



## The changing face of the dairy cow

By Christy Couch Lee

*Oh, the amazing, incredible dairy cow, possessing the ability to convert grass and grain into nature's most perfect protein — helping children grow; helping athletes recover; helping humans thrive.*

*The past century has seen great genetic advancements made through natural selection, allowing the dairy cow to continually become more efficient in her productivity.*

*"The ability for one cow to feed a vast number of people — at an average, feeding 40-50 people; at peak lactation feeding 100 people? That, to me, is an accomplishment," says Kent Weigel, Ph.D., professor and chair of the Department of Animal Science at the University of Wisconsin-Madison. "Anything else pales in comparison."*

*In fact, USDA statistics show that U.S. dairy farmers of today are producing nearly three times more milk with about half the cows, compared to 1960.*

*How has the American dairy cow changed? And what does her future hold? The information is astounding.*

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### PROGRESSING THROUGH THE YEARS.

Genetic selection has led to great advancements in the efficiency and production capabilities of the American dairy cow.

Nearly a century ago, in the 1920s and '30s, the dairy cow's performance was just beginning to be measured.

"Producers utilized all natural service matings," Weigel says. "We, as a dairy industry, also began our ability to measure the performance of individual animals within herds and base selection on that performance."

The advent of artificial insemination (AI) in the late 1940s and early '50s was a game changer in genetic selection, Weigel says.

"Before AI, the genetic level of the farm was tied to the level of bull you happened to have — you would use that bull on all of your cows," he says. "The ability to utilize frozen semen, which could be shipped long distances, was a big milestone for the dairy industry."

Progeny testing, which measures the productivity of a bull's offspring in relation to others, also brought new opportunities and growth in the dairy industry.

"Being able to measure the performance of a bull's cows in relation to others provided a great opportunity to determine if genetics or environment were contributing to the productivity of certain genetic lines," he says.

Measuring milk protein, beginning in the 1970s; the increased ability to predict calving ability; genetic selections for overall net profit; and sexed semen have also been great advancements in the U.S. dairy industry, Weigel says.

### HER CHANGING LOOK.

"Our cattle were dual-purpose — being used for both milk and meat production," Weigel says. "As the industry has progressed, we are no longer dual-purpose. Beef cattle went in one direction and dairy cattle went another."

Because of this, he says, the dairy cow has continually improved in udder capacity, udder depth and teat placement, as well as feet and leg structure.

"In addition, the dairy cow has continually progressed to be taller, thinner and more angular," Weigel continues. "They're not putting those nutrients into body fat and reserves, but into milk production."

And has her production ever increased.

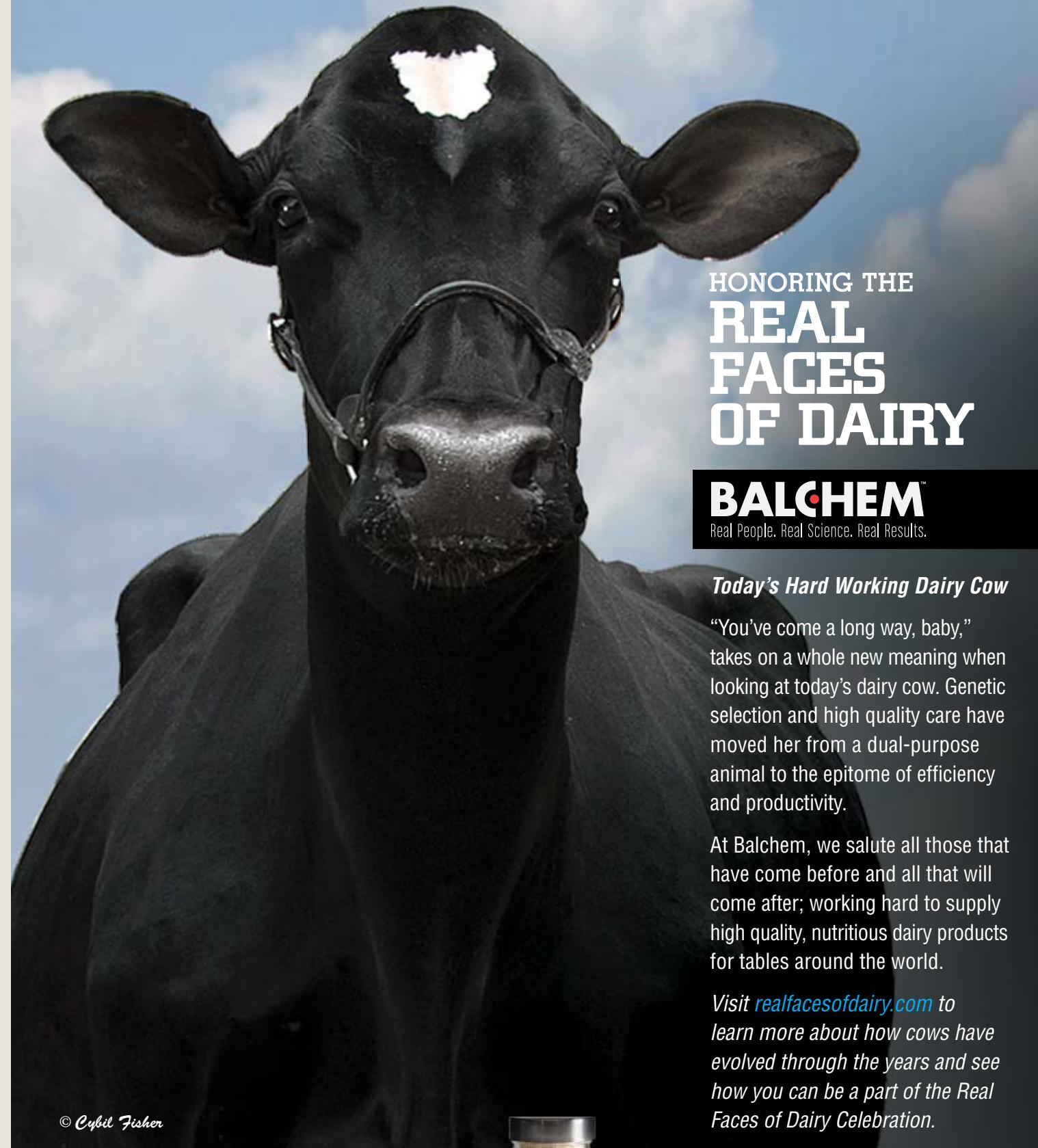
In the past century, the American dairy cow has increased production four to five times — from an average of about 6,000 lb. of milk annually in 1930 to 22,393 lb. annually in 2015, according to USDA.

"And not only are we continually working to increase the production per cow — we are also trying to increase total fat and protein yield," Weigel says. "We don't



*Kent Weigel, University of Wisconsin-Madison, says the American dairy cow has made great advancements through the past century, both in productivity and efficiency.*

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Kent Weigel*



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## REAL FACES OF DAIRY

The Faces of Dairy campaign is a year-long project designed to honor and celebrate the past, present and future people—well known and lesser known—shaping the American dairy industry through their personal stories. It provides a forum to highlight the many advancements creating an exciting and vibrant industry serving a global market.

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*“In the U.S., we haven’t focused selection on milk properties, such as on casein proteins, but we need to look at that more in the future. A long-term strategy would be to have a clear idea of what we want to see in the milk and use certain groups of cattle for certain products.”*  
**Kent Weigel**

want to just make more water. We want quality, too.”

### INCREASING EFFICIENCY.

In a study conducted by M.J. VandeHaar and N. St-Pierre in 2006, a cow producing about 100 lb. of milk per day needs four times the energy required for maintenance alone. An elite cow producing 200 lb. of milk at peak lactation requires seven times more energy than during maintenance.

“The way we often think of efficiency is in terms of maintenance,” Weigel says. “A cow needs a certain amount of feed to maintain, and over and above that, she uses the feed to produce milk. Historically, she was using twice as much feed for maintenance.”

Weigel says current University of Wisconsin research is working to develop genomic selection tools to improve efficiency within cows, not simply increase production.

By feeding a reference group of about 8,000 cows and measuring feed intake per cow per day, researchers are able to determine feed efficiency in relation to production.

### THE CRYSTAL BALL.

Weigel believes the dairy industry of the future will see increased selection for feed efficiency and postpartum health.

And, although the industry seems to be swinging toward a larger cow body size, he warns against chasing extremes.

Keeping sight of moderate body size and uniformity in herds could lead to reduced health problems and improvements in foot and leg conditions, Weigel says.

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“As an industry, we haven’t paid a lot of attention to uniformity,” he says. “We’ve often bred for extremes and the outliers. Uniformity within herds can benefit the industry.”

Weigel also sees the possibility of genetic selection focusing on consumer demands in the future.

“In the U.S., we haven’t focused selection on milk properties, such as on casein proteins, but we need to look at that more in the future,” he says. “A long-term strategy would be to have a clear idea of what we want to see in the milk and use certain groups of cattle for certain products.”

And, if history provides insight into the future, production will also likely increase.

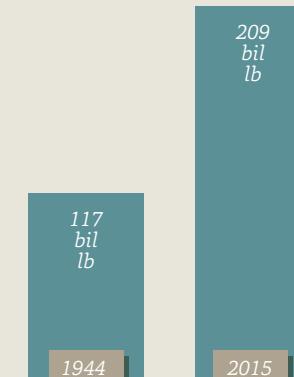
Holstein cow Bur-Wall Buckeye Gigi, owned by Robert Behnke, Brooklyn, Wis., just broke the world record for milk production in a year — nearly 75,000 lb.

Weigel says if you look back through scientific literature through the years, each record — 20,000 lb., 40,000 lb. — was thought to not be attainable as a herd average. But eventually, the cows caught up. So is it possible that herd averages could reach 70,000 lb.? It’s possible, Weigel says.

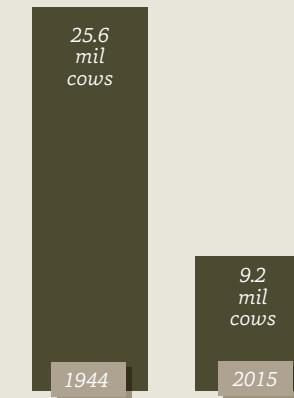
“The key is, what is the cost of animal care and rations to reach that level of production?” he asks. “More cows at a 40,000 average could be more efficient than a few at 80,000.”

Yes, the American dairy cow is quite the incredible being. We’ve seen her develop and change throughout the past century, and the evolution will only continue into the future.

## Environmental Impact Reduction due to Improved Productivity



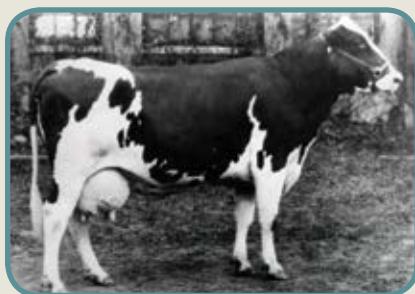
U.S. produces **79%** more milk with **64%** fewer cows



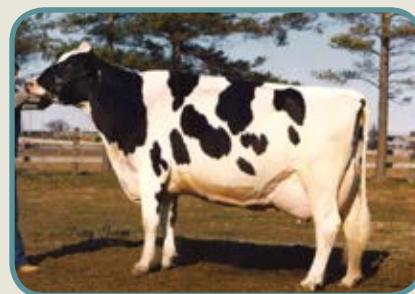
### ABOUT THE AUTHOR

Christy Couch Lee combines a background and passion for agriculture, and has owned Cee Lee Communications, Hoopston, Ill., for six years, specializing in freelance writing and photography in the agricultural industry. You can read more about Christy at [www.realfacesofdairy.com](http://www.realfacesofdairy.com).

SOURCE: Created by Jude L. Capper, 2012; Data from Capper et al. (2009) “The environmental impact of dairy production: 1944 compared with 2007” J. Anim. Sci. Updated with 2015 USDA numbers.



**1921**  
 National Champion 1921:  
 Huldah Segis Koroba,  
 owned by Aitken Brothers,  
 Waukesha, Wis.  
 365d 17,185m 720f



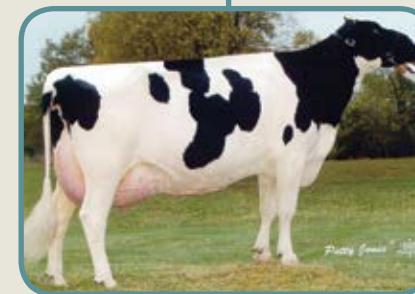
**1980**  
 National Champion 1980:  
 Northcroft Ella Elevation EX-97-4E,  
 owned by Woodbine Holsteins,  
 Airville, Pa.  
 7-07 365d 48,730m 2,028f



**2015**  
 National Milk Production Record Holder:  
 Bur-Wall Buckeye Gigi EX-94 3E,  
 owned by Bob & Denise Behnke,  
 Brooklyn Wis.  
 8-02 365d 74,650m 2,126f 2,251p



**1955**  
 National Champion 1955:  
 Gray View BD SkyAnne EX-96,  
 owned by Harvey Nelson and Sons,  
 Union Grove, Wis.  
 5-10 365d 20,404m 829f



**2001**  
 National Champion 2001:  
 Tri-Day Ashlyn-ET EX-96 2E,  
 owned by Ernest Kueffner &  
 Oseana Holsteins, Boonsboro, Md.  
 4-09 365d 43,090m 2,079f 1,503p

### SHARE YOUR STORY

Throughout 2016, the Real Faces of Dairy project encourages everyone to share their dairy story and upload pictures of what dairy means to them. The dedicated website will feature interactive activities, including photo and essay contests. Visit [www.realfacesofdairy.com](http://www.realfacesofdairy.com).

**NEXT MONTH:** The faces connecting an industry: Customers are disconnected from their food and its origin. In the June issue, we’ll meet a farm mom who is telling the positive story of the dairy industry.