Why? Because on most farms, first-lactation heifers represent the highest number of calvings per lactation group. Whether a dairy calves out 60 or 500 replacement heifers a year, the potential additional lifetime income from using A.I. is quite large. On the day of sorting into the A.I. pen, all heifers should receive prostaglandin (PGF) to minimize days to first A.I. The greater the number of animals that are in heat simultaneously, the greater the opportunity for A.I. personnel to identify them.

Keep in mind, however, that efficient and accurate heat detection is the primary factor limiting reproductive performance on most dairies. Heat detection aids (chalk, tail paint, visual pressure-sensitive devices) may be used to achieve greater heat detection rates.

Heat detection has limitations

It is important for A.I. personnel to know the limitations of heat detection aids while keeping in mind that the primary sign of heat is "standing to be mounted by a herdmate." Secondary signs include clear mucus discharge, ruffled hair on the tailhead, increased activity, mounting other heifers, and chin resting.

When heat detection is performed infrequently (once or twice daily), heifers should be inseminated at the next most convenient time after first detection since the onset of heat is not known. Ovulation is physiologically tied to the start of heat. Consequently, there is a limited window of opportunity to breed the heifer and maximize fertility. Research using HeatWatch reveals that fertility was maximized when A.I. was performed within 16 hours of the onset of heat.

Synchronization programs for dairy heifers are available. As mentioned previously, synchronization of heifers with PGF when entering the A.I. pen reduces the time to first A.I. in herds with good heat detection. Heifers not inseminated after the first PGF should receive a second injection 11 to 14 days later. Alternatively, a timed-A.I. protocol for heifers (CIDR in 5 d - CIDR out + PGF– 72 h – GnRH +TAI) developed at the University of Florida has achieved pregnancy/AI of nearly 56 percent and may be beneficial in herds that struggle with heat detection.

Breeding-eligible heifers should be observed daily to identify those that return to heat. Pregnancy (open) checks should occur regularly, at a minimum every 14 days. This strategy allows for the quick identification of open heifers, facilitating management (PGF or a timed-A.I. protocol) to ensure a timely re-insemination. Reconfirm pregnancy (70 to 90 days in calf), and re-enroll or cull heifers that have aborted.

Visual sizing is guessing

Functional facilities for efficiently managing dairy heifers are mandatory. Although many dairies have a scale to weigh feedstuffs as they are delivered, few have invested in an appropriate weighing and sorting facility for heifers. Consequently, visual estimation of weight, or selection of heifers based on age, leads to inefficient and costlier-than-necessary heifer rearing.

To optimize nutrition, growth, and development, and to attain an age at conception goal, heifer raisers should use a scale and sorting system regularly to monitor growth and decrease variation in groups. Heifers should not be overcrowded in A.I. pens and each pen should be constructed with a back fence and headlocks to facilitate a 100 percent lockup rate.

Although conception rate (number of pregnant heifers divided by the number inseminated) is commonly used to describe reproductive success (or failure) among heifer raisers and dairy producers, pregnancy rate is the preferred metric for evaluating reproduction. Why? Because pregnancy rate is the percentage of eligible heifers within a given interval (21 days, the typical length of an estrous cycle) that actually become pregnant.

An eligible heifer is one that is postpubertal, is not pregnant, and does not have a breeding with an unknown outcome. By dividing the breeding program into 21-day intervals, the effect of recent events or management changes on reproductive efficiency can be determined. This definition of pregnancy rate provides a method to monitor the rate at which heifers become pregnant.

What about the use of sexed semen? Sexed semen has been commercially available in the U.S. for less than a decade. Early research focused on maximizing fertility of sexed semen in heifers because well-managed heifers are highly fertile following A.I. with conventional semen, whereas lactating cows are less fertile.

Published reports from Select Sires describe an average conception rate at first service of 47 percent (31,815 services) in Holstein heifers and 53 percent (2,064 services) in Jersey heifers. Further, the conception rate achieved following AI with sexed semen averaged 80 percent of that achieved with conventional semen at first service.

In Holstein heifer herds that reported at least 50 services to sexed and conventional semen, the overall conception rate to sexed semen (for all services) averaged 45 percent (ranging from 27 to 70 percent; 39,763 services), compared to 56 percent (ranging from 34 to 83 percent; 53,718 services) for conventional semen.

There is ample research and commercial data in dairy heifers to support the expectation of an average conception rate to sexed semen of approximately 80 percent of the conception rate to conventional semen used at first service. Consequently, if a dairy or heifer raiser currently achieves a 65 percent conception rate at first service in heifers with frozen-thawed, conventional semen, a reasonable expectation (with good management) is a conception rate between 46 and 52 percent with frozen-thawed sexed semen.

Sexed semen fertility varies

As can be seen from data in the previous paragraph, there is large variation in fertility following A.I. with sexed semen. This is not surprising, as the level of management of each herd must be considered, as well as the bias introduced by the owner or A.I. technician when choosing animals to receive A.I. with sexed semen (first service only as compared to multiple services, for example).

Victor Cabrera (Extension specialist, dairy management, at the University of Wisconsin-Madison) argues, however, that the single most important parameter in the decision to use sexed semen is the current conception rate with conventional semen.

A free decision support tool, *"Economic value of sexed semen programs for dairy heifers"* is available at http://dairymgt.info/tools.php#1 under the section Management Tools.

As mentioned previously, raising replacement heifers is usually the second largest expense associated with the dairy business. Replacement cost, as described by Greg Bethard (DRMS, Raleigh, NC) and Albert Nunes (Genske, Mulder, and Co., Salida, CA) is the cost of maintaining herd size and structure. To determine replacement costs on a cash basis, the following formula may be used:

[(cost of raising or purchasing replacements - cull cow income)/cwt milk sold].

As can be seen from the formula, replacement cost is expressed on a hundredweight basis. Therefore, replacement cost is size and production neutral. Consequently, replacement cost may be compared among small and large herds or for herds milking 50 or 100 pounds per day. Lastly, a reasonable replacement cost goal in most areas of the U.S. is less than $1.50 per hundredweight.

Heifers do not provide a return on investment until after first calving and initiation of lactation. Therefore, it is imperative that dairy producers and heifer raisers set realistic goals and monitor the growth of their heifers. Age at conception will determine age at first calving, and implementation of management strategies for timely and consistent pregnancy production will enhance overall dairy profitability.

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