



Key Points:

- Putting in a little extra effort with replacement heifers will ensure longevity and high performance
- Consider if you need to shift your breeding priorities to develop a herd of cows best suited to robotic milking
- Don't be complacent with heifer training – time spent training will be rewarded with confident heifers that perform well in the system
- A well-executed plan is necessary for heifer training and calving management to ensure that staff are all well positioned to 'take the reins'

Raising cows for large herd automatic milking systems

By Kendra Kerrisk and Lee-Ann Monks

Most dairy cows can be milked by robots. But once you have an automatic milking system (AMS) you may choose to refine some of your routine practices to better prepare cows for robotic milking.

These may include:

- Calf rearing.
- Heifer management.
- Record keeping.
- Joining and sire selection.
- Heifer pre-training.
- Heifer training.

If you have a large herd AMS, heifer pre-training and training could pose some logistical challenges. It's worth thinking through your approach well in advance.

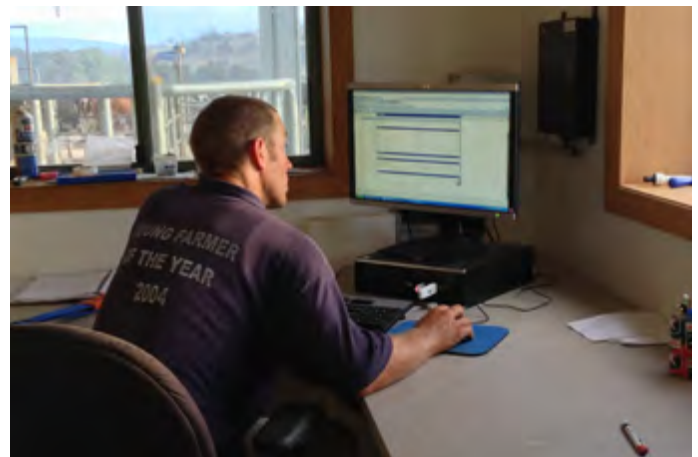
Calf rearing

Have a regular practice of checking for extra teats when a calf is removed from its mother. Remove extra teats with surgical scissors when calves are 1-2 days old. It is much less painful to remove teats at a very young age. Ask your vet about the best practice for pain and infection control.

Removing teats at a young age is a good practice for any dairy farm but it is especially important for AMS farms because extra teats can slow down robotic cup attachment and have an impact on throughput potential (the number of milkings that can be conducted each day).

Effective debudding/dehorning is also important as a 'horn stump' on an individual cow can allow that animal to have a negative impact on other cows in an AMS. There is no formal research to show that horn stumps increase the dominance effect of a cow over herdmates. However, most AMS farmers agree that cows with horns or horn stumps in a predominantly dehorned herd,

regularly prevent herdmates from passing through single file areas such as drafting gates and into milking stalls. It is possible that these cows create unnecessary congestion at the dairy.



Above: You'll need to enter heifer information in the AMS support software well before she enters the milking herd (see p2).

Heifer management

You might want to reconsider some of your heifer management practices such as assessing growth rates and conformation, cow identification and tail docking.

Make sure heifers are well grown to ensure each can hold her place in the herd. This is important on any dairy farm to ensure heifers can compete for feed, but in a robotic milking system an undergrown heifer may be more disadvantaged if she is not able to hold her place in the holding yard. She cannot simply wait for the last row or rotation as she might in a conventional milking system – now the cows keep coming and there is no end to the milking session.

InfoSheet

At weaning assess each calf's structure, for example back legs and stature. If there are any heifers with particularly poor leg and foot structure consider selling them if you have surplus replacements.

With an AMS, collar numbers may be a more useful form of cow identification than freeze branding. The robots and drafting gates work from an automatic ID chip. So the decision about freeze branding or collar numbers depends on the preferences of the people who will be identifying cows in paddocks and laneways.

Tail docking or trimming is not necessary for an AMS. In fact, robots may confuse the end of a tail for a teat if it is tucked around the udder of a nervous heifer at the first few milkings. However switch trimming just before entering the milking herd is recommended.



Above: Carefully monitor heifer growth rates: in a robotic milking system an undergrown heifer may be more disadvantaged if she is not able to hold her place in milking queue.

Record keeping

The software programs that come with AMS equipment collect detailed information about cows' events and production. The software also generates reports at the cow and herd level. Most AMS farmers find these reports extremely valuable for management decisions.

To make the most of these tools, you'll need to enter heifer information in the support software well before she enters the milking herd. This is likely to include cow ID, date of birth, pedigree, A.I., all reproductive events, preventative health and treatment details. Consider using this software as the home for all treatment data so that it is always handy for future reference. You should be able to easily enter blanket treatments (such as vaccinations) across the whole group of replacements if you have assigned them as a virtual group in the computer.

The reports will only be as good as the information you provide, so update records regularly to ensure useful reports. For example a report of cows due to calve this week will be inaccurate if you haven't entered mating and pregnancy testing results.

Build time into your schedule for routine data entry. Deciding how you assign animals to different groups is important. For example, if you have a group of heifers in training that are grazing with the herd and trafficking through the dairy don't put them in the milking cow group. They will affect data averages such as production per cow or milking frequency per day if the data is being averaged across the milkers and a mob of non-milking heifers.

Joining and sire selection

FutureDairy's experience and feedback from commercial AMS farmers suggests that most cows can be milked by robots so there is no need to sell a significant proportion of your herd or even to make radical changes to your breeding objective. However the importance you place on some traits may change which may influence your sire selection priorities. You may consider some minor adjustments to your breeding objective, such as increased attention to udder conformation and rear leg placement



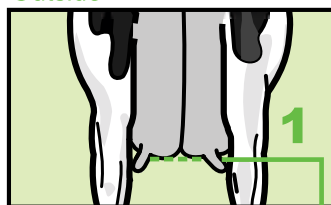
See separate FutureDairy Info Sheet: **Breeding for automatic milking**

Avoid placing too much emphasis on a strong central ligament when selecting sires for udder conformation. Robots will have difficulty attaching cups to cows with crossed over rear teats. Teat placement at the bottom of the lobes of the udder is ideal.

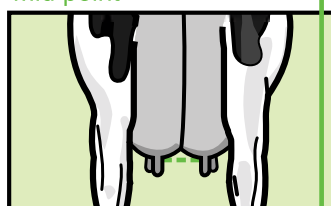
It would be helpful to be able to breed for a high level of motivation for voluntary cow movement around the farm, but we don't know how to categorise for that yet. There is some anecdotal evidence that some breeds or cross-bred cows may be more hardy and more motivated for voluntary movement.

When making sire selections, you may also wish to consider animal efficiency. For example, milking speed may be more important when you consider the impact that it can have on throughput potential (the number of milkings the robots can conduct each day. In a conventional dairy, cutting the average milking time by 30 seconds would have virtually no impact on a milking session. In a single-box AMS, cutting the average milking time by 30 seconds would allow an additional 10 milkings per day (that is you could milk an extra five cows, twice a day, or an extra three cows, three times a day). Similarly, you could milk more cows through an AMS if you had a herd of cows that can cope with average milking intervals of say 18 hours (instead of 12) without decreasing milk production.

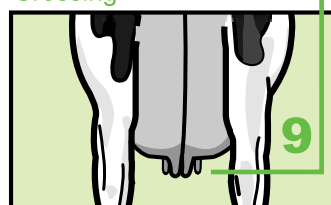
Outside



Mid point



Crossing



Right: When selecting sires, consider teat placement: teat placement at the bottom of the lobes of the udder is ideal.

Heifer training before calving

About three to four months before calving is a good time to introduce your heifers to the AMS. FutureDairy's research and experience with commercial farms has shown that up to two weeks pre-training is worthwhile. The pre-training approach will depend on whether you have a seasonal or year round calving herd, as this determines the number of heifers to be pre-trained at a given time.

The pre-training program aims to introduce heifers to drafting gates, robots and voluntary cow movement (moving by themselves from paddock to dairy and around the farm).

During the pre-training period consider also offering heifers grain at the AMS units or at feeding stations. While it is good for them to become familiar with voluntary cow movement, the milking equipment and feed stations, your ability to achieve this will depend on how much impact it will have on the milking herd's access to the dairy and yards.

Getting ready

Before heifers are introduced to the AMS, they will need to be fitted with a transponder which is their electronic ID and visual ID such as numbers on collars and/or ear tags.

Enter the relevant data (eg animal ID transponder number) into the computer so that the system can be programmed to draft heifers in training to appropriate directions and to ensure they are set for trafficking but no milking.



Above: Before heifers are introduced to the AMS they need to be fitted with a transponder (electronic ID) and visual ID such as collar numbers.

Drafting gates, robots etc

The first pre-training session involves an intensive couple of hours where heifers are introduced to one-way gates, drafting gates, the milking facility and feeding stations.

Auto-drafting gates can be left open for the first few visits; or perhaps operated manually while observing the heifers' inquisitiveness to explore the gate. Within a couple of days they should accept the gates in fully auto mode.

Be aware that during training the inexperienced heifers are likely to form 'trains' – following each other through without waiting for the gate to change – resulting in some erroneous drafting. Within a week they should be well settled into using the gates and will pause at the gate rather than trying to race through a gate that is shutting on them.



Above: When training heifers, auto-drafting gates can be left open for the first few visits.

Don't force the heifers. They learn most by doing it themselves. Position yourself to encourage them to make the right choice.

If time allows on the first day, give the heifers two runs through the robotic rotary platform or boxes. Some AMS have a training function where the robot simply moves under and around the heifer, exposing them to some of the associated noises and movement. Likewise expose the heifers to teat spray if possible so that they become familiar with the noises and sensations associated with this.

If you are putting heifers on a robotic rotary and plan to put the robots under them it can be a good idea to alternate them with mature cows. The larger cows will push into the heifer bails a bit and reduce the room the heifers have to move around the bail. Also the calmer cows will help keep the heifers calm.

Set the heifers to receive half a kilogram of concentrate at the feeders or the milking units. This ensures they develop a taste for the feed and become familiar with the sounds of the feeding system. With box robots, providing some feed in the robot encourages the heifer to learn that she can stop in the machine and take some feed. She will be less likely to learn to force her way out of the box. Some cows can develop a habit of forcing their way out of the box; it is a difficult habit to break and it is far better to prevent it happening in the first place.

Each morning, provide assistance to any heifers that are loitering in any part of the dairy. For example, they may need to be guided through the gates and robots.

If you have a priority or 'VIP' lane, use this for the first couple of days of heifer training. It makes sure the heifers have experienced it prior to calving. It also helps minimise disruption to milking cows when training heifers. After the first two days, put the heifers through the main holding yard.



Above: The first pre-training session involves an intensive couple of hours where heifers are introduced to one-way gates, drafting gates, the milking facility and feeding stations.

Seasonal calving herds

A seasonal calving herd will have a large number of heifers entering the milking system within a specific time period. As pre-training is done well before calving, a good approach is to introduce heifers to the AMS in smaller mobs of about 20. Each week, the settled animals can be removed and replaced with naive heifers.

This process can drag out with a large herd but the alternative is training 100-200 heifers at once, which can significantly slow down the voluntary movement of the milking herd. This is obviously not a problem if the milking herd is very small with the majority of cows dry.

Another option can be to put the heifers in their own paddock (with the gate shut so they can't voluntarily move around the farm). Bring them to the dairy once a day at a time that is generally a bit quieter (i.e. not many milking cows around) and take them

through the gates, dairy and feed stations. Set the last drafting gate to send them back to their paddock. This means they don't learn to voluntarily move around the farm but they will learn this quickly when they calve into the system if they are already familiar with the facility and laneways.

Year round calving herds or training small groups

With a year round calving systems you will have smaller groups of heifers to pre-train at any given time. With smaller groups (up to about 20 heifers) you can easily have them running with the milkers after moving them through the dairy on their first day of pre-training.

Voluntary cow movement

The first step in training heifers for voluntary cow movement is training them to electric fences. This is only needed if they are not already familiar with temporary electric fences. It can be done a couple of months in advance (i.e. as early as six months before they are due to calve). If heifers do not have respect for electric fences they will tend to break through the fence and let the whole herd out of their pasture allocation which will severely affect the milking frequency of the main herd.

After visiting the dairy facilities, release the heifers to a stale paddock (such as the paddock that the cows will begin to leave within the next few hours), so that they can move back to the dairy with the cows that night.

If you are allowing the heifers to volunteer around the system consider only allowing heifers to move through the dairy during day time hours. This will minimise the number of evening/night callouts they create and reduce the chance of heifers getting trapped or jammed for extended periods. Just set their night time drafting option to be released directly to the fresh paddock. Whether you decide to do this or not will depend on the nature of the heifers, how well grown they are and your own routines.



Above: The first step in training heifers for voluntary cow movement is training them to electric fences, if they are not already familiar with them.

Settling heifers into the system

In the lead up to calving

Once heifers are familiar with the gates, robots and voluntary movement, they can be managed the same as any cow in the lead up to calving; for example, put in a springer group.

Freshly-calved heifers

Regardless of whether you have a robotic rotary or box robots, if you are milking a large herd you will need to consider how you will manage freshly-calved heifers.

The AMS box units have the capacity to divert colostrum or antibiotic milk but the robotic rotary does not have this function. Think about how freshly calved heifers and cows will be dealt with on a daily basis. This will depend on the calving pattern. Work through the logistics of ensuring that heifers are milked completely at regular intervals while the rest of the herd (400-700 cows) is voluntarily moving around the system and milking themselves.

If you have a robotic rotary, one option is to install a small conventional milking facility. If your old dairy was a herringbone, it may be able to serve this purpose; some farmers include a purpose-built single-sided herringbone in their robotic rotary facility.



[See separate Info Sheet for more information on managing hospital/colostrum cows and dairy infrastructure options.](#)

If you have a herringbone, freshly calved heifers can be milked in it during their colostrum period. If possible, set up their group on the system to be directed to the feeding stations after milking so they get their grain allocation.

When milking freshly-calved heifers in the herringbone, follow normal management practices to encourage milk let down and minimise the risk of mastitis. The following are especially important for automatic milking herds:

- On day 1 hand strip and check for mastitis.
- Proactively treat oedema (a soft udder is easier for robotic cup attachment).
- Make the milk harvesting process as relaxed and calm as possible to avoid allowing heifers to develop bad habits.

During the last milking in the herringbone, singe udders and switch trim the tails in preparation for easier robotic cup attachment. If you can, minimise oedema as can negatively affect the speed and accuracy of cup attachment by the robots.

Automatic milking

When heifers are ready to join the milking herd set the system to draft these animals for their first automatic milking session. If you have a priority or 'VIP' laneway set the system to draft heifers through it for their first few milkings. Make sure they are set to go to the feed stations, if you haven't already done this.

You may wish to avoid the teat washing function/robot for the first automatic milking. This will improve the likelihood of successful cup attachment the first milking. Some farmers prefer to keep the teat washing function active from the first milking to save having to introduce something new within the following days.

If the heifer is moving around and the robot cannot get the cups on, consider interrupting the process and setting the robot to try again. After two or three tries, the heifer will often resist further movement as she realises there is no point; and successful cup attachment occurs.

However, if the heifer is becoming increasingly upset, abort the auto attachment and manually attach the milking cups, if your system allows manual attachment. This prevents the heifer from injuring herself or damaging the milking equipment. Ideally all cups will be attached automatically and milk will be harvested from each quarter; but don't try to achieve this if it creates a very negative experience. If necessary, intervene by aborting the robots and attaching the cups manually.

With the robotic rotary, place heifers on the platform between bigger, experienced cows whenever possible. This approach will encourage confidence, reduce fear levels and physically limit heifers' ability to move around too much.

Above: Each heifer's first few milkings should be supervised until you are confident the cups are attaching and a successful milking occurs.



Trainee herd

With a large herd AMS, the sheer number of heifers can create challenges. Providing individual attention to a large group of heifers can be a full time job, if they go directly from the colostrum herd to the milking herd where they must move voluntarily around the farm.

One option is to create a trainee herd as a transition between the colostrum herd and the main milking herd.

The trainee herd can be batch milked twice a day. This will reduce disruption to voluntary cow movement of the main herd. It will also enable you to plan to have someone available at specific times to supervise their milking and intervene with cup attachment to ensure they are milked completely twice a day.

A heifer can graduate from the trainee herd (batched milked) to the main milking herd (voluntary milking) once she has had four to six consecutive milkings in a row with successful cup attachment and complete milking without human assistance.

Keep a clip board record of the success of each milking. Don't rely on electronic data for this as the data often won't show the difference between a successful auto cup attachment and a manual (human assisted) cup attachment.

When the heifer graduates to the main herd, she can be monitored through her electronic records.

A trainee herd is just one option for handling large numbers of heifers in an AMS. However, FutureDairy's experience has shown it is an effective way to increase the chances of all heifers adjusting to the milking routine in a short time.

If training heifers are with the main herd it is difficult to find and give individual attention to the 15 or 20 each day that are not being milked completely. Because they are moving voluntarily around the farm they could be scattered across three paddocks.

A trainee herd that is batch milked is also worth considering for a large, year round calving herd. Although the trainee herd will be smaller, the approach will ensure all heifers are milked completely and twice a day for the first few days of automatic milking.

The first lactation

Once a heifer graduates to the main milking herd, she should be managed in the same way as other cows, to ensure she maintains a strong position in the herd. However, continue to monitor heifers through electronic reports and visual observations.

Consider using the management program to create a 'virtual group' of heifers so that you can pay extra attention to them in your routine monitoring on the computer. In particular pay attention to daily milk yields per quarter per day and feed consumption levels.

The herd management system does not replace visual assessment of the herd. The information from the system can enhance your stockmanship skills but should not be expected to completely replace them. For example, it could be tempting to think that a heifer that has a milking frequency of 0.5 milkings per day less than her herdmates is doing OK. But it is quite likely she is suffering from retained foetal membranes or another post-calving complication and deserves a visual assessment.

Subsequent lactations

Most cows re-entering the milking cow for subsequent lactations will not need any further training. They will remember the automatic milking system and voluntary cow movement from their previous lactation and settle in smoothly and promptly. When cows come into the dairy for their second lactation, some adjustment may be needed with the robots to accommodate the variation in shape of the udder as the first lactations mature (i.e. some training of the robots may be needed).

FOR MORE INFORMATION

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