BALANCED DAIRYING
-Production-

Texas Agricultural Extension Service
The Texas A&M University System

SYNCHRONIZATION PROGRAMS IMPROVE REPRODUCTION

Ellen R. Jordan, Ph.D., Professor and Extension Dairy Specialist;

Introduction

Profitability on today's dairy farms is controlled by a number of factors. Although individual producers can't control the milk prices, they can control many factors. To optimize profits, producers must first assess their enterprises and set goals. One goal is to attain a 12- to 13-month calving interval using all artificial insemination (AI). Reaching that goal, however, has been elusive because many factors influence herd fertility.

Improving Submission Rates

Various heat detection aids increase the number of cows detected in heat and subsequently submitted for insemination. Heat detection patches, tail painting, pedometers and Gomer bulls are just a few. Also, various synchronization programs allow breeding cows at a specified time rather than basing insemination on heat detection. Initially, programs were based on using prostaglandins ($PGF_{2\alpha}$). More recently, gonadotropin releasing hormone (GnRH) has been combined with $PGF_{2\alpha}$ in an attempt to optimize follicular development.

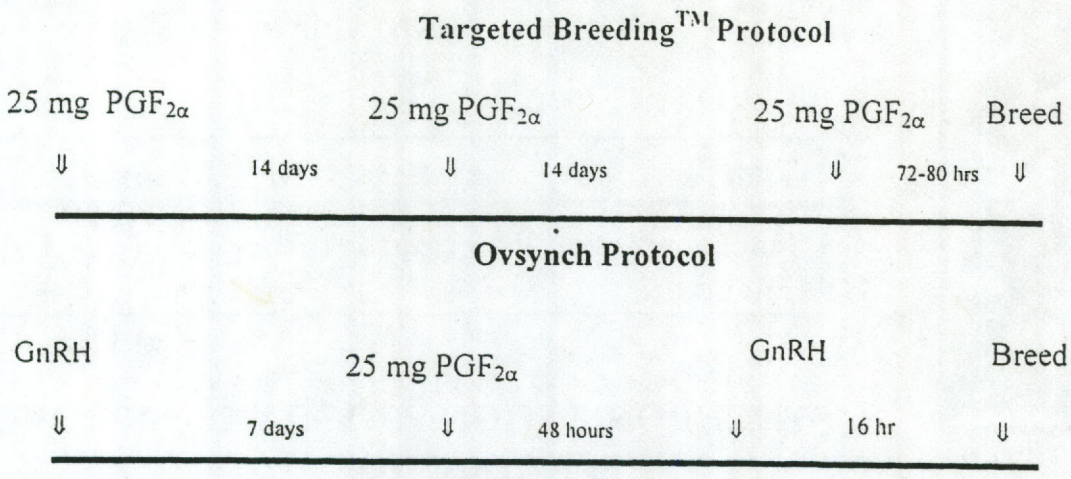
The two primary programs currently in use are:

- Targeted Breeding™ (Pharmacia-Upjohn, Kalamazoo, MI), a series of $PGF_{2\alpha}$ injections followed by timed insemination, and
- Ovsynch, a combination of GnRH and $PGF_{2\alpha}$ followed by timed insemination.

With Targeted Breeding™, PGF_{2a} is given as a setup injection approximately14 days prior to the end of the voluntary waiting period (VWP). Subsequent PGF_{2a} injections are given at 14-day intervals. Cows are inseminated at detected heat or 72 to 80 hours after the third PGF_{2a} injection. Injections are usually scheduled one day a week for convenience. In the Ovsynch program, 100 mg of GnRH is administered. Seven days later cows receive PGF_{2a}, followed by a second dose of GnRH 36 to 48 hours after the $PGF_{2\alpha}$ (Figure 1). All cows are inseminated 16 hours later whether or not they are observed in heat. Although this allows eliminating detection of heat at the initial insemination, heat detection must be used to determine which cows did not conceive. Otherwise, over a given period of time the percent pregnant declines because cows not conceiving are found only upon pregnancy examination.

For these protocols to be adopted on farms, they must fit today's management schemes. The Ovsynch protocol is very attractive to producers since no heat detection is required. However, producers must be committed to heat detection following the initial insemination. Other obstacles for producers include the timing and cost of the injections and paperwork associated with the protocols.

Figure 1: Comparison of the Targeted Breeding™ and Ovsynch synchronization protocols.



In many large herds, producers schedule heat detection, insemination and injection schedules once a day. To use the recommended Ovsynch protocol requires some injections in the evening and in the morning. Although it is recommended to inseminate cows 16 hours after the second GnRH injection, Wisconsin researchers reported that actual calving rate did not differ when cows were inseminated between 0 to 24 hours after the second GnRH injection (Table 1). Pregnancy status was determined by using ultrasound from day 25 to 35 post insemination while calving information was retrieved from on-farm records. Any cow diagnosed open prior to culling or subsequently re-inseminated was considered to have had a pregnancy loss. Based on this data, the recommended protocol can be modified to use all am or pm injections and inseminations.

One way to reduce the cost of the Ovsynch protocol is to reduce the quantity of drug required. Wisconsin researchers evaluated the effectiveness of reducing the GnRH dose from 100 to 50 mg. He found the synchronization and conception rates did not differ between the two doses. The conception rate was determined at day 28 and 56. The combined conception rate declined from 41.0% at day 28 to 34.4% at day 56, a 13.5% pregnancy loss. The cost per cow was $6.40 less when the half-dose was used. With reduced cost of the Ovsynch protocol, producers might use the program to breed all cows at the conclusion of the VWP, instead of primarily using the program for problem cows.

Table 1: Various reproduction measures in lactating Holstein cows inseminated at various times after the second GnRH injection of the Ovsynch protocol.

Item	Time from second GnRH until AI				
	0 h	8 h	16 h	24 h	32 h
No. of Cows	149	148	149	143	143
Pregnancy Rate/AI, %[a]	37	41	45	41	32
Pregnancy Loss, %[b]	9	21	21	21	32**
Calving Rate, %	31	31	33	29	20*

[a]Quadratic effect (P<.01)
[b]Linear effect (P<.05)
*P<.05
**P<.10

A second method to reduce costs for the Ovsynch protocol is to use a combination of the Targeted Breeding™ and Ovsynch called Modified Target Breeding. Cows receive a set-up injection of PGF_{2a} 21-days prior to the conclusion of the VWP. Fourteen days later they receive a GnRH injection, followed by a second PGF_{2a} injection in 7 days. Cows are bred at heat. Any cow not bred by 72 to 80 hours after the second PGF_{2a} is bred at that time. This protocol also ensures that 100% of cows are bred. And it avoids the potential pitfall caused by producers not feeling that they need to spend time detecting heat.

To capitalize further on the beneficial impact of using the Modified Target Breeding or Ovsynch Protocol to enhance submission rate, reinitiate the program whenever a cow is determined to be open, but has not been in heat.

Troubleshooting

Sometimes the results of a synchronization protocol do not meet expectations. Determining why can be exasperating unless a systematic evaluation of all facets of management is conducted. Begin troubleshooting with the transition cows. Examine all aspects of the nutrition program. Some areas to look at include:

- Evaluate protein, energy, fiber, vitamin and mineral levels in the transition and fresh cow rations.
- Check that the formulated ration is what is fed to and consumed by the cows.
- Maintain ration uniformity and particle size length.
- Track dry matter intake pre- and post-partum.

Monitor the number and type of disorders. Various disorders require different corrective measures. For example, if mastitis is a problem, conduct a milking system evaluation and critique the environment where cows are housed. Assess milking procedures and treatment protocols (lactating and dry). If ketosis is a problem, determine if it is primary or secondary. Check prepartum body condition and postpartum dry matter intakes. When dystocia in heifers is a problem, consider whether calving ease should be a factor in sire selection on this group of animals. Also determine if season is influencing the incidence of disorders. Identification of seasonal trends can point to management and environmental changes to investigate.

Next conduct an AI refresher course for all employees. During the course, check that the thermometer is accurate. Direct employees to load only one insemination gun at a time. In one study conception rates declined from 47.6% for the first insemination gun to 25% on the fourth insemination gun. Due to limited numbers, this decline was not significant, however, preliminary numbers from other trials have shown the same trend. Other researchers have shown that sperm lives for up to an hour when maintained at 90-95°F. Thus, the reason for the decline in the study is probably the inability of the inseminator to maintain the temperature in the AI guns within a narrow range.

Although Modified Target Breeding and Ovsynch programs allow insemination at a given time, heat detection is essential to enhance cumulative pregnancy rate. Assign an employee to check cows for 20 to 30 minute intervals at least three times per day. Provide the employee with training. Consider whether an incentive program can be used to improve heat detection.

Verify that injections are being given properly. Check dosage, route of administration, needle size, injection site and timing. Evaluate hormone storage conditions.

Conclusions

Today's dairy producer can take advantage of technological advances to enhance reproduction. However, 12- to 13-month calving interval goals require improved management of the cow as she transitions from the pregnant, dry cow to the non-pregnant lactating state as well. In addition, the producer must emphasize heat detection after the first insemination or gains made using a synchronization protocol during the first cycle will be lost in subsequent cycles.

TEXAS AGRICULTURAL EXTENSION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
THE TEXAS A&M UNIVERSITY SYSTEM
COLLEGE STATION, TEXAS 77843

CALENDAR OF EVENTS

March 2, 2000	DOPA Training (4 hr CEU), Stephenville, TX Contact: Sandy Stokes - (254) 968-4144
March 23, 2000	Comanche Farm Show (2 hr CEU for DOPA) Lagoon Sludge Ration Management Contact: Bob Whitney - (915) 356-2539
April 11, 2000	Initial DOPA Training (8 hr CEU), Sulphur Springs, TX Contact: Larry Spradlin - (903) 885-3443
May, 2000	Southwest Dairy Field Day (2 hr CEU for DOPA) Contact: Sandy Stokes - (254) 968-4144

Michael A. Tomaszewski
Extension Dairy Specialist
College Station, TX
409-845-5709

Ellen R. Jordan
Extension Dairy Specialist
Dallas, TX
972-952-9212

Sandra R. Stokes
Extension Dairy Specialist
Stephenville, TX
254-968-4144