

## Cow and Caretaker Alike Benefit from Robots

Since automatic milking systems—robotic milkers to most—burst on the scenes a decade and a half ago, they have become more dairy-friendly and are now becoming commonplace on farms across the country.

Though the promise of a smaller labor force draws most dairy producers to robots initially, other benefits of the system garner equally high praise after it has been used for some time.

Robotic systems not only milk the cows, but also collect a wealth of herd management information. Every day, hundreds of statistics are gathered on each cow—information that is nearly impossible to glean from traditional setups. This data can be used to manage cows as individuals and the herd as a whole. Most dairy producers like their robotic system because it allows them to be more proactive than reactive with cow care.

Having said this, because cows are no longer observed as they come through the parlor two or three times a day, it is paramount to stay on top of the information generated from the robotic system.

And, just because robots are milking the cows ‘round the clock, doesn’t mean the shop can go unmanned. Every dairy producer knows, equipment breaks. Be ready to fix a machine or call the technician in the wee hours of the morning.

There are a number of things to consider when taking the plunge and recouping the investment, which can run upwards of \$180,000 per robot. Often robots are considered when there is a need to upgrade facilities or expand the herd or when the next generation is brought into the business.

To give Jersey producers a feel for how robots are working in herds owned by their peers, the *Jersey Journal* visited with six dairy producers in the roundtable that follows. Producers operate dairies across the country, ranging from a third-generation Jersey breeder milking 135 Registered Jersey cows to a dairy producer who added Jerseys to a Holstein herd two years ago and now milks a mixed herd of about 650 cows. All are currently using robots manufactured by Lely.

Though all have different setups and tenures with robots, they

agree on one thing—robots do not let you put your cows on autopilot. Robots won’t make a bad cow manager a good cow manager. However, they can do wonders for people who enjoy managing and breeding cattle.

All agree too that doing your homework, which includes visits to several dairies with robots and long conversations with your consultants and suppliers, is key to setting up a successful system on your dairy.

### Roundtable Participants

**Glamourview, Walkersville, Md.:** Glamourview is a partnership between Gene Iager and Emily and Craig Walton. Emily’s parents, Max and Carol Thornburg, lend a hand with the operation of the dairy, as does a part-time employee who maintains machinery. Glamourview is milking a mixed herd of 175-180 Holstein, Jersey and Ayrshire cows. The Jersey herd is enrolled on REAP. The herd of 20 Excellent and 58 Very Good cows (none lower) has an appraisal average of 86.8%. The barn houses a number of elite show cows, including Cascadia Iatola Puzzle, Excellent-94%, Supreme Champion of the 2012 North American International Livestock Exposition and Overall Premier Performance Winner of the 2013 All American Jersey Show. The herd averages 70-75 lbs. milk per cow per day across all breeds. Iager and the Waltons grow crops on the farm’s 160 acres and 300 acres of rented land. Glamourview has been using three Lely A4 robots to milk the herd since August 2014.

**High Lawn Farm, Lenox, Mass.:** The 1,500-acre farm and dairy is owned by the Wilde family and operated by 26 employees. The herd of 235 Registered Jerseys is enrolled on REAP and has an actual 2015 herd average of 19,329 lbs. milk, 916 lbs. fat and 711 lbs. protein. High Lawn Farm ranks among the top genetic herds in the country with a JPI of +38 (60% genotyped). High Lawn has been marketing All-Jersey products for many years and using the Queen of Quality® label since 2008. Cows have been milked with two Lely robots since July 2014.



Glamourview, a partnership of Gene Iager, second left, and Emily and Craig Walton, holding their son, Briggs, center, milks a mixed herd of Ayrshires, Holsteins and Jerseys. Well-known on the tanbark trail, they are pictured here with MS Stranshome Alltheway-Red, Reserve Grand Champion of the 2015 International Red and White Show.



Recent facility upgrades at High Lawn Farm in Lenox, Mass., include a new climate controlled cow barn, above, with Lely robots, alley scraper, waterbeds and push up feeder. The All-Jersey distributor also built a new milk processing plant and sells High Lawn Farm products wholesale across New England.



The King family operates Jer-Bel Jerseys. Pictured with a pair of their favorites are Brian, Jason, David, Tim, at the halter of Jer-Bel Headline Amen {4}, Excellent-92%, Amy, with Jer-Bel Dale Abby {3}, Excellent-91%, Derek and Matt. Both cows have 305-day records in excess of 24,000 lbs. milk, 1,000 lbs. fat and 840 lbs. protein.



Kara, Amy, John, Edward and Joan Maxwell own Cinnamon Ridge Dairy in northeast Iowa. The family also operates an agri-tourism business and makes cheese on the farm. The facility has been designed to accommodate visitors and includes several windows to watch cows being milked by robots and cheese being made.

**Tim King, Fremont, Ohio:** King is a third-generation Jersey breeder who owns Jer-Bel Jerseys with his family. Daily operation of the 150-cow business is carried out by Tim and his wife, Amy, and their son, David. The herd is enrolled on REAP and ranks among the top 25% in the nation for genetic merit with a herd average JPI of +48 (August 2016). The herd average for September 2016 stands at 19,985 lbs. milk, 885 lbs. fat and 683 lbs. protein. The Kings raise most of the feed for the cows on the farm's 500 acres and have been milking the herd using a pair of Lely robots since March 2014.

**Amy Maxwell, Donahue, Iowa:** Maxwell and her family own Cinnamon Ridge Dairy, a 220-cow Registered Jersey dairy. Brothers John and Edwin Maxwell, and John's daughters, Amy and Kara, and wife, Joan, operate the dairy with the help of eight employees. The herd is enrolled on REAP and has a 2015 lactation average

of 22,764 lbs. milk, 1,071 lbs. fat and 823 lbs. protein, marks that rank among the top four in the nation for all measures of production among herds with 150-299 cows. The fully-genotyped herd has an average JPI of +50. The Maxwells farm 1,200 acres of owned land and 200 acres of rented land and custom farm another 2,500 acres. They also process cheese on the farm and operate a farm tour business. Cinnamon Ridge Dairy began milking the herd with four Lely robots in November 2012.

**Tony Meier, Palmer, Kan.:** Meier operates Meier Dairy with his parents, Duane and Ronda, two brothers, a sister and another full-time employee. Meier Dairy is a mixed herd of 600 Holstein cows and 56 Jersey cows. Brown cows were first added to the black and white herd with the purchase of 18 head at the Heartland Production Sale in 2013. The Jersey herd is enrolled on REAP and has a 2015



Tony and Traci Meier run Meier Dairy, a mixed herd of 650 Holsteins and Jerseys, with his parents, Duane and Ronda, two sisters, a brother and another full-time employee. The family first added Jerseys to the herd in 2013, purchases from the Heartland Production Sale. The herd ranks among the top 20 herds in the country for genetic merit.



The Nuhfers—Gary, Tom, Amy, Jason and Brandy with Gage—operate Bar-Lee Jerseys, a 220-acre, 135-cow Registered Jersey farm in Ohio. Robots have enabled the Nuhfers to reduce the work force to two full-time family members and a single part-time employee. They are pictured with a family favorite, BLJ HiredgunRose, Excellent-90%.

lactation average of 19,185 lbs. milk, 916 lbs. fat and 722 lbs. protein. Meier Dairy ranks #20 in the nation for JPI with a herd average of +70 (93% genotyped). The Meier family has been using 12 Lely robots to milk the herd since September 2015.

**Jason Nuhfer, Willard, Ohio:** Nuhfer and his parents, Gary and Amy, operate Bar-Lee Jerseys on a 220-acre farm that has been in the family since 1963. Jason's wife, Brandy, a large animal veterinarian, also lends a hand with the farm. The 135-cow Registered Jersey herd is enrolled on REAP and has an August 2016 rolling herd average of 19,071 lbs. milk, 934 lbs. fat and 741 lbs. protein. With the latest herd appraisal in March 2016, the herd includes 19 Excellent and 91 Very Good cows and has an average of 84.5%. The Nuhfers raise about 150 acres of corn and 80-100 acres of an alfalfa grass mix and double-crop 50 acres of rye or triticale on owned and rented ground. They have been milking the herd with a pair of Lely robots since December 2015.

### Robot Background

*Why did you decide to install robots?*

**Glamourview:** We chose robots when we made the decision to move from twice to three times a day milking. They were more efficient and less expensive than hiring someone to do the third milking.

**Highlawn Farm:** An issue with labor was the primary reason we installed robots. It is difficult to find reliable labor in our area.

**King:** We were spending roughly 10-12 hours a day just milking the cows, so wanted to try robots to reduce labor and use our time more efficiently.

**Maxwell:** When I graduated from Iowa State University, I wanted to return to the family farm and milk cows. At that point, our cows were being milked at Bohnert Jerseys in East Moline, Ill. Bringing them back home required a brand new facility. Robots offered us opportunity for flexible scheduling and high production.

**Meier:** Labor issues forced us to take a look at robots. It was getting too hard to find good quality employees to milk.

**Nuhfer:** Labor challenges and an outdated parlor were the primary reasons we started looking at robots. Like many farms, it was hard to find reliable people who wanted to milk cows. Because Mom was doing a lot of the milking, we wanted to find someone to replace her in the parlor. As well, our parlor was at the point of needing some work. It was as good a time as any to make the investment. After we started looking, the other benefits of the technology started to emerge too.

*What tools did you use to calculate a return*

*on investment?*

**High Lawn:** Two years ago, we were at a point where we needed to replace our existing parlor and build a new facility. We evaluated the costs of a traditional parlor versus robotic milkers and found the total investment, which included a new building, was not significantly different for either. The lower labor required by robots was one of the more important factors that helped us choose the robots.

**King:** We supplied figures to our banker, who calculated most of our ROI numbers.

**Maxwell:** We used an Excel spreadsheet that had been modified from Farm Works.

**Meier:** Our banker was very involved with the process. Once we figured out the construction costs, we were able to develop a plan to recoup our investment.

**Nuhfer:** Our accountant put together a spreadsheet to give us a start. As well, our bank had financed several robot projects before us, so they were very helpful in putting together accurate numbers.

*Have your initial expectations for income and expenses been realized?*

**High Lawn:** Yes, we believe so.

**King:** Yes. Our herd average has increased and we are more efficient with our expenses. However, the recent drop in milk price has caused our margins to become tighter.

**Maxwell:** Yes. The high cost of the robots is offset by decreased labor expenses and increased income from tours and higher milk production. We hold quarterly meetings with farm owners, employees and a team of advisors to manage and communicate expectations and plan for the farm future. The advisory team includes our banker, accountant, nutritionist, veterinarian and agronomist and representatives from Lely, our feed mill and our milk plant.

**Meier:** Ha, not with the current milk prices. Because the equipment is barely a year old and milk prices have been relatively low, we have not been able to recover costs as quickly as we would have in good years. We are optimistic this will change long term.

**Nuhfer:** Everything is pretty much how we planned, except cow numbers. We should be milking 140 cows, but are 30 shy of that. The spring we started the project, we sold a group of bred heifers as we typically do. Looking back, we should have held on to them to be at capacity sooner.

*What is the anticipated life of your robots?*

**High Lawn:** We hope to get up to 20 years of life with the robots taking into consideration that we are getting technology upgrades every year.

**King:** 20-25 years

**Maxwell:** 20+ years

**Nuhfer:** Lely told us the robots are made to work 20 years. Most of the time, however, they are doing a better job milking the cows at the end of their life than when they were new because of constant updates in technology. W.G. Dairy, the company that installed our system, anticipates the U.S. will have a rebuilding program like the one in Europe in the coming years. If that happens, we could trade our robots in for new ones after about 15 years. At that point, they would have trade-in value, so a certain amount would be taken off the cost of the new ones.

*What facility changes did you make to accommodate the robots?*

**Glamourview:** We essentially started from scratch with everything. We bought our farm with an old, renovated tie-stall barn, a three-sided pole barn and a house. We broke ground on our main milking facility April 2014 and the first two robots were up-and-running August 2014.

**High Lawn:** As mentioned previously, we had to build a new barn from scratch, so added equipment that accommodated the robots, including alley scrapers and robotic feed pushers.

**King:** Everything! Before we upgraded to robots, we were milking in a 42-stall tie-up barn, so the installation of robots required a whole new facility. We built a new 152-stall free-stall barn with waterbeds and alley scrapers and added a new manure storage system that included a lagoon.

**Maxwell:** We built a new barn with tourism in mind. We included a robot-viewing room and a second-floor meeting room with windows overlooking the cows and added windows to the cheese-making room. The barn also has a residence for me and additional areas to make and store cheese.

**Meier:** We retrofitted our existing facilities for a free cow flow system. We extended the sides of the free-stall barns to house the robots and also moved the bulk tank to the center of the facilities.

**Nuhfer:** Our robots were added to the front of our existing four-row free-stall barn. We have a robot on each side of the feed alley, which runs through the center of the barn. With this setup, we can maintain two groups and cows never have to cross the feed alley. We also added a new milk house, utility rooms, vet room and office to the front of the barn and 70 feet for additional free-stalls to the rear of the barn. We now have room for 140 milking cows and 24 far-off dry cows under one roof. As well, we added alley scrapers in the main free-stall barn since cows never leave the pen.

When we made the switch to robots, I decided to continue using sand bedding even though most of the farms we visited used

water beds to reduce trips through the barn with equipment, which can be difficult with cows in the pen. I wasn't ready to give up the cow comfort of sand to accommodate the robots. So, we have both.

The one day a week we bed stalls is time consuming, but I think it is well worth the extra effort. We move all the cows to one side of the pen, then rake and deep groom the stalls and add new bedding. Then, all the cows and the scraper are moved to the newly-groomed side and the remaining stalls are cleaned and bedded.

We added a sand separation lane to reuse sand. After two weeks of sitting, the sand is essentially brand new and doesn't even have a scent of manure. The process works very well and saves us \$1,000 a month alone.

The final facility upgrade we made in conjunction with the robots was the addition of a 72' x 100' transition cow barn. The bedded-pack barn houses cows in social stable groups from 35 days pre-fresh to seven days post-fresh. This barn would

not have been mandatory, but we wanted to take this group of cows to the next level, so they are ready to take full advantage of the robotic milking system.

### Robot Management

*What are you feeding through the robots?*

**Glamourview:** We feed pellets.

**High Lawn:** We are using a pellet mixture for the robots.

**King:** We are feeding a textured feed.

**Maxwell:** We feed a pellet. Additionally, we recently installed liquid pumps on the robots and feed a glucose supplement to cows fresh to 30 days-in-milk.

**Meier:** We feed a high-energy pelletized feed.

**Nuhfer:** We feed a pellet mainly as an energy source, with no minerals.

*How is feed allotment per cow determined?*

**Glamourview:** Feed allotment is based on milk production per cow.

**High Lawn:** Feed is determined by days-in-milk and production. We use a table associated with days-in-milk, how many times a cow visits the robot and production per day.

**King:** We use a feed table that is based on days-in-milk and production.

**Maxwell:** We have worked with our nutritionist to set our feed tables. For the first 45 days-in-milk, cows are fed at a constant rate. After 45 days, feed allotment is based on milk production. Two weeks before dry-

off, the pellet is reduced.

**Meier:** Currently, feed allotment is based on milk production.

**Nuhfer:** The amount of feed is based on milk production. There are many ways to set up feed tables with robots and we are still in trial-and-error mode.

*What routine maintenance needs to be performed on robots?*

**Glamourview:** The company that in-



One of a dozen Lely robots used to milk the 650-cow herd at Meier Dairy. Jerseys are grouped together; Holsteins are grouped by lactation number, with first-calf heifers in one group and mature cows in another.

stalled the robots performs maintenance and equipment checks on a quarterly basis. We check equipment—filters, gaskets, vacuum levels, inflations and such—on a routine basis.

**High Lawn:** The robots get a predetermined general cluster wash three times during a 24-hour time period. Additionally, the robot is cleaned after a cow is milked who needs to have her milk separated from the tank. We service robots in the morning and again in the afternoon to the tune of 5-10 minutes each making sure they are calibrated and the sensors and bleed holes are clean. Robots are also checked by Lely technicians throughout the year on a routine schedule.

**King:** We do a daily cleaning that includes three shutdowns for an automatic, thorough washing. We also spray off the robots each day to prevent manure buildup. The installation company visits about twice a year to do software updates and system checks. We change inflations every 10,000 milkings and brushes every 30,000 milkings and replace hoses and cords as needed.

**Maxwell:** Twice daily, we rinse the robot and check hoses, inflations and bleed holes and do calibrations of the arm and laser. As part of our six-month maintenance agreement, our dealership monitors the system and replaces various parts. The computer provides an alert when some parts, such as inflations and milk pump bladders, exceed number of recommended milkings and

need to be changed.

**Meier:** We wash the robots twice every day: when we walk into the barn in the morning and before we leave for the day. Our biggest concern is keeping the lasers clean. Lely provides us a schedule for maintenance.

**Nuhfer:** On a daily basis, we wash down the robot room and robot. We check the laser twice a day to ensure it is clean enough to properly find teats. We check the air bleed holes on each inflation and the cup offset about once a week, unless there is a problem in the interim. The computer alerts us when parts like inflations, brushes, milk pump and vacuum shut off sleeves need to be replaced. Life of inflations is 10,000 milkings; brushes run 20,000 milkings; and milk pumps get 40,000 milkings. Changing everything is fast, do-it-yourself project. W.G. Dairy follows a regular preventive schedule for on-site maintenance work.

*What is the biggest benefit to using robots?*

**Glamourview:** Improved udder health and increased production from three times a day milking are the biggest benefits we get from the robots.

**High Lawn:** There are many benefits of robots—increased production, improved milk quality, reduced labor and a new, more flexible work schedule.

**King:** Our cows are healthier and produce more because they are no longer milked just twice a day. They can come and go as they please and get milked more than twice if they are higher producers. We also have flexibility in how many hours we spend in the barn and when we do it. We are no longer tied to the barn. With robots, we don't have to stop the planter in the spring or the combine in the fall to go milk cows.

**Maxwell:** A major benefit comes from increased longevity of cows due to greater comfort and fewer health problems. With all the information gathered by the robots, we're better able to anticipate and respond to the needs of each individual cow and more closely monitor reproduction and health, which leads to a longer productive life.

**Meier:** Robots give us far more flexibility in managing the herd than before. As well, I believe udder health is improved and longer peaks attained when cows, especially fresh cows, can be milked more than three times a day.

**Nuhfer:** For nearly everyone on the farm, the biggest benefit is flexibility. If



A piece of equipment called a shuttle is used to collect samples for monthly DHI tests for herds on official test, including Meier Dairy, the first herd to install robots in Kansas..

we are making hay or planting corn, only one person needs to quit field work to do barn chores. As well, if someone needs to be away for chores, it is much easier for the rest of us to get the work done and have it done right.

For me, the heat detection system is a major benefit. I used to breed about 60% of the cows using ovsynch. Since we installed the robots, I have synched just four cows. Herd checks are a lot more enjoyable too. Typically, open cows are cystic or have other clinical issues. Cows not showing heat over the voluntary waiting period now are usually given prostaglandin, saving days as compared to ovsynch.

On the down side, heat detection with heifers is not very good. Their activity seems to be all over the board as compared to cows.

*Were there benefits you didn't anticipate?*

**Glamourview:** Extremely good teat end health.

**High Lawn:** The increase in production is the most impressive benefit of robots. Averages of 65 lbs. milk per cow per day or more are not uncommon for us in favorable weather conditions.

**King:** The cows are healthier and more comfortable than we expected. Since we installed the robots, the number of mastitis cases has dropped significantly and the cows are more comfortable.

**Maxwell:** Because of the robots, we have been able to sell more cows for dairy purposes. This includes cows that are more ideally suited for a parlor system and extra bred heifers we no longer need because mature cows are staying in the herd longer.

**Meier:** Improvements in teat and foot health.

**Nuhfer:** I think the cows are calmer. They were used to getting up to be milked when someone went in the pen to fetch them. Now, they don't pay much attention to people being in the pen with them. I breed most cows in the stalls and don't even bother setting the headlocks.

*What were some of the early headaches or challenges using robots?*

**Glamourview:** Our challenge really wasn't in getting the cows used to milking in the robot. It was getting the people used to letting the robots milk the cows.

**High Lawn:** Learning how to fix break-downs, large and small alike.

**King:** It took time to learn all the ins and outs of the technology. As well, it took time for us to learn to use the robots during our cold Ohio winters. In our area, we see some harsh winters, which led to the alley scrapers freezing and ice forming on the ropes connected to the teat cups.

**Maxwell:** The initial training for the cows was challenging. In the first six months, we had 120 first-calf heifers freshen, which came with many challenges. It took some time to develop an ideal work schedule and chore assignments with the addition of the robots.

**Meier:** For us, trying to start a dozen robots all at once was a big challenge. We just didn't have enough help.

**Nuhfer:** We had a very smooth transition. I anticipated having more challenges than we did. I couldn't have been happier with how the cows adjusted and the guys from W.G. Dairy were great.

*How did you overcome these obstacles?*

**Glamourview:** With time, we discovered the robots do a great job milking.

**High Lawn:** We learned how to fix our robots on our own by watching and learning from the technicians. We also discovered how important it is to have spare parts on hand so we can fix a machine on the spot on our own.

**King:** The more we used the system, the more familiar we became with the technology. For the alley scrapers, we discovered that setting them on continuous-cycle in colder months is more effective than the delayed-run we use in the warmer months. To prevent ropes to the teat cups from freezing, we purchased turbo heaters for use as supplemental heat in the robot room.

**Maxwell:** Training the cows and first-calf heifers to go through the robots took patience and persistence. We used trial and error to develop a work schedule, making adjustments and finding what worked best for both cows and personnel.

**Meier:** We just kept pushing the cows through the robots for four straight days and then slowly let them try it on their own. It took about three weeks after the initial start-up before every cow was going through the robot on her own.

**Nuhfer:** We really didn't have any major problems that weren't expected.

*What were some of the obstacles you didn't*

*anticipate?*

**High Lawn:** We didn't expect it to be so costly for a technician to fix a problem. We now do as much of this on our own as we can.

**King:** We didn't anticipate how the cold weather would affect the mechanics of the system.

**Maxwell:** Overcrowding the robot and milking too many cows was an unanticipated obstacle. When we sold 30 lactating cows, we were shipping the same amount of milk within a week because the cows were able to go through the robot more often.

**Meier:** We did not design our layout well enough to accommodate use of foot baths.

**Nuhfer:** The single biggest obstacle we have faced so far is dealing with older cows with low udders. The robot needs at least 13 inches of clearance to the teat end—not the udder floor—to get under the cow. Since we started with robots in December, we have culled 5-6 cows for udder depth. On the older cow side of the barn, we put two extra rubber mats under the cows to get them up another 1.5 inches off the ground. With the center cut out, the robot arm can still get under the cow without interference.

*Are milking times interrupted/affected if a component in the system breaks?*

**Glamourview:** Yes. As with any facility, down equipment means down time.

**High Lawn:** Yes, they are interrupted big time. The sooner we can get a machine fixed, the better.

**King:** Yes. Usually a break in the system requires one or both of the robots to be shut down. Depending on how long they are down, the cows get behind in their usual schedules.

**Maxwell:** Yes. Cows have developed routines and are thrown off if the robot isn't available around their usual milk time. The more cows per robot, the larger the back-up when the robot is down.

**Meier:** Any down time sets you back. But, we have multiple robots per pen, with about 55 cows per robot, so it's not an absolute rush to get a robot fixed right away.

**Nuhfer:** Milking is interrupted during maintenance or repair. Most of the time, just one robot is being serviced while the other continues to milk. It does take time to catch up, but thus far, we have not had a real problem. W.G. Dairy has a technician on call 24/7 to assist over the phone or come to the farm if needed. By using team viewer on the computer, the tech can control our PC to help diagnose problems faster.

*What changes would you make to your set-up today to make it function better?*

**Glamourview:** We wouldn't change anything.

**High Lawn:** We would be sure all preventive maintenance is done correctly and learn how to spot signs of potential breakdowns.

**King:** We are satisfied with our set-up and the decisions we've made, so would make no changes.

**Maxwell:** We would make the drain pipe under the robot larger, as we have some problems with drains backing up from sand and manure.



The Kings use a number of products manufactured by Lely to manage the herd at Jer-Bel Jerseys, including this automatic push feeder.

**Meier:** We would place the robots closer together. Because our facility is so spread out, cows have to do a lot of extra walking that could have been avoided had the robots been closer together.

**Nuhfer:** I would consider a barn that could be flushed. I see the alley scrapers being potential trouble down, mostly in winter months. Though I am not a really big fan of flush barns, I may have to delve into this further.

*What would you suggest to others contemplating robots?*

**Glamourview:** Do it! And yes, show cows can be milked in the robot.

**High Lawn:** Learn as much as you can from the installers and train your employees how to take care of the machine to prevent future troubles.

**King:** The benefits of putting in the robots have outweighed the drawbacks. They are worth the investment. Before deciding to put in the new system, we really did our homework, which included visits to multiple facilities with robots to get a better idea of how we wanted to construct our system.

**Maxwell:** Tour as many facilities as possible and ask questions, especially what the farm would do differently. Design your facility to match the goals you wish to accomplish.

**Meier:** They work! Don't be scared of

technology. We produce more milk with fewer employees and robots don't take sick days.

**Nuhfer:** If you want robots so you don't have to see the cows any more, they are not a good idea. As managers, robots allow us to spend more time taking care of the cows and doing other things better.

I would also highly recommend the robotic feed pusher, even if you don't have robotic milkers. The Lely Juno pushes feed up every hour so cows are never out of feed while we are away from the barn.

The technology seems overwhelming at first, but after using it every day, it becomes your normal routine.

**Cows and Robots**  
*How did you get cows to initially start using the robots?*

**Glamourview:** In our setup, it takes first-calf heifers about 2-3 days to be using the robots on their own. Fresh cows head to the robot on their own once we get them in

the free-stalls and the general milking area.

**High Lawn:** It was more difficult to get the older cows to use the robots than the younger cows. In the end, though, it has been a great experience to see just how well all our cows have adapted to the new system.

**King:** We got them comfortable with the system first. Before our official start-up, cows could visit the robot for feed consumption only. They were able to walk in, hear the noises the machine was going to make and get a sense for what would happen from then on out.

**Maxwell:** We forced all cows through the robot for three milkings each day for the first three days. After that, we fetched cows that weren't going through on their own.

**Meier:** We split the cows into groups and pushed them through the robots. Once milked, they were penned in an area with food and water. We tried to have three people per robot to put the cows through the robots. We kept rotating the groups through the robots 24/7 until cows were accustomed to the system.

**Nuhfer:** About five days before we started milking, I top dressed the TMR with the robot pellet. As well, in the week prior to startup, we ran all cows through the box for a training period three times. This allowed them to eat, hear the vacuum pump, see the arm swinging and become accustomed to the sights and sounds of the system.

The first three days of milking, each side

of the barn was split in half. The group in the front half of the barn, with the robot, waited to be milked. The other group in the back of the barn could eat, lay down and do whatever they wanted. Then the groups were switched. After about two days of this, most cows got the idea and would go through the robots on their own. On the fourth day, we pulled all the gates. For the first 10 days, there was a lot of bringing "collect" cows up to get milked, but it's been smooth sailing since.

*Beyond milking, did cows have to adjust to the robots in other ways as well?*

**Glamourview:** No.

**High Lawn:** In our case, with a brand new facility, it was a challenge to get the cows to lay down on the water beds. Even after two years, we still have to work hard to get some first-timers to adapt to them.

**King:** Because we started from scratch, they had a whole new facility to adjust to. This included adjusting to a TMR and laying on waterbeds instead of straw.

**Maxwell:** Yes. Because our cows were housed at Bohnert Jerseys prior to coming home, everything was totally new for them, including environment, feed and management.

**Meier:** Yes. Cows needed to learn to go through the robot on their own rather than being forced to do it. This was especially difficult with our older cows, who were used to people coming and getting them on a set schedule.

**Nuhfer:** Cows have adjusted to everything very well.

*How do you ensure later lactation cows visit the robot for their required milkings?*

**Glamourview:** We check the computer 3-5 times a day for push lists.

**High Lawn:** Most of the time, we have no problems with this. We are expecting that we will see later lactation cows milked fewer times per day.

**King:** We have a fetch pen next to one of the robots. Once a cow is in there, the only way out is through the robot.

**Maxwell:** We haven't had any problems with later lactation cows decreasing robot visits. Twice a day, we fetch cows over 12 hours since last milking. Two weeks prior to dry off, milking access is reduced to allow for milking every 36 hours.

**Meier:** We create a fetch list. If a cow doesn't come to the robot within a 12-hour time period, she is put on what we call a fetch list. We look at the computer throughout the day and fetch accordingly.

**Nuhfer:** We haven't had problems.

*Do you group cows by age, stage of lactation, or production? Or are they managed*

as a single group?

**Glamourview:** We have four groups in our barn: one robot and section for Jerseys; a second robot and section for first and second-lactation Holsteins and smaller Ayrshires; a third robot and section for third and later-lactation Holsteins; and a fourth section with large box stalls for show cows. Show cows are pushed to the robots (Jerseys on one side and Holsteins and Ayrshires on the other) twice a day.

**High Lawn:** Generally speaking, cows are a mix of ages. Though, we do try to have younger cows in one group and older cows in the second group.

**King:** We manage them as one group.

**Maxwell:** We have two pens with two robots each. The north pen has adjustments made to the robots to accommodate deeper-uddered cows. Robot boxes in the south pen are made narrower to limit cow movement. All first-calf heifers are grouped in the south pen. Cows generally are returned to the same pen each lactation, though changes are made based on cow numbers in each group and udder depth.

**Meier:** Our Holsteins are grouped by lactation, with first-calf heifers grouped separately from mature cows. Our Jerseys are grouped in a single pen.

**Nuhfer:** We have two free-stall groups: all two-year-olds (and some other younger cows) in one group and older cows in the other. Fresh cows are housed on a bedded pack for 7-10 days and walked to the robot twice a day for milking.

*Has milk production increased since installation of robots? If so, by how much?*

**Glamourview:** Yes, production has increased from the time we first installed robots.

**High Lawn:** In our case, daily milk production has increased 20 lbs. per cow on average. We also switched management styles as we were milking cows in a tie stall barn.

**King:** Yes, production has increased by about 15 pounds per cow per day.

**Maxwell:** Yes. In November 2013, after a year of robot use, we averaged around 63 lbs. milk per cow per day. Over the past three years, production has increased about 10 lbs. to 73 lbs.

**Meier:** Yes. Before robots we would typically average around 65-68 lbs. milk per cow per day milking twice daily. This summer, we were averaging about 80 lbs. on very poor quality feed.

**Nuhfer:** We have been using robots for just nine months now and are averaging 67 lbs. milk per cow per day. Since we added the robots, milk has come up some, but the rolling herd average hasn't shown a lot of gain yet. However, fresh cows are taking off very strong. We regularly have 5-10 cows making more than 100 lbs. of milk a day.

These are numbers we haven't seen before on so many cows. If they are persistent, I anticipate seeing a nice increase in herd average after all the cows freshen again.

*How many milkings per day do your cows average with the robots?*

**Glamourview:** 2.9-3.0

**High Lawn:** 3.0-3.2

**King:** 2.7

**Maxwell:** 3.1

**Meier:** Holsteins 3.0; Jerseys 3.8

**Nuhfer:** 3.2

*Do your cows seem more peaceful and content since robots were installed?*

**Glamourview:** Yes. If cows are bellowing, there is a problem.

**High Lawn:** Yes, they are more peaceful and comfortable.

**King:** Yes.

**Maxwell:** Yes.

**Meier:** Very much so. Now, the Holsteins are acting more like Jerseys and the Jerseys are acting like pets.

**Nuhfer:** Yes.

*Has the health of your cows improved since robots were installed?*

**Glamourview:** Yes.

**High Lawn:** Yes, that has been our experience.

**King:** Yes. The number of mastitis cases has decreased significantly and our somatic cell count has really dropped. We have also seen a lot fewer respiratory problems.

**Maxwell:** Since the cows were housed at a different facility before the robots, we aren't able to make that comparison. However, we feel cow health has improved. We see very few cases of mastitis with the robots.

**Meier:** Overall health has definitely improved. The system gives us so much information, we know a cow's sick even before she shows signs of illness.

**Nuhfer:** SCC is lower. We are very happy with the way the machines milk the cows, especially taking one quarter off at a time and using variable vacuum based on milk flow to maintain a more consistent teat end vacuum level.

*Has reproductive efficiency improved since robots were installed?*

**Glamourview:** Yes.

**High Lawn:** Yes, the robots provide good information about heat detection.

**King:** Yes. The software system works with the cow monitors to help determine optimum breeding times. Even if a cow does not show a standing heat, we can determine the best time to breed her through increased activity levels.

**Maxwell:** As mentioned earlier, we can't make that direct comparison. Though, we can say that heat detection with the robots

is excellent. The software records breeding time before or after peak heat and tracks these conception rates. It uses this information to predict ideal insemination time, a feature we find very helpful.

**Meier:** Yes. With the activity monitors, what took two people four hours per day to check with tail chalk now takes one person five minutes with the computer. So, in just five minutes, we have our breeding list ready to go for the day.

**Nuhfer:** Yes. As previously mentioned, improved heat detection is one of the benefits I most appreciate about robots.

## People and Robots

*Have you reduced labor expenses since robots were installed? Or, have you just shifted tasks from milking to other tasks on the dairy?*

**Glamourview:** Yes.

**High Lawn:** We have been able to reduce the number of employees who work with the cows and transfer them to the dairy processing and distribution divisions at High Lawn Farm.

**King:** As a family-run operation, we didn't reduce labor expenses. But we have shifted our tasks from milking cows to other duties.

**Maxwell:** Prior to robots, we had not milked cows on our farm for several years, so the labor needs are completely different.

**Meier:** With the robots, we were able to reduce employee numbers by six and now have just three people handling all the cow work each day.

**Nuhfer:** Before the robots, we hired a number of part-time employees. We eliminated 2-3 positions for high schoolers and kept our best part-time employee. We expanded his duties beyond barn work, which now includes feedings if I am away from the farm. As well, Mom has had to spend a lot less time in the barn.

*Have robots enabled you to better manage other aspects of the dairy that might have needed attention but were put on the back burner because of time/labor constraints?*

**Glamourview:** Yes.

**High Lawn:** Yes, robots have enabled us to spend more time working on other aspects of the business.

**King:** Yes. We are able to get into the fields in a more-timely manner and harvest higher quality feeds. Overall, we get more done in the day.

**Maxwell:** Yes. With robots, the dairy requires just a few hours of attention on some days. So, the rest of the day can be spent working on other projects.

**Meier:** My dad and brother have been able to focus on the crops rather than the cows since the robots were installed. This

leads to better, quality feed and better, healthier cows.

**Nuhfer:** Yes. There is more time to do a better job managing and taking care of the cows.

*What additional information have you been able to collect and use/analyze since installing the robots?*

**High Lawn:** We use several tools of information from the robot to make better decisions for cow production, health, heat detection, mastitis, genetics and more.

**King:** There is a wealth of information at our fingertips. The computer helps us analyze everything, from how many minutes a day a cow chews her cud, to milking speed, temperature and conductivity. We can monitor activity level of each cow and pay close attention to cows that get flagged red for a decrease in milk production from the previous day. All this information adds pieces to the puzzle and lets us better manage the health of each cow every single day.

**Maxwell:** The robots provide a plethora of information on the cows—both on an individual level and as a group. On an individual level, rumination, quarter conductivity and heat activity are especially useful. Monitoring milk production for cows grouped by days in milk over time has given us some insightful information.

**Meier:** Before the robots, we just had monthly DHI test results for each individual cow. Now, we have daily milk weights for each cow, along with rumination activity and a host of other information. All this is new to us. It makes us a lot better herdsman and a much more efficient dairy.

**Nuhfer:** The amount of information is amazing. Even simple bits of information are very useful, such as alerts to change inflations.

The rumination monitor helps us quickly diagnose sick cows. Rumination and activity is sent to the computer every two hours, even if a cow doesn't get milked. Because of this, I think we catching and treating bad cases of mastitis 12 hours sooner than in the parlor. This also allows us to monitor dry and pre-fresh cows and cows that don't feel well enough to get up and get milked.

Heat detection is outstanding for cows, but less accurate for heifers. The Lely system uses insemination time and conception rate data to provide an ideal time to breed based on our herd's specific statistics.

A lot of our high-producing cows are now getting milked five times a day, some six times. Since these cows aren't carrying the same amount of milk they would in a twice-daily milking setting, I am hoping to see improvements in udder longevity and health.

Milking speed is another aspect that is

evaluated with robotics. The faster a herd milks out, on average, the more efficient the system. The goal is more milk per robot per day. A cow that takes up to 15 minutes to milk out will be less profitable than 2-3 cows that are producing as much per cow and can be milked in the same 15-minute time period.

*What adjustments did your DHI tester have to make to get your information reported for pedigrees, herd averages, etc.?*

**High Lawn:** We are keeping all DHI information (calving, production, dry-off, etc.) in a program that coordinates with the Lely system. We collect samples every month with the Lely "shuttle," a piece of equipment needed to pull samples from the robot, and our tester picks them up at the farm.

**King:** A lot of the information from the Lely system and PC Dart is interchangeable, so it made it easy for our tester to transfer data. There weren't any major adjustments that needed to be made.

**Maxwell:** We test monthly. Our tester stops at the farm and picks up samples we've collected and labeled and enters information in PC Dart using reports we've printed out for him. He submits the information electronically and leaves bottles for our use the next month.

**Meier:** We were the first herd in the state to have robots, so this was a big change for everyone involved with the process. We had to get used to the shuttle. Our tester needed to establish a time frame in which samples from every cow could be obtained. Not every cow gets milked in any given eight or 12-hour time period.

**Nuhfer:** Lely milk weights are considered official and these records are simply transferred to DHI by the milk tester once a month. An automatic shuttle is used to take milk samples from each cow. We rent these from DHI and collect samples every other month. Getting the shuttles to work properly has been one of our biggest challenges so far. Though not a huge deal, it has been annoying.