



DAIRY CATTLE REPRODUCTION COUNCIL

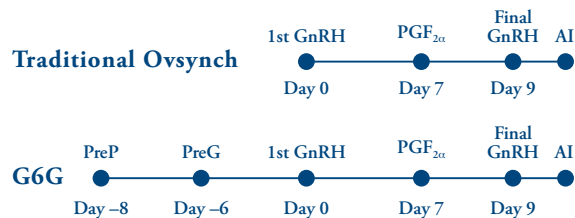
From Research to Reality: Translating Science to On-Farm Technology

Science is the basis by which we make a multitude of decisions on the dairy. Whether it's feeding calves, harvesting crops, milking cows or improving herd reproduction, dairy producers rely heavily on scientifically backed research to improve and maximize cow performance. We've identified two reproductive technologies founded on and backed by research that can improve performance and maximize labor efficiency, cow health and profitability.

Synchronization Programs

University researchers have continued to evolve synchronization programs. Dr. Richard Pursley of Michigan State University was a Ph.D. student under Dr. Milo Wiltbank at the University of Wisconsin-Madison, working on the Ovsynch™ protocol, when he gained a keen interest in creating a synchronization program that matched the cow's natural reproductive cycle, thus improving herd reproductive performance.

Comparison of Traditional Ovsynch and G6G Protocols



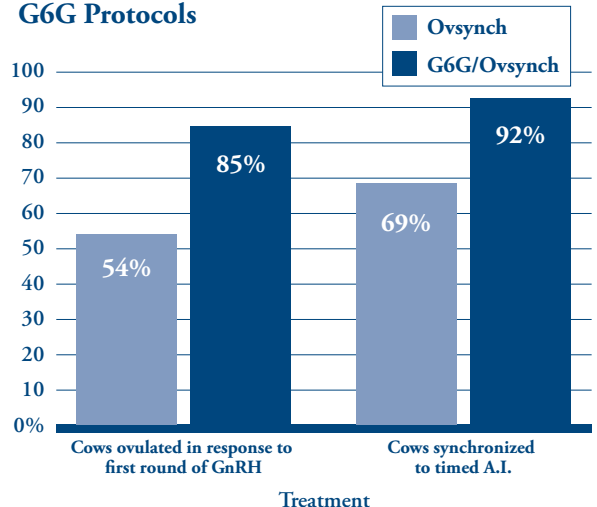
“What we’ve tried to do is mimic the natural cycle of the cow with our synchronization programs,” says Dr. Pursley. “I think we continue to get better at matching our protocols to what cows need physiologically to get pregnant.”

Today, Dr. Pursley works in extension and research at Michigan State University focusing primarily on improving fertility in the lactating dairy cow. One tool he has created through extensive research is the G6G/Ovsynch protocol.

G6G is a set of two hormonal injections—the first injection of prostaglandin (PGF_{2α}) induces luteolysis of mid- and late-cycle corpora lutea and the second injection of gonadotrophin releasing hormone (GnRH) induces ovulation. These two injections are designed to initiate a new estrous cycle. Six days later, the first shot of GnRH is given to cause ovulation and jump-start the Ovsynch program. Pursley’s data indicate that Ovsynch works best when started on day six or seven of the estrous cycle.

Research¹ is showing how effective the new G6G protocol can be to increase ovulation after the first dose of GnRH. A recent on-farm study found that 85 percent of the cows enrolled in the G6G program ovulated in response to the first round of GnRH, while only 54 percent showed a response in the traditional Ovsynch group.

Response to Ovsynch and G6G Protocols





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The study also found 92 percent of the cows on the new protocol were successfully synched to timed A.I. compared to 69 percent of cows on traditional Ovsynch protocols.

As Dr. Pursley continues to work with synch protocols, one idea rings true: it's all about the end-users—the dairy producers—who must implement these technologies on the farm.

“I've learned that we must provide dairy producers with simplified technology so it can be implemented properly on the dairy,” says Dr. Pursley. “If producers are interested in synch programs, I recommend they work with their herd veterinarian to find the program that fits the operation best. We work closely with veterinarians to ensure everyone understands how synch protocols work, and our work with them transfers to producers.”

One veterinarian who has worked closely with Dr. Pursley to integrate the G6G protocol is Dr. Bob Vlietstra, one of nine large-animal veterinarians with the West Michigan Veterinary Service. His client herds range from 40-cow purebred herds to 3,500-cow commercial dairies. Dr. Vlietstra began recommending G6G two to three years ago when the technology was first available.

Dr. Vlietstra and his associates spend considerable time keeping up with peer-reviewed journals and research, and work closely with university experts to evaluate the application of new technologies for their client's herds. As a benefit of this close relationship, Dr. Vlietstra has been able to see two sides of new technologies, both as a consultant evaluating the effects for his clients and as a participant in research identifying the applications of new products and ideas.

“University researchers do what producers and veterinarians don't have time or the expertise to do. They develop new ideas and put a lot of time into identifying technologies that are applicable, useful and profitable for producers,” explains Dr. Vlietstra. “Realistically, we couldn't practice in the modern dairy industry without the constant new ideas and technologies identified by university researchers.”

In light of changes in herd size and industry standards, Dr. Vlietstra has noted a higher demand for analytical veterinary services.

“A lot of what I do is studying records and working through numbers to find indices for the best fitting programs for a herd. With new protocols such as G6G, I look carefully at the herd and their performance. I've found the most benefits come from identifying protocols that are the best fit for the entire herd. I recommend treating as a population and adhering to consistent routines with technology such as G6G for the best results.”

He has seen great results from this seemingly simple concept, and he and his clients notice a positive change in more than just pregnancy rates. “I see a change in attitude as producers begin to see the value of spending more time analyzing their herd performance: reviewing the data from pregnancy tests and synch programs gets them hooked on the process. It makes herd repro fun again and the results are great all around.”

Pregnancy Detection

Other research-based technologies have taken over 30 years to research and design before reaching the dairy producer. Dr. Garth Sasser, a professor emeritus at the University of Idaho, discovered pregnancy-specific



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protein B (PSPB) and published the first study on the protein in 1982.² From the discovery an assay was created and published in 1986³ by Dr. Sasser to provide the first blood-based test for pregnancy in cattle.

A more affordable form of the test became available in 2002. The blood test is marketed under the name BioPRYN®, and is used throughout the dairy industry to identify pregnancy status. To do so, a blood sample is taken on the farm, shipped to a local laboratory and results are sent to the producer detecting cows as pregnant or open within two to four days. Producers then can make management decisions based on the results.

Research⁴ shows how effective BioPRYN can be to diagnose pregnancy status. A study at two North Carolina State University research facilities found that overall pregnancy status was diagnosed correctly in 93.5 percent of the cows, similar to rectal palpation but requiring less skill. The study concluded the test offers producers another option for pregnancy detection while minimizing the need for high-level skills.

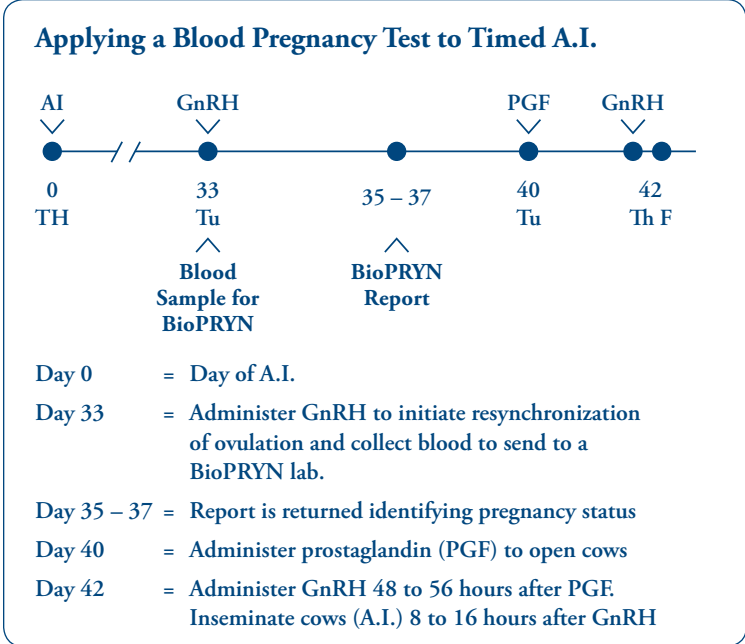
BioPRYN has been set to have a cutoff such that if a cow is detected nonpregnant the result is greater than 99 percent accurate. With this accuracy the breeder is free to hormonally induce a new estrous cycle without fear of aborting an embryo. On the other hand, if the cow is detected pregnant, the result is between 91 and 95 percent accurate. The lower percentage is partially a result of cows losing embryos before follow-up evidence is obtained.⁵

As interest in a blood pregnancy test continues to grow, Dr. Sasser focuses on the importance of research for creation and implementation of reproductive technologies.

“University research is a place where science and findings are geared toward pure science and eventually are translated to something useful for the producer,” he says. “I’ve been fortunate to have something to share with producers that will make an impact on how pregnancy is detected and on-farm reproductive programs run.”

Dr. Sasser highlights how researchers and producers have the same goal: improving dairy cow reproductive function to improve herd profitability. As Dr. Sasser notes, researchers are the foundation for improvements in reproductive technologies, while dairy producers and veterinarians are the key to implementation.

“Many studies are built off the results of previous university research” he adds. “University researchers are not just the originators, but they’re also looking to further the technology and its use on the dairy. Even today we continue to search for ways to improve products on the market so producers have access to the best technologies.”





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Research findings have helped some producers reorganize their reproductive protocols. David Danzinger, owner of DS Farms, Alma, Wisconsin, has used BioPRYN as part of the reproductive protocol on his 540-cow dairy for the past two years. His herd utilizes a full synchronization program beginning at 51 to 57 days in milk and includes the BioPRYN test at 30 – 36 days after breeding. Once detected pregnant, subsequent blood tests are performed at 60 – 66 days and 120 – 126 days bred to confirm the pregnancy is carried full-term.

Danzinger first learned of the technology from a reproductive sales specialist, who shared the success other producers were having with the blood pregnancy test and how it could be implemented into reproductive protocols with ease.

“Using BioPRYN in conjunction with a standardized, consistent synchronization protocol has had good results for our herd’s twenty-one day pregnancy rate,” says Danzinger. “BioPRYN lets us be in complete control of our herd reproduction.”

Today, the herd runs a 21-day pregnancy rate of 29 percent on Dairy Comp 305[®], which Danzinger attributes to a successful synchronization program and quick return to Ovsynch when cows are detected open.

“When the bottom line is getting cows pregnant, this is a very valuable, convenient tool that has fit perfectly with timed A.I. and our other reproductive management practices,” says Danzinger.

As both technologies have shown, researchers are continually working to improve available protocols and technologies so producers can remain profitable. We continue to learn about the important role research studies and scientific findings have on reproductive performance, and the continued role producer uptake plays in making reproduction more successful.

1 Michigan State University. *Michigan Dairy Review*. G6G/Ovsynch to Increase Reproductive Performance. Available at: <https://www.msu.edu/~mdr/vol12no2/bello.html>. Accessed: August 8, 2008.

2 Butler JE, Hamilton WC, Sasser RG, Ruder CA, Hass GM, Williams RJ. Detection and partial characterization of two bovine pregnancy-associated proteins. *Biol Reprod*. 1983;26:925.

3 Sasser RG, Ruder CA, Ivani KA, Butler JE, Hamilton WC. Detection of pregnancy by radioimmunoassay of a novel pregnancy-specific protein in serum of cows and a profile of serum concentrations during gestation. *Biol Reprod* 1986;35:936-942.

4 Whisnant CS, French JT, Bush DJ, Coite EA, Cassidy JP, Washburn SP, Meier AA. Evaluation of a Novel Pregnancy Test for Cattle. North Carolina State University. *Animal Science Departmental Report*. 2004-2005. Available at: <http://mark.asci.ncsu.edu/SwineReports/2004-2005/BeefCattle/Reproduction/Whisnant2.htm>. Accessed: August 8, 2008.

5 Biotracking LLC. <http://www.biotracking.com/bioprynfaq.php>. Accessed: August 8, 2008.