Monitoring Reproduction From the Starting Gate

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Introduction

Aggressive reproductive management comprises three strategies that can be implemented early during the breeding period of lactating dairy cows: 1) submit all cows for first postpartum AI service at the end of the voluntary waiting period, 2) identify nonpregnant cows early post-AI, and 3) quickly return cows failing to conceive to first AI service to second AI service. Although many dairy producers rely on estrus detection to inseminate cows, less than 50% of all estrus periods are accurately detected on an average dairy farm in the United States (Senger, 1994). This inefficiency in estrus detection can increase the average interval between AI services to 40 to 50 days (Stevenson and Call, 1983) and limits both reproductive efficiency and profitability. New tools for managing reproduction can be used to improve reproductive efficiency within a dairy herd. Use of hormonal synchronization systems that allow for fixed-time AI ensures that all cows receive AI at or near the end of the voluntary waiting period. New strategies also are being developed to identify nonpregnant cows early after they receive first AI service. Systems for aggressively returning cows that fail to conceive to first AI service currently are being tested and developed.

First AI Service: To Synch or not to Synch - That is the Question

It is a fundamental principle of reproductive biology that artificially inseminating a cow is the first step toward establishing a pregnancy. Unfortunately, many cows do not receive their first postpartum AI service until after 100 days in milk. First postpartum AI service represents a unique opportunity for reproductive management of lactating dairy cows because all cows in the herd have a known pregnancy status at this time (e.g., nonpregnant), which allows for use of hormonal synchronization systems that use $PGF_{2\_}$ without the risk of aborting a previously established pregnancy. Furthermore, reducing the interval from calving until first AI service for all cows in the herd has a profound effect on reproductive efficiency. The interval that must elapse from calving until a cow is eligible to receive her first AI service is termed the Voluntary Waiting Period (VWP). As the name implies, the duration of this interval is voluntary (i.e., a management decision) and traditionally varies from 40 to 70 days on most dairies.

To illustrate the advantages of programming cows to receive first AI service, we will compare reproductive data from two dairy farms in Wisconsin that employ two different strategies to initiate first postpartum AI service (Figure 1). For both graphs, days in milk (DIM) at first breeding is plotted on the vertical axis (y-axis) and time is plotted on the horizontal axis (x-axis). Each square represents an observation, or a cow within the herd, and a bold line has been drawn horizontally at 100 DIM. In both plots, cows receiving first AI service before 100 DIM fall below the bold line, whereas cows receiving first AI service after 100 DIM fall above the bold line. The upper plot in Figure 1 shows the pattern of cows receiving first AI service for cows in a herd managed using visual detection of estrus for first postpartum AI service, whereas the lower plot shows the pattern of cows receiving first AI service for cows managed in a herd that uses Presynch (a hormonal synchronization system described in the next section) and timed artificial insemination for first postpartum AI service.

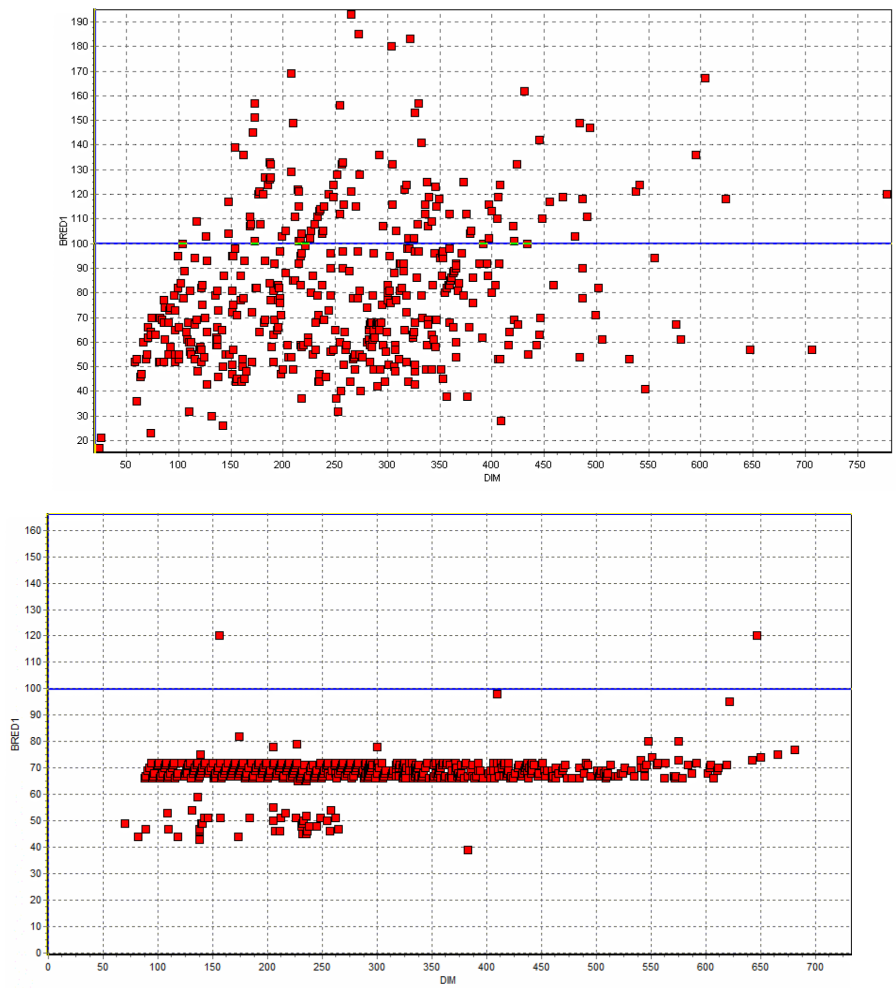

Figure 1. Days in milk at first breeding (y-axis) by time (x-axis) for cows managed using visual detection of estrus for first postpartum AI service (upper panel) and cows managed using Presynch and timed artificial insemination for first postpartum AI service (lower panel).

Nearly one-third of the cows in the herd shown in the upper panel of Figure 1 exceed 100 DIM before first AI service. It should be obvious that none of these cows has a chance of becoming pregnant before 100 DIM because they have not yet been inseminated. Although most dairy producers identify a set duration for the VWP, breeding decisions for individual cows often occur before the VWP elapses. The VWP for the farm illustrated in the upper panel of Figure 1 is 50 DIM; however, many cows are submitted for AI before this time. The decision to AI a cow for the first time postpartum is determined based on when (or if) a cow is detected in estrus rather than on a predetermined management decision. In such instances, the cow is managing the decision to breed rather than the dairy manager. The decision to inseminate a cow before the VWP elapses is motivated by one factor, and that factor is fear. Most producers fear the decision to not breed a cow detected in estrus because she may not be detected in estrus again until much later in lactation. Unfortunately, this risk is often realized on dairies that rely on visual estrus detection for AI because of poor estrus detection by dairy personnel and poor estrus expression by lactating dairy cows. We recently have shown that nearly one-third of lactating cows were not cycling by 60 DIM (Pursley et al., 2001).

If the upper graph reflects the reproductive performance to first AI on your farm, you should consider using a controlled breeding program to initiate first postpartum AI service. Use of a controlled breeding program such as Presynch for initiating first AI service exposes all cows in the herd to the risk of becoming pregnant at or very near the end of the VWP. In the lower panel of Figure 1, nearly all cows receive their first postpartum AI service between 65 and 73 DIM. In this scenario, the end of the VWP is roughly equal to the average day at first service for the entire herd. Of course, not all cows will conceive to first service; conception rates in lactating dairy cows are poor, and hormonal breeding programs increase pregnancy rate by increasing service rate, not conception rate. Figure 1 illustrates two extremes with regard to initiating first postpartum AI service. Many farms have adopted blended approaches in which cows receive AI to a standing estrus for a period of time after the VWP. Any cows not receiving AI by a predetermined DIM are enrolled into a controlled breeding protocol to receive a fixed-time AI service.

Ovsynch, Pre-Synch, Co-Synch, the Kitchen-Synch: Hormonal Protocols for Timed AI

A variety of new timed insemination protocols have been introduced to the dairy industry since the introduction of Ovsynch in the mid 1990's. The variety of modifications of the original Ovsynch protocol has lead to much confusion among dairy producers and their reproductive consultants regarding the "best" timed insemination protocol to implement on a dairy. Three widely used timed insemination protocols include Ovsynch, Presynch, and Cosynch. The benefits and of each of these protocols are overviewed below.

Ovsynch

Reproductive physiologists had long searched to develop a synchronization program that could overcome the problems and limitations associated with visual estrus detection. Such a program was developed at the University of Wisconsin-Madison in 1995 (Pursley et al., 1995) and is now commonly referred to as Ovsynch. Ovsynch, synchronizes follicular development, luteal regression, and time of ovulation, thereby allowing for TAI after the second GnRH injection and improving the AI service rate (Pursley et al., 1995). Ovulation of a dominant follicle in response to the second GnRH injection occurs in around 85% of high producing lactating cows receiving this protocol (Fricke et al., 1998), and ovulation occurs within 24 to 32 h after the second GnRH injection in synchronized cows followed by growth of a new follicular wave (Pursley et al., 1995). Using a 50 _g dose (1.0 ml) of Cystorelin for each injection of the Ovsynch protocol results in similar synchronization and conception rates as using a 100 _g dose (2.0 ml) of Cystorelin (Fricke et al., 1998). Although a reduced dose of Cystorelin has been shown to be effective, the labeled dose of $PGF_{2\_}$ should be used for all TAI protocols.

Many studies have shown Ovsynch to be a highly effective and economical strategy for improving reproductive performance in high-producing lactating dairy cows (Burke et al., 1996; Pursley et al., 1997a, b; Britt and Gaska, 1998). The first studies comparing use of Ovsynch in which conception rates of lactating dairy cows managed in confinement-based dairies receiving Ovsynch were similar to that of cows receiving AI after a standing estrus (Pursley et al., 1997a,b). However, several subsequent studies have reported that Ovsynch results in lower conception rates compared with AI after estrus (Jobst et al., 2000; Stevenson et al., 1999). In addition, the effectiveness of Ovsynch for breeding lactating dairy cow managed in grazing-based dairies remains equivocal (Cordoba and Fricke, 2001, 2002). Factors explaining the variation in conception rate to TAI among herds are unknown at this time but may include the proportion of anovular cows in the herd, the follicular dynamics of individual cows within the herds, or the ability of farm personnel to implement Ovsynch in their herds.

Presynch

Results from Vasconcelos et al. (1999) using lactating dairy cows, and those of Moreira et al. (2000a) using dairy heifers suggested that initiation of Ovsynch between days 5 to 12 of the estrous cycle may result in improved conception rate over the original Ovsynch protocol. Hormonal pesynchronization of cows to group randomly cycling cows to initiate Ovsynch between days 5 to 12 of the estrous cycle can be accomplished using two injections of PGF_2_ administered 14 days apart before initiation of the first GnRH injection of Ovsynch. A presynchronization strategy in which two injections of PGF_2_ administered 14 d apart preceded initiation of Ovsynch by 12 d has shown to improve conception rate in lactating dairy cows compared to Ovsynch (Moriera et al., 2000c). Lactating dairy cows were randomly assigned to receive Ovsynch (n=262) or Presynch (n=264) for their first postpartum TAI, which was conducted 16 h after the second GnRH injection. The first and second PGF_2_ injections for Presynch cows were administered at 37 and 51 days in milk, respectively, and all cows received a TAI at 73 days in milk. Conception rate increased from 29% for Ovsynch to 43% for Presynch cows. Thus, use of Presynch for programming lactating dairy cows to receive their first postpartum TAI can improve first service conception rate in a dairy herd.

A common question regarding the original Presynch data from Moriera et al. (2000c) pertains to the importance of the 12-day interval between the second PGF_2_ injection and the first GnRH injection. If this interval could be extended to 14 rather than 12 days, the first four injections could be scheduled to occur on the same day during successive weeks. This becomes important for compliance on dairy farms that assign groups of cows to initiate the protocol weekly so that injection schedules do not get confused among the groups. To determine if two injections of PGF_2_ 14 d apart administered 14 d before initiation of Ovsynch, would change follicular dynamics, ovulation rate, and conception rate in lactating dairy cows (Navanukraw et al., 2002), nonpregnant lactating Holstein cows (n=257) >60 DIM were blocked by parity and were randomly assigned to each of two groups. Cows in the first group (Ovsynch, n=128) received 50 _g GnRH (d -10); 25 mg PGF_2_ (d -3) and 50 _g GnRH (d -1) beginning at a random stage of the estrous cycle. Cows in the second group (Presynch, n=129) received Ovsynch but with the addition of PGF_2_ (25 mg) injections on d -38 and -24. All cows received TAI (d 0) 18 h after the second GnRH injection. Although the proportion of cows ovulating after the first and second GnRH injections did not differ statistically between treatments (41.1 and 69.6 vs. 35.9 and 81.1% for Ovsynch vs. Presynch, respectively; P=0.58 and 0.17, Chi-square test), conception rate was greater (P<0.08) for cows receiving Presynch vs. Ovsynch (48.1 vs. 37.5%). These data support use of this modified Presynch protocol to increase conception rate of lactating dairy cows receiving TAI, and most dairies using Presynch have incorporated this modified protocol.

Cosynch

The term Cosynch has been used for a specific modification of Ovsynch or Presynch in which cows receive TAI immediately after administration of the second GnRH injection. Use of Cosynch allows dairy managers to restrain cows for treatment purposes one less time compared to the original Ovsynch protocol, but more important, allows for all cow-handlings to occur at the same time each day. Although this may be advantageous from a management standpoint, optimal conception rates are not achieved using Cosynch (Pursley et al., 1998). Thus dairy farmers should be aware of data that has assessed conception rates at various times in relation to the second GnRH injection of the Ovsynch protocol shown in Table 1 before making a management decision to implement Cosynch.

To assess the optimal time of AI in relation to synchronized ovulation, lactating dairy cows (n = 733) from Wisconsin dairy herds with 22,000 to 26,000 pound rolling herd averages were randomly assigned to five groups by stage of lactation and parity (Pursley et al., 1998). Ovulation was synchronized using Ovsynch, and cows received AI at 0, 8, 16, 24, or 32 hours after the second injection of GnRH. In this study, the 0 h group is equivalent to the Cosynch protocol. As determined in a preliminary study, all cows ovulate 24 to 32 hours after the second GnRH injection. Injection times were varied so that all cows were inseminated at the same time, and the inseminators were blind to treatment group. Pregnancy status was determined 25 to 35 days after AI for all groups by using transrectal ultrasonography. Conception rate and calving rate was greater (P<0.05) for cows in the 0, 8, 16, and 24-hour groups compared with the 32-hour group (Table 2). Pregnancy loss was less (P<0.05) for the 0 hour group compared with all other groups, and there was a tendency for greater pregnancy loss in the 32-hour group (P<0.1; Table 1). Thus, although no statistical difference in conception rate occurs when breeding from 0 to 24 hours after the second GnRH injection, breeding too late (i.e., at 32 hours) decreases conception rate.

Table 1. Reproductive measures in lactating dairy cows inseminated at various times in relation to ovulation synchronized with an injection of GnRH (Adapted from Purlsey et al., 1998). In this experiment, the 0 hour group is equivalent to Cosynch.

	Hours from second GnRH injection to TAI					
Item	0	8	16	24	32	Total
n	149	148	149	143	143	732
Conception rate (%)	37	41	45	41	32**	39
Pregnancy loss (%)	9**	21	21	21	32	22
Calving rate (%)	31	31	33	29	20*	29

*Differs within a row (P<0.05).
**Differs within a row (P<0.10).

New Methods for Answering the Age-Old Question: Is She "Open"?

Early identification of nonpregnant cows post breeding improves reproductive efficiency and pregnancy rate in cattle by decreasing the interval between AI services and increasing AI service rate. New technologies to identify nonpregnant animals early post AI may play a key role in a reproductive management strategy to rapidly return these animals to AI service. Some tools that have recently become available include the ECF test and use of transrectal ultrasonography.

The Early Conception Factor (ECF) Test

Recently, a new early pregnancy test has become commercially available for use in cattle. The Early Conception Factor (ECF) test (Concepto Diagnostics, Knoxville, TN) reportedly detects a pregnancy-associated glycoprotein within 48 h of conception. Early pregnancy factor (EPF) was first identified in pregnant mice (Morton et al., 1987) and later in sheep and cattle (Nancarrow et al., 1981) by using the rosette inhibition test. Two studies have compared results from the ECF test conducted between Days 3 to 7 and Days 11 to 15 post-AI to pregnancy diagnosis using palpation per rectum and ultrasound ranging from 25 to 60 post-AI (Adams and Jardon, 1999; Des Côteaux et al., 2000). One concern with these assessments is that animals with viable embryos during early pregnancy that subsequently undergo embryonic loss before pregnancy diagnosis using palpation per rectum or transrectal ultrasonography increase the rate of false positive results and bias the assessment. The fertilization rate after AI in beef cows is 90%, whereas embryonic survival rate is 93% by Day 8 and only 56% by Day 12 post AI (Diskin and Sreenan, 1980). Similarly, only 48% of embryos recovered from dairy cows on Day 7 after AI were classified as normal (Weibold, 1988). Thus, substantial pregnancy loss likely occurred before the establishment of pregnancy status using rectal palpation or transrectal ultrasonography in these studies.

To preclude this possibility, noninseminated Holstein cows (n=9) and heifers (n=8) were evaluated as an unequivocal source of nonpregnant animals, and Holstein cows (n=17) and heifers (n=1) inseminated at estrus and in which at least one embryo of transferable quality was recovered at a nonsurgical flush 6 d after artificial insemination were evaluated as an unequivocal source of pregnant animals (Cordoba et al., 2001). Blood samples were collected from all animals 6 d after estrus, which was immediately before embryo collection in pregnant animals. Each serum sample was evaluated using two ECF test cassettes (Test 1 and 2), and the result of each test cassette was interpreted by two independent readers (Reader 1 and 2). Results are shown in Table 2. Test sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were 86%, 4%, 49%, 23%, and 46%, respectively. Although the observed agreement between readers (91% for Test 1; 89% for Test 2) and between tests for the same serum sample (94% for Reader 1; 91% for Reader 2) was high, the overall rates of false positive and false negative ECF test results were 96% and 14%, respectively.

Table 2. Early Conception Factor (ECF) test results for blood sera collected from pregnant and nonpregnant dairy cattle on Day 6 after estrus[1] (Adapted from Cordoba et al., 2001)

			Pregnancy status[2]	
Test	Reader	ECF test result	Pregnant	Nonpregnant
1	1	Pregnant (+)	16	16
		Nonpregnant (-)	2	1
1	2	Pregnant (+)	14	17
		Nonpregnant (-)	4	0
2	1	Pregnant (+)	17	17
		Nonpregnant (-)	1	0
2	2	Pregnant (+)	15	15
		Nonpregnant (-)	3	2

[1]Serum samples from pregnant (n=18) and nonpregnant (n=17) dairy cattle were evaluated using two ECF test cassettes (Test 1 and 2) and the result of each test was interpreted by two independent readers (Reader 1 and 2).

[2]For pregnant dairy cattle, sera were collected on Day 6 after estrus and immediately before collecting embryos from Holstein cows (n=17) and heifers (n=1) inseminated after a detected estrus and in which at least 1 embryo of excellent, good, or fair quality was recovered at a nonsurgical flush 6 d after AI; for nonpregnant dairy cattle, sera were collected on Day 6 after estrus from noninseminated Holstein cows (n=9) and heifers (n=8).

Results from our experiment show that the ECF test, in its present form, is an unreliable method for determining pregnancy status on Day 6 after estrus in dairy cattle. The predictive value of a negative ECF test result would be less than 50% (i.e., no better than a guess) in dairy herds exhibiting a conception rate greater than 25%. Dairy producers who choose to use this commercially available ECF test as a tool for early detection of nonpregnant dairy cattle can expect a high rate of embryonic loss when administering $PGF_{2\_}$ to animals based on a negative ECF test result.

Transrectal Ultrasonography

The use of transrectal ultrasonography to assess pregnancy status early during gestation is among the most practical applications of ultrasound for dairy cattle reproduction. Pregnancy diagnosis in dairy heifers based on the presence of intraluminal uterine fluid before Day 16 is unreliable because small amounts of fluid are present in non-inseminated heifers as early as Day 10; however, accuracy of diagnosis based on fluid alone approached 100% by Day 20. The accuracy of pregnancy diagnosis in dairy heifers was not greater than 50% before Day 18 using a 5.0 MHz transducer, or before Day 16 using a 7.5 MHz transducer (Kastelic et al., 1991).

Under most on-farm conditions, pregnancy diagnosis can be rapidly and accurately diagnosed using ultrasound as early as 26 d post AI (Filteau and DesCôteaux, 1998; Kastelic et al., 1991). Sensitivity and specificity of pregnancy diagnosis using ultrasound was 44.8% and 82.3%, respectively, when conducted between 21 and 25 d post AI but increased to 97.7% and 87.7%, respectively, when conducted between 26 and 33 d post AI (Pieterse et al., 1990a). Although pregnancy status can be established early, care must be taken to ensure the accuracy of a diagnosis. For example, a false negative diagnosis was more likely when the uterus was located cranial to the pelvic inlet in beef cattle than when the uterus was within the pelvic cavity (Szenci et al., 1995).

Ultrasound is a rapid method for pregnancy diagnosis, and experienced palpators adapt to ultrasound technology quickly. The time required to assess pregnancy in beef heifers at the end of a 108-day breeding season averaged 11.3 seconds using palpation per rectum versus 16.1 seconds required to assess pregnancy and fetal age using ultrasound (Galland et al., 1994). Fetal age also affected time required for diagnosis with older fetuses requiring less total time for diagnosis (Galland et al., 1994). Although ultrasound at ≥ 45 d of gestation did not increase accuracy of pregnancy diagnosis for an experienced palpator, it may improve diagnostic accuracy of a less experienced one (Galland et al., 1994). Generally, two factors affect the speed at which ultrasound examinations can be conducted on a dairy farm: operator proficiency and availability and restraint of animals. When both factors are optimized, the speed of ultrasonography can approach that of palpation while exceeding palpation in the amount of information gathered from each animal.

Early Embryonic Loss in Lactating Dairy Cows

Pregnancy loss contributes to reproductive inefficiency because fertility assessed at any point during pregnancy is a function of both conception rate and pregnancy loss. Conception rates at 28 to 32 d post-AI in lactating dairy cows range from 40 to 47% (Fricke et al., 1998; Pursley et al, 1997b), whereas conception rates in dairy heifers are nearly 75% (Pursley et al., 1997b). Similarly, pregnancy loss in lactating dairy cows is greater than that in dairy heifers (20% vs. 5%; Smith and Stevenson, 1995). Although the specific factors responsible for early embryonic loss in dairy cows are not known, they may be similar to those factors responsible for reduced conception rates.

Because pregnancy status can be determined earlier using ultrasound compared with palpation, the rate of pregnancy loss detected is often higher when a positive diagnosis is made earlier post breeding. Of cows diagnosed pregnant at 28 d post AI, 10 to 16% experience early embryonic loss by 56 d post AI (Fricke et al., 1998; Mee et al., 1994; Vasconcelos et al., 1997). Therefore, cows diagnosed pregnant at 28 d post AI using ultrasound should be scheduled for a subsequent examination around 60 d post AI, when the rate of embryonic loss per day decreases dramatically (Vasconcelos et al., 1997). Although the rate of pregnancy loss is significant in studies using ultrasound to assess the rate of loss, the technique of ultrasound itself has not been implicated as a cause of embryonic death in cattle (Ball and Logue, 1994; Baxter and Ward, 1997). Furthermore, ultrasound is a much less invasive technique for early pregnancy diagnosis than is rectal palpation (Paisley et al., 1978; Vaillancourt et al., 1979) and may minimize the rare incidence of palpation-induced abortions.

At present, there is no practical way to reduce early embryonic loss in lactating dairy cows. However, recognizing the occurrence and magnitude of early embryonic loss may actually present management opportunities by taking advantage of new reproductive technologies that increase AI service rate in a dairy herd. If used routinely, transrectal ultrasonography has the potential to improve reproductive efficiency within a herd by reducing the period from AI to pregnancy diagnosis to 26 to 28 d with a high degree of diagnostic accuracy (Pieterse et al., 1990a). Early pregnancy diagnosis, however, can only improve reproductive efficiency when a nonpregnancy diagnosis is coupled with a management strategy to rapidly return cows to AI service, and such strategies have not yet been empirically tested for their effects on conception rate. In addition, cows diagnosed pregnant at an early ultrasound exam have a greater risk of early embryonic loss and, therefore, must undergo subsequent pregnancy examinations to identify and rebreed cows that experience such loss. If left unidentified, cows experiencing embryonic loss after an early pregnancy diagnosis would actually reduce reproductive efficiency by extending their calving interval. This concept applies not only to ultrasound, but also to any method used to assess pregnancy status early post breeding.

Programming First and Second AI Service: Presynch and Resynch

Timely rebreeding of lactating dairy cows that fail to conceive to first AI service is essential for improving reproductive efficiency and profitability in a dairy herd. Because AI conception rates of high producing lactating dairy cows are reported to be 40% or less (Pursley et al., 1997a; Fricke et al., 1998), 60% or more of lactating cows will fail to conceive to a given AI service. Now that it is relatively easy to program cows for first postpartum AI service, many producers are asking how best to identify nonpregnant cows and program them for second AI service.

We recently conducted a field trial to answer this question (Fricke and Welle, unpublished data). Our objective was to compare conception rate to first TAI service after a modified Presynch protocol with conception rates after resynchronization of ovulation using Ovsynch at three intervals post TAI (Resynch). Lactating dairy cows (n =711) on a commercial dairy farm in North-central Wisconsin were enrolled into this study on a weekly basis beginning on May 10, 2001 and ending on May 30, 2002. All cows received a modified Presynch protocol to receive first postpartum TAI as follows: 25 mg PGF_2_ (d 18 ± 3; d 32 ± 3; d 46 ± 3); 50 _g GnRH (d 60 ± 3); 25 mg PGF_2_ (d 67 ± 3) and 50 _g GnRH (d 69 ± 3) postpartum. All cows received TAI immediately after the second GnRH injection of the Presynch protocol (d 0) as per a Cosynch TAI schedule. At first TAI, cows were randomly assigned to each of three treatment groups for resynchronization of ovulation (Resynch) using Ovsynch [50 _g GnRH (d -9); 25 mg PGF_2_ (d -2) and 50 _g GnRH + TAI (d -0)] to induce a second TAI for cows failing to conceive to first TAI service. All cows (n=235) in the first group (Day 19) received a GnRH injection on d 19 post TAI and continued the Ovsynch protocol if diagnosed nonpregnant using transrectal ultrasound on d 26 post TAI. Cows (n=240) in the second (Day 26) and cows (n=236) in the third (Day 33) groups initiated the Ovsynch protocol if diagnosed nonpregnant using transrectal ultrasound on d 26 post-TAI or d 33 post-TAI, respectively. Preliminary results from this study are shown in Table 3.

Table 3. Conception rate to first timed artificial insemination (Presynch), second timed artificial insemination (Resynch), and pregnancy loss for cows conceiving to Presynch (Fricke and Welle, unpublished).

	Conception rate (%)		
Treatment group	Presynch TAI	Resynch TAI	Pregnancy loss[1] (%)
Day 19	46.0[a]	23.3[a]	27.8[a]
Day 26	42.1[a]	33.9[b]	27.7[a]
Day 33	32.6[b]	37.8[b]	11.7[b]
Overall	40.2	32.0	23.4

[a,b]Within a column, percentages with different superscripts differ (P<0.01).

[1]Cows conceiving to Presynch TAI that subsequently were diagnosed nonpregnant at pregnancy recheck.

Differences in conception rate to the Presynch TAI and pregnancy loss can be accounted for because the pregnancy check was conducted 26 d post TAI for the Day 19 and Day 26 groups, whereas the pregnancy check for the Day 33 group was conducted on 33 d post TAI. Most important, the Day 19 group had a lower conception rate to Resynch than did the Day 26 and Day 33 treatment groups. Based on this preliminary data, the Day 19 scheme should not be used to resynchronize cows for second service, whereas the Day 26 and 33 groups resulted in similar conception rates to Resynch.

Conclusion

Currently, use of controlled breeding protocols for initiating first postpartum AI service and use of transrectal ultrasound for determining nonpregnancy early post breeding are proven methods for improving dairy cattle reproduction. The ECF test, in its present form, is an unreliable method for determining pregnancy status on Day 6 after estrus in dairy cattle. The predictive value of a negative ECF test result would be less than 50% (i.e., no better than a guess) in dairy herds exhibiting a conception rate greater than 25%. Future research will lead to new and improved methods for assessing pregnancy status early post breeding and resynchronizing cows for second and subsequent AI services.

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