Why? Because on most farms, first-lactation heifers represent the highest number of calvings per herd. Whether a dairy calves out 300 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 progesterone (PGF) to minimize days to first AI. 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 to “be in a hurry, or a little upset.” Signs include clear mucus discharge, ruffled hair on the tailhead, increased activity, mounting other heifers, and thin rearing. When heat detection is performed infrequently (e.g., once a week), heifers should be in estrus at the next most convenient time for heat detection, which is during the onset of heat. The onset of heat is not known. Ovulation is physiologically tied to the start of estrus. Consequently, there is a limited window of opportunity to breed the heifer and maximize fertility. Research using HeatWatch reveals that estrus was maximized when A.I. was performed within 15 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 heifers with good heat detection. Heifers not in heat synchronized at the A.I. pen should receive a second injection 11 to 14 days later. Alternatively, a timed-A.I. protocol for heifers (CIDR in 5 days – CIDR out + PGF – 2 days – GnRH + TAT) developed at the University of Florida has achieved pregnancy/ AI of nearly 50 percent and may be beneficial for heifers that struggle with heat detection.

Breeding eligible heifers should be observed daily to identify those that return to heat. Pregnancy (open) check should occur regularly, at a minimum every 21 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-synchronization. Resynchronization (70 to 90 days in calf), re-evaluate or culled heifers that have aborted.

**Visual sizing isguessing**

Functional facilities for efficiently managing dairy heifers are mandatory. Although many dairies use some form of size-sorting, 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 overweaned in A.I. pens and each pen should be constructed with a back fence and headlocks to facilitate a 100 percent looking rate.

**Average 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 pro-

ducers. 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 became pregnant. An eligible heifer is one that is postparturient, 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 a 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 AI with conventional semen, whereas lactating cows are less fertile.

Published reports from Select Stares describe an average conception rate at first service of 47 percent (815 services) in Holstein heifers and 53 percent (2,664 services) in Jersey heifers. Further, the conception rate achieved following AI with sexed semen averaged 50 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 was 46 percent (ranging from 37 to 70 percent; 39,783 services) compared to 50 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 when used at first service. Consequently, if a dairy or heifer raiser currently achieves a 45 percent conception rate to first service or 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 the data in the previous paragraph, there is large variation in fertility following AI 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.


As mentioned previously, raising replacement heifers is usually the second largest expense associated with the dairy business. Replacement cost, as described by Greg Behard (D.S.M., Raleigh, NC) and Albert Nunes (Geneseo, Midlothian, 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 replacement calves) × number of calves expected to calve] / (expected income from first 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 considered among all sizes of herds or for heifers milking 50 or 100 pounds per day. Lastly, a reasonable replacement cost goal in most areas of the U.S. is less than 81.50 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.

Western Dairy News is published as a service to people interested in the health and welfare of the Western dairy industry. Archives of this publication may be found at: http://ahltv/ Western Dairy News

For further information contact:
Dr. Reagan Adams, Editor
LAM, CSU-VTH
300 W Drive Road
Fort Collins, CO 80523
970-297-0371
rcaums@amrco.co.state.edu

Material published in Western Dairy News is not subject to copyright. Permission is therefore granted to reproduce articles, although acknowledgment of the source is requested.

Cooperative Extension programs are available to all without discrimination.