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2009 : July 2009 - Fast Moving Fronts : Lawrence R. Schaeffer

**FAST MOVING FRONTS - 2009**

July 2009



**Lawrence R. Schaeffer talks with ScienceWatch.com and answers a few questions about this month's Fast Moving Front in the field of Plant & Animal Science.**



**Article: Strategy for applying genome-wide selection in dairy cattle**  
 Author: Schaeffer, LR  
 Journal: J ANIM BREED GENET, 123 (4): 218-223 AUG 2006  
 Addresses: Univ Guelph, Dept Anim & Poultry Sci, Ctr Genet Improvement Livestock, Guelph, ON N1G 2W1, Canada.  
 Univ Guelph, Dept Anim & Poultry Sci, Ctr Genet Improvement Livestock, Guelph, ON N1G 2W1, Canada.

**SW: Why do you think your paper is highly cited?**

It was the first paper that looked at the effects of genome-wide selection on dairy cattle bull progeny testing, and showed that the gains in improved genetic progress and lowered costs could be very significant. I think the paper sort of woke everyone up. I also published the paper quickly so that no one could patent those ideas, and that they would be available to everyone.

**SW: Does it describe a new discovery, methodology, or synthesis of knowledge?**

It described the potential advantages of genome-wide selection, which were considerable when compared to current practices in dairy cattle progeny testing.

**SW: Would you summarize the significance of your paper in layman's terms?**

By using single nucleotide polymorphism (SNP) panels of many thousands of markers, it is possible to genotype animals at birth and to predict the animal's genetic merit with an accuracy equivalent to that of a newly progeny-tested bull, but without waiting five years to get that same level of accuracy.

A progeny-tested bull costs approximately \$50,000 in terms of food and maintenance over five years, while genotyping a bull calf will cost less than \$300 within the first month of the life of that animal. Only one in 20 progeny-tested bulls is returned to duty to inseminate cows. With genotypes at birth, the 19 poor bulls can be screened early and never entered into artificial insemination.

**SW: How did you become involved in this research and were any particular problems encountered along the way?**

We had a project with the Semex Alliance (artificial insemination organization) to work on predicting genetic merit for genotyped animals. I decided to look at how these

*"I also published the paper quickly so that no one could patent those ideas, and that they would be available to everyone."*

predictions were going to be used, assuming that the accuracy was going to be very favorable.

The problems during the project were obtaining the money to genotype bulls, and getting genotypes back from the lab quickly enough, but these did not impact on my paper. The accuracy of the predictions of genetic merit turned out not to be as high as anticipated, but they were high enough to be useful, as I showed in later simulations.

**SW: Where do you see your research leading in the future?**

Future research will be on how individual dairy producers might use this technology, how to make the predictions of genetic merit more accurate, and what will be the long-term effects of using this technology.

**SW: Do you foresee any social or political implications for your research?**

The political implications will be conflicts with groups that will patent areas of the genome, such that the SNP markers could not be used because they are too close to the patented gene. Patented genes, in dairy cattle at least, will not be used if they demand royalties for their use. This will make genetic predictions less accurate and less useful. You can probably tell that I am opposed to patenting genetic material, genes, and chromosomes.

**Lawrence R. Schaeffer, Ph.D.**  
**Professor of Animal Breeding**  
**University of Guelph**  
**Guelph, Ontario, Canada**

KEYWORDS: GENOME-WIDE SELECTION, DAIRY CATTLE BULL PROGENY TESTING, SINGLE NUCLEOTIDE POLYMORPHISMS MARKERS, PROGENY-TESTED BULL, SEMEX ALLIANCE.



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