Big breakthrough technologies

THE 10 BIGGEST AG CHANGES IN THE NEXT DECADE

1 Smart interactive livestock eartags

The Ceres Tag will be released in Queensland next May, aimed squarely at large outback cattle stations. The Ceres Tag is the world's only direct-to-satellite smart geo-location eartag, which is effectively a unique animal monitoring sensor, GPS individual stock tracker and locator and global traceability ID tag rolled into one. Costing about $100 each it is no cheap investment, but CEO David Smith says 8000 tags have already been ordered from cattle producers in eight countries including Australia.

Some operators want the tag to reduce helicopter mustering and fuel costs on outback stations by ensuring a clean quick roundup, while other producers like the Ceres Tag's link with the E-Grazor app, offering data feedback on every animal's pasture feeding efficiency, paddock location, daily movements and even greenhouse gas emissions. Preventing stock theft, particularly now cattle are worth up to $2500 a head, is another bonus.

More: www.cerestag.com

2 Virtual fencing and eShepherd

It's been a long time in the making but the ability to do away with expensive wire, steel post and timber fences and instead use modern technology in the shape of virtual fence "lines" drawn on farm maps on iPads, linked to electronic neck bands on cattle has finally arrived. Marketed by Agersens as a "gamechanger for the livestock industry", eShepherd is described as a "revolutionary livestock management system providing fingertip control of pastoral assets, paddock rotations and livestock movements".

The 2kg, solar-powered neck bands will be commercially released in Queensland next year. Each neck band, which will cost a hefty $350, enables farmers to both contain cattle in "virtual" borderless paddocks or grazing cells, or to slowly move stock along an invisible route at the rate of about 1km every 6-12 hours, without the need for expensive fences or laneways.

The collars are linked to farm computers via a special farm-located 3G or 4G base station, with cattle first hearing an audio signal or buzz from their collar when they approach close to the virtual fence, and then receiving a slight electric pulse if they continue towards and "touch" the e-fence. Benefits of eShepherd are biggest for the largest cattle stations, saving on the cost of building new fences, and increasing pasture utilisation by dividing vast outback paddocks into smaller virtual cells, but still linked to a central watering point.

More: www.agersens.com

3 BioGenetics

Breeding better cattle, sheep or crops with the most favourable and productive characteristics to suit an individual farm, region or end food demand using traditional methods can take many generations of cross-breeding and decades of selection of natural variation. But modern genomics, including the delicate gene editing, speeds up the selection process within one generation by allowing specific genes in the DNA of an animal or plant to be edited or switched on and off in the laboratory.

A US gene technology company has already developed a line of polled cattle using gene editing, without negatively affecting other production traits, while other gene editing work has selected animals that are more tolerant of heat or have foot-and-mouth disease resistance, and crops that are tolerant of weed-killing herbicides.

In Canberra, CSIRO plant breeders may have cracked the genomic code to producing naturally-coloured cotton, using gene editing to grow cotton that is coloured not bright white, but yellow, dark purple and even black. The cotton industry is keen to build on its reputation as growing a renewable, recyclable and natural fibre, reducing the need to use chemical dyes.

In Melbourne, Animal genetics professor at La Trobe University, Jennie Pryce, was recently named as Australia's top animal researcher for her genomic selection work in increasing the feeding efficiency and heat tolerance of dairy cows and is now looking at using genomic selection to breed environmentally friendly cattle that have much lower methane gas emissions in their farts and burps.

4 FutureFeed

Much hoopla has surrounded the $15 million plunge by major joint venture investors including Woolworths, GrainCorp and Andrew 'Twiggy' Forrest into backing the CSIRO-developed FutureFeed supplement, made from the red seaweed asparagopsis. Adding FutureFeed as a feed additive to cattle reduces harmful methane gases emitted by livestock by as much as 65-75 per cent, opening the way for cattle to be more efficient converters of grass to meat, and also farmers using the supplement to receive cash payments from the Emission Reduction Fund for contributing to Australia's climate change targets for reduced greenhouse gas emissions. CSIRO research shows cows fed 1 per cent of their daily intake as red asparagopsis achieve the emission benefits, with its application immediately apparent for beef cattle housed in intensive feedlots, or daily-milked dairy cows.

More: research.csiro.au/futurefeed/

5 The Yield and Internet of Things

The Yield, the $29 million sensoring company that started from small beginnings in Tasmania six years ago is now a global leader in micro-climate sensoring, monitoring and "hyper-local" weather predicting and analytics to the high-value horticultural sector using artificial intelligence. All of giant Costa Group's blueberry-growing tunnels now use The Yield to not only monitor growing conditions to reduce irrigation costs, disease threat and predict yields, but to also predict future weather and help them plan labour needs and berry sales.

The actual sensors measure a wide range of conditions including: air temperature, humidity, pressure, sunlight, wind speed and direction, rainfall, leaf wetness and soil moisture, but then – using AI and previous analysed data – also generates accurate predictions for weather in a specific microclimate (e.g. a greenhouse tunnel) up to three days in advance, providing farmers with a big picture of what to prepare for and when.

The company is on track to triple its revenue this year, with a new area of focus including working with the growing band of small robots on fruit and vegetable farms to ensure crop weed and disease spraying is carried out in optimal conditions.

More: www.theyield.com

NEW FARMING SYSTEMS

6 Circular farming

The new buzz phrase in world agricultural spheres is circular