Kenya Agricultural & Livestock Research Organization

**Project Title:** Surveillance and Molecular Epidemiology of Newcastle Disease in Kenya

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<tr>
<th>Institute</th>
<th>Biotechnology Research Institute</th>
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<td>Center(s)</td>
<td>KALRO Kabete Biotechnology</td>
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<td>Principal Investigator</td>
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**Problem Statement**
Newcastle disease (ND) is one of the most important diseases of poultry worldwide. It is caused by Newcastle disease virus (NDV), or avian paramyxovirus type 1 (APMV-1), a negative-sense single-stranded RNA virus of the family Paramyxoviridae. The virus is a select agent that affects a wide range of wild and domestic bird species and display large genetic variability (18 genotypes circulating worldwide). Periodic, large scale outbreaks cause extensive morbidity and mortality in poultry and in wild birds in Kenya, and it is a real concern for authorities. A collaborative research program between United States Department of Agriculture/Agricultural Research Service-Southeast Poultry Research Laboratory (USDA/ARS-SEPRL), the Kenya Agricultural Research Institute (KARI), the Department of Veterinary Services (DVS), the Kenyan Wildlife Services (KWS), and the International Livestock Research Institute (ILRI) will be established to study the epidemiology of Newcastle Disease in Kenya. The project will mitigate the effect of WMD by allowing identification and reporting of new strains of virulent Newcastle Disease virus circulating in Kenya.

**Objective(s)**
The objective is to conduct active surveillance in chickens and passive surveillance in chickens, pigeons, and wild species of birds to determine viral distribution and identification of ecological correlates in Kenya. A second objective is to develop a training program on genomic characterization, sequencing, and bioinformatics at Southeast Poultry Research Laboratory for Kenyan scientists.

**Planned Activities**
1. We will conduct monitoring of ND in chickens and passive surveillance to identify virulent NDV isolates circulating in chickens, pigeons and wild species of birds. These studies will permit the determination of viral distribution, and identification of socio-economic and ecological correlates in Kenya.
2. Scientists from Kenya will conduct nucleic acid extraction, genomic sequencing, and genotypic characterization of the isolates
3. Genotype identification will be conducted by initially by partial genome sequencing
4. Scientists at SEPRL and ILRI will conduct random Nexgen sequencing of samples from outbreaks during vaccination failures to simultaneously characterize NDV and any other co-infecting agent that may be present in the clinical samples
5. SEPRL will transfer to KARI methods for development of real time PCR tests and sequencing
6. A database of sequences will be generated and connected with epidemiological data. Data analysis and peer reviewed publications will be carried out in a collaborative manner between Kenyan partners and ARS-SEPRL
7. In summary, this proposal will allow Kari to and KWS to independently conduct viral epidemiology of avian diseases, and will identify viral reservoirs and epidemiological factors associated with increased NDV disease incidence

**Outputs**
1. Molecular diversity of Newcastle disease viruses in Kenya in wild and domestic birds characterized
2. Relationship of Newcastle disease viruses isolated from domestic and wild birds established
3. Four M.Sc. students trained
4. Diagnostic tests established at the BioRI – Kabete
5. Scientific papers

**Outcomes**
A better understanding of Newcastle disease in Kenya in wildlife and domestic birds for better control and vaccination

**Budget**
102,271,260.00

**Start date**
2018-02-28

**End date**
2018-02-28

**Funded by**
Department of threat reduction agency (DTRA) through USDA;

**Collaborators**
USDA; KWS; DVS; ILRI;