

Research Brief #61

Ovsynch results variable on grass-based dairy farms

To take maximum advantage of pasture growth, dairy farmers using rotational grazing often have a short (less than 3 month) spring calving window as a goal. But this is difficult to achieve. CIAS-supported research on a Wisconsin grazing farm shows that the Ovsynch breeding program, while successful on confinement dairy farms, can be problematic on grazing dairy farms.

Why use Ovsynch?

Getting cows bred in a timely manner has become an increasing problem for dairy farmers. According to a Minnesota study, the average first service conception rate (# cows conceiving/total # cows serviced) is 30 to 35 percent, but on many farms the conception rate is lower. Effective heat detection could increase that rate, but watching cows for signs of estrus (heat) can be time consuming and difficult.

Ovsynch is a series of three injections that synchronize ovulation and allow cows to be artificially inseminated at the same time (see box on page 2 for more information). These injections are approved for use in lactating dairy cattle and are available through a veterinarian. Since artificial insemination (AI) is based on the timing of the injections, no heat detection is required with Ovsynch. In addition, non-cycling cows often begin cycling again with Ovsynch.

However, Ovsynch is not recommended for dairy heifers. While most high-producing, mature dairy cows have two waves of growing follicles (developing eggs) per estrous cycle, heifers are more likely to have three waves. Ovsynch works on the two wave cycle; animals with three waves do not respond as well to the Ovsynch protocol.

UW-Madison dairy scientists Connie Cordoba and Paul Fricke hypothesized that Ovsynch could help farmers on grass-based dairies tighten their calving window to help achieve seasonal or semi-seasonal calving goals. They proposed that Ovsynch could help farmers lessen workloads by minimizing estrus detection for the first postpartum breeding and avoiding heat stress problems in bulls by using AI effectively. But the extra expense of Ovsynch needs to be justified by results.

How was the study conducted?

In 1999, on two grazing dairy farms, the researchers found that Ovsynch and a modified Ovsynch protocol resulted in conception rates of 51 percent and 49 percent—similar to rates for timed AI using Ovsynch on confinement dairy farms. Cows on these farms received a total mixed ration and pasture, and produced 59 to 72 pounds of milk per day. But Ovsynch cows in a study on another grazing farm in 2000 experienced much lower conception rates.

The 2000 study involved 228 mature dairy cows. Cows assigned to the study were milked twice a day, rotationally grazed on improved pastures during the trial, and received supplemental concentrate at milking. The cows were crosses of Holstein and Brown Swiss, and average milk production per cow was 44 pounds per day during the study.

A professional AI technician conducted all AI services throughout the trial. Semen from multiple AI sires was used and AI sires were randomly distributed between treatments.

Cows were assigned randomly to two groups. In the **Ovsynch group**, 114 cows received the Ovsynch treatment at a random stage of the estrous cycle. All cows were artificially inseminated 12 to 18 hours after the final (third) injection, on the first day of the breeding period. Cows subsequently detected in heat based on tail paint removal due to mounting activity received a second AI service.

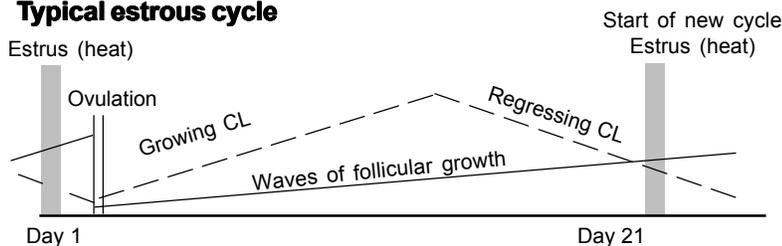


Lower production grass-based dairy cattle like these Brown Swiss/Holstein cows did not respond well to Ovsynch.

Dairy cow reproductive cycle and Ovsynch protocol

Follicles contain developing eggs and produce estrogen.	At ovulation, a follicle ruptures and releases an egg.	Waves of follicular growth continue throughout the cycle. As one wave ends, another begins.	The corpus luteum (CL) produces progesterone and inhibits cycling. It regresses if the cow does not conceive.
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Typical estrous cycle



Ovsynch protocol



The first injection of Gonadotrophin Releasing Hormone (GnRH) synchronizes the growth of a new follicular wave.	The injection of PGF _{2α} (prostaglandin F _{2α}) synchronizes regression of the CL and allows ovulation to occur.	The final injection of GnRH synchronizes ovulation. Timed AI occurs 12-18 hours after the final injection.
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In the **Heat Detection group**, tail paint was applied to 114 cows at the first day of the breeding season. When the tail paint was removed, the cows were artificially inseminated. Eighty-four percent of these cows were detected in heat during the 21-day AI breeding period. Six to eight bulls were introduced to all cows at the end of the 23-day AI breeding period and remained for 14 weeks.

The first service conception rate was only 27 percent for the Ovsynch group and 47 percent for the Heat Detection group. The second service conception rate for the Ovsynch group based on tail paint removal was 43 percent, which is comparable to the first service rates for the Heat Detection group. "These data indicate that Ovsynch failed to synchronize ovulation, which resulted in poor conception," Fricke says.

Why the poor response to Ovsynch?

"The low first service conception rate in the Ovsynch group surprised us," says Fricke. "We thought the 1999 study had established a similar response to Ovsynch between grazing and confinement cows."

In reviewing the data, the researchers noted that while some of the Ovsynch cows that did not

conceive to the timed AI came back into heat between days 18 and 24 as expected, a sizable group came into heat early. This was a clue that something was going on.

"We looked at blood sample progesterone levels," Fricke explains. "These indicated two main reasons for conception failure. First, 14 percent of the cows in the Ovsynch group ovulated between the first and second injections rather than at the end, resulting in a mistiming of the AI. Second, the corpus luteum did not

fully regress after the second injection in 12 percent of the cows."

Why did some cows come into heat during the protocol? Fricke speculates it could be for the same reasons that Ovsynch is not recommended for heifers. "New Zealand research has suggested a greater proportion of mature dairy cows there exhibit three follicular waves," says Fricke, "and since New Zealand's dairy cows are primarily lower-producing, grass-based animals, we could be seeing something similar among U.S. grass-based dairy cows that are lower in production."

More data on follicular growth in grass-based dairy cows is needed to confirm the hypothesis that three follicular waves explain these cows' poor response to Ovsynch. Fricke says, "As was demonstrated in the two years of our study, variation in the response to Ovsynch may occur across herds under various management systems and physiologic scenarios."

The researchers thank the participating farmers for their cooperation and involvement in this study.

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