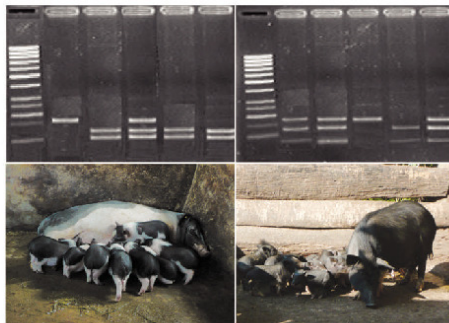




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**On Farm Performance of Vietnamese Pigs Breeds and its
Relation to Candidate Genes**

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1 INTRODUCTION

1.1 Problem statement

Vietnam is an agricultural country with 80% of the population living in the countryside and approximately 70% relying on agriculture almost exclusively for their livelihood (Ogle and Phuc, 1997 and Kinh *et al.*, 2002). In the agricultural sector, rice and pig production are tightly linked with the Vietnamese farmers' livelihood (Anh, 2000). Livestock husbandry is an important component in the mixed farming systems in South-East Asia in general and in Vietnam in particular (Devendra *et al.*, 1997). Animal production always occupied an important place in the Vietnamese farming system and in the life of smallholders in rural areas (Ly, 2002).

Pig production is a traditional occupation in Vietnam, playing an important role for farmers' economic and cultural life (Lemke *et al.*, 2006). Pig keeping is widely spread, and pigs are considered to be one of the most important livestock species (Singh *et al.*, 1996). The majority of pig producers are smallholders, and smallholder-farming systems comprise the predominant part of pig production in Vietnam (Thong *et al.*, 1996). Up to 80% of pig production is estimated to be small-scale; smallholders typically own one or two sows and less than 10 fatteners (Lapar *et al.*, 2003). The main sources of income of smallholders are from agriculture, of which pig farming is one of the major parts besides income from crop production, contributing between 9% and 41% of the total income of pig keeping smallholders in North Vietnam (Le Coq *et al.*, 2002). This contribution is especially significant in the ethnic minority areas with high poverty (Duyet, 1992).

Pigs are raised by smallholders both for sale and for home consumption (Eugene *et al.*, 1999). They are very important for smallholders in many aspects, e.g. contributing to farm income, enhancing crop production, providing additional economic goods (Steinfeld and Mack, 1997), creating employment, reducing poverty, improving the family diet, financial security, and farmers' livelihood (Tuyen *et al.*, 1998). In the hilly and mountainous regions, pig raising is closely linked with culture and tradition of ethnic minorities such as celebrations of new year and special occasions throughout the year, which are strongly connected to the local customs and feasts (Xuan *et al.*, 1995; Tung, 1999 and Valle Zárate *et al.*, 2003).

The pig population has increased considerably, in 2001, the pig population was 21.8 millions, and it reached 27.4 millions in 2005, an annual average increase of 6.3% (Statistical office of the Department of Animal Husbandry, 2006). In 2005, 2.3 million tons of pork and in 2006, 2.4 million tons were produced, which made up 81% and 71.5% of total meat production, respectively (Gain Report 2006). The pork production accounting for 76,4 % of the total meat production in the country, and most of it comes from smallholder farms. Over 90% of the pork supplied by farmers is consumed in national markets. More than 98% of all Vietnamese households consume meat products, especially pork (Tung *et al.*, 2005). Especially in the northern Uplands of Vietnam, many households consume self-produced meat (Que, 2006).

Since market demand for pork is rising, it is desirable, that the production by smallholders should increase. In order to increase their output the pig breeds have to be improved and a suitable breeding program for households has to be established. These will help to increase the output per animal. Therefore, the reproductive and productive performance and its relation to genetic polymorphisms at selected loci can be used to improve the performance. Pig breeds reared under smallholder conditions have to be studied in detail to meet the demand in order to increase the efficiency of production in the northern mountainous region of Vietnam. The performance of Mong Cai and Ban pigs reared under smallholder conditions and its relation to genetic polymorphisms at selected loci have been studied, because these can improve the reproductive performance by set up an adapted breeding programs.

Several studies have been carried out to estimate the performance of pigs in commercial farms and breeding centers of exotic and crossbreds and some characteristics of local pig breeds such as litter size at birth and at weaning, growth performance, lean meat and fat percentages of their carcasses have been determined as well (To and Duc . 1967; Duc *et al.*, 1997b; Binh, 1992; Thien *et al.*, 1999; Duc *et al.*, 2001; Nhiem *et al.*, 2002; Duc *et al.*, 2006). However, under smallholder conditions, especially in smallholder farms in the mountainous areas with different intensity levels (semi-intensive and extensive), where the local pig breeds are dominantly kept, their performance has been estimated to a limited degree only (Lemke *et al.*, 2002).

Reproductive performance, growth performance, and carcass characteristics of the Mong Cai and Ban breeds have been studied in some researches (To and Duc, 1967; Duc *et al.*, 1997; Duc *et al.*, 2001b; Lemke *et al.*, 2002; Tra, 2003, Huyen, 2004; Hoa, 2005; Duc *et al.*, 2006; Lemke *et al.*, 2006), but results on meat quality are not yet available.

Vietnamese native pig breeds can be distinguished by their morphological characteristics and economic performance, but molecular genetic information about local pig breeds is very limited (Hau, 2002). Information on major genes, which contribute to the control of economic traits and breeding values, is not available.

Systematic on-farm performance testing to evaluate pigs reproductive performance, carcass characteristics and meat quality and relating them to genetic polymorphisms of candidate genes has not yet been conducted in Vietnam. These evaluations are important to explore the ability of local pig breeds to increase reproductive efficiency of sows and meat production in order to develop and improve pig production in the mountainous area of the northwest of Vietnam.

1.2 Objectives of the study

The specific objectives of this study were:

- i) To estimate and to compare the reproductive performance of two indigenous pig breeds (Mong Cai and Ban) kept on farms under smallholder conditions in Son La province, northwest of Vietnam.
- ii) To evaluate and to compare the growth performance, carcass characteristics, and meat quality of the two indigenous pig breeds reared under smallholder conditions in Son La province.
- iii) To determine the relationship between genetic polymorphisms at selected loci of the Mong Cai and Ban breeds and their reproductive performance traits.