



# Cow welfare under Halter management

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## Preliminary research results

Virtual-fencing is an emerging technology with the potential to revolutionise grazing livestock systems.

### How does the technology work?

Virtual-fencing (VF) requires each cow to wear a collar that communicates to the animal using sensory cues, rather than relying on stock-people and electric fencing.

The Halter virtual-fencing system uses sound (called 'piezo'), electrical (called 'pulse'), and vibration cues.

Cows are confined to a pasture allocation using the primary piezo cue, and if they ignore this then a secondary pulse cue is used.

Halter can also virtually herd cows to the dairy using piezo and vibration cues. The piezo guides cows in the right direction, while the vibration encourages them to continue moving forward. A pulse is only delivered if the piezo and vibration cues are ignored.

It takes only a few days for cows to learn to avoid a pulse by responding to the piezo or vibration cues.

### Scientific assessment of welfare

Scientists use physiological stress, health and normal bodily functioning, and behaviour to assess animal welfare. Stress can be detected through measurements of the hormone cortisol in biological samples, including milk, but need to be considered along with changes in behaviour and other indicators of physical health and function.

## What was examined?

The Tasmanian Institute of Agriculture assessed the welfare of cows managed with Halter virtual fencing (VF) compared to cows managed with electric-fencing and with stockpeople bringing them to the dairy on quad bikes (EF).

## What was the outcome?

Cow welfare was comparable between VF and EF management systems, assessed by measures of cow stress, behaviour and productivity.

### KEY POINTS

- One-hundred and sixty mid-lactation dairy cows were split into four groups and managed either with Halter (VF) or with electric-fences and stockpeople on quad bikes (EF).
- Milk cortisol data shows no difference between EF and VF groups during training, or in the weeks after training. The cortisol response of VF cows did not differ between training and management periods.
- Rumination time, pasture utilisation, milk production, live weight, and body condition were comparable between management systems.
- VF cows spent 5% less time grazing/day, but this had no practical significance as there were no differences in rumination, pasture consumption, stress or productivity.

## What did the trial involve?

Conducted at the Tasmanian Institute of Agriculture's Dairy Research Facility, this trial examined the welfare of cattle managed with the Halter virtual-fencing (called 'VF') system compared to those conventionally managed (called 'EF'). EF cows were allocated pasture using electric-fencing and brought to the dairy for milking by a stockperson on a bike.

The study considered three time periods:

- A** The study started with a 6-day **adjustment period** where all cows were EF managed.
- T** The **training period** occurred over 10-days during which VF cows adjusted to management with the technology. Stockpeople were gradually removed over the training period as dependence on the collar cues increased.
- M** The **management period** was 4-weeks long, starting after training ended. In this time VF cows were managed entirely with the Halter technology.

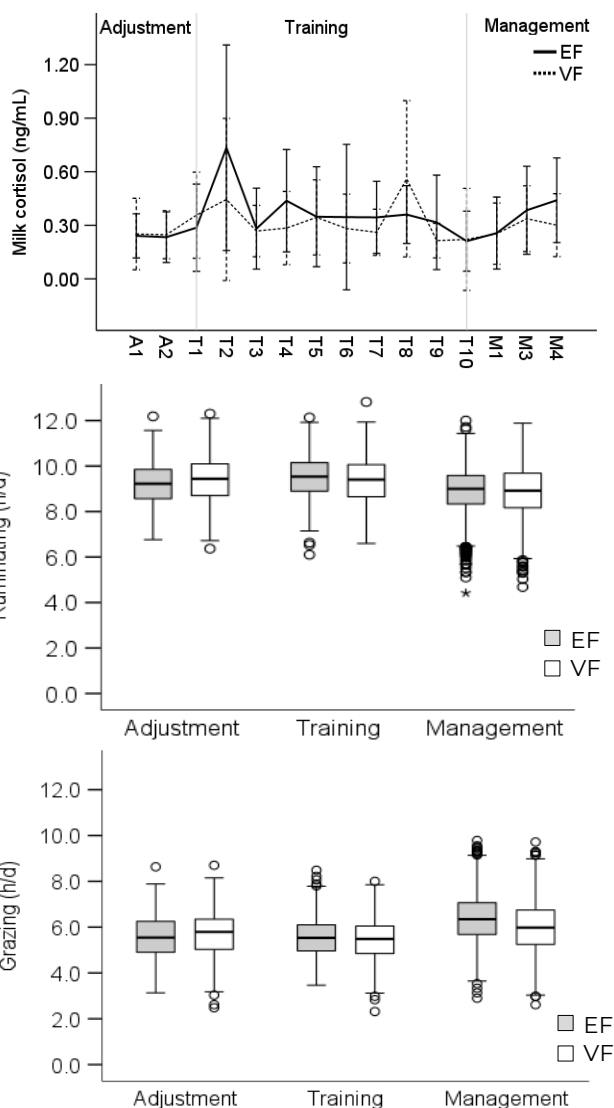
All cows were milked twice per day. Milk production, body condition and live weight were recorded at the dairy twice daily. Time spent grazing and ruminating per day were continuously recorded by Halter collars. Milk cortisol concentrations were determined on 2 days in the adjustment period, each day of the training period, and 3 days of the management period (preliminary cortisol data from 50% of the cows presented here).

## What were the findings?

There was no evidence of increased cortisol in VF compared to EF systems, and no evidence of increased cortisol during the training of VF cows.

Ruminating time, pasture consumption and cow productivity were comparable between systems throughout the study.

The VF cows spent 5% less time grazing, however, this difference had no practical significance, as there were no differences in pasture consumption, physiological stress or productivity.



**Figure 1** Milk cortisol concentrations and ruminating and grazing times for conventionally (EF) and Halter (VF) managed cows, over the adjustment period, the 10-day training period and the 4-week management period.

**Table 1.** Average milk production (L), body condition score (BCS, 8-pt scale) and weight (kg) of cows managed conventionally (EF) or with Halter (VF). Days within the training period are also presented (Day 1 to 10 = D1 to D10).

	Adjustment period	Training period										Management period
		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	
Milk production												
EF	17.2	17.7	17.5	17.3	17.3	17.7	17.5	16.1	16.9	16.7	16.7	17.3
VF	17.2	18.1	17.8	17.6	17.6	18.0	18.6	16.2	17.6	16.8	18.4	17.4
BCS												
EF	4.3	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.5
VF	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.5
Live weight												
EF	556	561	560	562	564	565	566	566	565	566	566	572
VF	556	559	559	559	560	561	561	561	560	560	562	570

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