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Electronic identification and management of eradication plan for brucellosis, leucosis and tuberculosis in buffalo breeding: innovative system for recording of data collected by veterinary services

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Introduction

Buffalo farming in Italy found favourable breeding conditions in the southern part of the country, where most of these animals are bred. In fact, more than 50% of buffaloes are located in the province Caserta, Campania region. Brucellosis in buffaloes is actually the most relevant problem representing a strong limit to the development of this particular zootechnical sector. A reliable identification system represents a key point in the strategy to limit and eradicate animal diseases. Eradication plans for Brucellosis, Tuberculosis and Leucosis are regulated within European Union (EU) countries by Directives 64/432, 91/68, 97/12 and Decisions 90/424, 2002/677, 2004/450. Since 1990, EU is funding these plans because of the diseases relevance on public health. Among financial procedures, reimbursements are given to breeders in order to refund income losses as consequence of slaughtered positive buffaloes. Identification of these animals, considering the particular environmental conditions which they live in, may result difficult (dirty ear tags, deterioration due to adverse atmospheric conditions, ear tag losses).
In order to apply effective eradication control measures, a univocal, permanent and tamper-proof identification system is required. Since 1998, IZS A&M is running specific research programs on Electronic Identification (EID) of buffaloes, with positive results.
The Campania region launched, in 2006, a specific regional program to electronically identify buffaloes using ceramic boluses provided with transponders, in order to comply with the Ordinance 2006/11/14 of the Italian Ministry of Health. Up till now a total number of 222.000 (87%) buffaloes have been identified by EID and recorded in the National Data Base (BDN) for cattle and buffaloes. In order to improve the sanitary status of the herds, an innovative system - called Animal Health (SANAN) - has been developed by the National Service Center of IZS A&M to record animals sanitary data collected during field activities.
Six thousand electronically identified buffaloes were tested for brucellosis, and blood samples, collected from each animal,were labelled by a printer connected to a hand-held computer equipped with Windows CE.NET version 4.2/5.0 operating system and provided with a client-server application able to manage data downloaded from BDN (ear tag identification number, sex, race, birth date).
The application manages some activities performed in the field, (animal identification, sampling, vaccination), including also the labelling of blood samples thus ensuring a reliable identification tool for Veterinary Services
Aim of this poster is to describe a new methodology to record data collected from sampling activities related to the national eradication plans for Brucellosis, Tuberculosis and Leucosis by Veterinary Services.

Results

Official activities for buffaloes EID started in 2006 and are still going on. Up till now more than 222.000 buffaloes have been electronically identified in the concerned area (87%).
Animal Identification procedures are simple and fast, and give to Veterinary Services a secure way to identify either animals or blood samples.
Over 6.000 buffaloes were tested using this new methodology.
No difficulties were reported by users in field working conditions.
The blood sampling procedures ensure a safe and univocal identification and improve the recording procedures of the official laboratories.
A report tool helps Veterinary Services to monitor the activities connected to the eradication plans and allows to share all the information with the actors involved (Local and Regional Veterinary Services and CVO).
Monitoring is helpful for the management of activities and decision making purposes. Fast uploading of data collected during field activities makes this tool more effective, giving a real picture of the epidemiological situation.

Methods

Identification

Buffaloes were electronically identified by a 72 grams, 67x19 mm ceramic bolus, provided with a 32 mm length HDX transponder, complying with the ISO standard regulations 11784:1996 Amendment 1:2004 and 11785:1996

Sampling

Six thousand buffaloes from 120 farms located in the Caserta province were bled for brucellosis test; blood samples were recorded by a hand-held computer, Psion Teklogix Workabout Pro, equipped with Windows CE.NET version 4.2/5.0 operating system. Psion hand-held computer was connected either with an Allflex portable RfiD reader (stick reader Mod. RS 320) by Bluetooth™, or a portable thermal transfer printer (Brady TLS PC-Link™) by a serial RS-232 cable (Figure 1: Field equipment).
Sticky labels Mod Brady TLS 2200® 50x25mm complying with EU Directive 2002/95/RoHS were used to identify blood samples (Figure 2: Blood samples).
A Java 2 Standard Edition (J2SE) based platform client-server application was developed to manage sanitary information collected during field activities (Figure 3: SANAN global view).
The connection between the hand-held computer, through its docking station with a Personal Computer connected to internet, allows to transfer data from the BDN to Psion, giving to the Veterinary Services an electronic register of the holding. Operational approach is easy and improves efficacy and efficiency of field activities, reducing waste of time and data errors.
Safe data transfer to/from SANAN and BDN was ensured by Secure Socket Layer (SSL) over Hyper Text Transfer (HTTP) protocol.

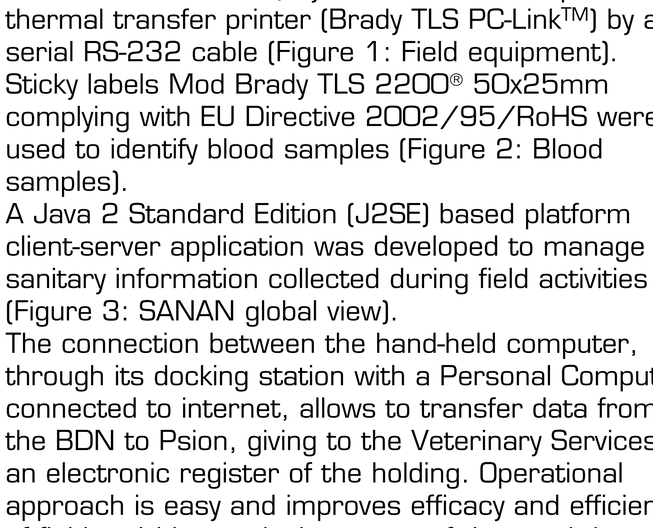

Figure 1. Field equipment

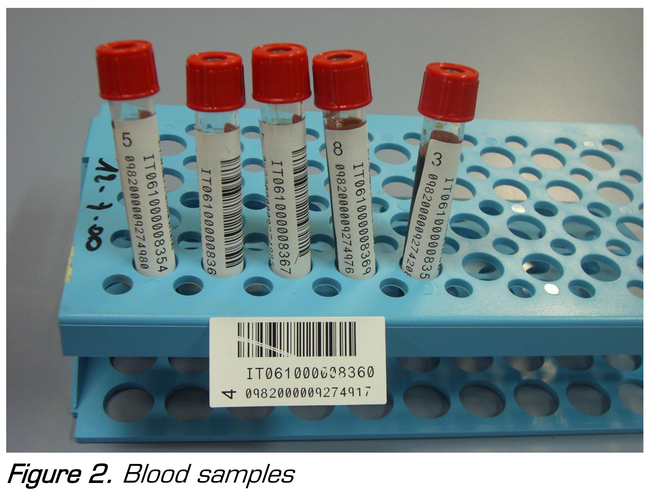

Figure 2. Blood samples

Blood samples identification by sticky labels was managed by using the client-server application; recording the blood sample data starts with the reading of the electronic bolus linked to conventional ear tag code. Sticky labels are printed at the same time. The sticky label has the conventional ear tag code and the electronic code printed on, either in readable characters or in barcode
Updated sanitary and EID information collected during field activities are uploaded into the SANAN or BDN database, respectively.

Laboratory processing

Once identification code of the animal reported on vials and identification code of the holding is checked, samples are recorded by the laboratories according to their official procedures. Barcodes reporting the official identification code of the sampled animal are helpful to improve recording procedures and to reduce errors due to manual data entry.

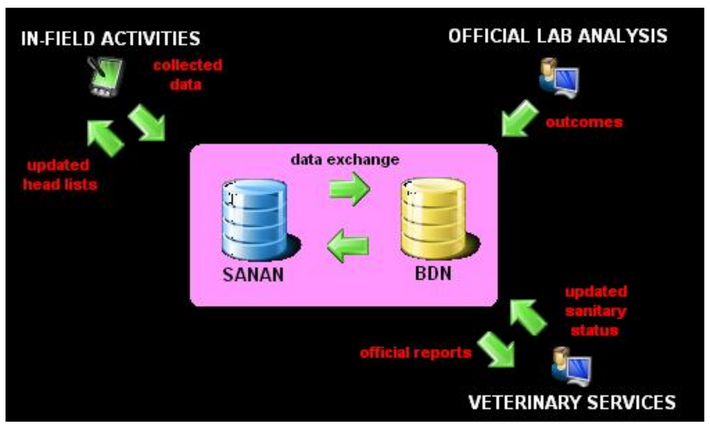

Figure 3. SANAN global view

Veterinary Services

As soon as laboratory official report is available, Veterinary Services update the sanitary status of the holding and close the official activities if there is no outbreak notification.

Conclusions

Buffaloes EID is necessary to guarantee a strong identification tool to Veterinary Services in order to effectively manage the activities of the eradication plans.
EID improves traceability of products of animal origin.
Reduction of errors either in animal identification procedures or animal sampling is necessary to improve animal health condition and public health too.
This first trial on buffaloes shows that the system could be adopted on a national scale.
Fast updating of animal sanitary status gives a real picture of epidemiological situation useful to establish effective control measures.
Use of innovative systems able to connect and quickly transfer sensitive information by secure communication protocols (SSL over HTTP) could be used to promptly answer to health emergencies, and guarantee consumers safety.