Rethinking the Voluntary Waiting Period

Biology, Economics, and the Case for Individual Cows

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Abstract

The voluntary waiting period (VWP) has traditionally been applied as a herd-level reproductive target, with cows becoming eligible for breeding after a predetermined number of days following calving. Recent research suggests that this approach may not be optimal for every cow. High-producing animals with persistent lactations may benefit from delayed breeding, potentially improving conception while maintaining milk production, whereas cows with rapidly declining production or increasing body condition may benefit from earlier insemination. Milk yield and lactation persistency, however, are only part of the decision. Body-condition change, parity, health and reproductive history, calf value, feed costs, and replacement needs can all influence the biological and economic value of extending lactation. Rather than replacing one fixed VWP with another, a more useful approach may be to identify cows likely to benefit from different breeding strategies. The optimal time to breed is therefore not simply a reproductive target, but an economic decision based on the biology of the individual cow.

Introduction

Consider two cows at 150 days in milk. The first is still producing strongly, maintains body condition and has a persistent lactation curve. The second peaked lower, milk production is declining rapidly, and she is beginning to gain excessive body condition. Should these two cows have been bred according to the same reproductive calendar? For decades, dairy reproduction has followed a familiar target: breed cows once they have recovered sufficiently from calving, commonly after a voluntary waiting period (VWP) of 50 to 80 days, with the goal of establishing another pregnancy and maintaining a short calving interval.

Recent research, however, challenges the assumption that one VWP should fit every cow. For selected animals, delaying breeding can improve first-service conception and reduce the number of inseminations while allowing productive cows to remain in milk longer. The important question, therefore, is not whether 50, 125, 140 or 175 days is correct, but whether the optimal breeding time should be determined according to the individual cow and the economics of the farm.

“The right time to breed should depend on the cow, not just the calendar.”

Why wait at all?

The biological rationale for a VWP is well established. After calving, the uterus must undergo involution, ovarian activity must resume and the cow must adapt metabolically to the demands of lactation. Early lactation is also characterized by negative energy balance in many high-producing cows, making this a challenging time to establish and maintain pregnancy.

The waiting period therefore serves an important purpose: ideally, it identifies the point at which the biological probability and economic value of breeding become favorable. The question is whether that point occurs at the same time in every cow.

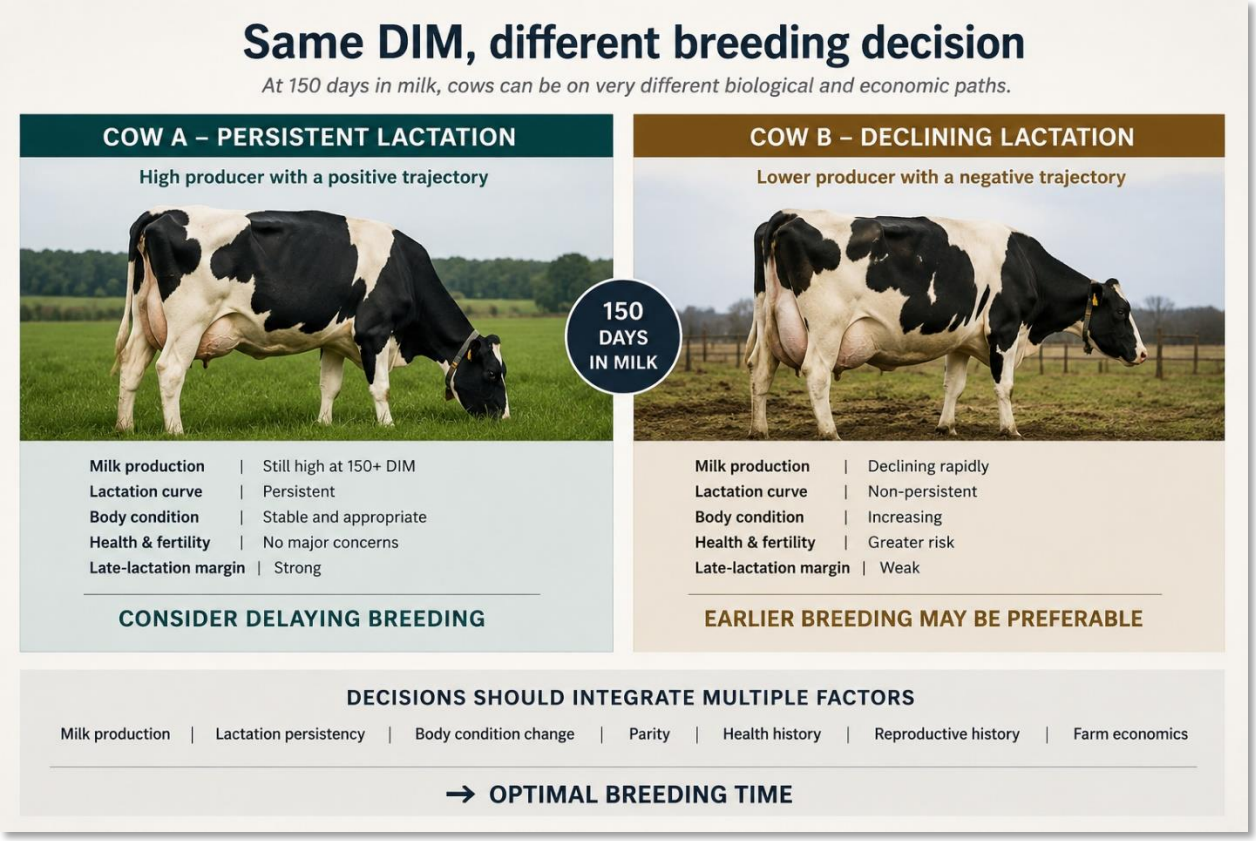
A 2022 study by Burgers et al. compared waiting periods of 50, 125 and 200 days. Extending the interval resulted in a greater proportion of cows having normal ovarian cycles by the time breeding began. This does not mean that waiting 200 days automatically improves herd fertility, but it demonstrates an important biological principle: cows bred later are further removed from the metabolic challenges of early lactation and may be in a more favorable physiological condition for reproduction.

What does the recent research show?

Some of the strongest recent evidence comes from a 2025 study by Hansson et al. involving second-parity cows in 12 high-yielding Swedish herds. Cows were assigned to breeding beginning at either 50 or 140 days after calving. The longer interval increased the calving interval from 12.5 to 14 months, but daily milk production did not differ between treatments. Cows bred later averaged approximately 34 kg of energy-corrected milk per day between successive calvings and about 40 kg per lactating day.

Reproductive performance improved with delayed breeding. Pregnancy at first service was 62% compared with 46% for cows bred earlier, while inseminations per born calf declined from 2.02 to 1.61 and culling was not significantly affected. These results demonstrate that delaying first insemination to 140 days can be a viable strategy for high-yielding second-parity cows, but they do not establish 140 days as the new optimum for every animal.

That distinction is reinforced by a 2024 study by Edvardsson Rasmussen et al. of primiparous cows in 18 commercial Swedish dairy herds. Cows considered potentially suitable for delayed breeding were selected according to early-lactation characteristics, including high genomic persistency, difficult calving, or disease during the first month, and milk production above the herd average. Selected cows assigned to delayed breeding produced approximately 13,803 kg over the complete lactation compared with 10,257 kg for cows managed conventionally. First-service conception was also higher, 60% versus 45%, and inseminations per conception declined from 2.19 to 1.67, while milk yield per day of calving interval did not differ. The significance is not that first-lactation cows should routinely remain open for 175 days, but that cows likely to benefit from a longer lactation can potentially be identified before making the breeding decision.



Which cows may benefit from waiting?

Lactation persistency may be one of the most useful characteristics for making that distinction. A cow that continues producing substantial amounts of milk at 250 or 300 days in milk may still generate a healthy margin over feed, making another 60 or 90 days in the current lactation economically attractive. A cow whose production declines rapidly presents a different situation. Delaying breeding may simply add more days of low milk production while increasing the risk of excessive body condition. There is little biological or economic reason to assume that these two cows should have the same optimal breeding date.

Milk production and persistency alone, however, should not determine the decision. Changes in body condition, parity, health history, reproductive performance, and previous calving difficulty may also help determine whether delaying breeding makes sense.

Automated technologies could increasingly help integrate this information. Milk production records can be combined with reproductive and health data, while technologies such as 3D imaging can provide repeated measurements of body condition and changes in body reserves. Technology does not determine when a cow should be bred; it provides better information with which to make that decision.

The economics of waiting

The traditional economic argument for maintaining a short calving interval is intuitive. More frequent calvings provide more opportunities to return cows to the high-production phase of lactation and produce more calves. A longer lactation changes both sides of that calculation: improved conception may reduce inseminations, while fewer calvings, dry-offs and transition periods may lower reproductive and calving-related labor. On the other hand, delaying conception means fewer calves, slower genetic turnover and potentially more time at lower late-lactation production.

Burgers et al. evaluated these trade-offs in cows assigned to waiting periods of 50, 125 or 200 days. Their analysis included milk and calf revenues together with feed, insemination, veterinary, culling and labor costs. Annual revenue was highest with the 50-day strategy, largely because of milk revenue, but costs were also highest. When net partial cash flow was calculated, differences among strategies were not statistically significant. Another consideration is the transition itself. If a healthy, persistent cow can remain productive for several additional months without becoming excessively conditioned, postponing another biologically demanding transition may have value, although current research does not establish that doing so automatically reduces disease or culling.

The value of the calf must also be considered. A dairy selling valuable beef-cross calves may place considerable importance on maintaining a regular calving rate, while a farm with limited replacement needs and little value for surplus calves may reach a different conclusion. Likewise, a herd emphasizing rapid genetic progress may favor shorter generation intervals, while another may prioritize longevity and obtaining more milk from cows already performing well. The economics of the waiting period therefore cannot be separated from the economics of the entire dairy system.

From a herd rule to an individual decision

The emerging strategy may be neither a conventional short waiting period nor a universally extended one, but a combination of both. Rather than breeding every cow beginning at 50 or 60 days, or delaying every cow until 140 or 175 days, farms could identify animals likely to benefit from different strategies. Milk production, lactation persistency, body-condition change, parity, health, and reproductive history could all contribute to that decision.

Conventional measures such as days to first service, conception rate, pregnancy rate, and calving interval remain valuable, but they do not necessarily tell us whether a particular breeding decision was profitable. A cow becoming pregnant at 70 days is not automatically more profitable than one becoming pregnant at 140 days. If the latter maintains high milk production, conceives efficiently, and remains healthy and in appropriate body condition, delaying conception may create more value. Conversely, for a cow declining rapidly in production or becoming over-conditioned, waiting may simply add days of low-margin production.

The optimal breeding time is therefore not simply a reproductive target. It is an economic decision based on biology. Instead of asking, “What is the ideal VWP for the herd?” the more useful question is: “For this cow, in this herd, under these milk, feed, labor and replacement economics,

when is the right time to breed?" Moving from a calendar-based target toward an individual biological and economic decision may be the most important change in how we think about the voluntary waiting period.

Further reading

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3. Burgers, E. E. A., et al. 2022. "Consequences of Extending the Voluntary Waiting Period for Insemination on Reproductive Performance in Dairy Cows." *Animal Reproduction Science* 244:107046. DOI: 10.1016/j.anireprosci.2022.107046.

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5. Edvardsson Rasmussen, A., et al. 2024. "Customized Voluntary Waiting Period Before First Insemination in Primiparous Dairy Cows: Effect on Milk Production, Fertility, and Health." *Journal of Dairy Science* 107:9558–9571. DOI: 10.3168/jds.2023-24593.

6. Hansson, A., et al. 2025. "Effect of Voluntary Waiting Period Length on Milk Yield, Fertility, and Culling in High-Yielding, Second-Parity Cows." *Journal of Dairy Science* 108:13416–13424. DOI: 10.3168/jds.2025-26348.