



U.S. Milk Quality Monitoring Using Bulk Tank Somatic Cell Counts

The National Mastitis Council and USDA have collaborated on a monitoring system to summarize U.S. milk quality. The system represents 37 percent of U.S. milk and 45 percent of U.S. dairy producers with permits to ship milk.

Bulk tank somatic cell count (BTSCC, a measure of the number of white blood cells per ml. of raw milk) was chosen as an indication of milk quality. BTSCC reflects the level of infection and resultant inflammation in the mammary gland of dairy cows and provides an indirect measure of the processing quality of milk. While BTSCC is not a public health concern, reasons to monitor BTSCC include domestic consumer demands for high quality, processor need for high quality raw milk, to help improve cow udder health, and potential pressure from international markets for documentation of our high-quality dairy products.

The summary showed lower BTSCC in monitored herds in 1996 as compared to the 2 previous years, although a change in number of herds monitored precluded a direct comparison in BTSCC by year. The system also showed that milk quality was related to season of the year and the amount of milk shipped monthly by each producer.

The USDA's Centers for Epidemiology and Animal Health (CEAH), in a cooperative project with the United States Department of Agriculture: Agricultural Marketing Service (USDA:AMS) and the National Mastitis Council's Milk Quality Monitoring Committee, received data from five Federal Milk Marketing Orders during 1994 and 1995 and eight orders in 1996. Participating Federal Milk Market Orders collected BTSCC data from dairy operations through dairy cooperatives as part of multiple component pricing. These orders combined included dairy producers from 22 states.* The participating federal milk market orders provided the following data electronically by month for each dairy producer: total pounds of milk produced during the month, BTSCC, percent protein, percent fat, and percent solids non-fat (SNF). The BTSCC, protein, fat, and SNF were an average for the month. The participating federal milk market orders assigned each producer a code number to maintain confidentiality.

Dairy producers in the eight orders shipped a total of 14.5 billion pounds of milk in January through March 1996, equal to approximately 37 percent of the total U.S. milk production during this time (USDA:NASS Milk Production Report). These orders represented 47,210 producers in July 1996, or 45 percent of those with permits to sell Grade A or manufacturing grade milk (Western Dairyman, December, 1996).

Tables 1 and 2 provide information on the expanding coverage of BTSCC monitoring. The nine states shown were the largest milk-producing states in the monitored sample. Iowa, Minnesota, and Wisconsin were added to the monitoring system on January 1, 1996.

Table 1

Percent of Total State & U.S. Milk Production in the BTSCC Monitoring System									
Pounds of Milk (10 ⁶) in January-March									
State	1994			1995			1996		
	Sample	% State Total	State Total *	Sample	% State Total	State Total *	Sample	% State Total	State Total *
Iowa	0	0	958	0	0	1,001	625	67	934
Indiana	420	75	559	453	82	554	550**	100	550
Michigan	105	8	1,331	102	7	1,383	1,292	93	1,394
Minnesota	0	0	2,368	0	0	2,391	1,938	79	2,451
New Mexico	596	77	771	831	94	888	851	92	924

Ohio	1,000	89	1,125	1,055	91	1,159	1,061	94	1,128
Pennsylvania	378	15	2,527	395	15	2,631	402	15	2,723
Texas	1,242	76	1,631	1,606	98	1,646	1668**	100	1,668
Wisconsin	0	0	5,308	0	0	5,613	5,020	89	5,631
Total: Sample/State	3,741	2	16,578	4,442	26	17,266	13,458	77	17,403
Total: U.S.	3,880	10	37,613	4,610	12	38,941	14,500	37	39,140

*USDA:NASS Milk Production Report

**Value approximated

Table 2

Percent of Total Milk Production in the BTSCC Monitoring System									
Number of Producers									
	1994			1995			1996		
State	Sample # Producers in July	% State Total	Total # Producers with Grade A & B Permits *	Sample # Producers in July	% State Total	Total # Producers with Grade A & B Permits*	Sample # Producers in July	% State Total	Total # Producers with Grade A & B Permits *
Iowa	0	0	4,754	0	0	4,469	2,448	56	4,390
Indiana	1,925	54	3,554	1,869	56	3,339	1,920	62	3,121
Michigan	421	9	4,649	220	5	4,492	3,711	87	4,243
Minnesota	0	0	12,626	0	0	11,817	7,781	71	10,970
New Mexico	113	73	154	143	95	151	142	94	151
Ohio	4,043	66	6,121	3,988	69	5,751	3,772	67	5,657
Pennsylvania	2,093	17	12,000	2,091	17	12,000	2,027	18	11,417
Texas	1,578	81	1,960	1,846	98	1,880	1650**	100	1,650
Wisconsin	0	0	28,323	0	0	26,887	19,778	77	25,526
Total: Sample/State	10,173	14	74,141	10,157	14	70,786	43,229	64	67,125
Total: U.S.	10,864	9	117,732	10,827	10	111,932	47,210	45	106,028

*Sources: Hoard's Dairyman (October 25, 1994; October 25, 1995), Western Dairyman (December 1996).

**Value approximated

In 1996, this milk quality system represented 37 percent of the U.S. milk shipped (Table 1) and 45 percent of U.S. dairy producers (Table 2). This system represented greater than 65 percent of milk shipped and greater than 50 percent of producers with permits to ship milk in Iowa, Indiana, Michigan, Minnesota, New Mexico, Ohio, Texas, and Wisconsin.

Figures 1 through 3 are based on data from the participating federal milk market orders from January 1, 1994, through September 30, 1996. They do not represent all milk produced in the United States, nor do they represent all milk produced in the States involved. Figure 1 shows seasonal differences with an increase in BTSCC during the summer months in 1994, 1995, and 1996. This increase in BTSCC in herds monitored was less marked in 1996 than in the previous 2 years.

Fig. 1

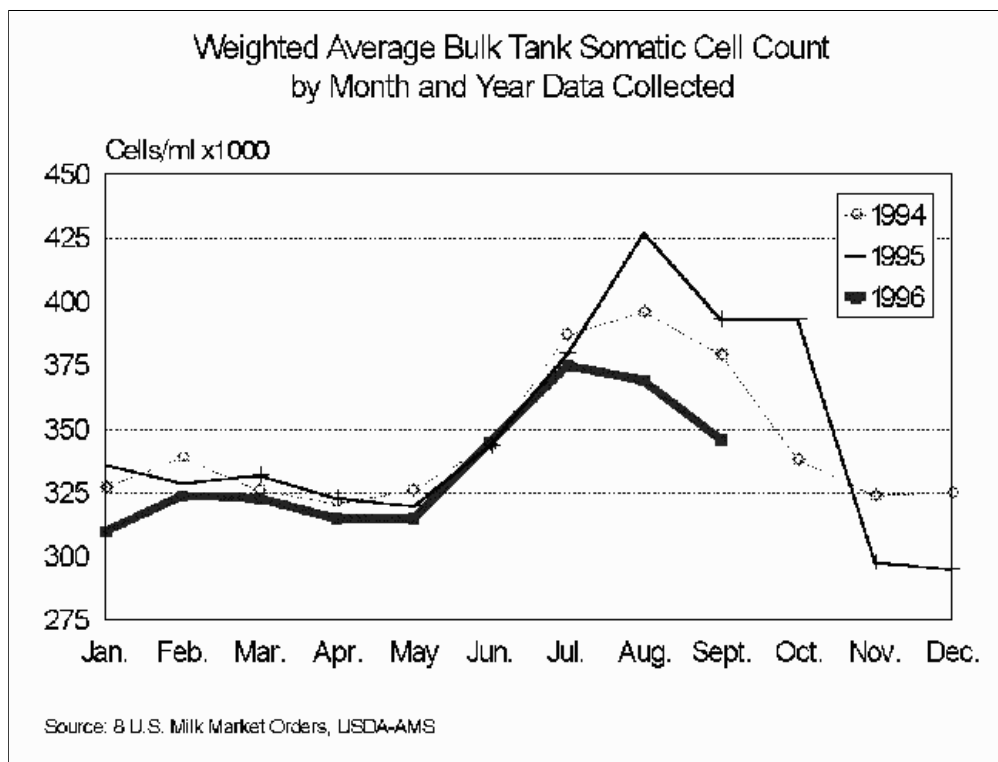


Figure 2 displays the relationship between the amount of milk shipped per producer each month (a reflection of herd size) and BTSCC for 1995. In general, herds shipping the most milk shipped milk with the lowest BTSCC. All three herd sizes showed similar upward trends during the summer months. Similar trends were noted for 1994 and for the first 9 months of 1996.

Fig. 2

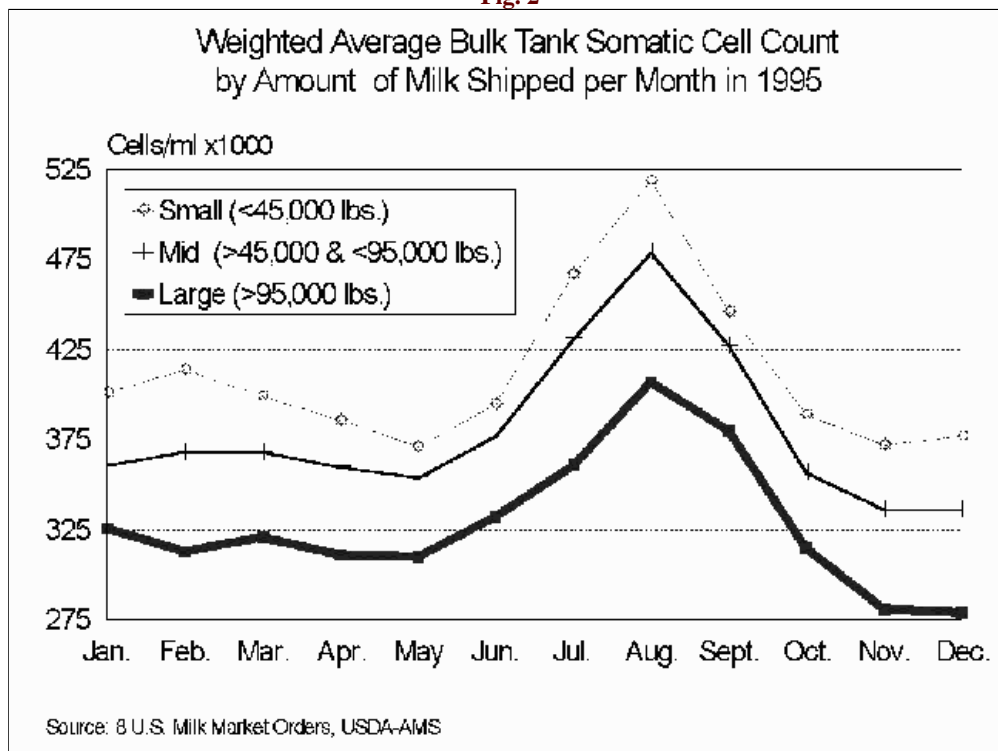
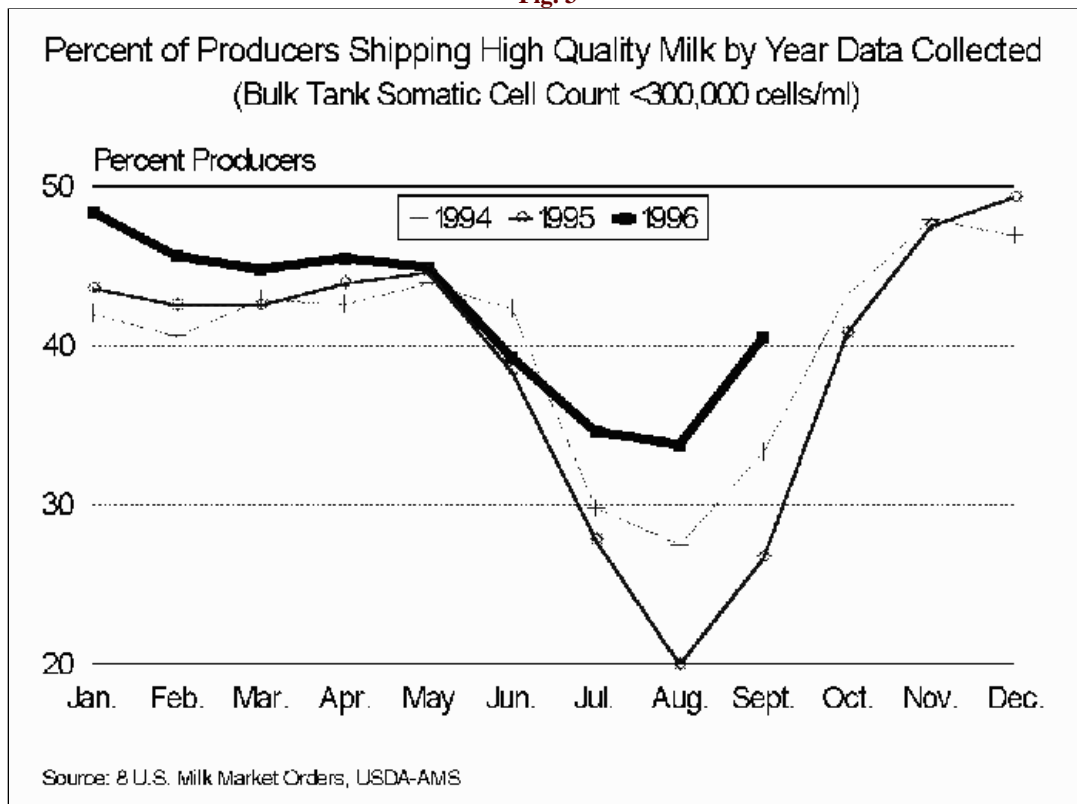


Figure 3 shows BTSCC in 1995 separated into three milk quality levels, the high level at less than 300,000 cells/ml and low at greater than 500,000 cells/ml. The graph represents the percentage of total monitored pounds of milk shipped per month in each of the BTSCC levels. During most of the year, about 50 percent of the milk produced in these milk market orders had BTSCC of less than 300,000 cells/ml. Figure 4 demonstrates the percentage of monitored dairy producers each year who shipped milk with BTSCC less than 300,000 cells/ml. Changes in numbers of monitored herds preclude simple year-to-year comparisons. In all 3 years, the percentage was above 40 percent, except during the summer months.

Fig. 3



This summary represents progress as of September 30, 1996, in summarizing U.S. milk quality using BTSCC as an indicator. This information may be useful in evaluating trends in raw milk quality and in targeting educational efforts toward lower BTSCC levels.

* Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Virginia, West Virginia, Wisconsin, and Wyoming.

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