

## **Dairy Dispatch – Fall 1998**

### **Dairy Herd Health**

#### **UC Davis School of Veterinary Medicine serves dairy industry for 50 years**

For decades, the University of California Davis School of Veterinary Medicine has played a major role in dairy herd health and food safety. One in three licensed California veterinarians received training at UC Davis School of Veterinary Medicine, and farm advisors in 58 counties rely on UC Davis Veterinary Extension faculty to communicate new ways to manage animal health, productivity and welfare on ranches and farm operations. As the only veterinary school in California celebrates its 50th birthday, its role in advancing medical knowledge to protect animal health, relieve animal suffering, conserve livestock resources and promote public and environmental health continues to thrive. During the past 50 years, the School of Veterinary Medicine has made numerous contributions to the dairy industry:

- In 1953 researchers characterized epidemiology and pathogenesis of bluetongue virus infection in cattle, sheep and wild ruminants. As a result, vaccines and improved diagnostic tests were developed to advance livestock health.
- The school began offering a blood-typing service in 1955 to provide parentage information for the cattle industry.
- In 1970 the Veterinary Medicine Teaching Hospital (VMTH) opened. The hospital currently serves 30,000 animal patients per year.
- In 1974 researchers discovered that pneumonia induced by Pasteurella bacteria caused most cattle deaths in feedlots. New treatment standards and procedures were developed to improve animal health, welfare and productivity.
- The Veterinary Medicine Teaching and Research Center (VMTRC) was established in 1983 in Tulare for applied research on cattle health, productivity and well-being. That same year, researchers developed the J-5 vaccine to prevent E. coli infection, which saves the dairy industry more than \$11 million each year.
- In cooperation with California Department of Food and Agriculture, the School of Veterinary Medicine established the California Veterinary Diagnostic Laboratory System (CVDLS) in 1987 with facilities in Davis, Turlock, Tulare, San Bernardino and Fresno to protect the food supply, race horses and other aspects of animal and human health.
- Transgenic technology was used in 1988 to develop a vaccine against rinderpest, an African cattle plague.
- In 1995 a vaccine and other control strategies were developed to protect dairy cows from salmonellosis. That same year a flotation technique was developed for "downer" cows, saving the lives of previously hopeless cases.

The school's many programs play an important role in all aspects of livestock production, health and well-being. The national Food Animal Production Medicine Consortium encourages student exchanges which take advantage of particular strengths of member veterinary schools across the country. Veterinary students come to the Veterinary Medicine Teaching and Research Center in Tulare, heart of the nation's dairy industry, to take advantage of the school's specialized facilities and expertise in dairy medicine issues. Visiting students receive in-depth training on the principles of dairy cattle health, productivity and welfare in an atmosphere emphasizing teaching, applied research and service to regional producers. Faculty members from the school's Veterinary Medicine Extension provide a vital link between researchers and county farm advisors, practicing veterinarians, animal producers and consumers. Extension specialists alert the campus to the needs of livestock industries and the public, and they

facilitate research activities on important industry issues. Ongoing dairy cattle programs being conducted through Veterinary Medicine Extension include:

- Footwarts in Dairy Cattle (Papillomatous Digital Dermatitis);
- Management Alternatives to Dry Cow Therapy;
- The Role of Nitrogen Dioxide (NO<sub>2</sub>) in Calf Pneumonia;
- Determining the Medical Causes of Disabled (Downer) Dairy Cows.

The Dairy Food Safety Laboratory, with locations in Davis and Tulare, provides immediate response to dairy herd health and food safety problems. Faculty members, state and federal regulatory agencies, dairy producers, processing plants, dairy cooperatives, farm advisors and members of related industries participate in the laboratory. Teaching activities include hands-on laboratory training for junior high and high school science students and undergraduate and graduate university students. The laboratory regularly presents to the public the latest information regarding many food safety and animal health issues. A critical need for a mechanism to perform rapid-response, applied research on dairy herd health and on-farm food safety problems prompted the creation of the new Center for Dairy Herd Health and Food Safety. This developing center has received more than \$1.2 million in grants from the California Dairy Research Foundation and has attracted an additional \$922,850 in grants from outside sources. The center operates as an umbrella organization for both the Dairy Food Safety Laboratory program at Davis and the dairy programs at the VMTRC in Tulare. Faculty from a variety of disciplines address disease and production problems affecting California's livestock through the Center for Food Animal Health (CFAH), the largest university-based animal health program in the United States. CFAH programs address production system health and sustainability, and animal issues such as pre-harvest food safety, environmental health, animal welfare, trade barriers and new and emerging diseases. Among other sources of funding, the dairy industry provides an additional \$500,000 per year for dairy cattle disease research. A new collaborative relationship between the School of Veterinary Medicine, College of the Sequoias, Tulare Joint Union School District and dairy producers has resulted in the jointly operated, self-supporting California Dairy Technology Center. When completed, the project will blend academic instruction with vocational training geared toward the expanding dairy industry. Working in a fruitful partnership among dairy farmers, UC Davis faculty and public agencies, the School of Veterinary Medicine looks forward to creating new directions in dairy medicine and science. This partnership can continue to create the practical solutions of dairy management in animal health, public health and food safety, environmental health and financial well-being within the country's leading dairy state.

### **Silliker/DFL shares decades-long relationship with UC Davis**

Few companies can boast about surviving the Great Depression, but for 73 years a Northern California dairy products testing laboratory has proved itself a respected leader in providing cutting-edge technology to the dairy industry with the help of UC Davis.

Originally known as Dairy Products Laboratory, Silliker/DFL was established in 1925 by San Francisco veterinarian Henry Torgenson. In 1945 the lab, then located at 18th and Eureka streets, was purchased by George Young. Since George had served as head of the USDA lab for Foremost Foods in San Francisco, he brought USDA testing certification status to Dairy Products Laboratory.

"During World War II, my father's lab did all of the USDA testing on West Coast products that were shipped off to war-milk powders, butter, cheese-all dairy products," said Randy Young, now a member of the board of directors at Silliker Laboratories Group Inc. "Those products had to be graded by the USDA prior to sale to the government."

George, who was a graduate of the Dairy Industry Program at UC Davis, hired fellow UC Davis graduate Elwood Veliquette as his laboratory supervisor. "There has been a major UC Davis influence on Dairy Products Laboratory, later Dairy & Food Labs (DFL), throughout the history of the lab," said Randy. "Many, many times George would come back to Davis and get assistance for testing procedures."

In the 1950s George developed a close relationship with the late UC Davis Professor Edward Collins, a dairy bacteriologist and head of the Food Science Program. When the California cottage cheese industry faced serious problems with lactic acid bacteria growth due to phage (virus) infection at the cheese plants, George worked with Collins in developing a single-strain culture program, which literally saved the industry. The cultures originally were housed at UC Davis, but eventually became an industry item offered by Dairy Products Laboratory, which developed a spin-off company called DPL Culture Service.

"Also in the 1950s, an incident of salmonella contamination in milk powder triggered a need for the industry to move forward in the field of pathogen testing," recalled Randy, who graduated from UC Davis in 1963 with a degree in food science and technology. "Again, Dairy Products Laboratory working closely with UC Davis became one of the leaders in that area."

Following graduation, Randy took a job with Cloverleaf Dairies in Stockton before joining Dairy Products Laboratory in 1964 after his father suffered a mild heart attack. By then the laboratory had moved to a larger facility at 17th and Folsom streets in San Francisco. With the help of UC Davis, Dairy Products Laboratory was the first independent laboratory in 1972 to successfully use infrared testing to measure fat and SNF content in milk. The company then set out to verify milk lactose and protein, and to provide standardized samples to those with instruments to calibrate them just as third-party testing began in California in 1974.

"The university was one of the key players in making this whole thing go," said John Bruhn, director of the Dairy Research and Information Center at UC Davis. "It was one of the greatest team efforts between Randy's lab, George DeMedieros at Dairymans Cooperative (first to use infrared testing in 1969), Petaluma Co-op (California Gold), Daylin Labs in L.A., the California Department of Food and Agriculture and the university." In addition, the Dairy Institute and several processor and producer groups provided the stimulus and support necessary for the success of the program.

The infrared testing program still exists today and has become a model for the rest of the country. "We pioneered how you measure solids in milk using infrared, which now is routine, but no one else in the world had done that," explained Bruhn. "As instrumentation improved, the rest of the country joined in about a decade later."

Randy purchased Dairy Products Laboratory from his father in 1983 and changed the name to Dairy & Food Labs (DFL). He then sold the culture service, using some of the proceeds to move the laboratory to Modesto in the Central Valley and to set up a corporate office in San Ramon. Randy also spun off another company in 1984 called D&F Control Systems, a supplier of low-tox chemicals to the dairy laboratory field. The company has two major products, one of which is called Broad Spectrum Micro Tabs.

"These tiny, high-tech tablets don't interfere with infrared testing and do a great job preserving milk," said Randy. "The product replaced a lot of bad actors in the field-very toxic chemicals. We have patents on it and product ownership of it." The tablets are currently manufactured in Nottingham, England, and sold to laboratories worldwide.

Silliker/DFL laboratory employs several graduates from UC Davis and Cal Poly, San Luis Obispo, including Cal Poly graduate Gary Magelssen, who serves as Silliker/DFL's technical director for the Western Region. UC Davis graduate John Case joined the company in 1989 and serves as director of the Modesto laboratory. "UC Davis and Cal Poly graduates are sprinkled throughout our operation," said Randy.

After the sale of DFL to Silliker Laboratories in January, the two companies consolidated their five California laboratories into two-one in Modesto and one in Carson (South Los Angeles). Chicago-based Silliker brought to the table expertise in pathogen testing and a lot of special services in the food areas. The company's Modesto facility is becoming the dairy center for all of Silliker's national centers for excellence.

"We're striving to be on the leading edge in testing. We're always striving to be there to assist a client, which means being involved in trouble-shooting problems. Our goal is to provide useful information to management."

Silliker/DFL is on the verge of another technological breakthrough. In response to needs voiced by the cheese manufacturing industry, the company is working on infrared technology to determine casein content in milk and will provide infrared assistance as part of an upcoming study by Cal Poly San Luis Obispo focusing on current levels of fat, protein, casein and other valuable components of milk. "We're just now completing the methodology stage and field testing it." said Randy. "It's definitely leading-edge stuff."

It looks like the California dairy industry will once again become pioneers in the field of infrared testing.

### **People in the news**

#### **Awards, IAMFES honors Christine Bruhn**

Christine Bruhn, director of the Center for Consumer Research at UC Davis, was selected as Ivan Parkin Lecturer for 1998, an honor bestowed upon a individual who has made significant contributions to food safety. Bruhn presented the honorary keynote address at the 1998 meeting of the International Association of Milk, Food and Environmental Sanitarians (IAMFES).

Bruhn, who received her M.S. and Ph.D. degrees in consumer behavior at UC Davis, has an extensive background in food science and consumer economics. She taught food science and consumer courses at the University of California and California State University, Sacramento, for 10 years before joining Cooperative Extension in 1986. As a consumer food marketing specialist, Bruhn studies consumer attitudes toward food safety and quality, and conducts educational programs that inform consumers about new products and technologies. Her research generates knowledge that provides a foundation for effective decision making by consumers, and for effective policy making and action by public and private organizations.

Bruhn has authored more than 90 popular and professional papers on consumer attitudes toward food. These have included several articles in the Journal of Food Protection and Dairy Food and Environmental Sanitation. She receives numerous national and international requests

to address consumer food issues. Bruhn's professional memberships include an active participation in IAMFES. She won the first Developing Scientist Competition in 1986, and serves on the Editorial Board and Journal Management Committee for Dairy, Food and Environmental Sanitation, and has spoken for numerous symposia at IAMFES annual meetings. She also serves as a member of the Institute for Food Technologists, American Dairy Science Association, California Nutrition Council, Society for Nutrition Education and American Council on Consumer Interest.

## **Research Update**

### **Two projects explore consumer preference of dairy products**

By Christine Bruhn

What do consumers think about probiotics, viable bacteria consumed for health benefits, in dairy products? Why do some young people cut back on dairy products when they get older? These are questions Christine Bruhn, director of the Center for Consumer Research at UC Davis, is investigating.

#### **Probiotic cultures**

In a project funded by the Dairy Research and Information Center (DRINC) at UC Davis, Bruhn is exploring probiotic cultures in dairy foods. After interviewing more than 100 consumers throughout California, Bruhn will determine the level of consumer response to beneficial bacteria such as *Lactobacillus* or *Bifidobacterium*.

"Consumers vary in their recognition of the fact that some bacteria can actually be good for you," explains Bruhn. "Some are so sensitized to harmful bacteria in the news media that they find it hard to believe that some types of bacteria are desirable. Others have heard of 'friendly bacteria' and choose to consume yogurt or acidophilus milk, for example, to avoid developing a yeast infection after taking antibiotics."

Studies on the health-promoting effects of dairy probiotics are being conducted worldwide, and scientists have reported research findings on immune system stimulation, adherence, prevention of gastrointestinal infection and lactose intolerance.

"Consumers are quite enthusiastic when they hear that research indicates *Lactobacillus* or *Bifidobacterium* may actually enhance the immune system, making people more resistant to illness, decreasing blood cholesterol and reducing cancer rates," said Bruhn. "Most people believe that strengthening the immune system is the most important benefit of probiotics, since it increases overall health."

Survey respondents have suggested several methods of conveying the positive benefits of probiotics to the general public. Television talk shows, such as the *Oprah Winfrey Show*, were among those mentioned as a means of reaching a large audience. Radio broadcasting, including Spanish language radio, was also suggested, as were popular magazines displayed in doctor's office reception areas.

#### **Adolescent choice of calcium-rich foods**

Numerous studies have found a positive correlation between calcium intake and bone mass. Osteoporosis affects 15-24 million Americans, including half of women over the age of 45 and 90 percent of women over the age of 75. Recent reports suggest that peak bone density might occur as early as age 16 for the hip bones and early to mid 20s for other bones, but the actual

intake of calcium among young women falls during adolescence and continues to drop through adulthood. While females are known to be at a higher risk for contracting osteoporosis, males are not immune to this disease.

Christine Bruhn represents California in a 12-state, five-year regional research project to gain a better understanding of food choices among young people. Bruhn and her colleagues at UC Davis are interviewing boys and girls, age 10-11 and 16-17, through their schools to determine common food choices among them. The selection of these two age groups will identify the factors influencing consumption when intake is higher (age 11-12) and when it has fallen (age 16-17). The age span also represents a time of critical bone growth and is an important time for the establishment of dietary and lifestyle patterns.

"Early findings from the first stage of the study confirm the importance of parents in setting food habits that last for a lifetime," reveals Bruhn. "Those young people who continue to choose dairy products come from homes in which dairy products are consumed by the entire family, and they're more likely to maintain this choice despite the pressure to switch to soda."

This study will identify socio-cultural variables affecting the consumption of calcium-rich foods in adolescents. California will complete four focus groups with Asian-American youths and two groups with Hispanic youths. For more information on these studies, call Christine Bruhn, director of the Center for Consumer Research, at (530) 752-2774, or e-mail [cmbruhn@ucdavis.edu](mailto:cmbruhn@ucdavis.edu).