CHAPTER 1
INTRODUCTION

1.1 Statement and significance of the problem

Respiratory diseases with significant impact on Thailand's pork production are the co-infection between Porcine Reproductive and Respiratory Syndrome (PRRS) and secondary bacterial infections[1]. Herds infected with PRRS virus experience reproductive losses followed by increased intensity of pneumonia and poor growth in the nursery and finishing stages[2, 3] Due to the economic losses associated with these diseases, strategies to control infection and its effects are a priority for the swine industry.

Previously published elimination programs for PRRS virus infection have used methods that include multi-site production, whole herd-depopulation and repopulation, test and removal[4], herd closure[5], serum inoculation[6], and mass vaccination with modified live virus vaccine[7-9]. However, results have not always proven successful.
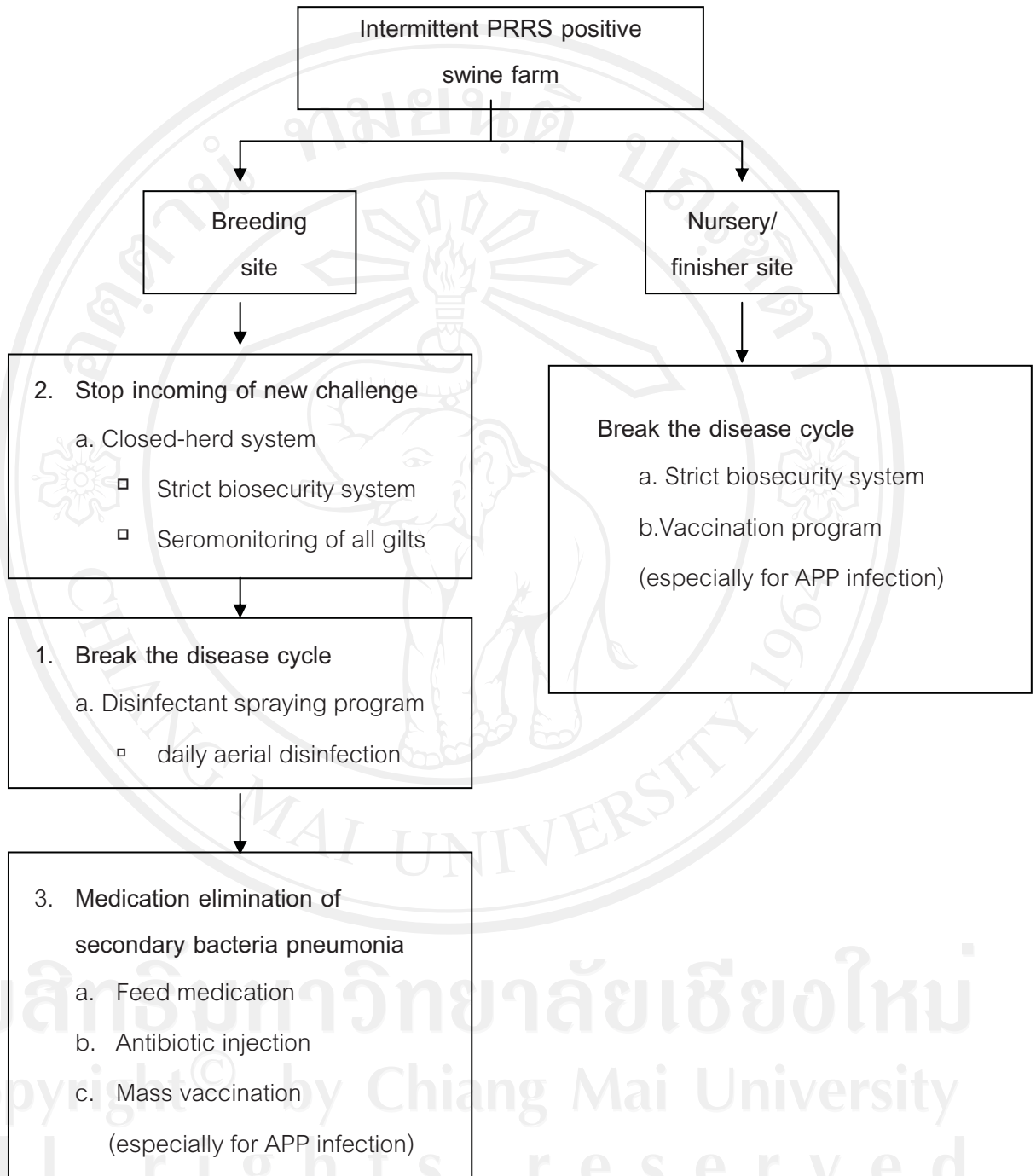
1.2 Objectives

1. To distinguish the seroprevalence between an intermittent PRRS positive herd and after using the closed-herd system.
2. To assess the effectiveness of aerial disinfection in the control of PRRS virus spread in a breeding herd.
3. To evaluate the effects of medical elimination techniques in combination with a vaccination program in controlling secondary bacterial infection from *Actinobacillus pleuropneumoniaea*.
4. To improve pig productivity and performance in a herd with endemic respiratory infection.

1.3 Conceptual framework

The concept of the study was based on the following interventions in order to control and eradicate PRRS (Figure 1.1):

1. A closed-herd system with stringent biosecurity will improve gilt acclimation and stabilize herd immunity.
2. Aerial disinfection will break the disease cycle in the population.
3. The process of mass vaccination and whole breeding herd medication will prevent direct transmission of secondary bacterial pneumonia from carrier to susceptible pigs.

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│  Intermittent PRRS positive │
│       swine farm         │
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Breeding site

2. Stop incoming of new challenge

   a. Closed-herd system

      □ Strict biosecurity system

      □ Seromonitoring of all gilts

1. Break the disease cycle

   a. Disinfectant spraying program

      □ daily aerial disinfection

3. Medication elimination of secondary bacteria pneumonia

   a. Feed medication

   b. Antibiotic injection

   c. Mass vaccination

    (especially for APP infection)

Nursery/ finisher site

Break the disease cycle

   a. Strict biosecurity system

   b.Vaccination program

   (especially for APP infection)

Figure1.1: PRRS control and eradication intervention strategies.

1.4 Term definitions

There were several terms used in the PRRS elimination project which was modified from other research, including:

Serologically stable breeding herd refers to a vaccinated herd with a PRRS ELISA S/P ratio < 2.0 for at least 90% of breeding herd serum samples. It also refers to a non-vaccinated herd with a PRRS ELISA S/P ratio < 1.0 for at least 90% of breeding herd serum samples in which less than 10% of samples had a S/P ratio > 2.0[9].

Stable herd is defined as one in which clinical signs of PRRS have not been observed and horizontal or vertical shedding of PRRS virus has not been detected by serological ELISA or PCR testing of sentinel animals.

Naïve refer to an animal or population of animals that has neither been exposed to PRRS virus nor possessed PRRS virus antibodies due to passive immunity.

Negative animal refer to an animal who was previously exposed to PRRS virus, but who has experienced antibody decay such that serological ELISA testing yields S/P ratio < 0.4. An animal may also be described as negative if it has received maternal antibodies to the PRRS virus, but this antibody level has subsequently decayed until the ELISA S/P ratio is < 0.4.

Negative population of animals is defined by testing a sub-sample of the population statistically selected to detect a 10% seroprevalence at 95% confidence level. All test animals must have an ELISA S/P ratio < 0.4 for the population to be considered negative.

Sentinel animal is an animal that is naïve to PRRS virus and is introduced into a stable population as a sensitive indicator of horizontal virus spread.

Multi-site production is the swine production methodology that refers to rearing the various age groups of swine at different locations.