



THESIS APPROVAL
GRADUATE SCHOOL, KASETSART UNIVERSITY

Doctor of Philosophy (Tropical Agriculture)

DEGREE

Tropical Agriculture

FIELD

Interdisciplinary Graduate Program

PROGRAM

TITLE: Identification of MHC Haplotype Related with Avian Influenza
Virus Disease in Thai Indigenous Chicken

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23 / 05 / 2006

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Kalaya Boonyanuwat 2006: Identification of MHC Haplotype Related with Avian Influenza Virus Disease in Thai Indigenous Chicken.

Doctor of Philosophy (Tropical Agriculture), Major Field:

Tropical Agriculture, Interdisciplinary Graduate Program. Thesis Advisor:

Associate Professor Voravit Siripholvat, Dr.Agr. 92 pages.

ISBN 974-9840-77-1

Natural infections with avian influenza viruses (AIV) had been reported in a variety of animal species including human, pigs, horses, sea mammals, mustelids and birds. Occasionally devastating pandemics occurred in domestic chicken (broiler and layers) and human. During November 2003 to March 2004 in many countries in Asia, there were outbreaks of H5N1 avian influenza virus, causing death of infected patients and devastated poultry industry. Some Thai indigenous chicken were survivable. They were suggested resisted to AIV. These traits were related to immunogenetics, especially the major histocompatibility complex (MHC) class I and class II molecules. These researches were separated into two parts: 1) performed at Livestock Research and Breeding Center of Department of Livestock Development using 255 Thai indigenous chicken to identify MHC haplotypes, used as reference population, and 2) performed at the rural area of AIV outbreaks in central part of Thailand, using 730 Thai indigenous chicken to study influences of MHC haplotypes on AIV resistant traits. Genomic DNA were precipitated from blood samples and feathers. They were used to identify MHC haplotypes by Single Strand Conformation Polymorphism (SSCP) for MHC class I and II haplotypes, and by LEI0258 microsatellite marker for MHC class II haplotypes. Each group of SSCP and LEI0258 method was standardized by partial sequencing BfoI and BLβI at region of exon2 for MHC class I and class II respectively, because this region was translated to domain of pathogen binding site protein. The results represented 12 and 24 homozygous and heterozygous MHC class I haplotypes respectively. Reference population had 8 and 16 homozygous and heterozygous MHC class II haplotypes respectively. The B21 haplotype and their heterozygote of MHC class I and II chicken showed the strongest AIV resistant traits. These results confirmed that MHC genes can be used as genetic markers to improve genetics of AIV resistant traits of chicken for disease prevention strategy. Finally, poultry industry has high standards in the world for raising healthy livestock and providing consumers with safe products.

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