



Using Unsupervised Production Information In Canadian Genetic Evaluations

Since 1986, production performance information recorded by herd owners has been included in the calculation of genetic evaluations for milk, fat and protein in Canada. Other major dairying countries also include significant proportions of unsupervised data in their genetic evaluations for production traits including Australia, Denmark, Finland, Germany, Israel, New Zealand, Norway, Sweden and United States. This practise of including such "unsupervised" production data has sometimes been criticized since it is perceived as reducing the accuracy of the resulting bull proofs and cow indexes. This article takes a closer look at this question and the possible impact on rates of genetic improvement in Canada.

Milk Recording Programs

For decades now, milk recording agencies have offered Canadian dairy producers the choice of collecting their own production records on a monthly basis or having a milk recording employee confirm each cow's identification, record the yield for each cow, take milk samples and generally "supervise" the performance recording procedures on the farm. With the introduction of Vision 2000 in late 1999, complete flexibility in choice between supervised and unsupervised testing services are available to Canadian producers. Lactations based on producer-recorded information are used for on-farm management decisions while those based on mainly supervised information may be used in official publications, promotional advertisements and for individual cow or herd awards. Initial research conducted in the mid-1980's indicated that since the unsupervised data was only used for management reasons, the producer was primarily interested in providing accurate information and there was subsequently no reduction in the accuracy of genetic evaluations which included unsupervised data.

Information in Genetic Evaluations

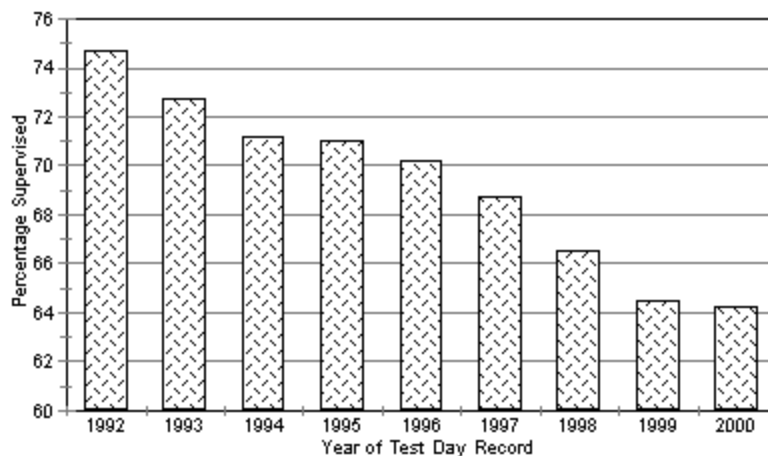
In Canada, there were 740,651 cows in 14,112 herds enrolled on milk recording in 1999. Of these cows, 43.7 percent were on complete unsupervised testing

while the remaining 56.3 percent were on a regular milk recording program involving supervised testing. The latter includes the usual 24-hour recording programs whereby all milkings that day are supervised, the AM/PM programs which include the supervision of either the morning or evening milking in conjunction with a timing device which records the interval between milkings, and an alternating program which requires a supervised test between each pair of unsupervised ones.

Specific guidelines, related to the accuracy of the information recorded during an unsupervised test, are verified prior to inclusion in the Canadian Test Day Model genetic evaluations for milk, fat, protein and somatic cell score. Only data from registered cows which are in herds that meet required levels of animal identification and a successful annual milk meter verification process, is included in genetic evaluations. In addition, there are minimum standards regarding the amount of supervised data used to calculate a cow's genetic index for production traits which is publishable. Cow indexes based primarily on unsupervised information are provided twice yearly to herd owners, again for management purposes only since they are labelled as "Not for Publication".

The November 2000 production evaluations included 25.6 million test day records in the Holstein breed for cows first calving since 1988, of which 69.4 percent are supervised. On a year by year basis, the trend towards more unsupervised and less supervised data in genetic evaluations is clear (Figure 1).

Figure 1: Trend in the Percentage of Supervised Records in Genetic Evaluations



Currently, close to 36 percent of the new test day records being added to genetic evaluation calculations in the Holstein breed are unsupervised. The trend towards unsupervised data contributing to genetic evaluations also differs by province as indicated in Table 1. Some provinces which traditionally used supervised testing programs, such as Manitoba, British Columbia, Saskatchewan and Nova Scotia, have seen a significant trend towards more unsupervised testing since 1995. Québec and Alberta already have close to equal portions of

supervised and unsupervised test day records contributing to genetic evaluations. With the introduction of Vision 2000 only last year, there is still likely to be more shifting in milk recording services used by Canadian producers in the years to come.

Table 1: Change in Percentage of Supervised Test Day Records in Genetic Evaluations by Province from 1995 to 2000			
Province	Percent Supervised Records in 1995	Percent Supervised Records in 2000	Change in Percent Supervised Records
Prince Edward Island	92.6	89.7	- 2.9
Nova Scotia	96.5	90.8	- 5.7
New Brunswick	94.6	93.8	- 0.8
Québec	54.7	45.1	- 9.6
Ontario	79.4	78.2	- 1.2
Manitoba	95.2	81.8	- 13.4
Saskatchewan	87.6	80.2	- 7.4
Alberta	49.9	52.9	+ 3.0
British Columbia	96.6	89.1	- 7.5
CANADA	71.0	64.2	- 6.8

Impact of Unsupervised Records on Bull Proofs

With the continued trend towards more unsupervised testing included in genetic evaluations, it is important to monitor the impact on the accuracy of the resulting genetic evaluations. Since official cow indexes require a minimum amount of supervised testing, the main potential concern is the accuracy of bull proofs based mostly on unsupervised test day records.

To address this question, a recent analysis was done at Canadian Dairy Network using 571 currently proven Holstein bulls sampled in Québec by CIAQ from 1993 to 1996. Two special characteristics associated with this group of bulls make this study of particular interest. Firstly, the "Parent Average" for each bull at the time they were sampled was available for analysis. This information allowed for a fair comparison to each bull's eventual official proof for bulls tested in a common year since no adjustments for annual base changes were required and each

bull's Parent Average was not affected by their eventual proof. Secondly, there was a very significant variation across bulls in the percentage of supervised versus unsupervised test day records included in their August 2000 production proofs.

Bulls were divided into three equal-sized groups based on the percentage of supervised information in their proof; "Low" with less than 35% supervised, "Intermediate" with between 35% and 50% supervised and "High" with over 50% supervised. The overall analysis showed that ***the inclusion of unsupervised test day data in genetic evaluations results in no observed bias in official bull proofs***. It must be clearly understood, however, that this conclusion may be quite dependent upon the current Canadian policy of not issuing official lactation records nor official genetic indexes for cows which have primarily unsupervised test day information. More details of the study can be obtained by contacting CDN.

Impact on Genetic Progress

Should Canada have not made the 1986 decision to include unsupervised data from approved herds in genetic evaluations, there would have been approximately 25% less calvings each year used to prove bulls and, therefore, over 100 fewer Holstein young bulls tested annually. This would total at least 1,000 fewer Holstein bulls proven in Canada to date and would have significantly slowed down the rates of genetic improvement realized over the past decade. In addition, the owners of the cows on unsupervised milk recording have benefited from the availability of unpublishable genetic indexes for management decisions. As the dairy cattle improvement industry continues to evolve in the services provided to producers, the accuracy of genetic evaluations and other official genetic improvement tools will be regularly monitored. A balance between maximum usage of information and accuracy of results is the main goal for optimum efficiency and breed improvement.