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Retrospective study on cattle and poultry diseases in Uganda

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ABSTRACT

Cattle and poultry enterprises are among the major contributors to food security and socioeconomic empowerment of households in Uganda. However, various diseases constrain their productivity. A two-year retrospective study between April 2012 and March 2014 was conducted using records for cattle and poultry diseases diagnosed at the Central Diagnostic Laboratory (CDL) to determine prevalent diseases in Uganda. The laboratory received 836 samples from poultry (36.3%) and cattle (63.7%). Of the 836 samples, 47.5% had a definitive diagnosis of disease causation. Most of the cattle and poultry diseases diagnosed were protozoan diseases (39.3%) followed by bacterial (21.4%), viral (17.1%), helminthiasis (11.1%), nutritional diseases (4%) and others (7.1%). For poultry, viral diseases (29.5%) and protozoan diseases (27.1%) especially newcastle disease (44.3%) and coccidiosis (100%) respectively, were the most diagnosed. While for cattle, hemo-protozoan parasites (52.1%) were the most prevalent, of which 92.9% were east coast fever infection. Bacterial infection (20.5%) in cattle were the second most diagnosed diseases and mastitis was the most diagnosed (46.2%). In summary, coccidioisis, collibacillosis, newcastle disease, gumboro disease, and avian helminthiasis were the most prevalent poultry diseases while in cattle, east coast fever, helminthiasis, mastitis, brucellosis and rabies were the most frequently diagnosed diseases. This study has identified the major diseases that hinder poultry and cattle production in Uganda. The data generated by CDL could be used for surveillance, monitoring and designing strategic interventions for control of poultry and cattle diseases in Uganda.

1. Introduction

The livestock sector in Uganda contributes 3.2% to the national gross domestic product (GDP) and is projected to be rising [1]. A report in 2009 showed that 4.5 million households (70.8%) owned livestock or poultry [2,3]. The increase in animal population followed deliberate efforts by the Government to modernize and restructure agricultural extension services. This was achieved through the introduction of farmer-centered and market oriented extension system called the National Agricultural Advisory Service (NAADs) and distribution of improved breeds to boost household income and food security [4]. Additionally, Non-government organizations like Heifer International and Send a cow Uganda [5], have been distributing livestock to families in the rural communities across the country in a bid to alleviate poverty [6]. However animal diseases constitute a major constraint towards achievement of poverty reduction goals based on improved livestock technologies [7–10]. Therefore, strengthening national animal disease diagnostic capacity is one of the pathways through which diseases can be promptly detected and controlled [11].

In Uganda, animal disease diagnosis and control is the primary role of the Directorate of Animal Resources in the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). It is the mandate of the National Animal Disease Diagnostic and Epidemiology Center (NADDEC) to carry out routine surveillance, monitoring and control of animal diseases. The Central Diagnostic Laboratory (CDL), located at the College of Veterinary Medicine, Animal Resources and Bio-security (COVAB), Makerere University was established

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in 2011 as part of the Joint National Animal Diagnostic Centre (JNADIC) to complement the efforts of NADDEC. It was envisaged that the data generated from CDL would be a powerful tool for passive surveillance and could inform strategic intervention for nation wide animal disease control. In this retrospective study, records for cattle and poultry diseases diagnosed at the CDL were analyzed to determine prevalent diseases in Uganda from April 2012 to March 2014.

2. Materials and methods

2.1. Study area

This retrospective study was based on records of cases diagnosed at the Central Diagnostic Laboratory (CDL). The laboratory is located at the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), Makerere University, Kampala, Uganda. The CDL has five sections namely; bacteriology, parasitology and hematology, pathology, serology and virology. Samples are received centrally at the laboratory and distributed to the various sections based on the assessment of the resident clinician and/or the request of the client. The major disease diagnostic techniques used at CDL include; inter alia, postmortem examination, histopathology, microscopy, bacteria culture and isolation, antibiotic sensitivity tests, virus culture and isolation, hematology, biochemical tests, enzyme linked immune sorbent assay (ELISA), immunofluorescent antibody test (IFAT), complement fixation test (CFT) and polymerase chain reaction (PCR).

2.2. Study design

A two year retrospective study from April 2012 to March 2014 was conducted on records for cattle and poultry diseases collected from Central Diagnostic Laboratory (CDL) database. The records retrieved from the database included; type of specimen, date of submission, origin, animal species and diagnosis. The sample whose disease causative agent was identified was considered as definitively diagnosed while negative results were those without any identifiable causative agent. The result of diagnosis based on hematological profile were considered inconclusive since the causative agents responsible for the changes in blood picture were not identified. For the definitive diagnosis, the diseases diagnosed were categorized based on the causative agent; bacterial, viral, protozoan, nutritional diseases, helminthiasis, fungal, tumor, co-infections and others.

In this study, data for average monthly precipitation was obtained from the Uganda National Meteorological Authority (UNMA) and used as cross reference to determine whether there was a pattern against disease burden and samples submitted.

2.3. Data analysis

The data was entered into Microsoft excel (Windows version, 2010) to calculate the mean and standard deviation for the number of samples received. SPSS version 21 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp) was used to generate and summarize frequency tables and a Pearson chi square analysis was done to establish the relationship between variables at 95% confidence interval. A p value ≤ 0.05 was considered statistically significant. GraphPad Prism version 6.00 for Windows (GraphPad Software, La Jolla California USA) was used to calculate the odds ratio (OD) and risk ratio (RR) and generate the graph used in this study.

3. Results

3.1. Samples received in the study period

A total of 836 samples were received during the 24 months period, of which 36.2% (303/836) were from poultry and the rest from cattle 63.8% (533/836) (Table 1). Among the samples received by the laboratory, blood samples were the most frequently submitted 48.7% (407/836) followed by organ specimens 31.5% (263/836). Most of the blood samples were from cattle 406/407 (99.8%) whereas 216/263 (82.1%) of the organ specimens were of poultry origin. Other specimens included carcass or live specimens for autopsy, milk, fecal samples, pus, aspirates and swab.

3.2. Cattle and poultry diseases diagnosed

Of the 836 samples received, 47.5% (397/836) had a definitive diagnosis while 52.5% (439/836) were either negative 42.4% (186/439) or inconclusive 57.6% (253/439). For both poultry and cattle, protozoan diseases were the most prevalent 39.3% (156/397), followed by; bacterial infections 21.4% (85/397), viral infections 17.1% (68/397), helminthiasis 11.1% (44/397), nutrition diseases, 4.0% (16/397), others 2.7% (11/397), co-infections 2.3% (9/397), tumors 1.2% (5/397) and fungal diseases 0.75% (3/397), (Table 2 and Table 3). For the cattle samples with a definitive diagnosis (Table 3), hemo-protozoan parasites were the most prevalent 52.9% (100/189), with east coast fever being the most diagnosed 92% (92/100), whereas for bacterial diseases, mastitis was the most diagnosed 47.3% (18/38). Of the 208 poultry samples with a definitive diagnosis (Table 2), viral diseases 29.3% (61/208) were the most diagnosed and newcastle disease was the most prevalent 44.3% (27/61). Bacterial infections were the second highly diagnosed 22.2% (47/208) in poultry of which collibacillosis was frequently diagnosed 61.7% (29/47), (Table 2). Nutritional diseases 7.7% (16/208) were only diagnosed in poultry and avian

Table 1
Type of samples submitted to the Central Diagnostic Laboratory for diagnosis between April 2012 and March 2014.

Sample type	Quantity of samples per laboratory unit							Total
	Bacteriology		Pathology		Parasitology and hematology	Virology	Serology	
	Poultry	Cattle	Poultry	Cattle	Cattle	Poultry	Cattle	
Blood	1	30	0	4	360	0	12	407
Organ specimens	34	4	176	39	3	6	1	263
Fecal	0	5	0	0	43	0	0	48
Carcass for autopsy	10	0	32	0	0	2	0	44
Live specimens for autopsy	6	0	35	0	0	0	0	41
Milk	0	27	0	0	0	0	0	27
Pus	0	4	0	0	0	0	0	4
Aspirate	0	1	0	0	0	0	0	1
Swab	1	0	0	0	0	0	0	1
Total (%)	52 (6%)	71 (8%)	243 (29%)	43 (5%)	406 (49%)	8 (<1%)	13 (2%)	836 (100%)

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