

# Why all gestations aren't equal

Breed, sire, and dry period length play a role. Also, progeny test herds aren't equal.

by Hoard's Dairyman staff

**A**T THE American Dairy Science Association annual meeting in San Antonio, Texas, researchers gathered to discuss a wide array of issues. There were a number of good presentations in the genetics arena. What follows are highlights from [research by Animal Improvement Programs Laboratory scientists](#) at USDA's Agriculture Research Service in Beltsville, Md. Additional research on crossbreeding is summarized by Bennet Cassell on page 572.

## Gestations vary nearly 8 days among breeds

Over 9 million calving records, taking place from 1999 to 2005 for five dairy breeds, were evaluated for a variety of parameters. Table 1 shows how gestation length varies among the breeds and between first-calf heifers and older cows. Brown Swiss and Guernseys have the longest gestations at 287.5 and 285.8 days, while Holsteins were the shortest at 279.5 days. Jerseys and Holstein first-calf heifers calved about 1-1/2 days sooner than older counterparts, with the other three breeds having less difference between age groups. There was limited

Breed	First calving	Second through later calves	Difference
	Days		
Ayrshires	281.8	281.7	0.1
Brown Swiss	287.3	287.5	0.2
Guernseys	284.8	285.8	1.0
Holsteins	277.9	279.5	1.6
Jerseys	278.5	280.0	1.5

data on first-calf heifers in the Ayrshire, Brown Swiss, and Guernsey breeds.

They also found that calves conceived in autumn and born in summer entered the world about 2 days sooner than those conceived during the spring and born in winter. Single-birth females are born 1 to 2 days earlier than males. Twins are born about 5 days earlier than single calves.

## Birth dates range 10 days based on service sire

Building on the before-mentioned research, AIPL scientists made some additional edits that eliminated females that had less than 87 percent breed purity. Cows and heifers were also eliminated if they were not bred to an A.I. bull. That left about 5.5 million available records.

Scientists determined the heritability of Holstein service sire gestation length (GL) is 34 percent, similar to many yield traits. Meanwhile, the cow sire GL heritability is 12 percent, like that of many health traits.

They also developed predicted transmitting abilities (PTAs) for service sire and cow sire GL. To be included in the study, a bull had to have 100 breedings and 100 daughters in the data set. Among service sires, gestation length ranged from -5.3 to 5.3 . . . meaning that the spread between the shortest and longest gestation service sire was 10.6 days. The spread wasn't as great for cow sire, only 4.4 days. Results are shown in Table 2.

## Short, long gestations lead to more dead calves

Using similar data as the previous two projects, AIPL researchers investigated the connection between gestation length and stillbirths. Only gestations that were between 260 and 295 days were included in this study, and herds must have had at least 15 calvings with 3 or more reported still-

births in Holstein herds.

They found that the average stillbirth rate was 12.3 percent for heifers and 5.4 percent for cows. Stillbirth rates were 1.5 percent higher for cows conceiving from March-April compared with those conceiving in July-August. Meanwhile, stillbirths were 4.3 percent higher for heifers conceiving in March-April compared with August-September.

Stillbirth rates were higher for short and long gestation lengths. Short gestations likely resulted in more stillbirths because of inadequate calf development and vitality.

On the flip side, long gestations likely led to more dead calves because of dystocia problems.

As expected, more dead calves also occurred in multiple births. In fact, stillbirth rates were 3.5 times higher for cows and 2.3 times higher for heifers having multiple births. There were 2 percent more dead calves when lactations were over 500 days, compared to those about 250 days in length. Low-producing Holsteins milking less than 13,000 pounds of milk had 1.5 percent more dead calves than those over 35,000. Lastly, stillbirth rates were higher for cows in fifth and later lactations.

## For live calves, avoid short, long dry periods

Much has been written on how shorter dry periods affect the cow. What about newborn calves? AIPL researchers evaluated over 450,000 records to see how dry periods affected the resulting calf.

For the calf's sake, data suggest extreme dry periods under 40 days and those over 60 days should be avoided. Stillbirth rates were the lowest for dry periods 55 to 60 days in length. Stillbirth rates remained low for dry periods between 40 and 60 days. The negative effect of short dry periods was most pronounced in dams with less than 30 days dry, with 5 percent fewer of their heifer calves surviving to the first lactation. Calving ease scores rose (more difficult calving) as the dry period got longer and plateau at about 70 days dry. Further research on survival to first calving, adjusting for outside effects, is needed.

## All herds are not equal for progeny test

Researchers at AIPL and Penn State demonstrated that heritabilities could be generated for individual herds based on the relationship between daughter records and either their dam records or

Effect	PTA population	Gestation length PTA (d)	
		Shortest	Longest
Service sire	Heifer	-4.2	4.2
	Cow	-5.3	5.3
Cow sire	Heifer	Aspiration	Sovereign
		Darren	Silky Gibson
	Cow	-2.1	2.3
		O Man	Shandy



**TWINS AND TRIPLETS** are born about 5 days earlier than single births. Besides that, they are 3.5 times more likely to result in stillbirths in cows.

their sire predicted transmitting abilities (PTAs). Personnel from A.I. studs then provided paternity verification results from DNA marker analysis on 235 herds. The number of cows DNA tested per herd ranged from 3 to 274 cows. The herd heritabilities and sire misidentification rates were then used to develop a misidentification rate prediction formula. Using this formula, they evaluated records from 7 million cows in nearly 21,000 herds.

They found there was a wide range in the usefulness of genetic information for sire evaluations from herd to herds. On average, they estimated the misidentification rate to be 13 percent. Misidentification rates were higher in larger herds.

It makes sense that herds with accurate identification are more valuable to A.I. sampling programs. But they also found that A.I. young sires were less likely to enter proven lineups if they were sampled in herds with low heritability (high misidentification rates) compared to herds with average to excellent identification. The researchers concluded that in the future, herd heritability estimates could be used to identify sires with potentially underestimated genetic evaluations.

## More cows die in July and August

There have been reports of more deaths among milk cows. To take a hard look at the matter, researchers looked at a 10 percent sample of all the DHI records completed in the U.S for a 11-year time span. Herds with less than 400 lactations during that time and those with death rates under 0.3 percent were excluded. Three breed groups were evaluated: Holstein, Jersey, and other.

The frequency of lactations ending in death was 2.92 percent. There has been an upward trend in deaths from 1995 to 2005, 1.72 percent was the total increase. There was a spike in deaths from 2003 to 2004. That spike was likely due to a change in USDA regulations that require downer cows to be euthanized.

Deaths were more likely to occur in early lactation. Compared to lactations longer than 250 days, lactations that terminated at less than 46 days had a 16.5 percent higher death rate. Death rate steadily rose with parity. By the eighth lactation or greater, death rate was 2 percent higher than for first-lactation cows.