Virtual grazing systems

The summation of 30 years of research on animal behaviour and the greater availability and affordability of satellite based navigation systems has enabled Dr Dean Anderson to develop the ultimate fencing solution – Directional Virtual Fencing (DVF™). During a three month sabbatical with CSIRO Dr Anderson explained his system to Australian livestock managers.

Emma Leonard

Intensive rotational grazing is widely accepted as a system that increases pasture productivity and herd performance. However, this system can be expensive to establish and time consuming to manage. Dr Dean Anderson, has developed a system of virtual boundaries that is able to manage animal movement in both intensive and extensive livestock operations.

Dr Anderson is a Research Animal Scientist with the US Department of Agriculture based at the Journada Experimental Range in New Mexico. The mission at Jourdana is to develop new knowledge of ecosystem processes as a basis for management and remediation of desert rangelands. These rangelands, like those in Australia, are fragile areas carrying large numbers of stock at low stocking rates, where grazing conditions can change considerably depending on patterns of rainfall.

Research and practice has shown that grazing management can yield improved productivity and be less damaging to these fragile environments. Dr Anderson has focused nearly 30 years of research on developing animal management systems to control the movement of grazing animals by using their innate behaviour, and precision guidance software. Earlier this year Dr Anderson presented his Directional Virtual Fencing™ system to livestock producers in SA and WA.

From his research Dr Anderson has established that applying audio or electric shock cues to an animal's right or left side controls animal location and direction of movement; the stronger the cue the greater the response.

By combining physics, electronics, biology and ecology Dr Anderson has developed a locator/controller collar that produces the audio and electric signals. But how does the collar know when to emit the signals?

Global Positioning Satellites (GPS) are used to determine an animal's location. This location data is transmitted from the collar to a Geographic Information System (GIS) that determines whether the animal is in the correct location range. If not or if too close to the boundary sends cues to the collar to emit signals to the right or left side of the animal.

The virtual line or fence is determined by the manager submitting coordinates into the GIS system.

Audio cues are the least severe cue while a combination of audio and electric shock are the most severe. Even at the more sever levels the system causes the animal minimum stress. The cues are applied either to the right or left side of the animal depending on the angle of the animals head with respect to a virtual line.

The virtual line or fence is determined by the manager submitting coordinates into the GIS system. The coordinates can relate to a single boundary that joins physical fences or can consist of multiple virtual boundaries producing a virtual enclosure. When the GPS identifies an animal is too close to the virtual line the cues will be triggered until the animal has responded appropriately.

Animals have been found to condition rapidly to these cues and the process is consistent with low stress animal handling procedures.

Using Dr Anderson's system farmers will be able to program stock movement from their computer. This could be moving fences hourly in intensive grazing situations to droving cattle across range lands by regularly moving a virtual back fence.

The introduction of stock to graze stubbles in unfenced paddocks could also be possible with this system.

Dr Anderson believes that farmers need to change their current thinking about fencing and embrace the opportunities that new technologies offer; he suggest many have yet to be imagined.

"By 2050 internal conventional fences will be obsolete with conventional fences only being required around the boundary of the property," said Dean Anderson.

Research has proved that virtual fences work and have a range of practical applications but the product has yet to be commercialised. Dr Anderson anticipates this will occur in the foreseeable future.

He is continuing to work on the concept and is currently investigating the identification and use of collars only on lead animals in a herd or flock.

For more information
Dean Anderson
deananders@nmsu.edu