



Robots milk our herds

MOST new technologies work well at the beginning. But what about Year 2, Year 3 and beyond? We asked robot herds with at least a few years of experience about their ups and downs.

Why did you look at robots?

Colby: Robert spearheaded the project. He wanted to establish a stand-alone dairy facility at an agricultural education center run by a nonprofit county government partnership near the home farm. He also wanted that facility to require minimal labor as a satellite operation. It would also show the general public how modern, commercial dairies operate and care for their cows in a humane way.

Hammer: We needed to do something to reduce the manual labor and improve cow comfort. We first looked at improving the old facility. Then, our local dealer, Brent Leyenhorst, from Agrai-Dairy Mart, Edmonton, suggested that we look into robotic milking and arranged a trip to British Columbia to see a couple of systems.

Our goals included:

1. Less labor. Our children were leaving home, so we needed to lessen our labor load, especially during fieldwork time.

2. Flexibility. We did not want to be tied down to such a rigid schedule.

Kappers: The driving force for installing robots at Olspank Dairy was to be able to accomplish the milking and, as a result, the remaining farm work with minimal labor requirements. In the future, we will consider converting the milking parlor at Subliem Dairy, Inc. into an automatic milking system (AMS).

Meuwissen: When planning for this herd size,

the options were either a large parlor and hiring extra labor, or robotic milking. I was leaning toward the parlor. My wife had a strong preference for not working with employees, and after much deliberation we chose the robots and no hired help. Even though it was a good decision, the herd is too large for one operator.

How did you settle on cow movement?

Colby: We use free-flow cow movement. We find it to be the most efficient when considering milking, feeding and resting time. We built the barn with a fetch pen with a one-way gate and additional one-way gates at crossover alleys so we can operate it as a guided-flow if we change our minds.

We do find the additional gates useful for training or fetching the occasionally less-cooperative cow, but the vast majority of the time all the gates are left open for free flow.

Hammer: We use guided-flow cow movement that incorporates one-way and smart gates that allow free flow to the feedbunk when milking permission is not granted. We chose this system because there are fewer cows to fetch due to overdue milkings. This type of system was the most common at the time we installed our robot.

Kappers: We started with guided traffic but converted to a free-flow system, as this appeared to be the only way to ensure that cows are comfortable and are allowed to eat and rest on their own free will. This is a priority for us and has translated into a healthy herd, excellent milk components and overall excellent performance.

Meuwissen: We use free cow traffic because it is much better for the cows. Guided traffic would not work well for the high-producing cows be-

cause waiting in a fetch pen is stressful for them. Switching lower producing cows onto it after having free traffic before would be even worse, so we offer free traffic in both groups.

Did any cows not adjust?

Colby: We expected that up to 10 percent of cows would not make the transition. However, only three cows have failed at robot milking in eight years! Since we continue to milk cows in a conventional parlor at our home farm, we returned the failures to that facility. Of the three that didn't adapt to robots:

One boss cow beat up other cows in the fetch pen and wouldn't allow them into the robot.

One Jersey moved back and forth too fast for the robot to keep up with her to attach the teat cups. (The manufacturer does offer spacers for small-breed herds so the cows don't have so much wiggle room, but our herd is mostly Holstein so we left the robot box at standard dimensions.)

One high-strung cow kicked so much that she repeatedly pulled hoses off the teat cups.

Hammer: We had no idea what percentage of cows would not adjust. But all our cows learned the system, even an old 12-year-old cow.

We had cows that would kick in the milking parlor in our previous barn, and they had no issues in the VMS. Teat placement is very important; cows with very close or crossed rear teats was the only issue that gave us any problems. The design of the DeLaval VMS still allows us to bypass the automatic milking features of the stall and allows us to milk these cows manually, just like in a milking parlor.

Kappers: We originally estimated that approximately 10 percent of cows would not adapt. As it turned out, only 5 percent ended up not adapting



Colby Homestead Farms, Spencerport, N.Y.

In May 2004, the Colby family partnered with the Monroe County Parks Department and a nonprofit government entity to expand the organization's ability to teach the general public about agriculture and dairy. The Colbys lease the facility from the group and run it as a commercial operation.

The dairy is a satellite facility, located two miles from the Colbys' home farm, founded in 1802. The business has been in the family for eight generations and milks 175 cows. They are in the process of building a new free stall barn at this location to house two more robots.

At the robot facility, cows milk an average of 3.1 times per day with a 200,000 somatic cell count. They utilize a 55 stall barn with drive-through feed lane and automatic alley scrapers. Cows for the robot herd came from the Colbys' home farm.

The farm started with a Lely A2 robot and was upgraded to a Lely A3 about one year ago. The cows are in a free-flow management system and achieve 77 pounds per day on nearly a 3x average at 3.7 percent fat and 3.0 percent protein.

The business is run by brothers Charles and Robert Colby. Pictured is Robert with daughter Sarah.



Hammer Farms, Leduc, Alberta, Canada

The 63 Holstein cows at Kevin and Glenda Hammer's dairy are milked an average of 2.4 times per day. The farm in Leduc, Alberta, Canada, which is about one-half hour south of Edmonton, has a somatic cell count of 100,000. Hammer Farms milks in a 75-cow, 4-row free stall barn with a drive-through feed alley. They utilize guided traffic for their robot facility. Returning from the DeLaval Voluntary Milking System (VMS), cows visit headlocks where they can eat hay. That section of the barn also has a grain feeder that reads the cow's identification be-

fore determining how much grain the cow is allowed to consume.

Before the robot, the Hammers milked 53 cows twice per day. The VMS was installed in August 2005. The cows make 75 pounds per day at 4.0 percent fat and 3.3 percent protein. The Hammers have been farming for 23 years on 230 owned acres with another 400 rented. They raise all their young stock on-site.

In addition to crops and cows, they raised children Justin, Laura and Erik who now all have off-farm jobs, but the door remains open for them to return to the farm.



Kappers' Olspank Dairy, Ingersoll, Ontario, Canada

Jan Kappers is the owner of Olspank Dairy, where he works with his sons Chris and Rutger. Olspank Group, also owned by Jan, is the parent company that also owns Subliem Dairy. Subliem Dairy is a recently acquired 80-cow operation with a double-9 milking parlor which Jan intends to convert to a robot dairy in the future.

At Olspank Dairy, 180 Red and White milking cows average 3.1 milkings per day with a 275,000 somatic cell count. One Lely prototype robot was installed in December 1999, making the

Kappers family the longest-operating robot dairy in North America. Today, they have three robots and have since upgraded their original machine (see question 3) along with two Lely A2 robots to Lely A4 robots.

The cows average 20,000 pounds per cow per year in a 250-cow free stall barn with drive-through feeding. The farm started with guided-flow traffic but switched to free-flow cow traffic. Before installing the robots, Olspank Dairy milked 40 cows twice per day.

Pictured are Jan, left, and Chris.



Meuwissen Dairy, Mariahoop, The Netherlands

Across the pond, we find Har Meuwissen of Mariahoop, The Netherlands. Har started dairy-ing 25 years ago. His farm is based on 100 acres with an additional 75 acres rented. Har has all Holsteins, and he raises his own replacement heifers.

Meuwissen Dairy installed six robots made by S. A. Christensen (SAC). The machines come in "box-es" of two and are a licensed version of the Insentec system that is in North America. The farm has 275 cows that are milked 2.6 times per day with a 320,000 somatic cell count. Before installing the robots

in August 2008, Meuwissen Dairy milked 150 cows, twice per day, with a somatic cell count of 250,000.

The cows are housed in a slat-ed floor barn with eight rows of free stalls and feeding around the perimeter as well as a "U" drive-through feed alley that is entered from one end of the barn.

The 150 higher producing cows can exit one of four robots through a sort gate that will send them to the free stall, a separation pen or a fetch pen. The remaining two robots milk the 125 lower producers that are housed in an area with a different ration.

to the A2 system. As the A2's software was gradually updated and improved, that percentage fell to 3 percent. With the new A4, that percentage is even lower. Remaining issues are cows with a high rear udder tilt or crossing back teats.

In the case of high-producing problem cows, we continue to help them connect with the robotic system; in all other cases, we decided to sell the cow in question.

Meuwissen: Other herds starting with robots had not culled a lot of cows, and we did not expect we would have to either. Deep-udder cows can be a problem for some systems, but the SACs handle those very well, and we really did not do any extra culling.

How was production and SCC impacted?

Colby: We hoped that milk production would rise and somatic cell counts would fall with the robot. We did see modest progress in both those areas. The robot herd averages 5 to 7 pounds per cow per day more and runs about 40,000 lower SCC.

We planned on a gain in milk production due to more milkings per day, and we did see that improvement. Labor challenges forced us to go back to 2x milking in the parlor at the home farm, but when the cows went to the robot facility they milked an average of 3x voluntarily.

For SCC, we thought that consistency in a robot milking routine would improve our numbers, and we did see some of that. An unexpected benefit, however, was that because the robot teat cups are not attached to a claw unit, we don't see liners slip on uneven or oddly shaped udders.

Hammer: I expected milk production to rise. It did, especially in early- to mid-lactation cows. Early-lactation cows want to be milked, sometimes up to four times a day.

Somatic cell did go up slightly at first, due mainly to a change in the environment. In the old barn, the free stalls were bedded with straw and the cows were pastured during the summer

and fall. In the robotic barn, the stalls are bedded with sawdust, and the cows are kept inside year round. This seemed to contribute to a different form of mastitis. We now vaccinate for mastitis and regularly maintain the free stalls.

During the past three or four years, our somatic cell count has been comparable or better to what we had before robotic milking.

Kappers: We expected the milk production to bump up while we projected the SCC to remain the same after introducing the AMS. This is indeed what happened.

Meuwissen: I expected more production from more frequent milking, but that has not really happened. Production per cow is now 54 pounds, and it was 53 pounds four years ago when we started. I expected somatic cell count to go up, and it rose by about 70,000 cells, but there are fewer cases of clinical mastitis. The higher cell count may be influenced by some cows leaking milk in the free stalls and also by the fact that there is not enough time to clean the free stalls as often as I should.

The cows in the high group are averaging over 70 pounds on 2.8 to 3.0 milkings per cow per day. The low group is producing about 40 pounds on 1.8 to 1.9 milkings per day. If cows visited more often, production might be higher.

What about robot longevity and service?

Colby: When we installed our first robot, we planned on 10 to 15 years. However, we upgraded our robot last year after seven years, but that wasn't because of any functionality issues. Our original model was one of only a handful of that generation installed in the U.S., and the manufacturer did not want to provide service and parts for the few remaining older models.

We purchased a service contract on the first robot, largely because at the time the nearest dealership was three hours away across the U.S.-Canada border. The contract included everything but the disposable components. As far as we know,

those service contracts aren't offered anymore because of better dealer presence in our area. For our new robot, all major components have a replacement warranty of five to seven years.

Initially, the manufacturer had us stock almost every part for our old robot — again, because of the lack of dealer presence at the time. This was overkill even before dealership presence grew. Now we only stock hoses and hose clamps, cables (the strings that retract the teat cups), inflations and the rubber components in the pulsation system.

Hammer: We financed our robotic system for a period of 15 to 20 years. We are one-third into this period and have no concerns about life span. It is made of stainless steel, and all moving parts are replaceable or have replaceable bushings.

Spare parts needed include a backup vacuum pump and air compressor; rubber milk hoses and liner; rubber diaphragms, o-rings and bushings. We are located reasonably close to our dealer. Therefore, having a large inventory of spare parts is not as crucial for us.

Kappers: Given regular software updates and competent in-time service, we expect to get a minimum of 15 years from our Lely A4 robots. We had similar projections for our A2 system; however, it ended up being only 10 years in operation as the offered trade-in value made it worthwhile to switch.

We had a comprehensive service contract for our AMS systems right from the start. This turned out to provide peace of mind for us, with minimal costly surprises and associated headaches. Spare parts on hand at all times include milking hoses, teat liners, brushes and various small parts, including connectors, clamps and so on.

Meuwissen: I was replacing a 24-year-old parlor and assumed the life span of the robots would be similar. Since they need to work every day, worn-out components are promptly replaced with new, so I don't really see that there is a point in

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time when they will be worn out or obsolete.

Service has always been on demand, and I have never had a service contract. I do find the maintenance costs are higher than anticipated. Currently, I spend close to 30,000 Euro (\$40,000) per year on maintenance, and that does not include depreciation.

Who deals with the computer?

Colby: Our herdswoman learned the computer's software on the fly. It did help that we were already using AfiFarm with milk meters and pedometers at the home farm. So, we ran daily reports for problem spotting and heat detection. The only real advantage we noticed with the robot's software versus the home farm parlor system is that milking information (milk time, conductivity, color) is reported by udder quarter instead of only by cow.

We have only three software updates in eight years of robot use. The first two were covered by the service contract we had. The third was included as part of the upgrade to the newer robot.

Hammer: Kevin is in charge of the computer. No computer courses were taken, he just sat down and spent time exploring and deciphering all the information that is collected and using it to make herd health decisions. Kevin probably spends about 10 to 15 minutes on the computer each day to monitor cow activity, feed consumption, and individual quarter udder health and performance. Software updates do occur and generally improve the performance of the VMS.

Kappers: All operators (Jan, Chris and Rutger) at Olsrank Dairy are equally involved with the AMS computers.

Meuwissen: Learning to use the software was very easy and did not require any special training. The software does a good job of identifying "attention cows." This makes it possible for me to manage a lot more cows than before, when I had no data coming from the old parlor. Minor software changes happen automatically. There has only been one major upgrade, and that was also done at no cost.

How did labor change?

Colby: We do find that there is a labor savings somewhere in the neighborhood of 60 percent of man hours per cow which comes from the near elimination of man hours per cow for milking time. It only takes us 20 minutes twice a day to "milk" all the cows on one robot.

Hammer: We are now operating with less help. The 4-1/2 hours per day that were dedicated to milking cows before are now being spent interacting with the cows throughout the barn watching for heat, monitoring lameness, feeding and maintaining free stalls. It also allows me to spend more time operating other aspects of the farm.

Kappers: We expected significant time savings each morning and evening as compared to milking in a parlor. This indeed was the case.

Meuwissen: There is definitely less labor per cow, but I need to milk more cows to cover the higher capital investment. My extra time has all gone to managing more cows. I probably spend 20 percent more time in the barn with 275 cows milking now than I did with 150 cows milking in the parlor. The work is also less strenuous, and scheduling is more flexible. On a per-cow basis, I estimate the total time per cow is about two-thirds of what it was with the parlor.

Were there other management changes?

Colby: As mentioned before, we have seen a reduction in SCC that we attribute to the improved milking routine consistency of the robot. Now the greatest variable in milk quality seems to be free stall bedding that causes spikes in SCC and mas-

titis cases when the sawdust supply runs short.

The biggest change we made for the robot herd is in our feeding program. The cows now get a PMR (partial mixed ration) that consists of a minimal grain TMR in the feedbunk, and the majority of their grain comes from the robot.

We had problems with late-lactation cows becoming fat, causing metabolic issues at freshening. We adjusted our ration, but then cows were becoming too skinny. We are doing better at managing body condition now, but it is an ongoing issue. This has been the most challenging part of our learning curve from managing "groups of cows" to managing "individual cows."

Singeing the udder hairs does make a significant difference in teat cup attachment times. We also added a five-cow headlock area for treatment and health checks, but we've found we're able to do a lot of treatment right in the herd in the free stalls because the cows are so calm.

Hammer: One significant change was in managing the feeding. Since each cow has her own schedule, feed has to be available in the feedbunk at all times. Choosing sires based on teat placement has also become a high priority.

Singeing udders is very important. Every extra minute of prep time per cow because of hairy udders will cost you 15 milkings per day. When we have cows with incomplete milkings, there is a good chance she needs udder singeing.

We do have headlocks in the feed alley for herd health checks and treating. You do not want to use the milk stall as a treatment area in regards to giving injections or doing anything unpleasant for the cow. The environment of the VMS needs to be kept friendly and inviting.

Kappers: Singeing does help robots find teats faster. No additional changes were needed.

Meuwissen: My feeding program did not change when I switched to robots, and milk quality and conception rates have stayed the same.

We have found that singeing udders to remove hair is necessary, and we do it once a month in the winter and every two months in the summer. There are headlocks along the entire manger throughout the barn, and it is done after feeding with all the cows locked in the lockups.

How are heifers introduced?

Colby: Fresh heifers join the robot herd at 15-plus days postcalving. (Cows already in the robot herd freshen on-site, but all first-calf heifers freshen at the home farm.) They are walked into the fetch pen and then walked into the robot at 12-hour intervals for the first week. After that, they are walked into the fetch pen until they come in on their own.

Hammer: Heifers are introduced into the VMS stall 14 days before calving. They are allowed to learn the layout of the barn and discover how to use the one-way and smart gates. Computer feed is also provided for them when they check out the feed stations and VMS.

Kappers: Our heifers are introduced to the AMS just after calving. In our experience, calves that grow up with an automated calf feeder (we have a Lely Calm) are already accustomed to entering and exiting the feeding box. So they have an easier time with the robot box.

Meuwissen: After calving, the fresh heifers go into the straw pack beside the high group. For the first two milkings, we let the arm move around some, but we attach manually. After two days in the pen, a healthy heifer goes in the high group, and I fetch her twice a day if she doesn't come on her own. Many heifers learn in three days or less, but some take as long as two weeks.

How are fresh and treated cows handled?

Colby: At the robot facility, we leave dry cows in the milking herd until three to four weeks pre-

fresh instead of removing them immediately to a separate group. The dry cow pens at the robot facility usually do not have room for all the dry cows. The prefresh pens are fed the same PMR ration in the feedbunk as the milking herd with some topdress grain and grass hay.

Treated cows also stay in the milking herd. The robot automatically dumps treated cow milk which we enter in the computer. The robot does a brief wash after one comes in to be milked to clean any contamination out of the milking unit and pipelines. Occasionally, we will move a very ill cow to one of the dry cow packs temporarily if we are worried about her going down or getting stuck in the free stalls (milk fever cows and so forth).

Hammer: As long as you enter their milk destinations in the computer, milk will be diverted and the system rinsed following milking a fresh or treated cow. For cows that need twice-a-day treatment, we just change their milking interval to 12 hours and milk in manual mode until treatment is complete. Then we switch her back to automatic milking.

Kappers: As long as we enter fresh and treated cows into the robot's computer system, milk is diverted from salable milk.

Meuwissen: When we milked in the parlor in the old barn, we did not have facilities to separate special needs cows. The new barn lets us separate these cows into a straw pack. This is saving us quite a bit of time and also has reduced the number of cows that are culled for health-related reasons.

What about manure handling?

Colby: We made no change in our manure handling system. Automatic alley scrapers were installed at the robot facility which is what we were already using at the home farm.

Hammer: In the old barn, we used a skidsteer twice a day to scrape the alleyways; there was a lot of cow chasing and disturbance to do this. Now we have automatic hydraulic scrapers that run amongst the cows, the routine of each cow is not disturbed and the atmosphere of the barn is very quiet.

Kappers: We made no changes.

Meuwissen: The old and new barn both have slatted floors and mattress stalls, so nothing really changed in the way manure is handled.

What has been the best surprise?

Colby: The best surprise from installing a robot has been calmer cows. They don't automatically scatter when a human comes near them. This makes it easier to move just one cow at a time, and we're also able to do many treatments right in the free stalls.

Hammer: How quiet and calm the herd is and how quickly the cows learn and adapt to the automatic milking. Cows love the consistent routine.

Kappers: Time saved and greatly improved operational efficiency.

Meuwissen: The robots have given me much more flexibility, and the work is also less strenuous. While the flexibility is a big plus, when you are working alone you do need to balance that against the fact that a problem could demand your attention at any time night or day.

MORE CONTENT ONLINE

With so much to learn about automatic milking systems, we put four additional questions from these experienced owners online. Learn how they handle a breakdown to their robot, what they think of refurbished units, what they would change if they could start over with robots by visiting our Dairyman's Extras page at www.hoards.com/Dairymanextras.