Diagnostic Tools and Heat Stress Apps

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In the ever changing smartphone world, new applications for digital technology are constantly being introduced. Recently, more applications for animal agriculture are allowing producers enhanced management functions. Four such apps are being covered in this presentation: a necropsy diagnostic tool, and three heat stress apps that calculate temperature humidity index and provide tips on mitigating heat stress through management and nutrition changes.

DVM DX™ DIAGNOSTIC TOOL

DVM Dx is Software as a Service (SaaS) system designed for remote and digital diagnosis of sick or dead animals. Features include: web and smart mobile technology to gather photos, notes, and other related data fields needed to properly diagnose a case remotely.

The objective of DVM Dx is to provide a tool for progressive veterinarians looking to provide more value to their producers. DVM Dx gives you the ability to collect, analyze, store, and share diagnostics information from any location, making it easy to collaborate with laboratories and producers so you can improve cattle health through rapid disease identification and tracking. This tool will allow the end user to experience the future of faster, more useful diagnostic information with DVM Dx.

How the platform works

A basic overview of how DVM Dx would be applied in a *typical* necropsy-case fashion follows: When an animal dies, the on-ground user (veterinarian, producer, producer employee, or veterinary technician) would initiate DVM Dx and log that animal in as expired. Key data is gathered, such as tag number, environmental notations, approximate age, weight, breed, etc.

The DVM Dx application would then walk the user through the necropsy steps needed to gather the relevant data. Similar to GPS-based turn-by-turn directions, DVM Dx prompts the user to proceed through a series of steps then prompts them to capture an image at each relevant step.

After the pre-programmed steps are completed, the user uploads the images and data, easily via the app, to the web-based portal that is managed by the veterinarian. Once the veterinarian reviews the case, they issue a diagnosis or submit it to a participating diagnostic lab via DVM Dx interface. This interface would allow for the veterinarian to receive diagnostic reporting on a case, directly from the lab into a searchable DVM DX data base.

Access to case data throughout the DVM Dx process is granted by the overseeing veterinarian. A typical roster of participants granted access is determined by the purpose of the case. If it's for a full range of diagnostic determination and services, personnel listed on the left side of the table are normally involved. For cases

Full Service Diagnostics	Disease Surveillance
Producer/Vet/Lab/Pharma engagement	Primary users health management companies
Main focus of features is diagnosis	Main focus of features is data management
Leverage the full power of the platform	Promotes internal collaboration
Connects with EDU labs	Documentation of workflow
Collaboration	Collaboration Producer/Vet/Pharma engagement
Data collection	
Documentation of workflow	

centered on disease tracking and surveillance (versus submitted for diagnosis), participants listed on the right side of the table are typically involved.

HEAT STRESS SMARTPHONE APPS

The tempature humidity index (**THI**) for a variety of farm animals has been available for many decades. However, it has received little use by producers. The smartphone Apps are designed to replace the heat stress (**HS**) charts that are sitting in a book, on a shelf, in the barn office and put the information on a smartphone and into the hands of the producer. The Apps allow producers to make timely decisions on managing the livestock environment and reducing animal stress and mortalities. Below are three HS Apps that have recently been made available to the livestock industry to aid in managing HS.

Thermal Aid App

The ThermalAid app develop by University of Missouri gives the THI for both beef and dairy cows using real-time automated input from local weather stations and/or manual entry of ambient temperature and humidity. Specific group information can be added (e.g., grazing vs. confined, healthy vs. sick) and the THI will change accordingly. As the THI changes, the color of the backdrop shifts through the 4 stages of stress from no-stress (green) to emergency (red). Likewise, daily THI values for the next week can be accessed. Individual animal respiration rate can also be determined using the app, for a more precise determination of thermal stress level. In every case, one can save the information and get basic tips to reduce HS level.

Several other smartphone apps exist to manually calculate the THI for different livestock species. However, none utilize real-time data entry. Future goals are to develop cost-effective temperature/humidity sensors that can be placed at any location for determination of local THI. In addition, animal temperature sensors are being planned to interact with the app and provide continuous notification of thermal status according to Dr. Don Spiers, University of Missouri.

Cool Cow™ App

The Cool Cow™ mobile app, provided by Purina Animal Nutrition LLC, puts the tools dairy producers need to monitor and address HS at their fingertips. With the new Cool Cow mobile app, dairy producers will know when temperatures have reached levels that are stressful to the cow. This new tool is designed to assist dairy producers in mitigating the negative financial impacts of HS (communication with Elena Lindemann,

livestock marketing director with Purina Animal Nutrition LLC).

The mobile app features an easy to use HS calculator for inputting the current temperature and humidity readings. The temperature and humidity is then translated into a THI reading that shows the severity of HS, ranging from mild to extreme risk; providing dairy producers insight on the current conditions inside their barn. In addition to the HS calculator, the mobile app offers tips on mitigating HS from management to nutrition.

The Cool Cow™ mobile app is available to download for Android phones at: http://bit.ly/AndroidCoolCow and for iPhones at: http://bit.ly/iPhoneCoolCow.

For more information, call (800) 227-8941 or go to: www.dairy.purinamills.com.

HEAT STRESS IN LIVESTOCK AND POULTRY APP

The University of Guelph (Canada) and the Ontario Ministry of Agriculture and Food and the Ministry of Rural Affairs have developed a free mobile application available from Google Play or Blackberry Marketplace that calculates the level of HS in livestock and poultry.

The app allows producers to calculate HS based on the measured barn temperature and relative humidity. The resulting calculation shows the level of HS. It provides users with suggestions to reduce HS and improve animal and poultry comfort to help maintain feed intake and overall productivity.

The mobile app integrates research and production information from the Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs publications and University of Guelph research on livestock housing. In addition to English, the App supports French and Spanish.

Features include:

- Three languages: English, French and Spanish
- Seven types of livestock
- Temperature changes in 2 degree increments (metric/imperial)
- Humidity changes in 5 % increments (metric/imperial)
- A variety of ventilation systems
- Heat stress levels ranging from No HS to Emergency
- Practical actions to take to reduce the effects of HS in livestock and poultry

ADDITIONAL AG APPS

For additional Ag related apps, Texas A&M AgriLife Extension put together a list of numerous Ag Apps which can be found at http://agrilife.org/yoakumterryipm/?p=336