Breeding Decisions and the Genetic Future of the Herd

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Every decision made on a dairy farm is, by definition, a decision about the future. It may be a decision about something later on in the day or a decision that will shape the future two years down the road.

Because cows lactate at the highest level following calving, we seek to have cows pregnant as soon as possible after calving and begin trying to get them pregnant again as early as 45 days after calving. Obviously pregnancy is the primary goal, but producing a heifer replacement is the secondary goal in the rebreeding decision. After all, a dairy cow or heifer is an asset of the dairy herd which can reproduce herself. The genetic future of the herd is determined by the decisions made when a heifer is bred to produce her first calf or a cow rebred following a calving to produce that replacement asset.

Because all cows and at least 75% of the heifers must be bred to maintain herd size they will determine one-half of genetic contribution made to the replacement heifers which are produced and thus one half of the genetic future of the herd. The other half of the genetic contribution to replacement heifers will come from the sires of those heifers. Here we have a few more options for what that genetic contribution and it's quality might be.

To have the best estimate of the potential genetic contribution of sires, we can use semen from bulls in an artificial insemination stud whose genetic contribution has already been evaluated because they already have daughters who have calved at least once and lactated. These bulls are often referred to as "proven" bulls. One measure of the quality of their genetic contribution is the level of their lifetime net merit dollar index or NM$. NM$ is an index made up of yield, productive life, somatic cell score, udder traits, feet and leg traits, size, pregnancy rate and calving difficulty weighted according to their economic contribution to lifetime profit.

Another option is to use semen from young bulls in an artificial insemination stud which have not yet sired daughters with milk production records but whose sire was a "proven" sire and whose dam was a cow in the top 2% of all cows in the breed. Here again genetic quality will be determined by the merit of the sire and dam for an index like NM$.

A third, and much less desirable option, is to choose a natural service bull without any known genetic credentials. At best such a bull might also be the son of a high quality proven bull but whose dam wasn't good enough to be in the top 2% of the breed. Obviously, the higher quality of both the sire and dam the higher will be the expected quality of son.

Decisions about the genetic future of the herd really are about which cows and bulls will be the dams and sires of the future heifer replacements in the herd and the quality of

the genetic contributions they will make to those future heifers. The quarterly genetic evaluations for dairy bulls and cows put out by USDA give us an estimate of the genetic merit of these three groups of bulls. Results for August, 2006 for each of the dairy breeds are given in Table 1. The numbers in parentheses are the number of bulls in each category.

Table 1. Average evaluations for NM$ for three groups of bulls in each of five major dairy breeds.

Bull Group	Ayrshire NM$	Brown Swiss NM$	Guernsey NM$	Holstein NM$	Jersey NM$
Active AI	104 (22)	263 (44)	152 (22)	241 (660)	269 (96)
First Evaluation AI	183 (2)	118 (13)	192 (3)	186 (362)	192 (45)
First Evaluation Non-AI	88 (6)	115 (14)	21 (9)	41 (346)	45 (49)

The “proven” or Active AI bulls are somewhat superior to the young sires (i.e. first evaluation AI) except for the breeds with very small numbers of young sires . The most striking result is the inferiority of the “natural service” or first evaluation non-AI bulls to either of the two AI groups, with the exception of the Brown Swiss breed for this quarterly run. Clearly, AI bulls will make a greater contribution to the genetic future of the herd.