 2. Percentage of Cows with EBD Within Specific Dry Periods for a Projected Gestation of 279 Days and Actual Gestation of 283 Days.

Gestation (Days)	Percentage in Dry Periods Days				
	<40	40-49	50-60	61-70	>70
279	0	5	44	45	6
283	1	12	60	27	<1

For the purpose of comparison between KBD and EBD, percentages of cows having dry periods of 50 - 60, 40 - 70, and <40 and >70 days combined were used. When gestation length was calculated based on 279 days, the percentages of dry periods falling in the above categories for KBD were 38, 96, and 4 and for EBD: 44, 94, and 6, respectively (Table 3). When based on 283 days, for KBD the percentages were 68, 99, and <1 and for EBD: 60, 98, and 2, respectively (Table 4).

Table 3. Comparison of the Percentage of Cows with KBD and EBD Within Specific Dry Periods for a Projected Gestation of 279 Days.

Breeding History	Percentage in Dry Periods Days		
	50-60*	40-70	<40 and >70 (combined)
KBD	38	96	4
EBD	44	94	6

* Significant (P <0.025)

Table 4. Comparison of the Percentage of Cows with KBD and EBD Within Specific Dry Periods for an Actual Gestation of 283 Days.

Breeding History	Percentage in Dry Periods Days		
	50-60*	40-70	<40 and >70 (combined)
KBD	68	99	<1
EBD	60	98	2

*Significant (P <0.005)

Discussion

In bull bred herds with no recorded breeding dates, dry off dates are dependent on EBD by transrectal palpation in the majority of cases. While ultrasonography is an accurate means of determining the stage of pregnancy, it is rarely used at the present time.

Estimated breeding dates are most accurate when pregnancies are determined between 35 and 75 days. AV length between 35 and 65 days and head size after 65 to 70 days are the most accurate determinants of the stage of pregnancy. Guidelines for measuring the AV size and crown-nose length of the head by finger widths have been established.⁵ Given the above window of the gestation period, the accuracy of estimating breeding dates is often within a few days. In one study, estimation of the duration of pregnancy by palpation of the AV or fetal head in two groups of cows (36-77 and 40-79

days duration) resulted in an average miss and range in days of 3.2 and 0-12 and 2.3 and 0-12, respectively.⁵ Doing estimations early is important as errors become increasingly greater as gestation advances.

The average length of gestation for Holstein cows bearing single calves is reported as 278⁶, 282⁷, and 285⁸ days. Two surveys reported ranges of 271-300⁸ and 270-289⁶ days for normal singles. While a 279 day gestation table was used to calculate gestation lengths for this study, the actual average gestation was 283 days with a range of 265 to 296 days. While twin births were purposely not included in the data, it is possible that they were not always recorded by the dairyman so were included in the data and could account for short gestations.

With such a wide range in gestation length, the EBD could be exact but would not be apparent from the actual calving date. It is obvious that the accuracy of the EBD and the gestation length can have a significant effect on the length of the dry period. However, while the goal of most dairymen is to dry cows off about 60 days prior to their due date, intentional management decisions or management errors may alter the dry off time. Drying cows off in groups, long calving to conception interval, low milk production, poor record keeping, lack of pregnancy examinations, and failure to differentiate breeding dates are all factors which may alter the length of dry periods. In fact, the DRY COW PROFILE in the DHI herd summary of the average for all Indiana herds shows 15% dry < 40 days, 62% dry 40-70 days, and 23% dry > 70 days. From this data it is apparent that a significant percentage of cows are dried off earlier or later, for whatever reasons, than is desirable.

The wider spread, 38 versus 31 days, in actual gestation lengths for EBD would indicate there were some inaccuracies in aging pregnancies by transrectal palpation. Assuming cows were dried off 60 days before their

projected due date and using a 279 day gestation, a comparison of KBD and EBD revealed no significant differences in percentages of cows having dry periods of 40 - 70 or <40 and >70 days, but there was a significantly ($P < 0.025$) greater percentage of dry periods of 50 - 60 days in the EBD group (Table 3). When using a 283 day gestation, there were no significant differences between groups having dry periods of 40 - 70 or <40 and >70 days; however, there was a significantly ($p < 0.005$) higher percentage of dry periods of 50 - 60 days in the KBD group (Table 4).

It can be concluded from these data that if pregnancy examinations are performed early in gestation (35 to 75 days), EBD will be reasonably accurate and have no significant effect on the percentage of cows having dry periods of 40 - 70 or <40 and >70 days. However, the gestation table (279 or 283 days) utilized to figure projected due dates and EBD can both have an effect on the percentage of cows having dry periods of 50 - 60 days.

References

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