

Optimum Age at First Breeding in Dairy Heifers
“There is a right time for everything.”
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A few years ago, a dairy producer asked me a deceptively simple question: “At what age should I breed my Holstein heifers?” My answer was, “I wouldn't start with age.”

Traditionally in the US, we have worked with targets such as 750 g of daily gain and breeding at around 13 to 15 months. Those targets remain useful, particularly during the prepubertal period, but our approach to heifer development has evolved. Today, the more important question is whether a heifer has reached the appropriate size and developmental stage for breeding, not simply whether she has reached a particular age.

“Age tells us when. Growth and development tell us whether.”

For generations, dairy farmers have been taught to think about heifer breeding in terms of age, typically breeding at around 13 to 15 months and targeting first calving at approximately 24 months. But a heifer does not know that she has turned 13 months old. Her reproductive development, body size, and future performance respond to growth, nutrition, and health, not to the calendar. Perhaps the better question is therefore not “How old is she?” but “Is she ready?”



That distinction becomes increasingly important as dairy farms look for ways to reduce replacement costs without compromising future productivity. A replacement heifer consumes feed, labor, housing, and health resources for nearly two years before she begins generating milk income. Every additional month before first calving therefore has a cost. This does not mean that heifers should simply be bred as young as possible. The objective is to develop a healthy heifer efficiently and introduce her into the milking herd at the right time.

Age is a guide, but size tells the story.

One of the most practical ways to evaluate breeding readiness is to compare a heifer's body weight with the mature weight of cows in the same herd. A commonly used benchmark is approximately 55% of mature body weight at breeding. Ontario dairy guidance, for example, recommends using mature cow weight rather than age alone when determining whether a heifer is ready for breeding.

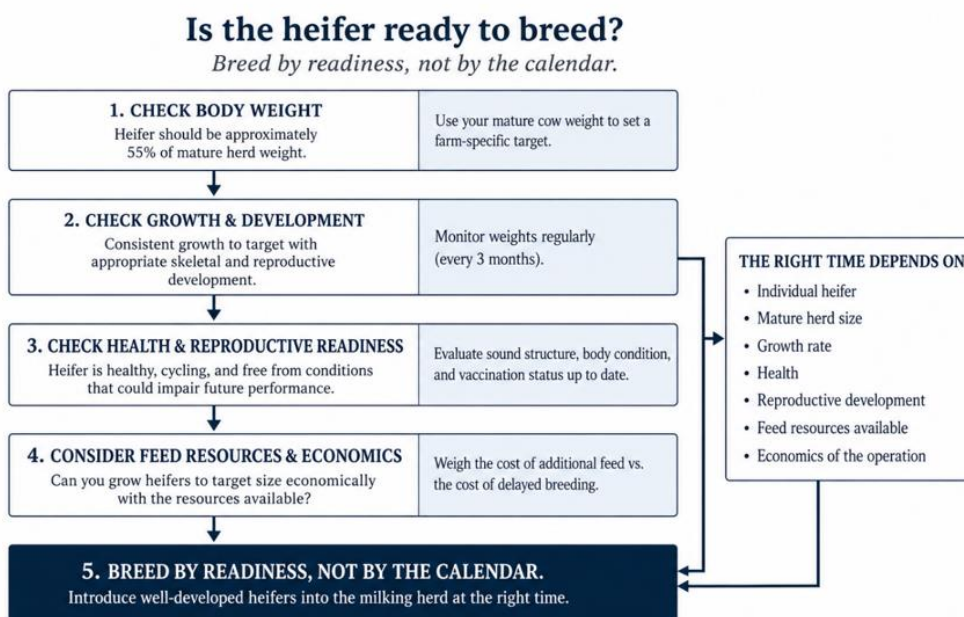


Figure 1. Breeding readiness should be evaluated using body size, growth and development, health, reproductive readiness, and farm resources rather than age alone.

This makes the target farm-specific. If mature cows average 680 kg, 55% corresponds to approximately 374 kg. If they average 750 kg, the target increases to about 413 kg. A 13-month-old heifer weighing 410 kg is therefore not in the same developmental situation as another 13-month-old weighing 330 kg, even though their birth dates are nearly identical. Growth should be monitored throughout the rearing period rather than evaluated only when breeding decisions are made.

A practical farm strategy

Rather than using one rigid breeding age, farms can establish a breeding window based on heifer development.

1. Establish mature herd weight.

Use a representative group of mature cows rather than relying on breed averages.

2. Set the breeding target.

Approximately 55% of mature body weight provides a useful starting point.

3. Monitor growth before breeding age.

Weigh heifers regularly and identify when growth is being lost. Waiting until breeding age to discover an undersized heifer is too late.

4. Put a price on delayed breeding.

Compare feed, labor, housing, and health costs of each additional month with the cost of keeping heifers growing on target.

5. Evaluate outcomes, not just age.

Monitor breeding and calving age, conception, calving difficulty, first-lactation performance, health, culling, and survival.

The goal is not simply to reduce age at first calving. It is to reduce unproductive days without sacrificing the future of the animal.

What does the newest research tell us?

A study published in the *Journal of Dairy Science* in 2026 examined age at first breeding in Holstein heifers from five commercial farms. The researchers compared animals bred before or after 13 months of age, with heifers in the study having reached more than 330 kg. The results challenge the assumption that delaying breeding is automatically beneficial. Among heifers that entered lactation, breeding before 13 months did not reduce first-lactation milk production. Older-bred heifers also had greater odds of abortion and a higher hazard of leaving the herd during first lactation, although some health outcomes favored the older-breeding group. The message is not that every heifer should now be bred before 13 months of age. Rather, the study suggests that well-grown heifers should not necessarily be held back simply because they have not reached an arbitrary age.

There is, however, another side to the story. A 2026 meta-analysis in the *Journal of Dairy Science* examined evaluated strategies that reduced age at first calving. Heifers calving younger produced less milk, fat, and protein per day during their first lactation. However, there were no significant differences in second- or third-lactation milk yield, calving difficulty, heifer reproductive performance, survival to calving, or survival through the end of first lactation.

Together, these studies illustrate the trade-off involved. A younger-calving heifer may produce somewhat less during her first lactation, but she also begins generating income sooner. Keeping her longer in the replacement herd means additional feed, housing, labor, and health costs before she produces any milk. The relevant question is therefore not simply which heifer produces the most milk during her first lactation, but which rearing strategy provides the farm with the best return on its total investment in that animal.

Feed resources change the equation

The optimum breeding age cannot be separated from the resources available on the farm. Consider two operations. Farm A has abundant good-quality forage, sufficient pasture, and relatively low feed costs, allowing heifers to consistently achieve their target growth rates. Farm B has limited forage, expensive purchased feed, and a seasonal period when heifer growth routinely slows. It would be surprising if the same breeding strategy were economically optimal for both farms.

For Farm A, achieving the size required for breeding at 12 to 13 months may be relatively straightforward and inexpensive. For Farm B, forcing every heifer to reach the same target at the same age might require substantial amounts of concentrate or purchased forage. The question is therefore not simply whether a farm can breed its heifers earlier, but whether it can grow them to the appropriate size economically with the feed resources available.

Pasture and home-grown forage can provide an economical foundation for heifer rearing, but only when they supply sufficient nutrients to maintain target growth. Likewise, adding expensive concentrate to accelerate growth is not automatically profitable. Producers need to consider forage quality, quantity, and seasonal availability and compare the cost of supplementation with the cost of delayed breeding when growth falls behind. What is “on time” for one farm may therefore be too early or too late for another.

There is also a danger in interpreting earlier breeding as a recommendation to simply grow heifers faster. The objective is not to put kilograms onto an animal as quickly as possible. Good heifer development requires appropriate skeletal growth, reproductive development, and body condition. The target should be efficient growth, not maximum growth.

The right time

There is an understandable attraction to simple targets such as breeding at 13 months and calving at 24 months. The latest evidence, however, suggests that well-grown heifers do not necessarily benefit from being held back simply because they have not reached a particular age. At the same time, the research does not justify breeding every heifer as early as possible, and the evidence base remains limited, with relatively few recent prospective studies available for making definitive recommendations.

The best time for first breeding ultimately depends on the individual heifer, mature cow weight, growth rate, health, reproductive development, and the resources available on the farm.

Perhaps the best recommendation is also the simplest: breed by readiness, not by the calendar. Because there is, after all, “a right time for everything.”

Further reading

Garcia, A. 2024. “The Average Dairy Cow Is Still Growing.” *Hoard’s Dairyman*. <https://hoards.com/article-35198-The-average-dairy-cow-is-still-growing.html>

Lean, A. K. G., H. M. Golder, J. C. Quinn, et al. 2026. “Age at First Breeding in Holstein Dairy Cattle: Effects on Age at First Calving, Production, Dystocia, Health, and Reproduction in Primiparous Heifers.” *Journal of Dairy Science*. [doi:10.3168/jds.2026-28762](https://doi.org/10.3168/jds.2026-28762).

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