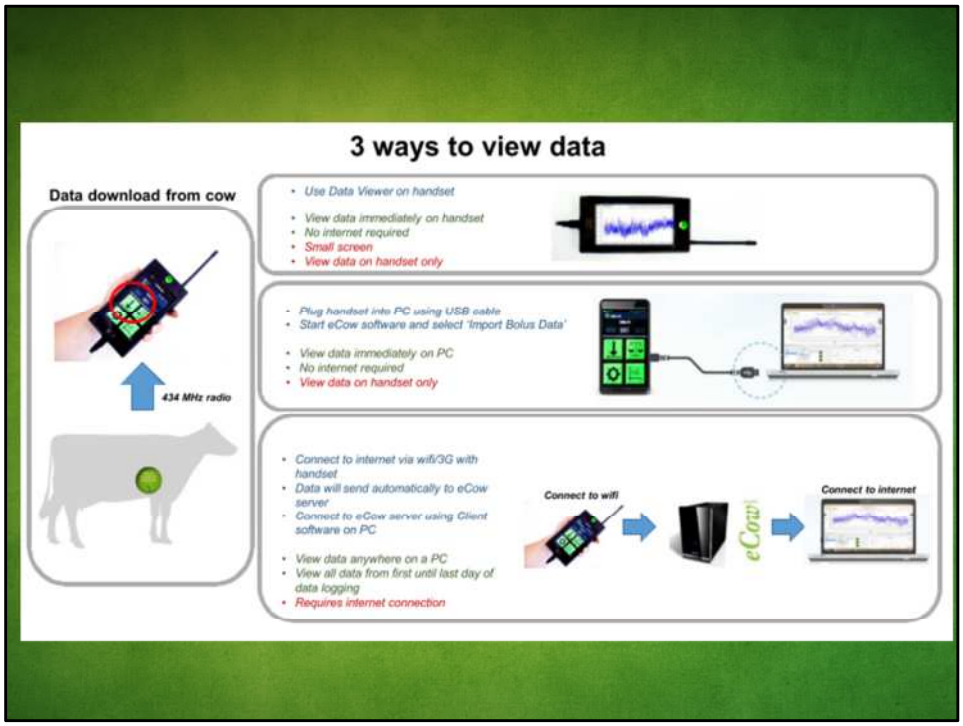

eCow

Key specs:

- Bolus length: 127 mm
- Bolus diameter: 27 mm
- Weight: 207 g
- Specific gravity: 2.7
- Temperature accuracy: +/- 0.1 °C
- pH accuracy: +/- 0.2 pH
- Life: 5 months
- Smallest bolus size available today
- Auto power off when outside of the animal to preserve battery life
- Bolus can be re-calibrated if retrieved (when using fistulates)
- One end weighted to encourage bolus to sink into reticulum and keep sensor in rumen liquor
- Installed with a standard bolus gun
- Can survive a 1 metre drop onto concrete
- Continuous recording
- Downloaded to handset when bolus woken by software
- We use Samsung Galaxy 2 as handset
- Software developed in house at eCow

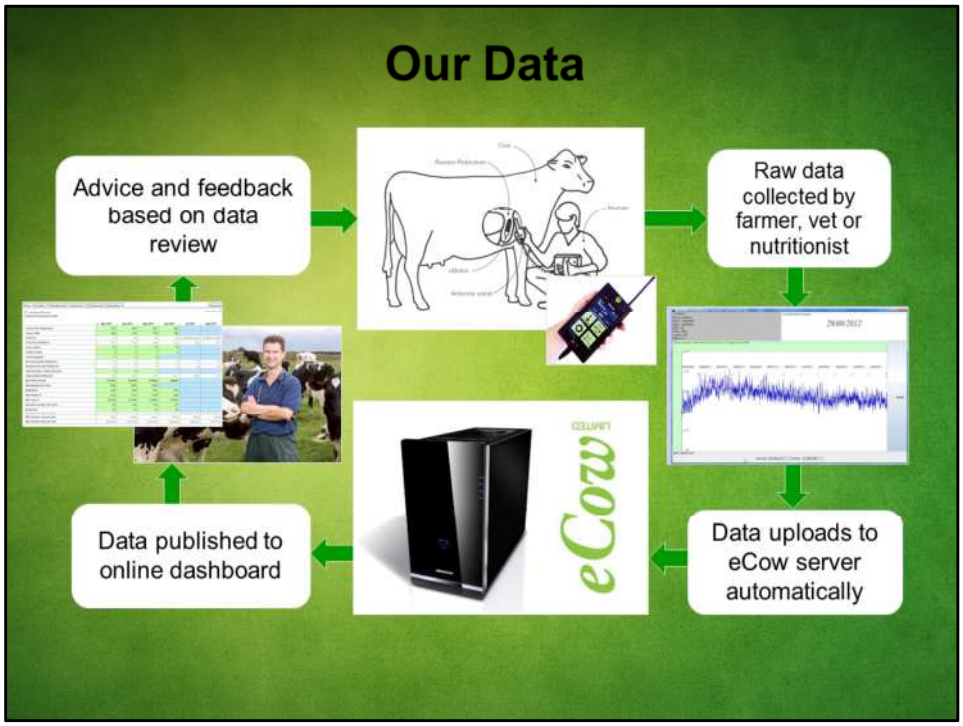
- Data taken every minute then averaged over 15 minutes
- 96 data points per day
- 2700 lines of data recorded – i.e. 28 days possible between downloads
- 5 months of continuous data capture possible
- Bolus weighted to drop into reticulum – we have never seen one regurgitated
- Handset takes data from bolus once bolus is woken



There are 3 methods to view the data

1. On the handset screen – last download only
2. By connecting the handset to the PC and using eCow software (downloaded from website) to view the data – last download only
3. On PC via internet link to the server – this allows you to view all the data for a particular bolus going back for the life of the bolus

The handset can read as many boluses as necessary and has the ability to connect to the internet and send data back to the eCow server.



The data is sent to our server, is provided to users who have access to that particular farm and then allows review by users

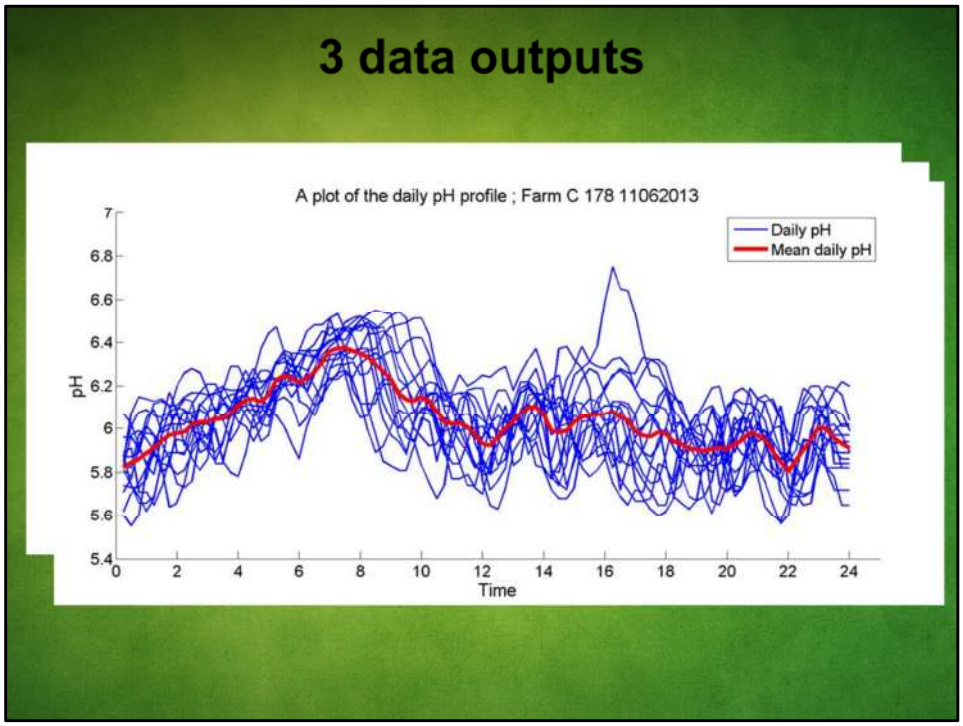
Customers have grown considerably in the last 2 years. Began life as a product for researchers and hence universities and R&D departments at large companies such as at Cargill. In summer 2013 we began running farm trials with Three Counties Feeds, EBVC and Mole Valley Farmers and since then have sold boluses into trials with Lely and Biotal amongst others.

Where did it come from?

- eCow founded in 2007 by Professor Toby Mottram
- In-dwelling rumen pH sensor first developed at Silsoe 2003, first prototypes lasted one week
- A pH and temperature measurement bolus born from a research project with Pfizer
- Has undergone multiple design iterations and improvements to maximise life and durability

Many design iterations in the product and has been adapted for use in commercial herds as well as research

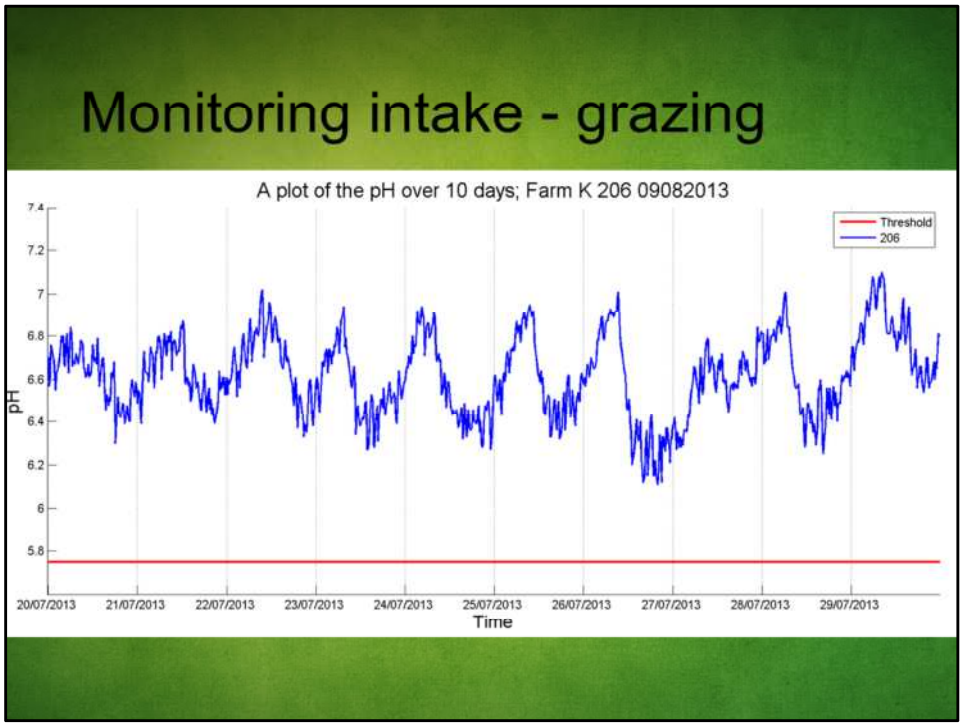
Some of Professor Mottram's (eCow's founder) other projects whilst as Silsoe



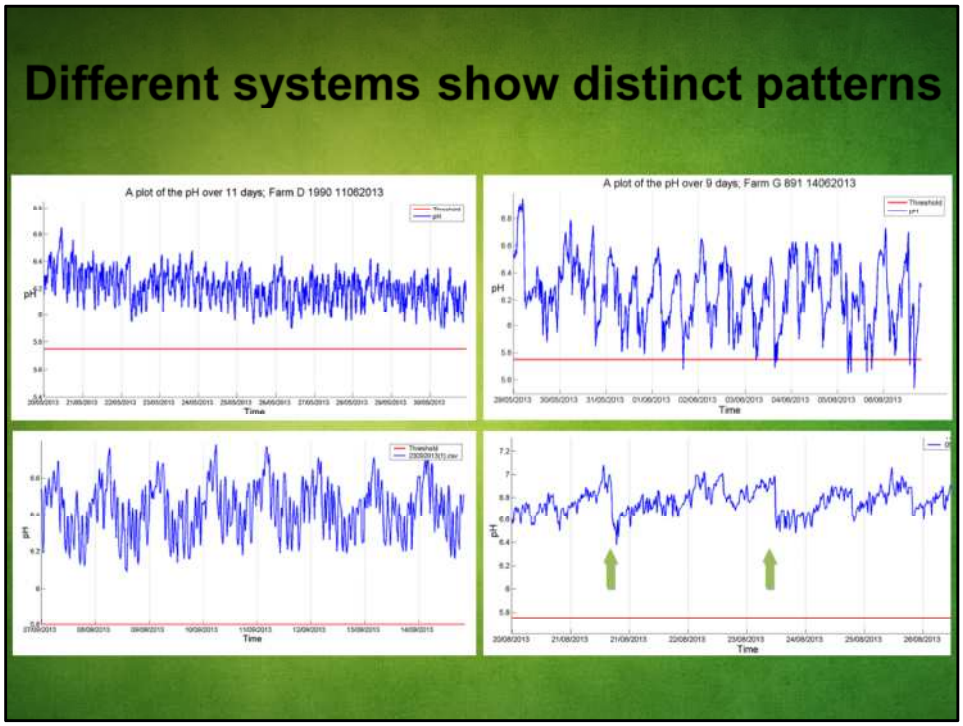
There are 3 main data outputs:

1. pH by day – vertical lines represent midnight and this shows us the overall trend of the data
2. Temperature by day – we can see drinking events here and infections
3. All the days plotted over one another with the mean shown in red – this helps us see the routine of the cows day

This slide provides the history of our trials with MVF & TCF and how we moved to the herd population we have now



This plot shows a dry cow at grass. This is therefore the regular 'natural' routine from grazing – eat in the morning leading to a drop in pH and then rest and ruminate in the afternoon leading to flat afternoon and then pH climbs at night as the cow rests



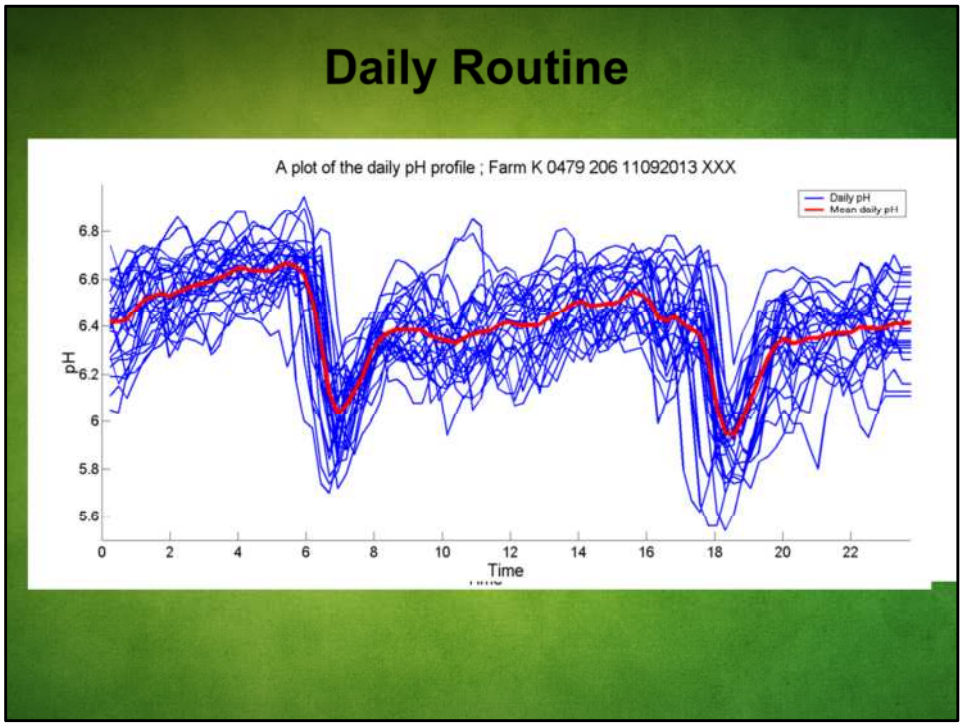
These plots show the characteristics of different systems on the pH.

Top left is a robot milked cow - very regular feeds and stable pH also note the low amplitudes of pH change as well

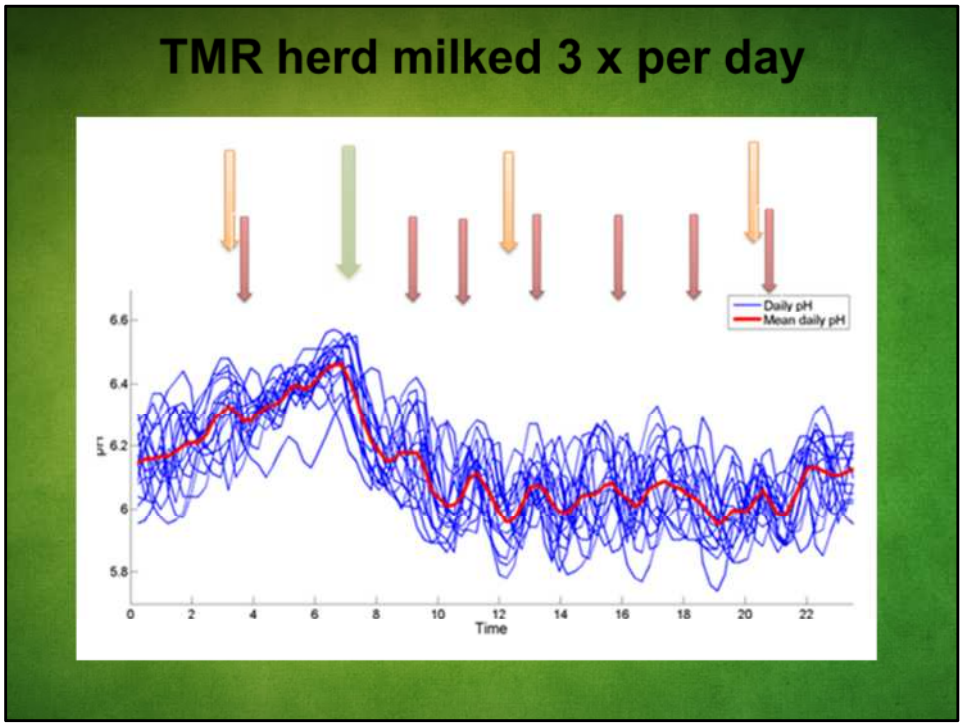
Top right is a cow at grass fed cake twice daily in the parlour – very big swings in pH in a few hours as grazing can be very variable due to environmental conditions such as weather and grass type. Also the cake in the parlour leads to big drops twice per day

Bottom left is a TMR herd, milked 3 times per day and kept housed. A very stable pattern each day and probably the closest to the natural grazing routine favoured by the dry cow at grass

Bottom right is a dry cow fed once every 3 days

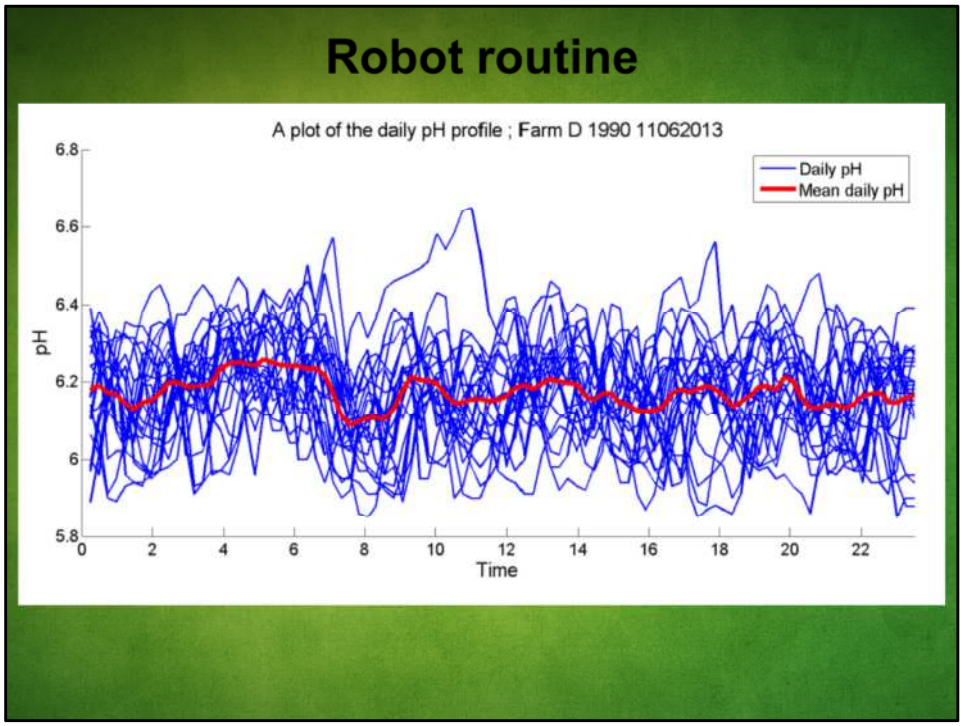


Daily routine is very interesting from those that show little consistency to those who get the same pattern every day. Typically, the more routine the days, the more productive the animals.



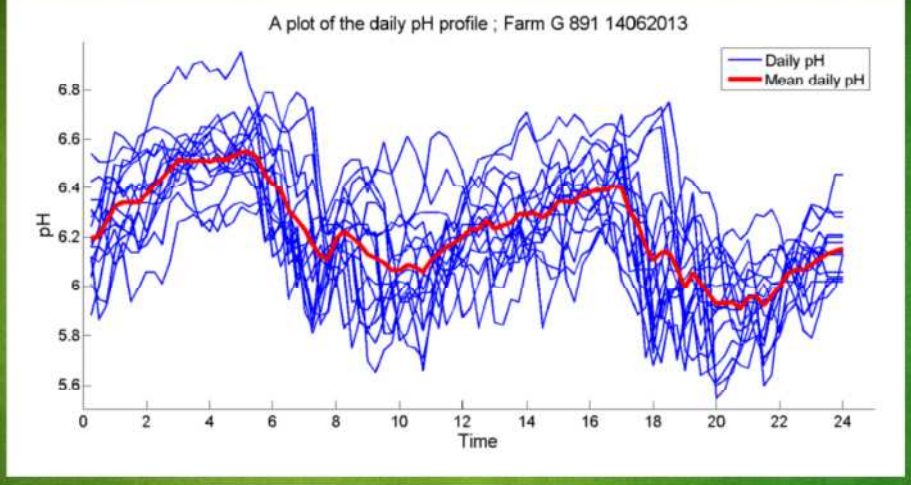
This chart shows the TMR herd routine in pH. New feed at 7am brings the drop in pH and then each push up can be seen through the day

Robot routine

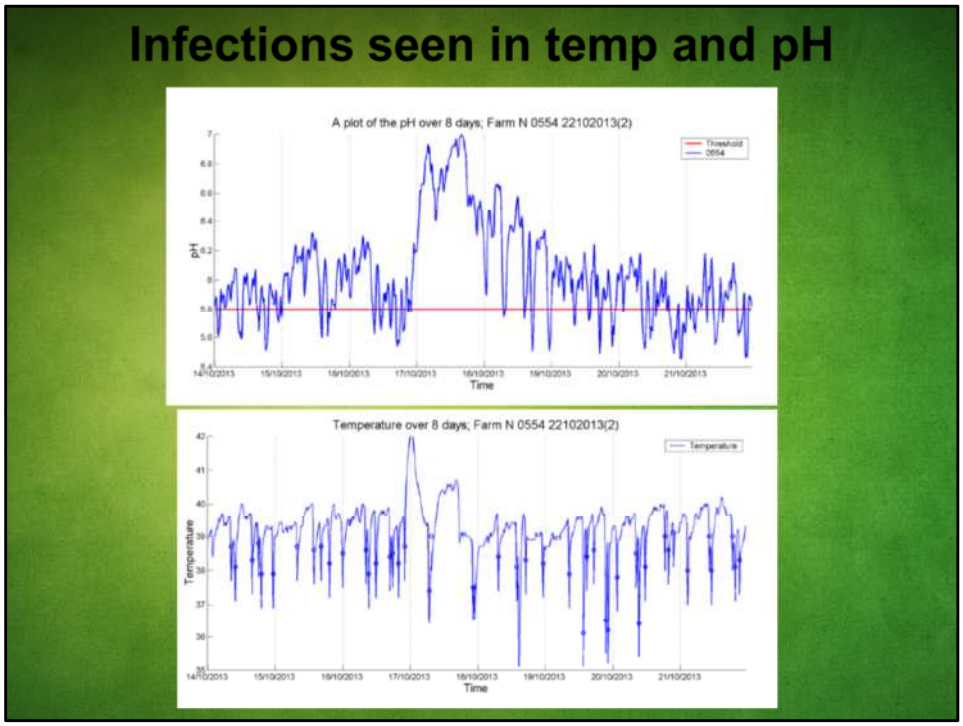


The robot daily routine is rarely the same but is very stable through the whole day and night

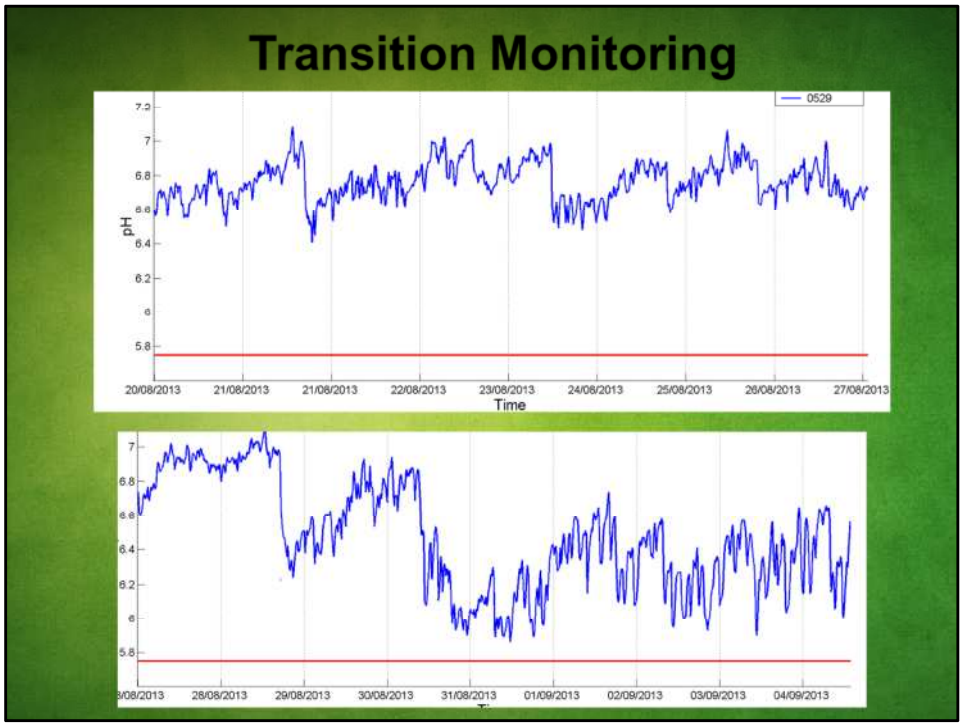
Grazing with compound



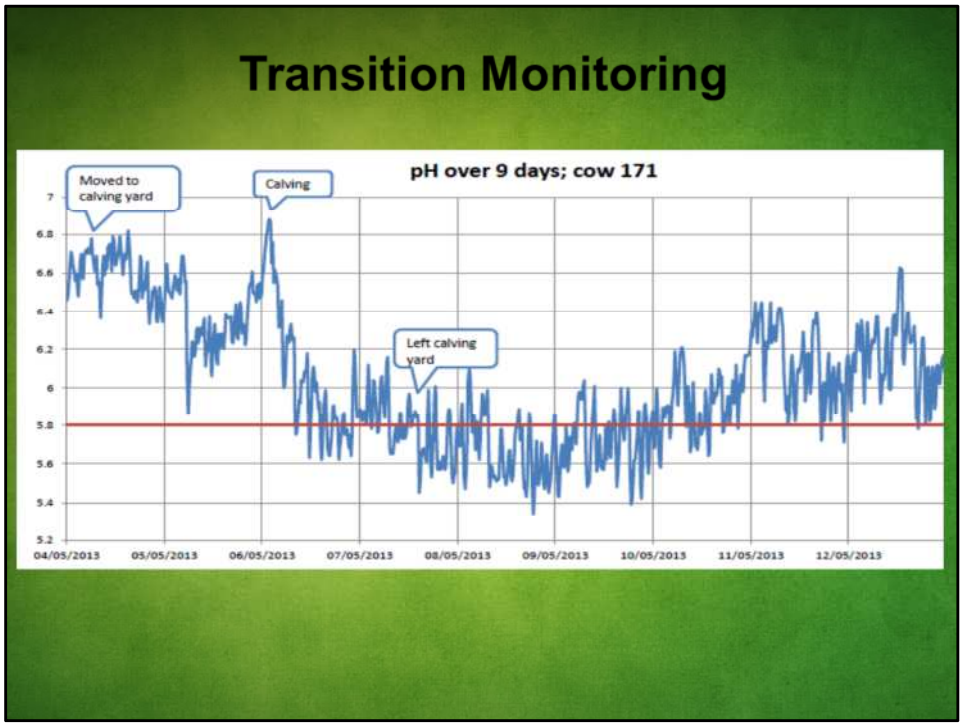
Compound in the parlour with grazing in between is probably some of the most variable data we see day to day



In the top chart we saw pH climb significantly one day meaning this cow ate little in 24 hours, but what caused it?
We then reviewed the temperature data and this showed a climb in temperature which can be attributed to an infection arriving at the same time. This cow takes 2 days to return back to the pH levels before the infection.

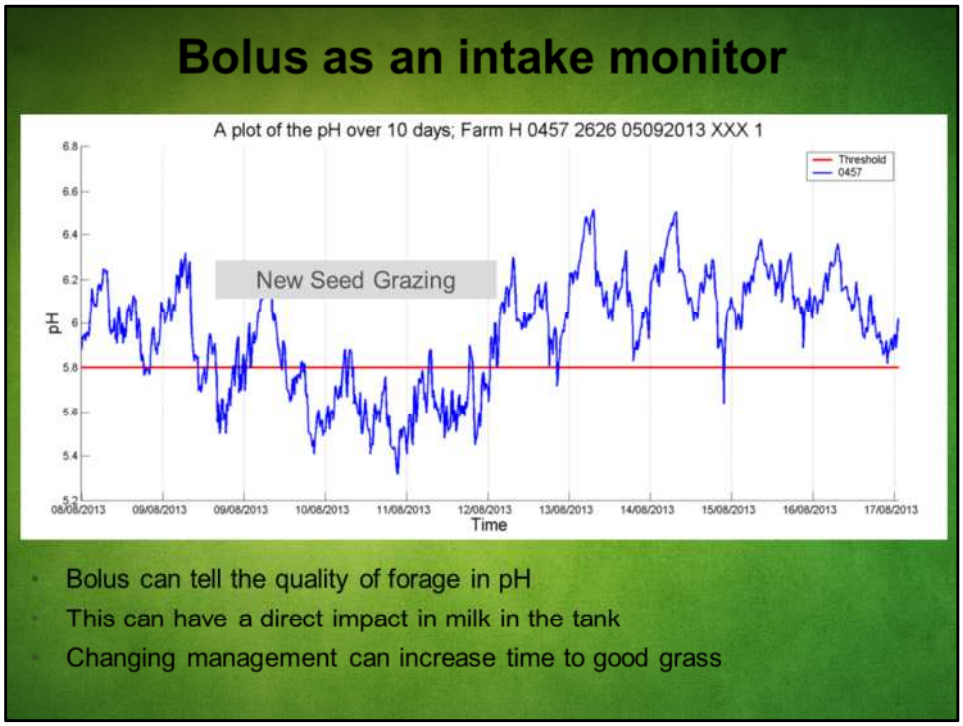


This dry cow data then leads into calving. In this case she does not drop too low after calving but see the next example

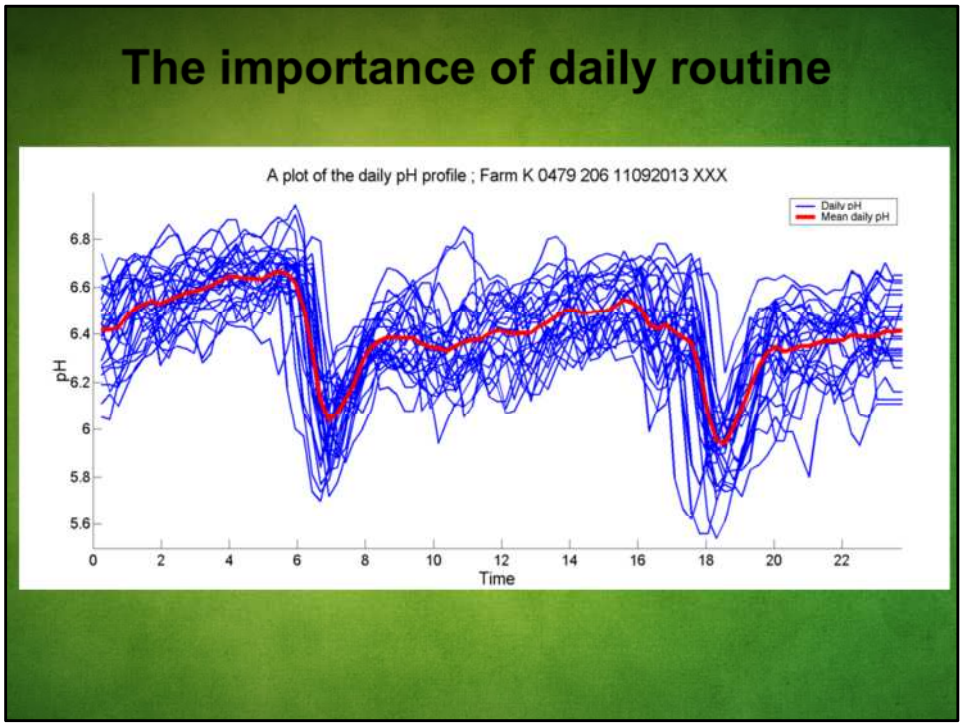


Here the cow drops into low pH's for 2 and a half days after leaving the calving yard as she tries to pick up the yielding ration, this is typical. Sometimes this drop can take up to 2 weeks to return to normal. This drop would be problematic if it went on longer. Therefore many insights into fresh rations and lighter rations for fresh cows have been gained.

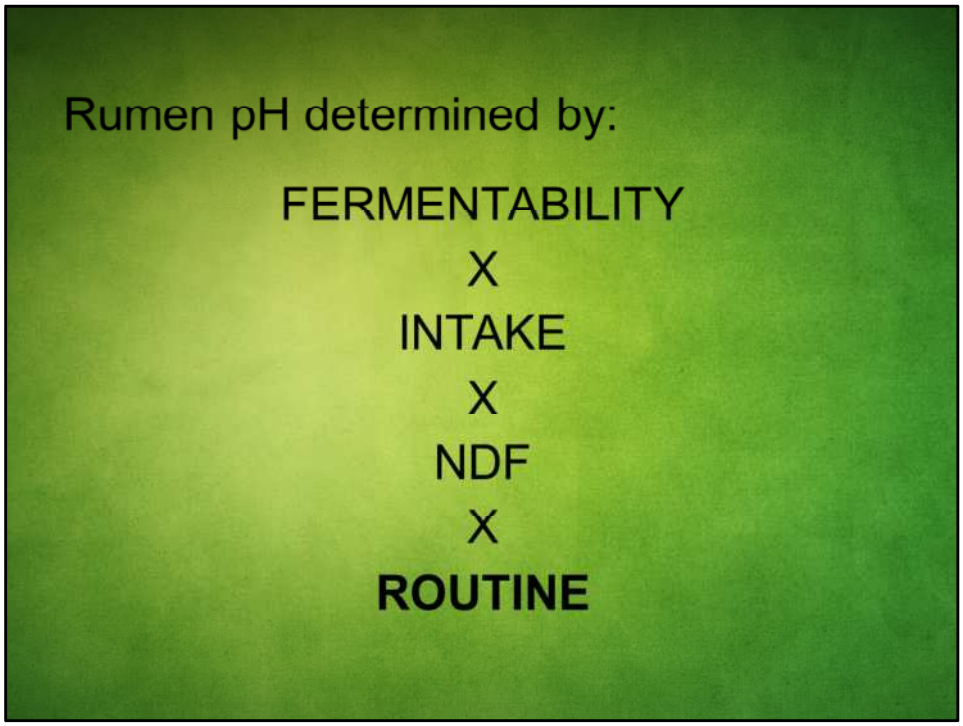
OK some interesting insights above but what does this mean in terms of return on investment…



Look at this plot – what has caused this drop in pH over 4 days?
This is new seed grazing, the grazing quality and age has a massive effect on pH, therefore imagine how powerful this could be if paired with suitable rations in the parlour. Or being able to know how long to keep these cows on each type of grass. Or ration development while in this field.



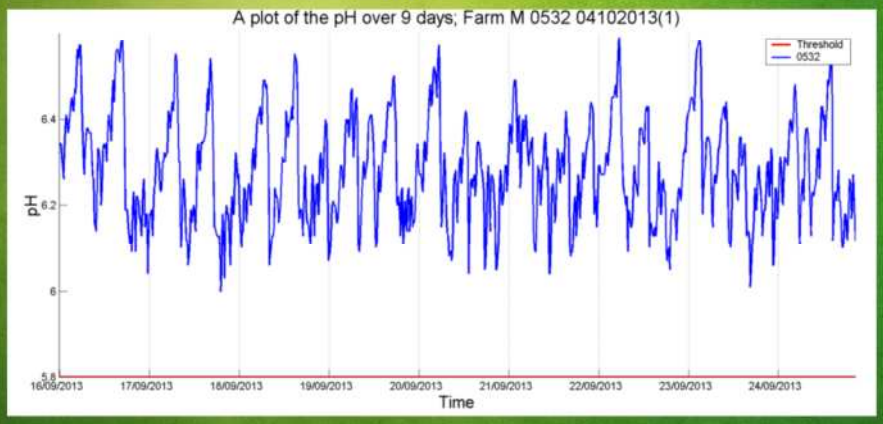
Generally more routine = more productivity



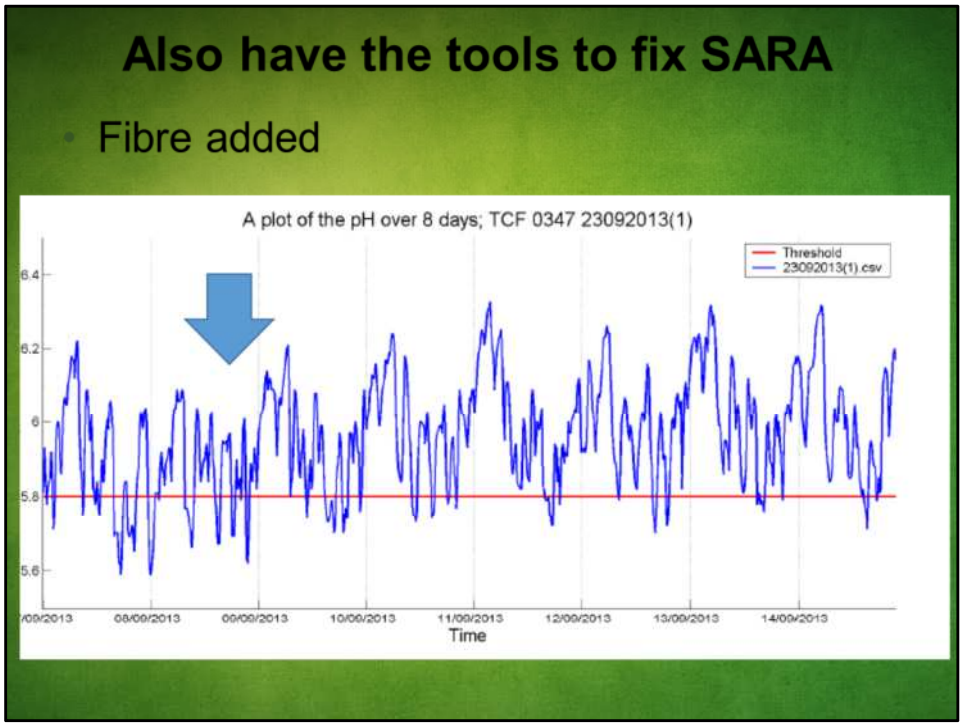
This insight has led to routine being added to one of the items discussed when reviewing rumen pH along with the traditional items

Un-proving Acidosis as much as proving it

- The following herd has had cow health issues for some time
- These are often blamed on the diet and low pH
- What have the boluses said?

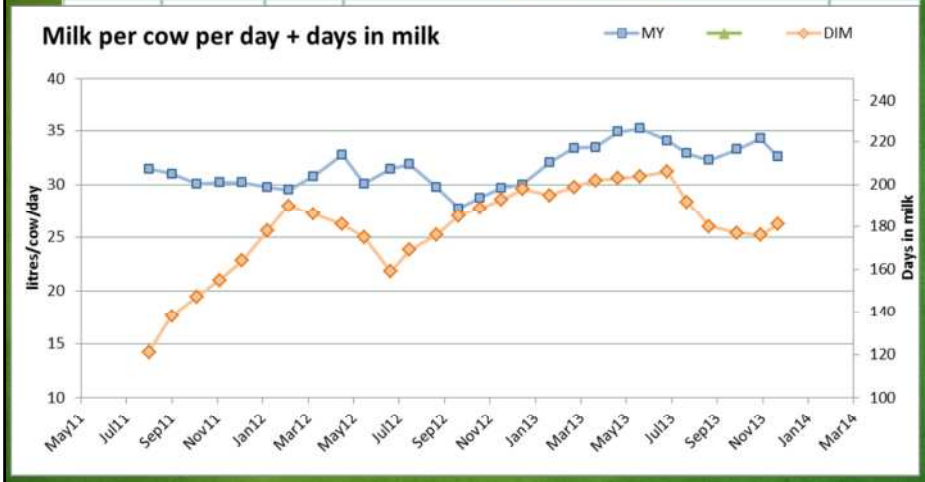


In this herd the vet had discussed the suitability of the diet on the farm and whether it was causing acidosis. Therefore the farm were adding a rumen buffer and a bicarb product into the ration. We put some boluses in and found that the pH's were pretty high. The farm then removed the buffers and bicarb. pH's remained high and yield was consistent. Therefore saving the farm £13K per year in feed costs.

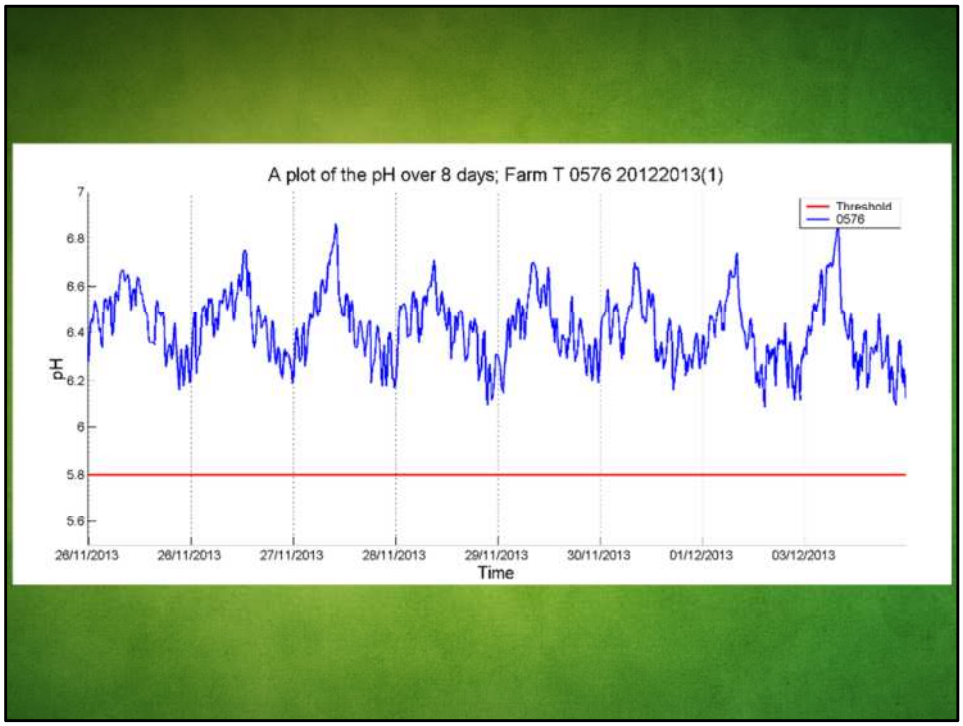


Of course, nutritionists have the ability to bring pH's back up by adding fibre or buffers, etc

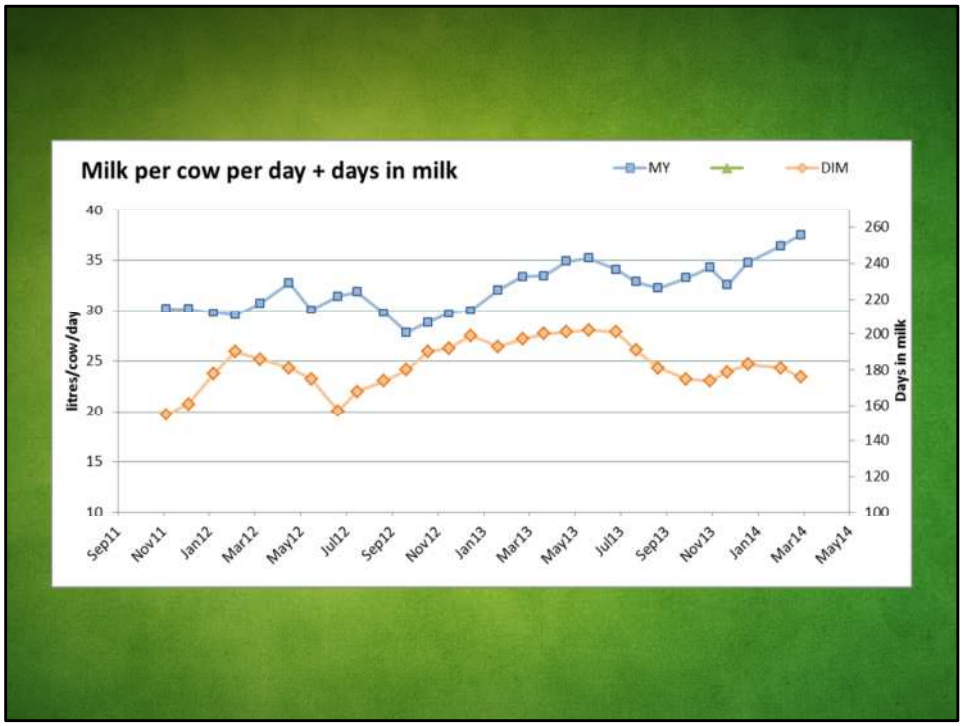
22-Nov-13	30-Oct-13		Production	22-Nov-12
339	337	cows	Total herd size	312
181	176	days	Days in milk	198
283,000	312,000	l/herd	Estimated monthly milk sales	248,000
32.6	34.3	l/cow/d	Milk per cow per day	29.7



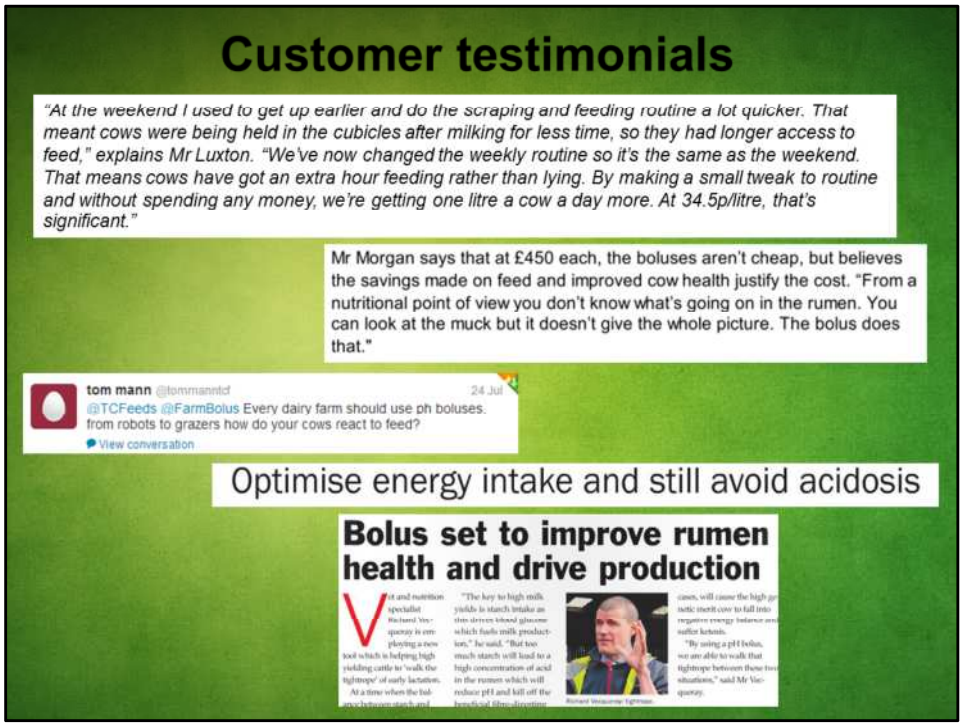
In this example the farm was going pretty well but seemed to have plateaued at between 30 and 35 litres of milk per cow per day. They wanted to progress and had other elements well controlled. We put some boluses in….



Here is the plot from that farm. What do you notice?
What the nutritionist saw was the chance to get the starch bugs working better and therefore some more starch was added to the diet.
What happened as a result?

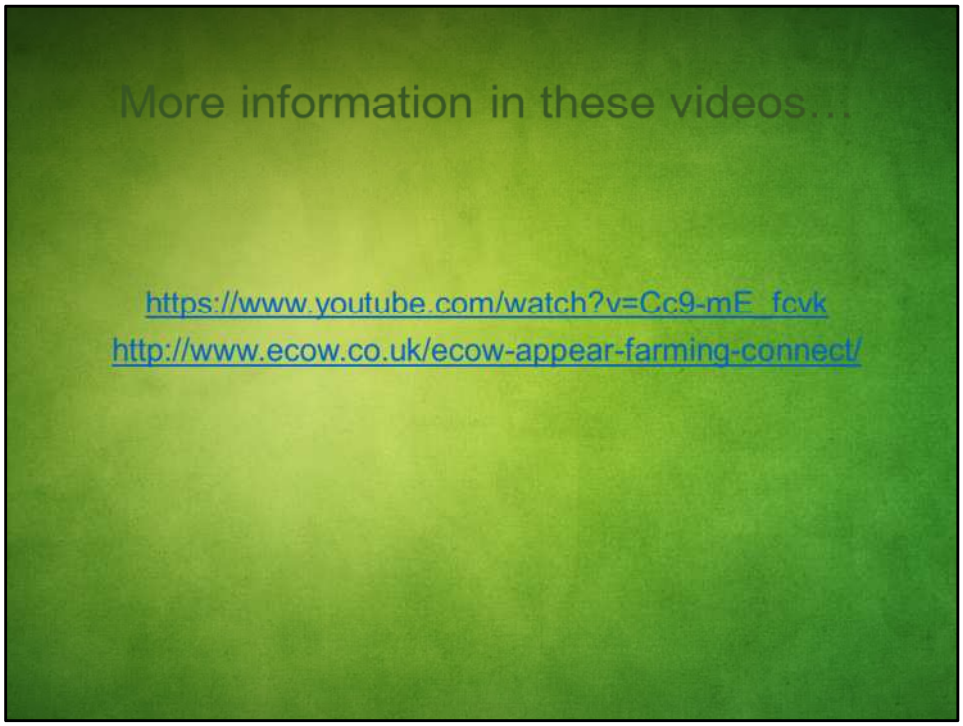


Next days in milk with yield per cow per day. This farm was able to progress beyond 35 litres per cow per day as a result



Here are some of the testimonials and press we have had since our launch last summer

Please call for more information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http://www.ecow.co.uk/ecow-appear-farming-connect/