Looking to the Future with Precision Dairy Farming

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The International Precision Dairy Farming Conference was held in Leeuwarden, Netherlands from June 21 to June 23, 2016. Researchers, veterinarians, producers, students, and industry members from around the world came together to visit farms across the Netherlands, present current research, and discuss new technology.

To help the attendees develop a better understanding of the European dairy industry, multiple farms using precision dairy technology hosted the conference participants. Dairy Farm "Dem Hartog" was in the North Friesian countryside. Milking 500 cows in a rotary parlor, the Dem Hartog family uses technology to modernize their dairy operation. The rotary consists of 40 stalls, and 2 DeLaval (Tumba, Sweden) pre and post-dip spray machines milking the cows twice daily.150 cows are milked each hour and were separated immediately after milking into alternate pens. The family boasted of a cull rate of 15%, compared to the Netherlands national 27% average. Their current daily production is near 68 pounds, with a 4.45% fat and 4.05% protein. CowManager SensoOr (Utrecht, The Netherlands) was used to track eating, walking, grazing, and heat detection within their herd. In their operation, tags were applied to calves to detect bovine respiratory disease and diarrhea. Additionally, the farm had a water purification system (Watter!) to ensure clean water in all the water troughs. The company suggested that a purifying system can increase daily drinking by 26 gallons per day, resulting in better health, and production.

The second family farm visited "Boersma," consisted of 8 DeLaval robots, Herd Navigator, and DeLaval' s automatic BCS camera. With the purchase of the DeLaval robots and Herd Navigator, the producer started producing 0.25 more gallons/cow for $0.05 less per cow. Averaging 4.05% fat and 3.6% protein, the cows were randomly assigned to two groups. The farm boasted of a straw calving area, and guided cow traffic in order to separate cows for sickness and pregnancy checks. The DeLaval automatic robots used force flow traffic, so cows must visit the automatic milking system before lying down. Cows pass under the BCS after each milking to track overall changes in BCS. The camera helps to identify cows in negative energy balance, potential problems with dry cow protocols, and other cows rapidly changing BCS.

The final visit was to the Kalma family farm milking 450 cows on 3 GEA (Dusseldorf, Germany) robots. By putting their robots in the middle of the barn, all cows had to travel an equidistant to the machines to reduce cow flow problems. The producers also invested in a locational tracking system through GEA that allows them to track cow location 24 hours per day. The system registers which cows are in the freestalls, at the feedbunk, or in the milking machines so a producer can spend less time searching for cows. Additionally, the producer focused on feeding a partial mixed using freshly grown grass.

In addition to farm visits, multiple researchers and industry professionals presented current research in dairy technology. Researchers from University of Calgary and University of Kentucky teamed up to validate Smartbow (Weibern, Austria), an ear based real time locational technology. Using University of Kentucky's old freestall barn, a two-part study was conducted to determine the accuracy, sensitivity, and specificity of SmartBow. Smartbow was determined to accurately measure real-time cow location within approximately 1 meter of the actual location. Although University of Kentucky only has 100 cows in their lactating herd, the technology could aid producers with large facilities and large milking herds.

Researchers at the University of Sydney explored methods to encourage grazing cows to enter automatic milking systems while providing heat stress abatement. Australian producers face hot temperatures during long summer months, the majority of Australian producers have grazing herds that must walk to the parlor for milking. Therefore, enticing cows to the parlor is crucial for dairy operations'

success during summer months. Using movable, shaded, lightweight structures, cow movement to the parlor increased without additional labor. By providing additional shaded zones on the path to the parlor, cows spent greater time underneath the shade, but showed no increase in milk production or decrease in body temperature. More research into heat stress and cow movement must be pursued in order to better understand manipulating the grazing herds.

Keynote speaker Dr. Schukken, the Chief Scientific Officer at GD Animal Health in Deventer and a Professor of Management of Farm Animal Health at Wageningen University discussed the use of technology to determine cow health and heat detection versus blanket protocols. As technology becomes more prevalent, producers must consider the cost of investing in new technologies. However, if the potential gains, such as more individualized heat detection and decreased use of sync protocols, are not achieved with technology, is a technology worth the cost? Across multiple studies, researchers determined that some blanket protocols can be more effective management tool for cows than individual protocols for each cow. Looking at heat detection, cows had a higher conception rate and decreased days open when comparing a technology to sync protocols. Additionally, looking at blanket dry off treatment of mastitis versus individual cow and quarter treatment, cows given a consistent dry off treatment in all quarters had a decreased risk of mastitis after calving. As technology increases in sensitivity and specificity and demand for decreased antibiotic use becomes more prevalent, the dependence on technology may increase. However, Dr. Schukken suggested that technology must be used in conjunction with common sense and good farm management to be most effective.

A few new technologies were also highlighted at the Precision Dairy Conference. For grazing herds, invisible fences have become the next way to manipulate grazing patterns without producer's moving gates or expensive infrastructure. Using invisible electric signal, cows hear a sound when entering within a certain distance of the invisible fence. If they ignore the sound, and continue, cows then receive a small shock to indicate that cows cannot graze in that area. Researchers reported that cows learned to listen to the alert within one to two days.

Tail mounted calving devices also have become more prevalent as a method to predict calving date. Because studies have shown an increase in tail movement directly before calving, the devices are mounted at the base of the tail with greater tail head movement indicating calving. Subsequent alerts are also released to give a better prediction of calving time. With better information about calving, producers may be better able to check and aid struggling cows.

To better understand how cows move, research is being conducted using pressure mats to track foot placement, distance between steps, and pressure applied to specific regions of the hoof. Monitoring the way lame and sounds walk may help to better objectively diagnose lameness in cows. Although they are not yet commercially available. Because it requires less steps and gives you objective comparable data, ulcers, foot rot and other hoof problems could be seen and addressed earlier.

If you are interested in attending a similar conference next year, the Precision Dairy Farming conference will be head in Lexington, Kentucky May 30 to June 1, 2017. There will be an opportunity to explore some of the technologies discussed and new innovative technologies that the University of Kentucky is researching. For more information, check out: precisiondairyfarming.com/2017.