

Scientists Study Holstein Milk Production, Fertility

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A genetic link between higher milk yields and less fertility has been found in Holstein cattle by ARS researchers and their colleagues.

(PhysOrg.com) -- Agricultural Research Service (ARS) scientists have discovered why Holsteins—bred to produce more milk—are less fertile than before breeding efforts were stepped up to increase dairy production: It's in their DNA.

Since the U.S. dairy industry intensified selective breeding efforts in the 1960s, average milk yield in Holsteins has doubled, but the [cattle](#) are less fertile. A comparison of DNA from cattle selectively bred for milk production versus cattle isolated from such practices shows a genetic link between increased yields and reduced fertility, according to researchers at the ARS Animal and Natural Resources Institute (ANRI) in Beltsville, Md.

The researchers teamed up with colleagues at the University of Minnesota (UM) to compare the genomes of modern Holsteins with those of UM cattle never exposed to the modern selective breeding practices. The lack of exposure meant

that DNA from the UM cattle were genetic "time capsules" of an era before the selection efforts intensified.

ANRI geneticist John Cole and colleagues drew DNA samples from the genetic material of about 2,000 cattle, stored at the ARS National Center for Genetic Resources Preservation, the Holstein Association USA, and five U.S. universities, including UM. The scientists extracted DNA and genotyped the samples using the Illumina Bovine SNP50 BeadChip, a glass slide capable of obtaining genotypes for thousands of markers simultaneously. The device was developed by ARS researchers in collaboration with industry, university and other ARS partners.

By analyzing 50,000 genetic markers, the researchers found that many of the chromosomal regions associated with increased milk yield were also associated with reduced fertility rates. The results also showed that up to 30 percent of the Holstein genome may be influenced by standard breeding practices, according to Tad Sonstegard, an ANRI geneticist.

The researchers say the results will help Holstein breeders and [milk](#) producers better understand tradeoffs between high yield and low fertility when selecting for more profitable dairy cattle.

More information: [Read more](#) about this research in the October 2009 issue of *Agricultural Research* magazine.

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