Epidemiology of selected pig viral diseases in Bhutan
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Abstract

Pig production in a developing country like Bhutan is characterized by traditional small scale subsistence driven production systems. As in most developing countries, very few publications on pig diseases are available. The aim of this thesis was to generate information on selected pig viral diseases in Bhutanese pig farms through seroprevalence study, genetic characterization of virus strains and studying the dynamics of diseases in the government breeding and village backyard farms. The thesis also aimed to understand the disease dynamics between the government breeding farms and backyard holdings. Chapter 2 described the sero-prevalence of important pig viral diseases in Bhutan and the risk factors associated with the occurrence and introduction of these diseases. The study focused on Classical Swine Fever (CSF), Porcine Reproductive and Respiratory Syndrome (PRRS), Porcine Circovirus type 2 (PCV2), Aujeszky’s Disease (AD) and Swine Influenza (SI). Antibodies to CSFV, SIV, subtype H1N1 (likely pandemic H1N1 2009) and PCV2 were detected in pigs sampled from the government farms village backyard pigs. The antibodies against CSFV were mainly against vaccination with no direct evidence of CSFV infections either by clinical signs or virus isolation. Antibodies to PRRSV and Aujeszky’s disease, were not found at all. Risk factors found were mainly related to practices of swill feeding and other biosecurity measures for CSF and lending of boars for local breeding purposes for PCV2. Chapter 3 covered a longitudinal study to elucidate the role of sows in the disease prevalence on government breeding farms and the dynamics of virus spread between the government herds and village backyard holdings in relation to virus spread within the government herds. The results revealed no differences in overall seroconversions between piglets raised in government farm or in backyard farms, even though seroprevalences for PCV2 and HEV where significantly higher in piglets raised in government herds. In the sows in the government herds, seroprevalences against all four viruses [CSFV, SIV (H1N1), PCV2 and HEV] were high and increasing towards the end, showing that active circulation of these viruses, except for CSFV took place. In chapters 4, Porcine Circovirus type 2 (PCV2) in the Bhutanese pigs were characterized through sequencing of their nucleotides. PCV2 genome was detected in tissue samples pigs from the government farm. Phylogenetic analysis
performed with a set of GenBank sequences revealed that the Bhutanese PCV2 strains belonged to the PCV2b genotype and grouped with cluster 1C. The Bhutanese isolates were characterized as genotype 4 with highest similarity (93.7%) with the Indian isolate IND-SW-00-01. In Chapter 5, the serological prevalence of Hepatitis E virus (HEV) and genetic characterization of HEV in pigs from Bhutan was documented for the first time with a high prevalence of HEV antibodies and observation of genotype 4. In Chapter 6, a study to evaluate the efficacy of the CSF oral bait vaccine in village backyard pig farms with assessment of the farmers’ knowledge on CSF and motivation on using oral vaccines was conducted. The study results indicated that the oral vaccine was effective.