



Guide to the eCow Mk3 bolus

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Summary

Since 2011 eCow has been making and selling specialist rumen pH telemetry designed around using a laptop or smartPhone as a download device. The pH measurement accuracy was good but the radio range was limited to a few meters. Recent developments in radio technology (LoRa) and reductions in the size of the radio microchips and some smart redesign by ourselves mean we can design a Mark 3 bolus. During the COVID-19 lockdown we stopped production of the old resin encapsulated bolus and we are rapidly designing and introducing a Mk3 bolus with many benefits.

- Greater radio range
- Portable fixed base stations continually downloading data
- possible reduced size of bolus
- data accessible to office desks via the local area network.
- Potential multi-sensor

The Mk3 is a product in development but with our fifteen years experience of designing and making pH telemetry boluses for research scientists around the world we are fairly confident in our ability to meet a demanding specification for research scientists.

How the new system works

The new system will work in a very different way from the old Mk2 using the latest LoRa radio technology which will give us longer radio range and allows a simpler way of working. You will no longer need to individually locate animals and download from them. All you need is a web browser on mobile or desktop.

For housed animals you will only need one base station. The base station should be mounted on a pole or other elevated place with mains power within line of sight of the area

where the animals are. Ideally you should connect the base station to the farm wifi. The base station has a touch screen to allow this to be done manually although this can be set up before shipping if you send the network name and password.

The base station will poll every bolus on its list up to 500m away in the open, probably 200m inside a building with metal and concrete barriers. The polling will be continuous, probably at hourly intervals to collect 4 quarter hour data lines. Those data will be stored on the base station. The bolus will also store all the data for its lifetime so if a bolus goes out of range then the data can be retrieved from the bolus by a function that makes sure that the data on the base station matches that on the bolus.

The data can be accessed by logging into the localhost webpage of the base station and requesting a .csv file of data from each bolus. That could be done by laptop or smartphone while doing animal checks or direct from an office computer.

The localhost webpage will also provide a calibration function which can be used to calibrate multiple boluses simultaneously. This is all in development, things are moving fast and I am sure that this Mk3 system will be an easier and quicker system to use.

Working Specification

- Accuracy pH +/- 0.1 for every 30 days in the rumen
- Data averaged every 15 minutes
- bolus diameter 23 mm length <100mm
- bolus specific gravity 2 (locates to rumen-reticulum)
- Radio range 200-500m
- each bolus identified separately
- multiple boluses possible
- no interference from magnets
- operational lifetime 90-150 days (target)