

Time for Technology

New Product Launch for Automatic Feeding

Jack Rodenburg, DairyLogix

The April 24th launch of a new automatic feeding system by Lely gives me a new piece of technology to talk about in this column and also an opportunity to reflect on what it takes to bring new ideas to the market place successfully.



The Vector, a fully automated TMR mixing and delivery system on wheels, has much to offer in terms of labour saving and precision feeding. Built on a platform that looks a lot like the Juno feed pusher, the Vector loads, mixes and delivers TMR rations day and night without operator labour. It picks up the feed ingredients from a loading area or feed kitchen. Restocking that area 3 times a week, and monitoring the formulation and delivery parameters will be all that is left of what is currently one of the two big labour demands on most dairy farms. The other one is milking and we know what robotics is doing for many herds in that area already.

The Vector system starts with feed placed in a roofed concreted area called a feed kitchen. Specific feed ingredients from bunker silos and commodity storages are placed in blocks or piles on the floor of the "kitchen" two or three times a week. These feeds are picked up by a rail mounted "grabber" and placed in the mixing and delivery robot. Individual scoops of various ingredients are weighed and sequenced so that ingredients are layered in, thereby minimizing the need for mixing. The system also accepts grain and mineral ingredients delivered by augurs. A laser finds the highest point in the defined area for each feed and guides the grabber to pick up from that spot. The grabber does quite an impressive job of cleaning up, but there will still be some management involved in keeping the kitchen organized and clean. Designing it for good access and ease of loading and clean up, will be a new challenge for barn designers. The system can also feed from a pile of loose material but silages would deteriorate quickly if left in a loose pile, so a block cutter will become an essential piece of equipment for farms adopting this feeding system.

The feed mixing and delivery robot loads and mixes while docked in the charging unit. Battery power is only used for feed delivery. Batch size and ingredients are computer controlled. Once a batch of feed is mixed, the robot follows a floor mounted metal strip to the feed manger and while travelling along the manger, it tracks along the manger wall in the same way as the Lely feed pusher. The system also makes passes where it only pushes up feed, and it decides when to make more based on a laser assessment of the amount of feed left at the last push up. When delivering feed, it speeds up where there are more leftovers and slows down where there are none, to even out the distribution of feed. Within the limitations of loading and delivery time and battery life, fresh feed can be delivered as often as desired. One of the Dutch herd owners using the system during its development, reports that his Vector feeds the milking herd fresh feed ten times per day. It can also feed any number of different rations anywhere

on the farm where its wheels will carry it. The maximum herd size for one mixing and delivery robot is about 300 cows but it will depend somewhat on travel distances and feeding frequency. Two delivery systems can work with a single kitchen with one feeding while the other loads.

Labour savings will be the big selling point for this system. In a survey of Ontario freestall farms conducted in 2010, the average survey herd spent 2.2 hours per day mixing and delivering feed plus an additional 22 minutes pushing up feed and 9 minutes per day cleaning the manger. So total time involved in feeding and feed handling was just over 19 hours per week. With the Vector, feed handling is reduced to filling and cleaning up the kitchen area 3 times a week. If that takes an hour each time, the labour saving on average is 16 hours a week. On the survey farms, when feeding involved a non family employee, he or she was paid an average wage of \$14.55, so the Vector can reduce feeding labour cost on the average survey farm by over \$12,000 per year.

But half of the survey farms only made fresh feed once per day and on average they pushed up feed four times per day. While the benefits of more frequent feeding in terms of higher milk production, better rumen health and lower concentrate costs are harder to quantify, they will add as much again to the value of this equipment. Other benefits claimed for the system include more accurate mixing with less chance of errors, and substantially lower energy costs than traditional TMR feeding systems. Quiet operation and no diesel fumes in the barn have to be a plus as well. To see the Vector in action go to <http://revolution.lely.com/en/home>.

If you want to adapt barn plans to accommodate this feeding system, you need to incorporate a logical spot for a feed kitchen in the plan. Drive through feed alleys can be narrower than conventional. The machine is 6 feet 4 inches wide, so add two feed mangers and an 11 foot drive through alley can feed both sides. The recommended width for a corridor where the machine drives without feeding is 9 feet so it can comfortably pass a person standing to one side, but it can run through 7 feet if needed.

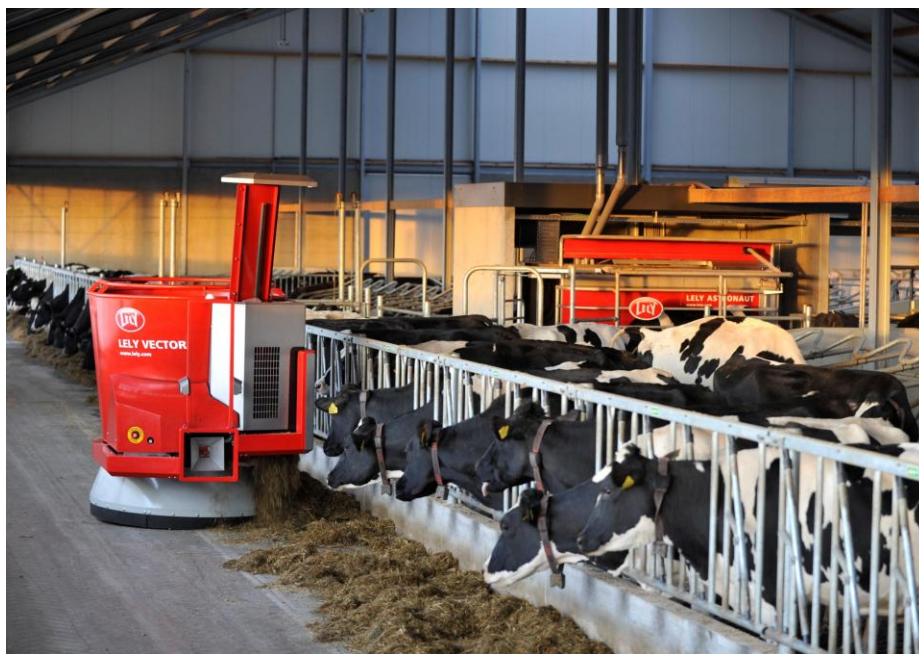
This technology takes feeding automation a substantial step beyond what other systems have offered up to now. There are numerous companies offering automatic batching systems but most can only deal with loose feed and that makes them impractical for loading silages from bunker silos because these feeds spoil quickly after they are removed from the silo and mixed with air. There are also several automated delivery systems for TMR, but except for a robotic, self propelled system not sold in Canada yet, all are track mounted systems that are limited in where they travel and where feed is placed. At this point in time, this is the only product that makes intelligent decisions about when to feed and where to put it based on what is left in the bunk.

But for a technology to benefit a Canadian dairy producer, the fact that it exists is not the whole answer. Since the Dairy Farmer magazine invited me to start this column in January 2009, 25 articles about various new precision and automation technologies have been published on a variety of topics. Of 26 specific products mentioned in past articles, 50% are in commercial use in Canada today. The other 50% are real enough in that they exist and are offered for sale somewhere in the world. Some of these products are not in use here because they are not supported by a Canadian distributor, others are not offered here yet because the distributor is not ready to sell them here, some are just seen as too

expensive by producers and some have not delivered what was promised. Some of the first things I wrote about are still "coming soon" but not available three years after their launch. According to Lely Canada, availability of the Vector will be phased in over time with immediate introduction in Holland, Scandinavia and France. Two reference installations will be installed in Southwestern Ontario this summer, and it will be offered in Canada commercially in the summer of 2013. When I asked about a price, I was told it would be "more than a TMR mixer, but less than the total of a TMR mixer and tractor". That's a big range, but even at the upper end it will fit on many farms, and at the lower end it could be the right way to feed on the majority of freestall dairy farms in Canada.



The Vector robotic feed mixing and delivery system, loading forages in the "feed kitchen, using the track mounted grabber. Planning appropriate feed kitchens will be a new aspect of design for barns using these systems.



The timing and amount of feed delivered by the Vector is determined by a laser measurement of the amount of feed left at the last push up. Fresh feed can be delivered automatically as many as ten times per day.