



Final Report

Project Title

**Assessment of Husbandry Systems and Genetic Diversity of Indigenous
Chicken in Lower Northern Thailand for Geosocial Based Sustainable
Development**

By

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**Assessment of Husbandry Systems and Genetic Diversity of Indigenous
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Development**

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Abstract

Indigenous chickens (IC) play an important role in local smallholder farming system in Thailand. Local IC are not only raised for household consumption and extra income but are also bred for sport such as fighting cock (FC). In recent year, cock fighting has become a high value sport challenge in Thailand. Here, our survey involving 200 households from 48 villages using both purposive and random sampling methods was carried out in five provinces of the lower northern Thailand to describe local IC production systems and socio-economic statuses of farmers. From present study, the majority of respondents were males (87%) and the main purposes of indigenous chicken were FC (78%). The chicken husbandry system could be classified into three categories as free-range systems (18%), intensive systems (6.5%) and semi-intensive systems (75.5%). The most local IC was left to scavenge, and farmers also provided some extra feed. The average flock size per household for roosters and hens was 3.07 and 9.06, with a total flock size of 39.23 birds. The predation (63.5%) and disease (22.5%) were the main cause of mortality. Although most of the farmers could do some vaccination by themselves, their knowledge about the prevention of epidemic diseases and farm management was still limited. For trading, the well-trained and well breed FC (5 to 12 months old) could be sold for very high prices compared with general IC. Education about chicken genetics, welfares and farm management are necessary and should be promoted for sustainable development. The investigated knowledge from this study will be beneficial for the conservation purposes

and utilization of Thai indigenous chicken genetic resources as well as improvement of agricultural production systems for geosocial based sustainable development in the future.

Keywords: Fighting cocks; Local Indigenous chickens; Lower-northern Thailand; Production systems

Executive Summary

Research problem and its significance

Thai indigenous chicken play an important role in smallholder farming systems and local populations for long time. They are raised using few input but still generate their products which are an important protein sources as well as are used to meet the multiple social, economic and cultural for house hold needs. Moreover, they are used for specific breeding as widely known fighting cock for chicken fighting sport in Thailand (DLD 2010). Thai indigenous chicken breeds are specific for particular regions and they are assumed showing specific adaptation to climate, disease and local low quality feed. In relation to biodiversity, therefore, they seem to be a reservoir of genes which could be a benefit for the future use. However, in recent years livestock production in Thailand has switched from backyard animals and integrated crop-livestock farming systems to industrial livestock enterprises. Rapid growth has occurred in pig and poultry production. Broilers, layers and pigs are mainly produced and raised by large agribusiness companies (FAO 2002; Na-Chiangmai 2002; OAE 2010). In parallel, exotic livestock was imported to improve production performance and for economically important traits. Indigenous chicken has therefore gradually been used for crossbreeding and was finally replaced completely by exotic commercial breeds. Furthermore, indigenous chicken populations in rural area are mainly bred based on owner preferences without genotypic characterization. These all breeding strategies oppose the concepts of sustainability and geosocial development, and will lead to the threatening risk of losing genetic identity and diversity of indigenous chicken breeds.

Genetic diversity is required for populations to evolve and to cope with environmental changes. A loss of genetic diversity is often associated with a reduction of reproductive fitness and lead to the edge of extinction (Frankham *et al.* 2002). Geosocial based sustainable development is the highest important concept for modern development nowadays. This concept focusing on balance development among the dimension of geography, agriculture, society, economics, culture, natural resources and environment. Therefore, the need to conserve and to utilize existing indigenous genetics have become a part of consequence. Studies on genetics, the development of economic traits and the preservation of indigenous breeds are crucial to defining and registering genetic resources

(Rege & Okeyo 2006). For this reasons, both husbandry systems and genetic information of indigenous chickens are significance for sustainable development. Today, molecular markers have proven to be the best tools available to estimate genetic identity and diversity as well as to assess phylogenetics and genetic origins of domestic animal. By comparing DNA sequence data which can derive evolutionary relationships and geographical sub-structuring within and between groups (Groeneveld *et al.* 2010).

As in other livestock species, mitochondria DNA (mtDNA) sequence analysis is one of the tool which has been widely used in chicken (West & Zhou 1988; Liu *et al.* 2006; Oka *et al.* 2007; Muchadeyi *et al.* 2008). However, there are no study has been conducted in mtDNA of Thai indigenous chickens, only nuclear DNA marker analysis has been reported (Dorji *et al.* 2011). Little is known about the genetic information and there origin. The overall goals of this research project are to investigate production system, diversity and origin of Thai indigenous chicken in lower northern Thailand. The investigated knowledge from this study will be beneficial for the conservation purposes and utilization of Thai indigenous chicken genetic resources as well as improvement of agricultural production systems for geosocial based sustainable development in the future.

Objectives

The objectives of this research project are to investigate production system, diversity and origin of Thai indigenous chicken in lower northern Thailand. The specific objectives are :

- 1) To characterize the farming system in lower northern Thailand and identify possible treats and opportunities to the existence of local chicken population.
- 2) To assess the genetic diversity of Thai indigenous chicken using mitochondrial DNA sequence polymorphism.

Methodology

The study was conducted between 2012 and 2013 in five provinces of lower northern Thailand. The sampling areas were the provinces of Phitsanulok (16°49'N 100°15'E), Phichit (16°26'38"N 100°20'52"E), Sukhothai (17°0'1"N 99°49'35"E), Kamphang Phet (16°33'29"N 99°30'40"E) and Uttaradit (17°37'47"N 100°5'48"E). In each province, two districts (*am-phoe*) with four subdistricts (*tam-bon*) within each district were chosen for surveys.

We used a random sampling method to select households for interviews by picking from a list. Forty respondents in each province were interviewed. A total of 200 households in 48 villages were included. Data was collected through direct interviews and observations with individual local indigenous chicken raisers. Qualitative data were obtained through group discussions with chicken raisers and observation, while quantitative data was obtained by interview. Blood sample of Thai indigenous chickens (at least 20 unrelated chicken samples per breed) were collected for DNA extraction.

Information was collected on the socio-economic status of respondents, chicken husbandry management, chicken types, flock structure, farming support services and local chicken marketing system. Visual assessment of the local chicken phenotype was undertaken for morphological description. Chicken blood samples from roosters and hens were taken for the next genetic diversity study (data was not shown in this study).

Both the qualitative and quantitative variables collected in this study were analyzed using frequency analysis and descriptive statistics (SPSS 1999). We considered the flocks in each village in the five provinces as different breeding populations. Due to small populations and without suitable breeding programs, there may have been the possibility of inbreeding. Thus, we calculated the inbreeding rate and effective population size per breeding population by using Wright's equation (Falconer and Mackay 1996). Significant differences between means were further determined using the Duncan's Multiple Range Test; the level of significance was set at 5%.

Results and Discussion

The survey indicated that indigenous chicken are widely raised in lower northern Thailand. Majority of respondents were men (87%), within the age range of 18 - 75, with mean age of 49 years. Primary school was the main level of education (65%). The proportion of respondents that had a raising experience of more than 20 years was 36.5%. The mean family size of respondents was 4 and the main source of livelihood was rice farming (46%), especially in PL province (70%). Motorcycles were the most popular method of household transport and tractors were occasionally used for rice and crop farming. These findings indicate that Thai people in rural areas are predominantly farmers or their occupations are related one way or another to agriculture. Furthermore, in term of socio-economics, indigenous chickens are much more beneficial as they are food for farmer, an investment at home, and can be used for cultural and religious activities.

The husbandry systems found from this study could be classified into three categories based on the level of management as free-range systems (18%), intensive systems (6.5%) and semi-intensive systems (75.5 %). If chickens were left to scavenge for feed resources with no supplementation, we classified it as a free-range system. In the case that chickens were permanently confined and supplied with balanced feed and healthcare, we classified this as an intensive system. Most local indigenous chicken husbandry systems in lower northern Thailand were semi-intensive systems, a combination of both systems mentioned above. For this system, chickens were partially confined and supplemented with balanced ration feeds and healthcare, they were mainly housed at night and were allowed to scavenge within homesteads or run around for natural feed in the day time. The most common natural feed of local chickens were earthworms, worms, termites, insects and plant leaves.

Virtually all the local chicken raisers provided supplementary feeding for their chickens. However, the type and amount of feed depended on the crops grown as well as the geosocial makeup of each area. The majority of farmers who practiced supplementary feeding used paddy rice, corn grain, commercial feed (chicken and pig feed), and others, such as broken rice, rice bran, coconut and noodles, depending on availability. According to the observation, the amount of feed given was generally not enough for the chicken's requirements, especially during the crop growing and harvesting seasons, as farmers went to the fields in the early mornings and returned in the late evenings. Therefore, this result suggests that it might be better to feed chickens only once, if the natural feed is plenty. This strategy would force the chicken to scavenge extensively and save some input.

In the case of fighting cocks, production was much more intensive. The owners usually took some specific daily care, including a special diet, training, and sun bedding. Routine activities also included a complex range of exercises that aimed to develop muscle and improve endurance. Most of the fighting cock owners have deep knowledge and make extensive use of empirical medicine and herbs.

The mean chicken flock size per household, breeding stock, effective population size and inbreeding rates in the five provinces of lower northern Thailand are shown in Table 3. The trend of flock composition generally followed the same pattern in all the provinces. The average flock size was about 38.2 birds with range between 32 and 44 birds per household ($P < 0.05$). Forty-nine percent of households kept 1-2 roosters and 86.5% kept 1-10 hens per household. According to the survey, almost respondents had their own breeding stock whilst

a few raisers depended on the other farms. The average breeding rooster-to-hen ratio was 1:3 per household. The mean average flock size and the sex ratio depended on the main purpose of the chickens. The breeding stock losses depended on mortality and predation. Chicken were mainly culled for home consumptions, as extra incomes and when they get a low performance. There were few records of household flock information for breeding purposes. Breeding stocks used were about 2-3 years old depending on their performance. The criteria for selection were, for males, high body weight, long leg, beauty and fighting ability (fighting cocks). The selection recommendations for females were good maternal ability, good behavior during incubation, and taking good care of her chicks.

The effective population size is a parameter used to estimate the rates of inbreeding and genetic drift; these parameters depend on the number of breeding individuals in an ideal population. Based on Wright's equation (Falconer and Mackay 1996), it is found that the effective population size (N_e) ranged from 7.56 to 11.40, with a mean of 9.17. The inbreeding rate per generation (ΔF) ranged between 4.38% and 6.54%, with a mean of 5.45% in five provinces. Many studies have been done about the production systems characterization of local indigenous chickens and fighting cocks in Southeast Asian countries (Alders et al. 2004; Henning et al. 2006; FAO 2009a; FAO 2009b; Cuc 2010), however, no information has been reported about the parameters of N_e and ΔF . Our present study therefore reports these calculated parameters for the first time.

The effective population size estimated in this study was 50% less than the actual population size and the estimated inbreeding rate was higher than the acceptable level of 1-2% per generation (Henson 1992). These results suggest that the breeding population was small and had a risk of inbreeding. Inbreeding causes a loss of genetic diversity which is often associated with a reduction of reproductive fitness and may lead to extinction (Frankham et al. 2002). The suggestion is that chicken owners should be informed to exchange or share their matured offspring among relatives, friends or others located farther than the scavenging distance to reduce inbreeding.

Furthermore, especially in fighting cocks, our study found that the most local chickens were crossbred with many imported exotic breeds. They were bred based upon fighting performance without genotypic conservation and scrutinized breeding programs. This breeding strategy opposed the concepts of sustainability which should incorporate both conservation and utilization from indigenous genetic resources. These circumstances will lead to the risk of losing the valuable genetic resources of Thai indigenous chickens.

Predation was the major cause of chicken death over the study area (63.5%), caused especially by dogs in the villages, followed by disease (22.5%). Newcastle disease and fowl cholera accounted for the most significant diseases in local chickens annually; which agreed with Choprakarn and Wongpichet (2008). The highest chicken death rate was observed during the season changes and 71% of the respondents reported occurrences of chicken disease outbreaks. When endemic disease occurred, some owners moved their chickens to the crop fields far from villages. This reduced the chicken mortality rate to some extent. In order to prevent disease, the local indigenous chickens of 66% of respondents had a vaccination of which 87.9% was done by the owner themselves (Table 4). Newcastle disease (86.3%) and infectious bronchitis vaccines (80%) were popular in five provinces of the study, followed by fowl pox (50.7%) and cholera vaccines (47.9%). Some owners could identify the differences between Newcastle disease and fowl cholera, and also pointed to the time of outbreaks.

As for sources of information about chicken husbandry and healthcare, it was found that the raiser mostly obtained these from friends or relatives (65%), followed by local government officers (46.5%), radio or television (49.5%), and magazine or newspapers (49.0%). A few farmers got information by using the internet (9%). Agricultural collaborations were found in some village (46.5%). Although, farmers could get extension from local government officers, but the officers were not frequently available. Health care support was not provided across all villages, especially in rural remote areas. Some owners used human medical supplies for their chickens. These included antibiotics and insecticides. Moreover, local herbs were very popular among owners to keep their chicken healthy. These herbs were used quite satisfactorily for disease prevention and parasite eradication.

Thailand experienced four major epidemic outbreaks of highly pathogenic avian influenza H5N1 (HPAI H5N1) between 2004 and 2006. Occasional cases were reported until late 2008 (Chantong and Kaneene 2011; DLD 2015). It was also a disease of economic importance that directly affects the poultry business of the country. It has been estimated that more than 65 million birds were destroyed to halt the outbreaks, and the government spent more than one billion Thai baht (THB) to compensate poultry owners. Most of the outbreaks reported in Thailand concerned the existence of traditional backyard chickens and free-range duck raising systems. However, nowadays, even though no information about HPAI H5N1 outbreaks in Thailand has been reported, the sustaining disease

surveillance and prevention are still strongly recommended (Wiratsudakul et al. 2014; DLD 2015).

The price of indigenous chicken sold for meat were between 50 and 100 THB per kilogram, depending on the season and special occasions. Chickens were sold live and the size varied from 1-kilogram body weight up to old parent stock. The most popular age of chicken sold for meat was between 5 and 8 months old (52.5%). Indigenous chicken owners sold their birds mainly to local traders at farm houses (52.5%). Some farmers preferred to sell chicken at local fresh markets in towns (26%) by themselves, as they could receive a higher price. The survey revealed that farmers did not sell indigenous chicken eggs for consumption.

Although the price of indigenous chicken was about 2-3 times higher than commercial broilers (Jaturasitha et al. 2008), it was very low when compared the price of fighting cocks. Cock fighting in Thailand is a flourishing industry, which includes the manufacture and supply of feed, medicine and equipment for arena operations and chicken handling (Safman 2010). The price of a fighting cock ranged from 400 to 10,000 THB per bird with prices between 500 and 2,000 THB found mainly in this observation. The market value of a fighting cock was established by the owner's reputation, fighting statistics and style in the pits. The desired age was between 9-12 months old (43.5%); the price tended to go down for younger fighting cocks. Almost all fighting cock owners did not prefer to sell their cocks at the arena (14%). Thus, their house was the most popular place for trading (65.5%); another selling style was delivery to customers by transportation companies.

Conclusion

- 1) This present study was the first effort to describe local indigenous chicken production systems in lower northern Thailand.
- 2) The occupations of Thai people in rural areas are related to agriculture or are predominantly farmers. The most of them are still poor and have a lack of education. Thus, local indigenous chickens are much more beneficial as food, extra income, and related with cultural activities for famers.
- 3) In terms of disease control and healthcare of chickens, the support from government and the knowledge of disease surveillance are still limited.

- 4) Moreover, the chicken crossbreeding with imported exotic breeds based upon owner preferences, without scrutinized breeding programs are very widespread.
- 5) Thai indigenous chicken is one of few agricultural products that have never faced a price problem.
- 6) Education about chicken genetics, local feed and farm management are necessary and should be promoted.

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Chapter 1

Introduction

Thai indigenous chicken has played a vital role in the Thai folk's livelihood for a long time. Thai indigenous chicken can adapt well to climate, disease, low quality feed and still reproduce regularly even with minimum management. Therefore, they can be seen throughout the local areas of Thailand. In relation to biodiversity, they seem to be a reservoir of genetic resources which could be a benefit for future use (Choprakarn and Wongpichet 2008; FAO 2009b; Dorji et al. 2011). Indigenous chicken meat has a unique taste with favorable toughness and less fat. Their market prices therefore two or three times higher than the commercial broiler chicken (Jaturasitha et al. 2008; Mekchay et al. 2014). Moreover, there were no cultural or religious taboos relating to consumption like pork or beef (Abdelqader et al. 2007).

In Thailand, indigenous chicken is not raised for consumption only but are also used for specific breeding as widely known fighting cock for chicken fighting sport. This game is very popular and enshrined in a long tradition more than a millennium ago (Baker and Phongpaichit 2005). Thus, local indigenous chicken are significant to food security, multiple social, economic and cultural of household in rural areas of Thailand (Choprakarn and Wongpichet 2008; FAO 2009b). Indigenous chicken populations in local areas are mainly selected and bred based on owner preferences without genotypic characterization due to poor understanding and lack of information. These breeding strategies oppose the concepts of sustainable development, and will lead to the threatening risk of losing genetic diversity (Danda et al. 2010; Charoensook et al 2013). The research works of local indigenous chicken genetic resources and production systems in Thailand are still limited. The most recent study of indigenous chicken genetics was done in the research station without surveys and sampling from the real local chicken population (Dorji et al. 2011; Mekchay et al. 2014). Furthermore, the survey in indigenous chicken production systems was mostly performed regarding the avian influenza outbreaks with a little information in relation to the local indigenous chicken husbandry, management, trading and socioeconomic status of households (FAO 2009b; Wiratsudakul et al. 2014).

The first step to be undertaken for the objective of identifying threats and opportunities for sustainable holistic development of local indigenous chicken is the

characterization of production systems (Mtileni et al. 2009; Danda et al. 2010). It should be done under on-farm conditions rather than on-station experimental studies (Abdelqader et al. 2007). Therefore, this study aims to characterize local chicken production systems in lower northern Thailand by assessing the husbandry, management and trading systems, as well as to assess the genetic diversity of Thai indigenous chicken. This investigation will benefit the conservation and utilization of local indigenous chicken resources in Thailand.

Chapter 2

Methodology

2.1 Scope of the study

The study was conducted between 2012 and 2013 in five provinces of lower northern Thailand. The sampling areas were the provinces of Phitsanulok (16°49'N 100°15'E), Phichit (16°26'38"N 100°20'52"E), Sukhothai (17°0'1"N 99°49'35"E), Kamphang Phet (16°33'29"N 99°30'40"E) and Uttaradit (17°37'47"N 100°5'48"E). In each province, two districts (*am-phoe*) with four subdistricts (*tam-bon*) within each district were chosen for surveys. We used a random sampling method to select households for interviews by picking from a list. Forty respondents in each province were interviewed. A total of 200 households in 48 villages were included.

2.2 Data collection

Data was collected through direct interviews and observations with individual local indigenous chicken raisers. Qualitative data were obtained through group discussions with chicken raisers and observation, while quantitative data was obtained by interview. The interviews were conducted using a checklist and structured questionnaire, which was managed at the chicken raiser's house with the assistance of local administrative staff and local officers from the Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives, Thailand. Information was collected on the socio-economic status of respondents, chicken husbandry management, chicken types, flock structure, farming support services and local chicken marketing system. Visual assessment of the local chicken phenotype was undertaken for morphological description. Chicken blood samples from roosters and hens were taken for the next genetic diversity study (data was not shown in this study).

2.3 Data analysis

Both the qualitative and quantitative variables collected in this study were analyzed using frequency analysis and descriptive statistics (SPSS 1999). Significant differences between means were further determined using the Duncan's Multiple Range Test; the

level of significance was set at 5%. The effect of the province on the different variables was estimated using the model below:

$$Y_{ijk} = \mu + P_i + G_j + e_{ijk}$$

where Y_{ij} is the dependent variable, μ is the overall mean, P_i is the effect of provinces (i = Phitsanulok, Phichit, Sukhothai, Kamphang Phet and Uttaradit), G_j is the gender of the household head effect, and e_{ijk} is the random residual effect.

We considered the flocks in each village in the five provinces as different breeding populations. Due to small populations and without suitable breeding programs, there may have been the possibility of inbreeding. Thus, we calculated the inbreeding rate and effective population size per breeding population by using Wright's equation (Falconer and Mackay 1996) as:

$$N_e = (4 \times N_m \times N_f) / (N_m + N_f),$$

the rate of change in inbreeding per generation was calculated as:

$$\Delta F = 1 / (2 N_e)$$

where N_e is the effective population size, N_m and N_f are the number of breeding cocks and hens scavenging together and mating freely, and ΔF is the inbreeding rate, respectively.

Chapter 3

Results and Discussions

3.1 Characteristic and socio-economic status of respondents

The background and socio-economic status of respondents from this study are shown in Table 1. The survey indicated that indigenous chicken are widely raised in lower northern Thailand. Majority of respondents were men (87%), within the age range of 18 - 75, with mean age of 49 years. Primary school was the main level of education (65%). The proportion of respondents that had a raising experience of more than 20 years was 36.5%. The mean family size of respondents was 4 and the main source of livelihood was rice farming (46%), especially in PL province (70%). Motorcycles were the most popular method of household transport and tractors were occasionally used for rice and crop farming (Table 1). These findings indicate that Thai people in rural areas are predominantly farmers or their occupations are related one way or another to agriculture. Furthermore, in term of socio-economics, indigenous chickens are much more beneficial as they are food for farmer, an investment at home, and can be used for cultural and religious activities. The present result conformed to the previous study of Choprakarn and Wongpichet (2008) and FAO (2009b).

3.2 Chicken husbandry systems and management

The husbandry systems and management of local chickens in lower northern Thailand are presented in Table 3.2. The husbandry systems found from this study could be classified into three categories based on the level of management as free-range systems (18%), intensive systems (6.5%) and semi-intensive systems (75.5 %). If chickens were left to scavenge for feed resources with no supplementation, we classified it as a free-range system. In the case that chickens were permanently confined and supplied with balanced feed and healthcare, we classified this as an intensive system. Most local indigenous chicken husbandry systems in lower northern Thailand were semi-intensive systems, a combination of both systems mentioned above.

Table 3.1 Characteristic and socio-economic statuses of respondents from five provinces in lower northern Thailand

Parameters	Provinces ¹					Mean
	PL	PC	ST	KP	UT	
Gender of respondents (%)						
Male	77.5	95.0	87.5	97.5	77.5	87.0
Female	22.5	5.0	12.5	2.5	22.5	13.0
Age (years)*	52.09±0.6 ^a	42.88±0.5 ^c	49.83±0.4 ^{ab}	47.08±0.6 ^b	49.86±0.4 ^{ab}	49.41±0.5
Education level (%)						
Illiterate	-	2.5	-	2.5	2.5	1.5
Primary school	72.5	67.5	67.5	67.5	50.0	65.0
Middle school	15.0	7.5	15.0	12.5	5.0	11.0
High school	5.0	10.0	10.0	7.5	20.0	10.5
Vocational certificate	5.0	10.0	2.5	2.5	15.0	7.0
Bachelor degree/higher	2.5	2.5	5	7.5	7.5	5.0
Main occupation (%)						
Rice farming	70.0	50.0	30.0	47.5	32.5	46.0
Crop farming	-	-	7.5	35.0	25.0	13.5
Horticulture	2.5	7.5	10.0	-	10.0	6.0
Livestock production	2.5	7.5	-	-	10.0	4.0
Formal employment	-	5.0	17.5	7.5	10.0	8.0
Informal employment	20.0	22.5	30.0	5.0	5.0	16.5
Tradesman	-	7.5	5.0	5.0	7.5	5.0
Chicken raising experiences (%)						
Less than 5 years	25.0	25.0	35.0	22.5	40.0	29.5
5 to 9 years	5.0	5.0	15.0	5.0	5.0	7.0
10 to 19 years	42.5	20.0	20.0	27.5	25.0	27.0
More than 20 years	27.5	50.0	30.0	45.0	30.0	36.5
Household vehicles (%)						
Bicycle	62.5	62.5	75.0	70.0	47.5	63.5
Motorcycle	90.0	97.5	92.5	97.5	100.0	95.5
Pickup truck	50.0	32.5	47.5	40.0	50.0	44.0
Tractor	52.5	10.0	40.0	65.0	27.5	39.0
Family size (no.)*	4.20±0.3 ^a	3.90±0.1 ^b	4.05±0.2 ^a	4.10±0.4 ^a	3.83±0.2 ^b	4.02±0.2

¹ PL = Phitsanulok, PC = Phichit, ST = Sukhothai, KP = Kamphaeng Phet, UT = Uttaradit

* Mean followed by different letters in the same row are statistically different ($P < 0.05$)

For this system, chickens were partially confined and supplemented with balanced ration feeds and healthcare, they were mainly housed at night and were allowed to scavenge within homesteads or run around for natural feed in the day time. The most common natural feed of local chickens were earthworms, worms, termites, insects and plant leaves. The husbandry system classification was similar to the previous studies in Thailand (FAO 2009b), Lao (Alders et al. 2004), Cambodia (FAO 2009a), Myanmar (Henning et al. 2006), Vietnam (Cuc 2010), Philippines (Cabarles Jr. 2013) and other developing countries in Asia (Bett et al. 2014). However, the percentage and ratio of each category were different.

Virtually all the local chicken raisers provided supplementary feeding for their chickens. However, the type and amount of feed depended on the crops grown as well as the geosocial makeup of each area. The majority of farmers who practiced supplementary feeding used paddy rice, corn grain, commercial feed (chicken and pig feed), and others, such as broken rice, rice bran, coconut and noodles, depending on availability (Table 2). According to the observation, the amount of feed given was generally not enough for the chicken's requirements, especially during the crop growing and harvesting seasons, as farmers went to the fields in the early mornings and returned in the late evenings. Therefore, this result suggests that it might be better to feed chickens only once, if the natural feed is plenty. This strategy would force the chicken to scavenge extensively and save some input (Choprakarn and Wongpichet 2008). In the case of fighting cocks, production was much more intensive. The owners usually took some specific daily care, including a special diet, training, and sun bedding. Routine activities also included a complex range of exercises that aimed to develop muscle and improve endurance. Most of the fighting cock owners have deep knowledge and make extensive use of empirical medicine and herbs.

Indigenous chickens were the predominant population and presented in the main poultry population sector of Thailand. As a part of agricultural lifestyle, they are raised in villages for many purposes (Chantong and Kaneene 2011; Wiratsudakul et al. 2014). The reasons for indigenous chicken raising in this study were cash income (88%), household consumption (77%), hobbies (60%), whilst very few were sacrificial (3%). The main purposes of local indigenous chicken found in this survey were for fighting (78%), followed by backyard scavenging (17%); with the beauty contest for indigenous chickens being the least (3.5%) and only found in some provinces (Table 3.2).

Table 3.2 Local indigenous chicken husbandry systems and management

Parameters	Provinces ¹					Mean
	PL	PC	ST	KP	UT	
Husbandry systems (%)						
Free-range system	17.5	7.5	2.5	32.5	30.0	18.0
Semi-intensive system	67.5	90.0	87.5	67.5	65.0	75.5
Intensive system	15.0	2.5	10.0	-	5.0	6.5
Feed and feeding (%) ²						
Free scavenging	80.0	75.0	90.0	80.0	92.5	83.5
Household residual	82.5	57.5	85.0	85.0	92.5	80.5
Commercial feed	42.5	52.5	62.5	47.5	52.5	51.5
Paddy rice	87.5	97.5	97.5	95.0	90.0	93.5
Corn grain	35.0	35.0	80.0	47.5	47.5	49.0
Others	15.0	15.0	30.0	25.0	20.0	22.0
Reason of raising (%) ²						
Consumption	65.0	65.0	87.5	80.0	87.5	77.0
Cash income	92.5	95.0	90.0	97.5	65.0	88.0
Hobbies	67.5	62.5	55.0	60.0	55.0	60.0
Traditional ceremonies	10.0	-	-	-	5.0	3.0
Main purpose of chicken (%)						
Fighting	72.5	90.0	87.5	92.5	65.5	78.0
Beauty contest	15.0	2.5	-	-	7.5	5.0
Food	12.5	7.5	12.5	7.5	25.0	17.0

¹ PL = Phitsanulok, PC = Phichit, ST = Sukhothai, KP = Kamphaeng Phet, UT = Uttaradit

² Respondent can choose more than one choice

3.3 Household flock characteristics and mating systems

The mean chicken flock size per household, breeding stock, effective population size and inbreeding rates in the five provinces of lower northern Thailand are shown in Table 3.3. The trend of flock composition generally followed the same pattern in all the provinces. The average flock size was about 38.2 birds with range between 32 and 44 birds per household ($P < 0.05$). Forty-nine percent of households kept 1-2 roosters and 86.5% kept 1-10 hens per household. According to the survey, almost respondents had

their own breeding stock whilst a few raisers depended on the other farms. The average breeding rooster-to-hen ratio was 1:3 per household. The mean average flock size and the sex ratio depended on the main purpose of the chickens. This result was comparable to FAO (2009b) and other Southeast Asian countries (Alders et al. 2004; Henning et al. 2006; FAO 2009a; Cuc 2010). The breeding stock losses depended on mortality and predation. Chicken were mainly culled for home consumptions, as extra incomes and when they get a low performance. There were few records of household flock information for breeding purposes. Breeding stocks used were about 2-3 years old depending on their performance. The criteria for selection were, for males, high body weight, long leg, beauty and fighting ability (fighting cocks). The selection recommendations for females were good maternal ability, good behavior during incubation, and taking good care of her chicks.

The effective population size is a parameter used to estimate the rates of inbreeding and genetic drift; these parameters depend on the number of breeding individuals in an ideal population (Abdelqader et al. 2007). Based on Wright's equation (Falconer and Mackay 1996), it is found that the effective population size (N_e) ranged from 7.56 to 11.40, with a mean of 9.17. The inbreeding rate per generation (ΔF) ranged between 4.38% and 6.54%, with a mean of 5.45% in five provinces (Table 3). Many studies have been done about the production systems characterization of local indigenous chickens and fighting cocks in Southeast Asian countries (Alders et al. 2004; Henning et al. 2006; FAO 2009a; FAO 2009b; Cuc 2010), however, no information has been reported about the parameters of N_e and ΔF . Our present study therefore reports these calculated parameters for the first time. The effective population size estimated in this study was 50% less than the actual population size and the estimated inbreeding rate was higher than the acceptable level of 1-2% per generation (Henson 1992). These results suggest that the breeding population was small and had a risk of inbreeding. Inbreeding causes a loss of genetic diversity which is often associated with a reduction of reproductive fitness and may lead to extinction (Frankham et al. 2002). The suggestion is that chicken owners should be informed to exchange or share their matured offspring among relatives, friends or others located farther than the scavenging distance to reduce inbreeding (Okeno et al. 2013).

Table 3.3 Characteristic of breeding stocks, effective population sizes and inbreeding rates at household levels of local indigenous chickens

Parameters	Provinces ¹					Mean
	PL	PC	ST	KP	UT	
Number of rooster (%)						
0	2.5	5.0	-	2.5	-	2.0
1-2	32.5	57.5	55.0	55.0	45.0	49.0
3-4	15.0	17.5	22.5	30.0	37.5	24.5
5-7	7.5	17.5	15.0	12.5	12.5	13.0
8-10	37.5	2.5	2.5	-	-	8.5
>10	5.0	-	5.0	-	5.0	3.0
Average rooster (no.)*	2.78±0.3 ^a	2.75±0.2 ^a	3.43±0.3 ^b	2.75±0.2 ^a	3.63±0.1 ^b	3.07±0.1
Number of hen (%)						
0	-	-	5.0	2.5	-	1.5
1-5	55.0	52.5	47.5	37.5	22.5	43.0
6-10	30.0	40.0	40.0	57.5	50.0	43.5
11-20	15.0	7.5	2.5	2.5	17.5	9.0
>20	-	-	5.0	-	10.0	3.0
Average hen (no.)*	6.50±0.4 ^a	6.05±0.5 ^a	13.20±0.7 ^b	6.28±0.4 ^a	13.28±0.6 ^b	9.06±0.1
Flock size (%)						
1-20	32.5	20.0	20.0	22.5	22.5	23.5
21-50	35.0	45.0	40.0	25.0	42.5	37.5
51-100	25.0	27.5	32.5	42.5	17.5	29.0
>100	7.5	7.5	7.5	10.0	17.5	10.0
Average size (no.)*	39.95±1.6 ^b	38.45±1.5 ^b	44.23±1.4 ^c	32.10±1.6 ^a	40.40±1.2 ^b	39.03±0.5
N_e ²	7.79	7.56	10.89	7.65	11.40	9.17
F ³ (%)	6.42	6.11	4.59	6.54	4.38	5.45

¹ PL = Phitsanulok, PC = Phichit, ST = Sukhothai, KP = Kamphaeng Phet, UT = Uttaradit

² N_e = effective population size per breeding population at household level

³ F = inbreeding rate per generation at household level

⁴ Respondent can choose more than one choice

* Mean followed by different letters in the same row are statistically different ($P < 0.05$)

Furthermore, especially in fighting cocks, our study found that the most local chickens were crossbred with many imported exotic breeds. They were bred based upon fighting performance without genotypic conservation and scrutinized breeding programs. This breeding strategy opposed the concepts of sustainability which should incorporate both conservation and utilization from indigenous genetic resources (Charoensook 2011; FAO 2014). These circumstances will lead to the risk of losing the valuable genetic resources of Thai indigenous chickens.

3.4 Chicken healthcare and the provision of extension services

The results of chicken disease control and the provision of extension services are shown in Table 3.4. Predation was the major cause of chicken death over the study area (63.5%), caused especially by dogs in the villages, followed by disease (22.5%). Newcastle disease and fowl cholera accounted for the most significant diseases in local chickens annually; which agreed with Choprakarn and Wongpichet (2008). The highest chicken death rate was observed during the season changes and 71% of the respondents reported occurrences of chicken disease outbreaks. When endemic disease occurred, some owners moved their chickens to the crop fields far from villages. This reduced the chicken mortality rate to some extent. In order to prevent disease, the local indigenous chickens of 66% of respondents had a vaccination of which 87.9% was done by the owner themselves (Table 4). Newcastle disease (86.3%) and infectious bronchitis vaccines (80%) were popular in five provinces of the study, followed by fowl pox (50.7%) and cholera vaccines (47.9%). Some owners could identify the differences between Newcastle disease and fowl cholera, and also pointed to the time of outbreaks.

As for sources of information about chicken husbandry and healthcare, it was found that the raiser mostly obtained these from friends or relatives (65%), followed by local government officers (46.5%), radio or television (49.5%), and magazine or newspapers (49.0%). A few farmers got information by using the internet (9%). Agricultural collaborations were found in some village (46.5%). Although, farmers could get extension from local government officers, but the officers were not frequently available. Health care support was not provided across all villages, especially in rural remote areas. Some owners used human medical supplies for their chickens. These included antibiotics and insecticides. Moreover, local herbs were very popular among

owners to keep their chicken healthy. These herbs were used quite satisfactorily for disease prevention and parasite eradication.

Table 3.4 Chicken disease control and the provision of extension services

Parameters	Provinces ¹					Mean
	PL	PC	ST	KP	UT	
Disease outbreak (%)						
Yes	67.5	85.0	70.0	72.5	60.0	71.0
No	32.5	15.0	30.0	27.5	40.0	29.0
Chicken vaccination (%)						
Yes	62.5	65.0	65.0	67.5	70.0	66.0
No	37.5	35.0	35.0	32.5	30.0	34.0
Vaccinator (%)						
Owner	72.0	96.2	92.8	88.9	89.3	87.9
Officer	28.0	3.8	7.2	11.1	10.7	12.1
Type of vaccines (%) ²						
Newcastle disease	84.0	62.0	96.2	92.6	92.9	86.3
Infectious bronchitis	68.0	77.0	84.6	83.3	87.0	80.0
Fowl pox	36.0	57.7	57.7	54.2	47.8	50.7
Fowl cholera	44.0	46.2	38.5	54.2	56.5	47.9
Infectious coryza	4.0	11.5	15.4	29.2	34.8	19.0
Combined vaccines	20.0	23.1	15.4	16.7	52.2	25.5
Agricultural collaboration (%)						
Yes	60.0	37.5	57.5	42.5	35.0	46.5
No	40.0	62.5	42.5	57.5	65.0	53.5
Source of information (%) ²						
Local officer	60.0	37.5	67.5	67.5	47.5	51.0
Radio/TV	40.0	40.0	42.5	50.0	75.0	49.5
Magazine/Newspaper	35.0	45.0	52.5	42.5	70.0	49.0
Friend/Relative	65.0	57.5	45.0	77.5	80.0	65.0
Internet	2.5	2.5	12.5	12.5	15.0	9.0

¹ PL = Phitsanulok, PC = Phichit, ST = Sukhothai, KP = Kamphaeng Phet, UT = Uttaradit

² Respondent can choose more than one choice

Thailand experienced four major epidemic outbreaks of highly pathogenic avian influenza H5N1 (HPAI H5N1) between 2004 and 2006. Occasional cases were reported until late 2008 (Chantong and Kaneene 2011; DLD 2015). It was also a disease of economic importance that directly affects the poultry business of the country. It has been estimated that more than 65 million birds were destroyed to halt the outbreaks, and the government spent more than one billion Thai baht (THB) to compensate poultry owners. Most of the outbreaks reported in Thailand concerned the existence of traditional backyard chickens and free-range duck raising systems (FAO 2009b). However, nowadays, even though no information about HPAI H5N1 outbreaks in Thailand has been reported, the sustaining disease surveillance and prevention are still strongly recommended (DLD 2015).

3.5 Marketing systems of indigenous chickens and fighting cocks

The price of indigenous chicken sold for meat were between 50 and 100 THB per kilogram, depending on the season and special occasions. Chickens were sold live and the size varied from 1 kilogram body weight up to old parent stock. The most popular age of chicken sold for meat was between 5 and 8 months old (52.5%). Indigenous chicken owners sold their birds mainly to local traders at farm houses (52.5%). Some farmers preferred to sell chicken at local fresh markets in towns (26%) by themselves, as they could receive a higher price. The survey revealed that farmers did not sell indigenous chicken eggs for consumption; this was in agreement with FAO (2009b).

Although the price of indigenous chicken was about 2-3 times higher than commercial broilers (Jaturasitha et al. 2008), it was very low when compared the price of fighting cocks. Cock fighting in Thailand is a flourishing industry, which includes the manufacture and supply of feed, medicine and equipment for arena operations and chicken handling. The price of a fighting cock ranged from 400 to 10,000 THB per bird with prices between 500 and 2,000 THB found mainly in this observation. The market value of a fighting cock was established by the owner's reputation, fighting statistics and style in the pits. The desired age was between 9-12 months old (43.5%); the price tended to go down for younger fighting cocks. Almost all fighting cock owners did not prefer to sell their cocks at the arena (14%). Thus, their house was the most popular place for trading (65.5%); another selling style was delivery to customers by transportation companies (Table 3.5)

Table 3.5 Local indigenous chickens and fighting cocks trading systems in lower northern Thailand (Respondent can choose more than one choice)

Parameters	Provinces ¹					Mean
	PL	PC	ST	KP	UT	
Trading for consumptions						
Age of chickens (%)						
3 to 4 month	27.5	10.0	5.0	15.0	25.0	16.5
5 to 8 month	57.5	67.5	67.5	42.5	27.5	52.5
9 to 12 month	5.0	2.5	5.0	2.5	2.5	3.5
Price per kilograms (%)						
50-70 THB	65.0	40.0	20.0	7.5	7.5	28.0
71-90 THB	17.5	40.0	45.0	35.0	22.5	32.0
> 90 THB	2.5	-	7.5	17.5	25.0	10.5
Trading places (%)						
Owner's house	75.0	50.0	62.5	52.5	22.5	52.5
Fresh market in town	25.0	30.0	22.5	15.0	37.5	26.0
Trading for cockfighting						
Age of chickens (%)						
3 to 4 month	2.5	-	-	5.0	2.5	2.0
5 to 8 month	17.5	20.0	17.5	25.0	15.0	19.0
9 to 12 month	30.0	62.5	55.0	52.5	17.5	43.5
> 12 month	15.0	2.5	2.5	5.0	2.5	5.5
Price per a chicken (%)						
< 500 THB	27.5	12.5	17.5	22.5	5.0	17.0
500-1,000 THB	30.0	47.5	42.5	35.0	17.5	34.5
1,001-2,000 THB	40.0	50.0	42.5	35.0	20.0	37.5
2,001-3,000 THB	10.0	12.5	17.5	37.5	10.0	17.5
3,001-4,000 THB	10.0	12.5	12.5	17.5	7.5	12.0
4,001-5000 THB	15.0	7.5	2.5	10.0	10.0	10.0
> 5,000 THB	10.0	22.5	22.5	40.0	20.0	23.0
Trading places (%)						
Owner's house	60.0	77.5	70.0	85.0	35.0	65.5
Cockfighting arenas	15.0	7.5	17.5	15.0	15.0	14.0
Others	2.5	5.0	5.0	2.5	5.0	4.0

¹ PL = Phitsanulok, PC = Phichit, ST = Sukhothai, KP = Kamphaeng Phet, UT = Uttaradit

Conclusions

Understanding of the household socio-economics as well as the husbandry systems and management of local indigenous chickens are necessary for the development of sustainable production and utilization. This present study was the first effort to describe local indigenous chicken production systems in lower northern Thailand. The occupations of Thai people in rural areas are related to agriculture or are predominantly farmers. The most of them are still poor and have a lack of education. Thus, local indigenous chickens are much more beneficial as food, extra income, and related with cultural activities for farmers. In terms of disease control and healthcare of chickens, the support from government and the knowledge of disease surveillance are still limited. Moreover, the chicken crossbreeding with imported exotic breeds based upon owner preferences, without scrutinized breeding programs are very widespread. Thai indigenous chicken is one of few agricultural products that have never faced a price problem. Historically, they have had a high demand whilst the supply has always remained low. Despite this, most smallholders have not increased their production, due to a lack of information. Therefore, education about chicken genetics, local feed and farm management are necessary and should be promoted. The results from this study will be helpful to government institutions and development agencies for devising policies and planning sustainable development projects in the future.

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Outputs

- 1) Submitted a **research paper** in English at KHON KAEN AGRICULTURE JOURNAL.

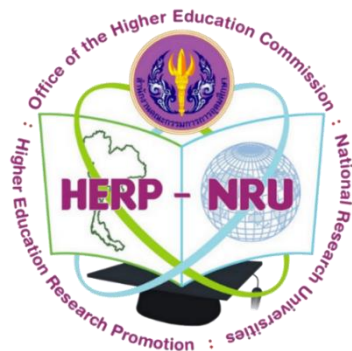
- 2) **Book publication** (Head of Editor and Author) in English-Japanese language, title “**Indigenous Chickens and Thais Way of Life in Phitsanulok Province – ピサヌローク県のタイ人の生活と地鶏**”, published in hard copy by Naresuan University and e-Book in ResearchGate Website (https://www.researchgate.net/profile/Rangsun_Charoensook)

- 3) To make the sustainable research study, it is necessary to have a collaboration with local organizations that have many experts to achieve the goal of development. In 2014, the group of researchers from three major educational institutes, led by *Naresuan University* accompanying with *Pibulsongkram Rajabhat University* and *Rajamangala University of Technology Lanna, Phitsanulok*, founded **Phitsanulok Indigenous Chicken Research Network (PICRN)**. The purposes of the establishment are to study on the biodiversity and production system of indigenous chickens in Phitsanulok; and to integrate various expertise of each organization to do **Academic Service Projects** that educate the local people.

Appendix

Research Paper

Academic Service Projects



กิจกรรมงานวิจัยและบริการวิชาการ 2557-ปัจจุบัน

ภาคีเครือข่ายวิจัยไก่พื้นเมืองพิษณุโลก

Phitsanulok Indigenous Chicken Research Network (PICRN)



ประวัติความเป็นมาของโครงการวิจัยฯ และ ภาคเครือข่ายวิจัยไก่พื้นเมือง พิษณุโลก

Phitsanulok Indigenous Chicken Research Network (PICRN)



จังหวัดพิษณุโลก เป็นแหล่งกำเนิดไก่พันธุ์พื้นเมืองเลื่องลือทางขาว อีกทั้งยังมีไก่พื้นเมืองสายพันธุ์อื่น กระจายอยู่ทั่วไปตามชนบท เนื่องด้วยลักษณะทางภูมิสังคมที่หลากหลาย จากพื้นที่ราบลุ่มไปจนถึงที่ราบสูงและเทือกเขา ก่อให้เกิดความหลากหลายทางชีวภาพทั้งในด้านพันธุกรรม ความหลากหลายของพืชอาหารสัตว์ รวมไปถึงภูมิปัญญาท้องถิ่น ตลอดจนวิถีชีวิตของผู้เลี้ยงไก่พื้นเมือง ซึ่งสิ่งเหล่านี้ควรค่าแก่การศึกษา อันจะนำมาสู่พื้นฐานองค์ความรู้ด้านต่างๆ สำหรับอนุรักษ์และใช้ประโยชน์จากทรัพยากรความหลากหลายของชีวภาพของจังหวัดพิษณุโลกและจังหวัดข้างเคียงในเขตภาคเหนือตอนล่าง

เพื่อให้การศึกษาวิจัยดำเนินไปอย่างมั่นคง ความร่วมมือกันจากหลากหลายหน่วยงานในท้องถิ่นที่มีความเชี่ยวชาญที่แตกต่างกันในหลากหลายศาสตร์ จึงเป็นเสมือนพลังสำคัญในการขับเคลื่อนงานวิจัย ให้บรรลุไปสู่วัตถุประสงค์ในการพัฒนาที่ยั่งยืน ด้วยเหตุนี้สถาบันอุดมศึกษาหลัก 3 สถาบันในจังหวัดพิษณุโลก อันได้แก่ มหาวิทยาลัยนเรศวร มหาวิทยาลัยราชภัฏพิบูลสงคราม และมหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา พิษณุโลก จึงได้มีการพัฒนาความร่วมมือสร้างแผนงานวิจัยเพื่อเชื่อมโยงความเชี่ยวชาญของแต่ละสถาบันเข้ามาในกรอบการวิจัยและเกิดการบูรณาการร่วมกัน จึงเป็นที่มาของกลุ่มวิจัยความหลากหลายทางชีวภาพของไก่พื้นเมือง วิถีชีวิตและภูมิปัญญาในการเลี้ยงไก่พื้นเมืองไทยในจังหวัดพิษณุโลก

Semi-Intensive Systems



Free-Range Systems



Intensive Systems



Fighting Cock Production



Fighting Cock Production



Fighting Cock Production



Fighting Cock Production





Biodiversity of local indigenous chickens



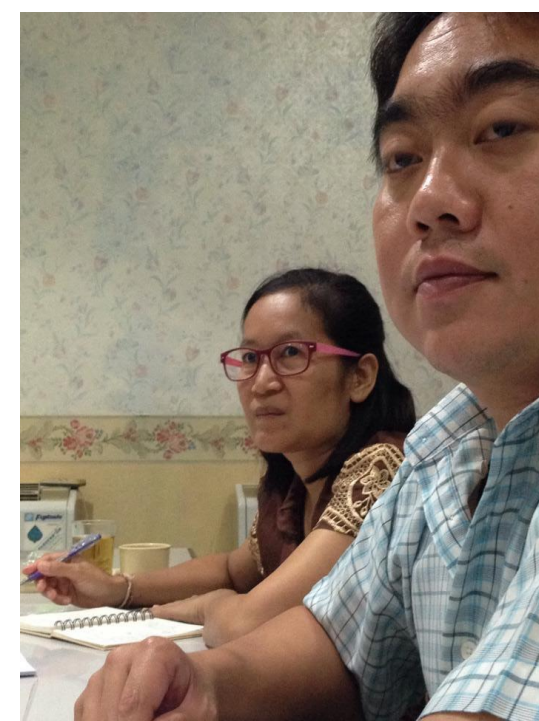
โพสต์ของ Punnares

 Punnares Rattanapradit ได้เพิ่มรูปภาพใหม่ 6 ภาพ — กับ Skorn Koonawootrittriron และคนอื่นๆ อีก 5 คน
30 สิงหาคม ค.ศ. 2014 · 

การประชุมระดมความคิด "แนวทางการอนุรักษ์พันธุ์ไก่พื้นเมืองไทยในเขตภาคเหนือตอนล่าง" ได้รับเกียรติจาก ศ.ดร.วิสุทธิ ไบไม้ นสพ.นิสิต ตั้งตระการพงษ์ ผศ.ดร.ศกร คุณวุฒิมุขิธรณ และคณาจารย์จาก 3 มหาวิทยาลัย ได้แก่ ม.นเรศวร มทร.ล้านนา พิษณุโลก และ มรภ.พิษณุโลก

50 ความคิดเห็น 3 รายการ 1 แชร์

 ถูกใจ  แสดงความคิดเห็น  แชร์



โครงการวิจัย ปี 2557-2560



1) มหาวิทยาลัยราชภัฏพิบูลสงคราม “การศึกษาความหลากหลายของวิถีชีวิตและภูมิปัญญาการเลี้ยงไก่พื้นเมืองไทยในจังหวัดพิษณุโลก”

2) มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนาพิษณุโลก “การศึกษาความหลากหลายและลักษณะตามอุดมทัศน์ของสายพันธุ์ไก่พื้นเมืองไทยในจังหวัดพิษณุโลก”

3) มหาวิทยาลัยนเรศวร “การวิเคราะห์ความหลากหลายทางพันธุกรรมและความสัมพันธ์กับลักษณะสีขนของไก่พื้นเมืองไทยในจังหวัดพิษณุโลก”

Methodology

- Survey Research
 - Questionnaire
 - In-depth Interview
- Purposive Sampling (TIC farmers)
 - 800 from 49,609 households (Yamane, 1967)
 - 201 in Nakhon Thai (NT)
 - 199 in Bang Krathum (BK)
 - 217 in Muang (PK)
 - 178 in Chattrakarn (CT)
- Statistical analysis
 - Mean, Percentage etc.



Methodology

- Survey Research
 - Questionnaire
 - In-depth Interview



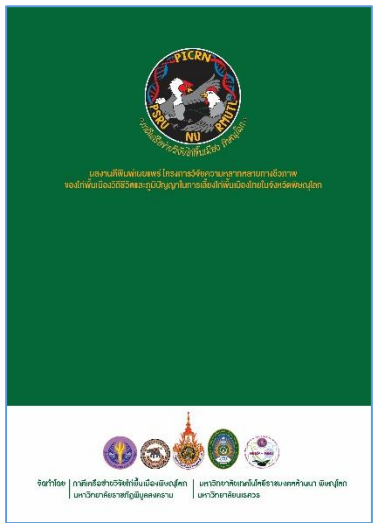
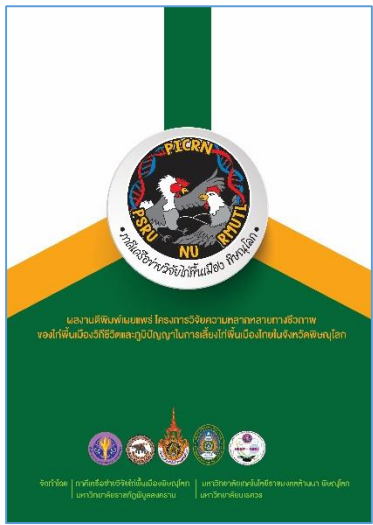
Methodology

- Survey Research
 - Questionnaire



Methodology





5.1 ปุณเรศวร รัตนประดิษฐ์ สุภาวดี แหยมคง นรกมล เล่าห์รอดพันธ์ ประภาศิริ ใจผ่อง รังสรรค์ เจริญสุข สนธยา นุ่มท้วม ทศพร อินเจริญ นววรรณพร จิรารัตน์ อุษณีย์ภรณ์ สร้อยเพชร. 2559. ความแตกต่างของวิถีชีวิตและภูมิปัญญาของเกษตรกรผู้เลี้ยงไก่พื้นเมืองไทยในพื้นที่จังหวัดพิษณุโลก. วารสารแก่นเกษตร. 44 (ฉบับพิเศษ 2): 255-262.

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5.3 นววรรณพร จิรารัตน์ อุษณีย์ภรณ์ สร้อยเพชร นิธิมา เฉลิมแสน ปุณเรศวร รัตนประดิษฐ์ สุภาวดี แหยมคง นรกมล เล่าห์รอดพันธ์ ประภาศิริ ใจผ่อง รังสรรค์ เจริญสุข สนธยา นุ่มท้วม ทศพร อินเจริญ. 2559. ความหลากหลายของลักษณะภายนอกของไก่พื้นเมืองไทยในจังหวัดพิษณุโลก. วารสารแก่นเกษตร. 44 (ฉบับพิเศษ 2): 398-404.

5.4 สุภาวดี แหยมคง ปุณเรศวร รัตนประดิษฐ์ นรกมล เล่าห์ รอดพันธ์ ประภาศิริ ใจผ่อง มาริษา จันทอง กมลรัตน์ ศรีอินคำ กุลสุวัชร ทองจันทร์มณี. 2559. วิถีชีวิตและภูมิปัญญาของเกษตรกรผู้เลี้ยงไก่พื้นเมืองในอำเภอชาติตระการ และอำเภอเมืองจังหวัดพิษณุโลก. วารสารวิชาการ สาขามนุษยศาสตร์และสังคมศาสตร์ มหาวิทยาลัยราชภัฏบุรีรัมย์ (ฉบับพิเศษ): 511-518.

5.5 อุษณีย์ภรณ์ สร้อยเพชร นววรรณพร จิรารัตน์ นิธิมา เฉลิมแสน สุภาวดี แหยมคง ปุณเรศวร รัตนประดิษฐ์ นรกมล เล่าห์รอดพันธ์ ประภาศิริ ใจผ่อง รังสรรค์ เจริญสุข สนธยา นุ่มท้วม ทศพร อินเจริญ นพณัฐพิทักษ์ สิงคำ และเอกชัย ย้อยสกุล. 2560. ความหลากหลายของไก่เหลืองหางขาวตามลักษณะอุดมทัศน์ในจังหวัดพิษณุโลก. วารสารแก่นเกษตร. 45 (ฉบับพิเศษ 1): 684-689.

5.6 รังสรรค์ เจริญสุข อรรถชัย เขียวศรี ทศพร อินเจริญ สนธยา นุ่มท้วม อุษณีย์ภรณ์ สร้อยเพชร นววรรณพร จิรารัตน์ ปุณเรศวร รัตนประดิษฐ์ สุภาวดี แหยมคง และนรกมล เล่าห์รอดพันธ์. 2560. ความหลากหลายทางพันธุกรรมของยีน MC1R ในไก่พื้นเมือง ไก่กระดุกดำ ไก่เล็กฮอร์นขาว และไก่โรดอร์แลนแดง. วารสารแก่นเกษตร. 45 (ฉบับพิเศษ 1): 758-764.

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5.10 นววรรณพร จิรารัตน์ อุษณีย์ภรณ์ สร้อยเพชร นิธิมา เฉลิมแสน นรกมล เล่าห์รอดพันธ์ ปุณเรศวร รัตนประดิษฐ์ สุภาวดี แหยมคง รังสรรค์ เจริญสุข สนธยา นุ่มท้วม ทศพร อินเจริญ สิงหา วังมูล และจิตนภา แก้วจา. 2559. ความหลากหลายของลักษณะภายนอกที่ปรากฏในสายพันธุ์ไก่พื้นเมืองในอำเภอบางกระทุ่มและอำเภอนครไทย จังหวัดพิษณุโลก. การนำเสนอผลงานวิจัย ภาคโปสเตอร์ ในการประชุมใหญ่โครงการส่งเสริมการวิจัยในอุดมศึกษา ครั้งที่ 4 The fourth Higher Education Research Promotion Congress (HERP CONGRESS IV). 8 – 10 กุมภาพันธ์ 2559. มหาวิทยาลัยราชภัฏอุบลราชธานี จังหวัดอุบลราชธานี.

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สมุนไพรกับไก่พื้นเมือง



การใช้สมุนไพรในไก่พื้นเมือง
ในพื้นที่จังหวัดพิษณุโลก

โครงการความหลากหลายทางชีวภาพ:
การศึกษาความหลากหลายของวิถีชีวิตและภูมิปัญญาการเลี้ยงไก่พื้นเมือง
ไทยในจังหวัดพิษณุโลก





บริการวิชาการและถ่ายทอด องค์ความรู้จากงานวิจัยสู่ชุมชน

Community Services



โครงการบริการวิชาการ

จัดโดย

ภาคีเครือข่ายวิจัยไก่พื้นเมืองพิษณุโลก

Phitsanulok Indigenous Chicken Research Network (PICRN)



**Traditional
Wisdom
Socio-cultural**



**Management
Phenotypic
Characteristic**



**Genetic
Breeding
Selection**



ภาคีเครือข่ายวิจัยไก่พื้นเมืองพิษณุโลก **Phitsanulok Indigenous Chicken Research Network (PICRN)** เป็นเครือข่ายการวิจัยระหว่างกลุ่มมหาวิทยาลัยในจังหวัดพิษณุโลก ประกอบไปด้วย มหาวิทยาลัยนเรศวร มหาวิทยาลัยราชภัฏพิบูลสงคราม และมหาวิทยาลัยเทคโนโลยีราชมงคลล้านนาพิษณุโลก

ตำบลบ่อภาค อำเภอชาติตระการ จังหวัดพิษณุโลก



ตำบลบ่อภาค อำเภอชาติตระการ จังหวัดพิษณุโลก



ตำบลบ้านดง อำเภอชาติตระการ จังหวัดพิษณุโลก



ตำบลสวนเมี่ยง อำเภอชาติตระการ จังหวัดพิษณุโลก



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ตำบลสวนเมี่ยง อำเภอชาติตระการ จังหวัดพิษณุโลก



ตำบลสวนผึ้ง อำเภอนาทิรการ จังหวัดพิษณุโลก





วัดหนองห้วยยาง ตำบลท่านางงาม อำเภอบางระกำ จังหวัดพิษณุโลก



อื่นๆ

โครงการบริการวิชาการ เรื่อง “โครงการอบรมเชิงปฏิบัติการ
การอนุรักษ์และใช้ประโยชน์จากภูมิปัญญาการเลี้ยงไก่พื้นเมือง
เพื่อการพัฒนาตามหลักภูมิสังคมอย่างยั่งยืน”

วันศุกร์ที่ 18 พฤศจิกายน พ.ศ. 2559

ณ มหาวิทยาลัยราชภัฏพิบูลสงคราม อำเภอเมืองพิษณุโลก
จังหวัดพิษณุโลก

อื่น ๆ



- การบูรณาการงานวิจัยกับการเรียนการสอน นักศึกษา และการลงพื้นที่เก็บข้อมูล





Thank You for Attention

ピサヌローク県の
地鶏とタイ人の生活



Indigenous Chicken and Thai Ways of Life
in Phitsanulok Province

ピサヌローケ県の
地鶏とタイ人の生活



FOREWORD

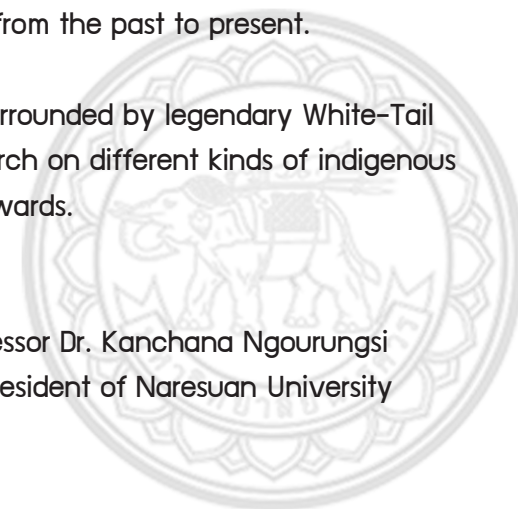
Indigenous chickens have been close to Thai culture, way of life and tradition since antiquity. The relationship between indigenous chickens and Thais has a very long history as appearing in the historical legend of chickens and Thai kings such as King Naresuan the Great who loved the White-Tail Yellow Chicken or King Taksin the Great who favored the Pali Green Chicken.

Regarding their relationship with Thai farmers, indigenous chickens involve people's life from consumption to household economy. When the number of raised chickens is more than enough, farmers sell them to get income in accordance with sufficient economy. Due to their beauty and passion for fighting, the roosters are raised for many reasons, including fighting in game farms as a sport. This makes indigenous chickens found in all regions of Thailand, generating local wisdom cultivated and inherited from generations to generations as the nation's intangible cultural heritage that has been standing alongside Thai culture for ages.

Phitsanulok is one of provinces that have been enthusiastic in the beauty contest for indigenous chickens since 1990. The purpose of the event is to select the White-Tale Yellow Chicken with Five Protecting Gods according to the legend of Thai fighting cocks and the history of King Naresuan's fighting rooster. The contest has been organised annually from the past to present.

As a source of numerous research studies and a location surrounded by legendary White-Tail Yellow Chickens, Naresuan University has conducted research on different kinds of indigenous chickens in order to conserve and develop their breeds onwards.

Honorary Professor Dr. Kanchana Ngourungsi
President of Naresuan University



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Contents



地鶏とタイ人の生活

Chicken and Way of Life

01

地鶏とタイ人の生活 及びその地域にある知恵

地鶏と人間との関係は長い間続いてきた。地鶏は東南アジアに生息する野鶏由来の鶏である。人間は野鶏を家畜として飼育し、鶏を外敵から守ってきた一方で、それを食用としてきた。相互依存をしてきたのだ。それゆえ、地鶏は人間の持つ伝統習慣、生活様式に左右されつつ変遷をしてきたので、研究の対象として価値を持つ文化遺産である。

タイでも地鶏は、古代からタイ各地のタイ人の生活様式、伝統習慣とともに生きてきた家畜である。古くからの伝説では、地鶏は「しゃも（＝闘鶏）」としてタイの王様との結びつきが語られてきた。例えば、ナレースワン大王とガイ・ルアン・ハーン・カーオ（尾が白くて、体が黄色の「しゃも」）、プラヤーピチャイ王とガイ・キオ・パーリー（緑色の「しゃも」）などの関係である。また、第2次世界大戦後には飼育の方法の向上とともに肉と卵の生産を目標に、外国から鶏を輸入して飼育してきた。異種間の鶏を交配させて、目的を達することができた。これ以外に、観賞用と闘鶏というスポーツのために「しゃも」を飼育してきた。それで血統や飼育方法も異なる様々なタイの地鶏が誕生した。これらのタイの地鶏は異なる環境や人々の生活様式の元で生きてきたので、地鶏の間での違いも出てきた。宗教儀式に利用されたり、様々な民族の信念のために利用されてきた。例えばカレン族のある村ではマットモーという伝統儀式で地鶏を犠牲にして、その内臓を食用にしたり、霊魂に捧げたりする。この儀式はタイヤイ族の村でも見られる。

地鶏とタイの農民との関係も長い結びつきがある。大体の農家では食用として地鶏を飼育しているが、その数が増えれば「十分な経済生活」というモットーのもとで、収入源としての恵みも受ける。また、地鶏はその美しい姿と闘争心を有することで、様々な目的で飼育されてきた。タイの至る所で「しゃも」としての地鶏が目につくが、それは地鶏がスポーツ試合で闘うために飼育されているからである。これは昔からの地方の人々の生活様式であり、よく言われるように「タイの田舎の人々は農作業が終わったら、闘魚と闘鶏に心が向く」のである。

地鶏のコンテストという催しがある。標準的な良い特徴を備えている鶏、または決められたポイントが豊富に備わっている鶏を選ぶために催されるが、これはその保全に向けた飼育を促すためである。この選択方法は鶏が持つ経済的特徴と昔から伝わっているタイ人の知恵を基準としている。次のような種類の「しゃも」が良く知られている。

- ガイ・ルアン・ハーン・カーオ種（尾が白くて黄色）
- ガイ・プラドゥー・ハーン・ダム種（尾が黒い）
- ガイ・キーオ・ハーン・ダム種（尾が黒くて緑色）
- ガイ・デーン種（赤い鶏）
- ガイ・チー種（チーという鶏）
- ガイ・ダーン種（ダーンという鶏）
- ガイ・タオ種（灰色の鶏）
- ガイ・ラーイ種（多文様の鶏）

コンテストに度々出場する飼い主たちは自分の鶏の長所や短所が認識でき、評価委員会の見解、指摘そして優良な品種を紹介しているハンドブックの情報などをもとにして、飼育の改善方法をさぐるのである。こうしてタイの地鶏の持つ優れた点を保全するとともに、鶏の価値を高めることにもなる。更にタイ人の知性と言われる「教科書どおりの美しさを持つ鶏は、常に強い鶏になっている」のである。

闘鶏合戦はスポーツの感覚で、優良な血統をもつ鶏を選び、飼育することにつながっていて、これはアユタヤー時代の昔から存在している。その時は高貴な人たちの宮殿で行われたスポーツだった。それゆえ、「しゃも」はタイの多くの王様との結びつきがある。例えば「ルアン・ハーン・カーオ」という「しゃも」はナレースワン大王と、「キーオ・パリー」はプラヤーピチャイダーブハック王と、「プラドゥー・サメー・ダム」はプラチャーオスア王などとの結びつきがある。スポーツ感覚で地鶏を飼育するには、その鶏の血統、存在地、闘争力などについての知識が必要となる。飼育する人は闘争合戦で優秀な履歴を有する血統の鶏を探して自分の養鶏所で育て、子孫を増やしていく。時には「パソム・ロン・ラオ」と言って優秀な血統を残していくために近親交配をさせる必要もある。なお、劣等な種類の鶏は食用にされる。その一方で優勝した「しゃも」はそれぞれの試合の相手のレベルに応じて、その値段が決定される。試合に勝ち、その価値を高めるためには、鶏の飼育者は昔からのタイ人の知恵に従って優良な血統の鶏を選ばなければならない。地鶏の姿、形や行動を注視したうえで選ぶ。その時は鶏の評判、信念、そして経験などが大切となる。このようなことを参考にして、教科書や現在に語り継がれている伝説が存在するのである。なお、優良な種類で大切な鶏が売られているところを紹介しておく。ランブーン県、スコータイ県、ピサヌローク県、チャイナート県、スィンブリー県、スパンブリー県、トラート県、チャンタブリー県、バンコク都、ナコーンラーチャシーマー県そしてタイ南部の南側にある県などである。

地鶏の飼育をする目的は、結局次の4点に分けられる。

- ―食料のため
- ―儀式と占いのため
- ―コンテストに出場させるのに必要な美しさをかもし出すため
- ―スポーツ競技に出場させるため

小規模の農家で地鶏を飼育しているのはどこでも見られるが、特にイサーン（東北部）地方、北部地方、中部地方そして南部地方に多い。一方、需要側と言うとタイ国内にも、国外にもあり目的は食用もあるが、より多いのは競技用である。

タイの地鶏は、人々の生活、伝統文化そして慣習と長期間共存してきたので、世代を超えて人々には次のような知恵が蓄積されてきた。

- ―地鶏の血統に関すること
 - ―地鶏の食料に関すること
 - ―地鶏の健康管理
 - ―地鶏の飼育方法
 - ―地鶏に関する信念と儀式
- 詳細は以下に述べる。

地鶏の血統についての知恵は2点に大別できる。まずは、各地域で飼育されている地鶏であるガイ・ダム・プーハーン、ガイ・チーフアー、ガイ・ファールアン、ガイ・メーホーンソーン、ガイ・ベートン、ガイ・チェンハイ、ガイ・コーロン、ガイ・トーク、ガイ・チェー、そしてガイ・タパオなど。次に、地鶏の種類、そして最も頻繁に出会う「しゃも」の色である。特徴から次の11種類に分けられる。ガイ・ルアン・ハーン・カーオ、ガイ・ブラドゥー・ハーン・ダム、ガイ・ブラドゥー・ハーン・カーオ、ガイ・キーオ・ハーン・カーオ、ガイ・タオ、ガイ・ノックゴート、ガイ・ダーン、ガイ・キーオ、ガイ・ラーイ、ガイ・チー（またはガイ・カーオ）そしてガイ・ノックデーである。しかし、このうちよく飼育され多く見られるのは、4種類のみである。ガイ・ルアン・ハーン・カーオ、ガイ・ブラドゥー・ハーン・ダム、ガイ・ノックデー、ガイ・チー

地鶏の餌についての知恵

- 1) 放し飼いの場合は、特に餌を与えない。
- 2) 籠に入れたり、放し飼いにしたりする場合は、特別に餌を与える。
- 3) 籠に入れて飼う場合は、朝、昼、晩の3食を与える。なるべく、その地域で栽培して採れるものを与える。例えば、バナナ、キュウリ、はちみつ、貝、小型の昆虫としての白アリ、ヤモリなど。

地鶏の健康管理についての知恵

ほとんどはハーブを使っている。知恵は2点に大別できる。

- 1) ハーブを使って地鶏の健康管理と病気の治療に関する知恵。
- 2) 「しゃも」を飼育するに当たってハーブを使用することについての知恵で、これには以下の3点がある。

- (1) 体のためになり、充実した体格をつくり、力強い鶏にする。
また食物の消化に良いハーブであること。
- (2) 便通を改善するもの。また、試合に負けて、
負傷したときに使うハーブ。
(これは寄生虫除去の薬ではない。)
- (3) 水浴時に使うハーブ。体についた寄生虫を除去し、
筋肉と皮膚を丈夫にする。

地鶏の飼育についての知恵、特に「しゃも」の飼育の方法

- 1) 建物内で鶏を飼育するときの器具について
- 2) ハーブを使った飼育についての知恵には次のようなことがある。疫病の防止、産卵に適する時期、産卵時の巣、巣で卵に寄生する寄生虫の防御、雌鶏を別の巣へ移すこと、受精卵の質の良否を見分けること、雌鶏が卵を見捨ててしまったときに代わりの雌鶏の候補、早産する雌鶏の発見、産卵時の雌鶏の観察方法、優良な血統の鶏の選び方、交尾のさせ方、雌鶏が卵を破壊させない方法、雌鶏同士のけんかの防止、餌のやり方、若い雌鶏の選び方など。

地鶏に関する信念と儀式の知恵

1) 儀式と占いの知恵は東北部や北部に住んでいる様々な民族の中に見られる。

2) 信念についての知恵には次のようなことがある。

—闘鶏合戦の当日に鶏を連れて行く前に、家ですること

—競技中の餌や水のやりかた

—競技するリングへ鶏を放すときのヒント

—将来、強い「しゃも」に育つ雛の特徴

—鶏の糞について

—競技の休憩中にすべきこと

—吉兆の時期の見方

—競技場でどこに陣取ればいいのかを見つけること

—色々な場合に歌う詩歌。例えば、試合開始時に鶏を手から放すとき、鶏の「けづめ」や「すね」に向けて歌うもの、鶏が恥ずかしがったり又は負けたときに呪文として歌うもの、傷の治癒を早めるとき、鳥が厄難から免れるように願うときなど。

—試合会場へ着て行く服

Indigenous Chicken, Thais Way of Life and Folk Wisdom

Indigenous chickens and humans have had a long bond of relationship. These chickens were originated from junglefowls in Asia, especially Southeast Asia. Humans have taken and raised them as a domestic animal, but both have lived dependently. The chickens depend on human's raising and protection, while their meat and eggs are humans' food. The chicken's evolution therefore reflects human living style and natural environment. Raising indigenous chickens has been the folk wisdom through living together between humans and indigenous chickens. Accordingly, the chickens are regarded as cultural heritage that is diversified and worth studying.

In Thailand, indigenous chickens have existed with Thai culture in every region. According to historical records, Thai indigenous chickens were used as Kings' fighting roosters. For example, King Naresuan favored 'Kai Lueng Hang Khao' (White Tail-Yellow Chicken) whereas King Taksin preferred 'Kai Keaw Paree' (Dark Green Chicken). After the end of World War II, chicken raising methods were developed by importing exotic chickens to raise for their meat and eggs. There has been crossbred for pleasure, consuming benefits and extra income as well as people also raised them for cockfighting and breed competition. Thus, indigenous chickens' breeds have been diversified, based on the original breed and raising style in each region. For instance, people used chickens as part of religious ceremony, e.g. Karen tribe people or Pga K'nyau use indigenous chickens in the spiritual rite "Gi Jue" and cook them for consuming, Shan tribe people use them only in a spiritual rite.

Regarding the relation with farmers, it is believed that indigenous chickens have an important and long relationship with family economy. People generally raise them for food in the family or sell them when there are many of them in order to follow the philosophy of sufficient economy. Due to their fine features and fighting behaviors, indigenous chickens have been raised with a variety of purposes. Fighting sport is found as the main purpose in every region. As stated in the history, it is the lifestyle of ancient people that after farming, local Thai farmers came back to eat fish and fight roosters.

Indigenous chicken competition is a kind of chicken breed conservation methods to select the most relevant one to the breed standard-perfection. The breed standard-perfection is based on economic traits, academic characters and ancient folk-wisdom such as White Tail-Yellow Chicken, Pradu Hang Dam Chicken, Black Tail-Green Chicken, Red Chicken, Chee Chicken, Daeng Chicken, Lai Chicken, etc. Persons who have their chickens joining the competition learn strong and weak points of their chickens' breed and improve them as judges suggested. They could also develop the breed following the manual of breeding. This development not only preserves good genetic of Thai indigenous chickens that have biodiversity, but also follows the Thai folk-wisdom "beautiful chickens as the manual says are great chickens."

Cockfighting is an indigenous-chicken raising for sport in order to screen breeding. The fight has been existed since Ayutthaya period as the royal sport. Fighting cocks were thus related to several Siamese Kings; Kai Leung Hang Khoa with King Naresuan, Kai Keaw Paree with Praya Phichai and Kai Pradu Samae Dam with Pra Srisanphet VIII. Indigenous chicken raising for sport requires those who know about fighting tactics of each breeding in each region. Chicken owner would seek for a good breeding to be the farm's breeders. Sometimes, it needs to breed the close blood (inbreeding), known as "line breed," to maintain the good breeding. Those that are not in a good condition will be cooked as food. The price of the winner depends on the number of winnings. To get the higher price from the fight, raisers need to know how to screen the appropriate breed based on the Thai folk wisdom manual by perceiving the appearance and behavior of indigenous chickens and keeping them as fighting roosters. The desirable and undesirable appearances are based on traditional notions, beliefs and situations that have been inherited until the present day. Well-known selling places of fighting roosters are Lam Phun, Sukhothai, Phitsanulok, Chainat, Singburi, Supanburi, Trat, Chantaburi, Bangkok, Nakhon Ratchaseema and Lower-Southern part of Thailand.



Cr. <https://www.pinterest.com/pin/611785930602989628/>



Cr. <https://www.pinterest.com/pin/1039531228544000/>

In short, reasons for raising indigenous chickens in Thailand can be categorized into four groups: for consumption, for spiritual rites, for competition and for sport. Raising indigenous chickens are popular in minor farmers, and the number of raising is high in every region. It is found that Northeastern part of Thailand has the highest number of raising indigenous chickens, followed by Northern, Central, and Southern parts, respectively. There are both inbound and exporting indigenous chicken markets in Thailand, mainly for consumption and mostly for fighting-rooster sport.

Since indigenous chickens have been long existed in Thais way of life, there is folk wisdom passing from generations to generations. There are five types of folk wisdom: indigenous chicken breeds, food, health condition, raising methods and spiritual rites. The details are discussed below.

Folk wisdom of indigenous chicken breeds

This wisdom is categorized into two types: general indigenous chickens raised in any regions and indigenous chickens raised for fighting (domestic fowl). General indigenous chickens consist of Black Bhubhan chicken, Chee Fah chicken, Fah Luang Chicken, Mae Hong Sorn chicken, Betong chicken, Shanghai chicken, naked-neck chicken, guinea fowl, bantam, and cochin. Indigenous chickens raised for fighting (domestic fowl) are mostly found, having the highest number of raising. The character of each breed is categorized by the colors of feature. There are at least 11 breeds, however, there have been only 4 breeds found most raised including White Tail-Yellow Rooster, Pradu Hang Dam Rooster, Nok Daeng chicken, and Chee chicken.

Folk wisdom of chicken feed and feeding

There are three types of folk wisdom for chicken feed and feeding: (1) free-range feeding (extensive), chickens are free to eat in natural condition; (2) half-range half-caged feeding (semi-intensive), chickens are kept in a cage at night and fed with supplementary feed during the day; (3) caged feeding (intensive), chicken are fed according to a schedule. Chickens' feed is generally bought from local shops and easy to find such as bananas, cucumbers, honey, small animals or insects (green frogs, shells, lizards, termites, etc.)



Folk wisdom of chicken health care

Generally, herbal application for indigenous chickens are categorized into two groups: herbs for disease prevention and treatment; and herbs for fighting-rooster raising. Herbs for fighting-rooster raising consists of three sub-groups: (1) nutrient herbs for good health, good digestion and blood pressure; (2) bruise treatment herbs or cathartic to cure the bruised body (not the use of vermifuge); and (3) bathing herbs to clean outside parasites for strong muscles and skin.

Folk wisdom of chicken management

There are several kinds of folk wisdom related to chicken raising management, especially in fighting cock raising: (1) management of chicken house and tools; (2) raising management. The latter one includes plague prevention, hatching season, hatching nests, including prevention for chicken mites in hatching nests. This also involves a transfer of hens to hatching nests and a solution to hens leaving nest. The raising management also looks at how to differentiate good and bad hatched eggs, get reserved hens to hatch, speed hens to hatch and notice young hens beginning to lay eggs. It also concerns a selection of breeds, plus a way of breeding, a resolution to self-eggs eating, a resolution to hen fighting, how to feed hens and a selection of young hens.



Folk wisdom of beliefs and spiritual rites

This folk wisdom consists of two groups: (1) spiritual rites and predictions; (2) fighting cock raising. Spiritual rites and predictions are found in several tribes in Northeastern and Northern parts of Thailand. Fighting cock raising starts from transporting a cock to the fighting field, feeding it during the fight and releasing it into the ring. The wisdom also involves good fighter's characters, a selection of good fighting young roosters and an observation of good fighting roosters. This includes the knowledge of candle feces, how to place fighting roosters, ways of giving water to the fighting cock during the match, plus other things to do in the resting time. The wisdom concerns how to find a good time to take the cock out to fight and select the ring's location. The process includes a lot of spells: comparing spells, calling-spur spells, shin spells, fighting-tactic spells, wound-healing spells, surviving spells, plus how to find auspicious time for fighting, dress for luck to the ring and release the rooster into the match.

ナレースワン大王鶏の伝説 タイ国の知的文化遺産

ナレースワン大王鶏は仏暦 2557 年度（西暦 2014 年度）に国の知的文化遺産に登録された。タイの歴史では仏暦 2124 年に、ナレースワン大王がビルマ（現ミャンマー）のウパラーチャー大王との間で闘鶏合戦を行い、勝利したことが記録されている。その時から 433 年も経っている。ナレースワン大王が、その闘鶏合戦で使った闘鶏（以下、闘鶏は「しゃも」と記す）はピサヌローク県ムアン郡バーングラーン町の鶏だった。ピサヌローク県は仏暦 2533 年 7 月 29 日に、タイ国で初めてのナレースワン大王鶏のコンテストを開催した。その日は、ナレースワン王子が大王に即位した日からちょうど 400 年目にあたったので、仏暦 2534 年にフアロー町でナレースワン大王鶏の保全と品種改良を目的とした団体がつくられた。その後現在に至るまで、いくつもの団体が誕生している。それらはターポー町、サモークー町、バーングラーン町そしてピサヌローク県立のピサヌロークパンヤヌグーン学校のナレースワン大王鶏保全センターである。

そこで文化省は仏暦 2557 年度にナレースワン大王鶏を国の知的文化遺産に登録することを発表し、文化省の文化推進局は 2557 年 8 月 9 日にナレースワン大王鶏の系統の「しゃも」を保全する、フアロー町にある「ナレースワン大王鶏の保全及び品種改良をする団体」を表彰した。現在、スパキット・パントセーン氏がその団体長になっている。

タイの歴史書ではナレースワン大王がウパラーチャー大王に闘鶏合戦で勝ったことが記録されているが、これについてニボン僧侶は次のように詳述している。「ある日ウパラーチャー大王がナレースワン王子と闘鶏合戦をして負けた時、大王は機嫌を損ねて王子に対して次のようにあざけりの文句を放った。《人質の「しゃも」は、俺の「しゃも」に勝てるほどすごい》と。王子はそれを聞いて傷心した。そして怒りをこめてウパラーチャー大王に、次のような返答をした。《この私の「しゃも」を見くびらないでください。この「しゃも」は陛下の「しゃも」に勝っただけではなく、陛下の国家にも勝てるんですよ》と。」歴史書におけるナレースワン大王鶏に関する記述からはこれしか知ることができない。どこで、いつ闘鶏合戦が行われたのかわからない。ただ、この記録の中に《人質の「しゃも」》という言葉がある。子供や学生が学校で、ナレースワン大王の歴史を勉強するとき、講義の内容は次のようなものである。ナレースワン大王はウパラーチャー大王と闘鶏合戦をしたのは、大王がまだ王子の時で、ビルマのホーンサーワディーという都にいた。これは、仏暦 2107 年ブレンノーン王が 9 歳のナレースワン王子を養子あるいは人質としてもらい受けたのだ。王子はその後、6 年の間ホーンサーワディーにとどまっていた。そして仏暦 2113 年、15 歳のときアユタヤーの都へ戻った。6 年間のホーンサーワディーでの生活中、王子がいつ闘鶏合戦を行ったのかは未知であり、従って今後は、史実に基づいた情報を捜し求めるべきであり、その日がわかればその日を「ナレースワン大王鶏の日」としたいものだ。

Naresuan Fighting Cock: The Nation's Intangible Cultural Heritage

Naresuan Fighting Cock was registered as the Nation's Intangible Cultural Heritage in 2014. It has been recorded in Thai history that Prince Naret's fighting cock defeated Pra Maha Uparacha's fighting cock in B.E. 2124, 433 years ago. The Prince's fighting rooster had been taken from Ban Krang, Muang District, Phitsanulok. The province later held the first Naresuan Fighting Rooster Competition on July 29, 1990, the 400th Anniversary of King Naresuan's Enthronement. In 1991, the first Naresuan Fighting Rooster Club was established at Hua Ro Sub-district and other clubs were later established, including Ta Pho Sub-district, Samo Khae Sub-district, Ban Krang Sub-district, and Naresuan Fighting Rooster Preservation Center, Phitsanulok-panyanukul School.

Ministry of Culture has verified Naresuan Fighting Roosters as the Nation's Intangible Cultural Heritage, announced on August 9, 2014. Therefore, Department of Culture Promotion, Ministry of Culture, has given the certification of verification to Naresuan Fighting Rooster Preservation and Development Club, Hua Ro Sub-district. The current chairperson of the club is Mr. Supakit Panthasen.

Thai history has been recorded that the fighting rooster of Prince Naret (later became King Naresuan) defeated the fighting rooster of Pra Maha Uparacha. An excerpt from 'Prince Damrong Rajanubhab's

The Bibliography of King Naresuan The Great' addresses that "One day Prince Naresuan played a fighting cock game with Pra Maha Uparacha, and won the game. The Prince of Burma, mad of being lost, mocked Prince Naresuan that the prisoner's fighting rooster had won his. Prince Naresuan replied that this fighting rooster could not only win Pra Maha Uparacha's, it could possibly conquer the kingdom." However, this is the only evidence found relating to King Naresuan's rooster fighting, and it was not even mentioned where and what year it was taken. It only mentioned the word "prisoner's rooster." History teachers have been teaching Thai student that Prince Naresuan, nine years old, won the rooster fighting in Bago, when King Bayinnaung of Burma had taken him as a stepson or a prisoner. Six years of residing in Bago, Prince Naresuan moved back to Ayutthaya in 2113 B.E., at 15 years of age. There is no any study of periods of the rooster fighting. Therefore, it is necessary to gather more historical information and take that date as King Naresuan's Fighting Cock Day.



This detail of a wall painting at Wat Suwan Daram in Ayutthaya, Thailand depicts a famous incident from the life of the Thai King Naresuan (1555-1605). As a young man, Naresuan was taken captive by the Burmese and grew up in the Burmese court, where he practiced cockfighting with the young Burmese Crown Prince. The painting depicts a famous cockfighting match between the two, which Naresuan's cock won. Naresuan is shown on the right, and the Burmese Crown Prince on the left. The painting was made between 1925 and 1934.

タイの地鶏の現状・保護・利用

地鶏はタイの民間の人々と農民の伝統、生活、文化に関わっている動物だ。それは育てやすく、環境に強いのだ。また、地鶏はブロイラーより肉が固まっておいしい、それに脂肪率がひくい。そのため、地鶏の値段は一般より2－3倍高くなる。しかしながら、地鶏を育てるのは時間がかかるという欠点がある。従って、市場の要求にも足りない。現在、タイでは2種類の飼育法があり、一つは、工業的ファームの飼育、もう一つは自然の飼育だ。後者の種類は、食用として飼育されているため、農家の村に多く育てている。

畜産局は理想的な基準である羽の色に従って地鶏の種類を大きく4種に分類されている。ガイ・ルアン・ハーン・カーオ地鶏、ガイ・プラドゥ・ハーン・ダム地鶏、ガイーデー地鶏、ガイーシーだ。しかし、現在の形質の研究によると農家が飼育している地鶏の種類が混雑していることが難しいようだ。それは計画的ではなく混雑させたのだ。特に闘鶏のために飼育している地鶏のグループだ。このグループはタイの地鶏の保護を考えておらず、闘鶏するときに効率的によくタイの地鶏とミャンマー、ベトナム、ブラジルなどの海外の種類と混雑させた。ナレースワン大王のガイ・ルアン・ハーン・カーオ闘鶏の出身地であるピサヌローク県と北部タイ南部の各県の地鶏の混雑の調査によると、ミャンマーの鶏と最も混雑された。それは大型であるタイの地鶏より素早く動いていて小型サイズのため、相手を探すが簡単なのだ。このため、将来タイの闘鶏の体系がだんだん小さくなることの不安がある。このような遺伝の改善はタイの地鶏の特色と種類を失う恐れがある。これは永遠の開発のスローガンと正反対になる。

この問題の解決方法は、最初に一般の人々がタイの本家の地鶏を理想的な基準に従って保護を奨励することだ。例えば定期的にタイの地鶏コンテストをし、優勝の方に王様のカップ賞と現金をもらえるなどの活動が考えられる。更に、地鶏の病気や虫に強い、トウモロコシ、もみ米などの農残物の利用、肉の品質のような特色的な遺伝を利用して、研究をし続けていくことも必要がある。この遺伝に関する研究は知識や高級レベルのテクノロジーを使わなければならない。現在では生物の遺伝の研究は分子と生物工学の遺伝学の知識を利用されている。これによりDNAの遺伝を研究することができる。この研究は、様々な形質な人間の遺伝子の度数の変化に影響を与える、遺伝子の位置と様々な種類がわかる。このような研究結果をもとにして地鶏の種類を改善できると考えられる。Online (GenBank) ネットワークの遺伝のデータにより経済的に関係をしている遺伝子が発見された。タイでの地鶏は様々な種類のタイ地鶏の遺伝子の変更についての研究があるが、ほとんどの研究は研究センターでしている。しかし、実際地方で飼育している現状のタイの地鶏数の遺伝の構造を研究するのはまだ少ないのだ。

地方で飼育している現状のタイの地鶏数の遺伝子の構造を研究することはタイの地鶏の種類を改善をすることに対して非常に重要なデータとなる。これはタイの地鶏の種類を保護と開発に役に立つと考えられる。

Present Situation of Thai Indigenous Chicken, Conservation and Utilization

Thai indigenous chicken has played a vital role in the Thai folk's livelihood for a long time. Local indigenous chicken can adapt well to climate, disease, low quality feed and still reproduce regularly even with minimum management. Therefore, they can be seen throughout the local areas of Thailand. In relation to biodiversity, they seem to be a reservoir of genetic resources which could be a benefit for future use. Indigenous chicken meat has a unique taste with favorable toughness and less fat. Their market prices therefore two or three times higher than the commercial broiler chicken. Moreover, there were no cultural or religious taboos relating to consumption like pork or beef.

In Thailand, indigenous chicken is not raised for consumption only but are also used for specific breeding as widely known fighting cock for chicken fighting sport. This game is very popular and belonged to a long tradition more than a millennium ago and seem likely to become one of the important factors in domestication process. Thus, local indigenous chicken is significant to food security, multiple social, economic and cultural of household in rural areas of Thailand. Indigenous chicken populations in local areas are mainly selected and bred based on owner preferences without genotypic characterization due to poor understanding and lack of information. These breeding strategies oppose the concepts of sustainable development and will lead to the threatening risk of losing genetic diversity.

Although the industrial chicken production is fast growing and has been mainly produced by large agrobusiness companies with high technology the research works about local indigenous chicken genetic resources and production systems in Thailand are still limited. The most recent study of indigenous chicken genetics was done in the research station without surveys and sampling from the real local chicken population. Furthermore, the survey in indigenous chicken production systems was mostly performed regarding the avian influenza outbreaks with a little information in relation to the local indigenous chicken husbandry, management, trading and socioeconomic status of households. From previous study indicated that the occupations of Thai people in rural areas are related to agriculture or are predominantly farmers. The most of them are still poor and have a lack of education. Thus, local indigenous chickens are much more beneficial as food, extra income, and related with cultural activities for farmers. However, in terms of disease control and healthcare of chickens, the support from government and the knowledge of disease surveillance are still limited. Moreover, the chicken crossbreeding with imported exotic breeds based upon owner preferences, without scrutinized breeding programs are very widespread. Although chicken production in agrobusiness companies in Thailand are fast developing with high technology but understanding of the household socio-economics as well as the production systems of local indigenous chickens are still necessary for development of sustainable production and utilization.

The first step to be undertaken for the objective of identifying threats and opportunities for sustainable holistic development of local indigenous chicken is the characterization of production systems. It should be done under on-farm conditions rather than only on-station experimental studies. The study of genetic diversity of local indigenous chickens will be a significant information for breeding program which is a benefit for the sustainable conservation and utilization of Thai indigenous for the future.



ガイタン・ガイトー
とそのコンテスト

Kai Tang/ Kai Tor
and Competition

02

ガイトン・ガイトー

ガイトン（北部の呼び方）・ガイトー（地方によって違う呼び方）は赤いガイパー（赤色野鶏・Red Junglefowl）の血統を持っている。ガイトンには耳が赤いのも白いものもある。出身地は北部のナーン県、プレー県、パヤオ県、チェンライ県などだ。ガイトンの性格は競争が好きで、よく鳴いて、羽ばたいてから鳴くもので、活発だ。野鶏が近づいたり、鳴き声が聞かせたりすると、挑戦心をもつようになる。

ガイトン・ガイトーの飼い方に関しては田舎の農民の伝統的な生活と合っている。飼いならされた状態になるまで飼って、雄と雌の野鶏をおびきよせる。飼う人はガイトンを使用して、自分のスペースを大切にする野鶏をおびきよせる。野鶏は他の鶏の鳴き声を聞くと、突然攻撃する。このことは「タンガイ」といって、野鶏をおびきよせるという意味だ。

ガイトンには首の毛が赤いものと金色のものがある。とてもきれいなので、かんしょう用として飼っている。また、鳴き声を聞いたり、コンテストに参加したりするためにも飼っている。貿易会社または、サービス会社がガイトンを会社の前で飼うと、会社主の高貴さをサポートして、金などを招くという信念もある。ガイトンは上記の特徴を持っているため、現在の値段がかなり高い。特にペットを愛する人にとって、新ペットとして人気がある。



Kai Tang / Kai Tor



Kai Tang (northern dialect), or generally called in other regions as Kai Tor, is a type of crossbreeding chicken of Red Junglefowls. The ear patches on the sides of the head are red or white. This type of rooster has been found in Province of the Northern Thailand such as Nan, Prae, Payao, Chiang Rai, etc. Kai Tang is a junglefowl that is good at fighting and likes to crow. It normally flaps the wings before crowing. Kai Tang is fast and challenged when hearing a junglefowl's crowing or seeing a junglefowl around. Kai Tang raising is concerned with urban farmers' lifestyle as they raise this type of chicken until it is tame and use it to delude a junglefowl. Junglefowls' possessive characters will be deluded when Kai Tang comes along to their location, and they immediately attack the violators. This method is call "Tang Kai (rooster's setup)" meaning to set up Kai Tang as the blind of junglefowl. Kai Tang's beautiful neck feature is golden or red color. As such, this type of chicken is raised for showcasing its beauty, listening to its crow or taking it to local contests. It is also believed that those who own a business will be lucky if they put a model of Kai Tang in front of their place. Because of those mentioned ideal characters, the price of Kai Tang/Kai Tor has increased and been increasingly popular, especially those who love raising animals.

ガイトン・ガイトーのコンテスト

基準は以下の通りだ。全7種のコンテストがある。

1. 鳴く回数がおおく、材木上に立つ
(鳴く回数を数える。) 15分

参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持つものだ。審査方法は15分で鳴く回数が一番おおいのが優勝だ。鳴く回数は揃う場合はもう一度鳴かせる。審査員は一人で鳴く回数を数える。

2. 鳴く回数がおおく、材木上に立つ (鳴く回数を数える。)
4ラウンド・1ラウンド1分

参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持つものだ。審査方法は1ラウンド1分、全て4ラウンドで鳴く回数が一番おおいのが優勝だ。

3. 鳴く回数がおおく、一匹ずつ材木上に立つ
(鳴く回数を数える。) 2分

参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持つもの大王。一匹ずつ材木上に立って、2分で鳴かせる。点数が高いものが優勝する。

4. 鳴く回数がおおく、地面に立っている材木上に立つ (鳴く回数を数える。) 15分

参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持つものだ。ひもで一本の向こうずねを結んで、地面に立っている材木に結ぶ。審査方法は15分で鳴く回数が一番おおいのが優勝だ。鳴く回数は揃う場合はもう一度鳴かせる。審査員は一人で鳴く回数を数える。

5. 「トーマーン」という種

「トーマーン」はタイ北部の方言で その鶏は魅力的で他の鶏をアピールするという意味だ。参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持っているものだ。審査方法はグループの4匹で行う。一匹は審査員となって、この一匹の審査員がどの鶏かを戦うと、一番目に戦ったものは優勝になる。二番目に戦ったものは準優勝となって、3番目に戦ったものは3位になる。

6. きれいな鶏

参加資格はタイの鶏、黒い向こうずね、野鶏の色がするもの、白いか赤い耳を持っているもの、向こうずねと口ばしの色は同じ、とさかはまっすぐ、2本の尾は平行しているものだ。さらに、タイの鶏の理想的な美しさを持っているものだ。

7. ファンシー

参加資格は様々な色を持っている鶏、黒い向こうずねと口ばし、向こうずねと口ばしは同じ色、とさかはまっすぐ、2本の尾は平行して、毛の色が様々だ。





Categories of Kai Tang/Kai Tor Competition

There are seven categories of Kai Tang/Kai Tor competition as follows:

1. Standing crowing (counting the frequency of crowing) within 15 minutes

The competitors must be Thai bantam with black shin with either white or red ear patches. The competition lasts 15 minutes. The one that has the most frequent crow wins. In case that the points are equal, the competition will be re-taken and judged by one evaluator.

2. Sets of standing crowing (counting the frequency of crowing) four sets, one minute each

The competitors must be Thai bantam with black shin, having the color of junglefowl, with either white or red ear patches. The competition takes one minute per each round, for four rounds. The number of frequencies will be summarized.

3. Solo crowing (counting the frequency of crowing) within 2 minutes

The competitors must be Thai bantam with black shin, having either white or red ear patches. The cocks will get on the perch one by one. Each one takes two minutes. The one that gets the highest scores wins.

4. Crowing on a ground perch (counting the frequency of crowing) within 15 minutes

The competitors must be Thai bantam with black shin, having the color of junglefowl, with either white or red ear patches. One shin is tied with the ground. The competition takes 15 minutes. The one that has the highest number of crowing wins. In case that the points are equal, the competition will be re-taken and judged by one evaluator.

5. Attractive Kai Tor

Kai Tor Marn (attractive Kai Tor) is a northern dialect meaning that Kai Tor is attractive. The competitors must be Thai bantam with black shin and the color of junglefowl. Each round contains four chickens, using the central chicken (the judge's chicken) to consider. The one that is reached out first wins the first prize. The second reached-out one wins the first runner-up. The third reached-out wins the second runner-up.

6. Beautiful chickens

The competitors must be Thai bantam with black shin, having either white or red ear patches, the same color of mouth and shin, a straight crest and curved tails, meeting the Thai bantam ideal characteristics.

7. Fancy chickens

The competitors must be colorful with black mouth and shin, straight crest, curved tails, and multicolored feature.

タイの地鶏
とそのコンテスト

Thai Indigenous Chicken Breeds
and Competition

03

大切なタイの地鶏の系統の歴史

ガイ・ルアン・ハーン・カーオ (ナレースワン大王鶏)

この「しゃも＝（闘鶏）」はナレースワン大王がビルマの都市ホンサーワディーにお住まいになっていたとき、ウパーチャー大王と闘鶏合戦をするために、タイのピサヌロークから持って行かれた鶏であることが、史実として記載されている。この「しゃも」は闘鶏合戦にかけては、実にすばらしい能力を発揮し、優勝して、「ガイ・ルアン・ハーン・カーオは、我らの主が飼育した鶏」という別名を持つことになった。それで、ピサヌローク県の家畜局は研究の結果、事実であることを広報し、仏暦2533年（西暦1990年）7月29日に最初のコンテストを実施して、仏暦2534年にはナレースワン大王鶏の保全団体を、ピサヌローク県ムアン郡フアロー町に立ち上げた。この団体は仏暦2542年までピサヌローク県の県議会から予算の支援を受けた。その後、県内の各郡でもこの血統の「しゃも」を保全し、改良して国の財産にする目的で団体が誕生した。この「しゃも」の種特異性は、首・背中・翼のまわりは黄金色で、尾は白色、耳は白色または黄色または黒色の3色、また嘴と脛は象牙色をしている。更に大切なことは、羽毛の5箇所（首・背中・翼のまわり、尾、脚）に白色のスポットが混入していることだ。それらは、頭に1箇所、両側の翼と両側の足首に合計4箇所。このような特徴を「五人の王」、つまり神が五人の王様を見守っている、という意味になる。このような特徴を有する鶏を「プラーヤーガイ」という。



History of Thai Indigenous Chicken Breeds

Kai Lueng Hang Khao/ White-Tail Yellow Chicken (Naresuan Fighting Cock)

According to Thai history, Kai Lueng Hang Khao (White-Tail Yellow Chicken) is a fighting rooster appearing in the chronicle when Prince Naresuan lived in Pegu, Burma. He brought the rooster from Phitsanulok to fight with that of Phra Maha Uparacha. Due to its smartness, the cock won the fight and got the name 'Lueng Hang Kao, Kai Chao Lieng (yellow chicken with white tail raised by royalty).' Phitsanulok Livestock Office studied the rooster and transfer knowledge to people by organizing the first Naresuan Fighting Rooster Competition on 29 July 1990. In 1991, the first Naresuan Fighting Rooster Club was established at Hua Ro Sub-district and other clubs were later established, including Ta Pho Sub-district, Samo Khae Sub-district, Ban Krang Sub-district, and Naresuan Fighting Rooster Preservation Center, Phitsanulok Panyanukul School. White-Tail Yellow Chicken has outstanding features: front hackle feathers, back hackle feather, golden wing feathers and white tail. Its ear feathers have three colors: white, yellow and black. The beak and shanks are as white as ivory. Most importantly, its feathers must have five white spots: one on its head, two on the wings and the other two on the legs. These five characteristic spots are known as Five Gods. The chicken with these spots is called Phraya Kai.

ガイ・プラドゥー・ハーン・ダム

この「しゃも」は、長い歴史を持つガタンウーまたはガイ・ウーという地鶏から発達してきた。スコタイ時代から村人たちが闘鶏合戦に持ち込んでいた。やがてそれは、貴族たちを経て、王様たち、すなわち、ナレースワン大王、エーガートサロット王、スア王、タークシン大王などの時代の王様たちにスポーツ感覚で扱われてきた。この原種の産地はspan>ブリー県、span>ブリー県、チャチェンサオ県、ミnブリー地区、そしてノンチョーク地区である。この鶏がその名声を高めたのは、ナレースワン大王の弟のエーガートサロット王がspan>ブリー産の鶏を闘鶏合戦で使い、連勝したことである。ある教科書には、この鶏はほかの種類の「しゃも」の原種であることが記載されている。大変美しい鶏である。中級程度の体格で、雄鶏は3キログラム以上、雌鶏は2キログラム以上の重さである。「プラドゥー」はある大木の名前で、その花の色は黄色である。



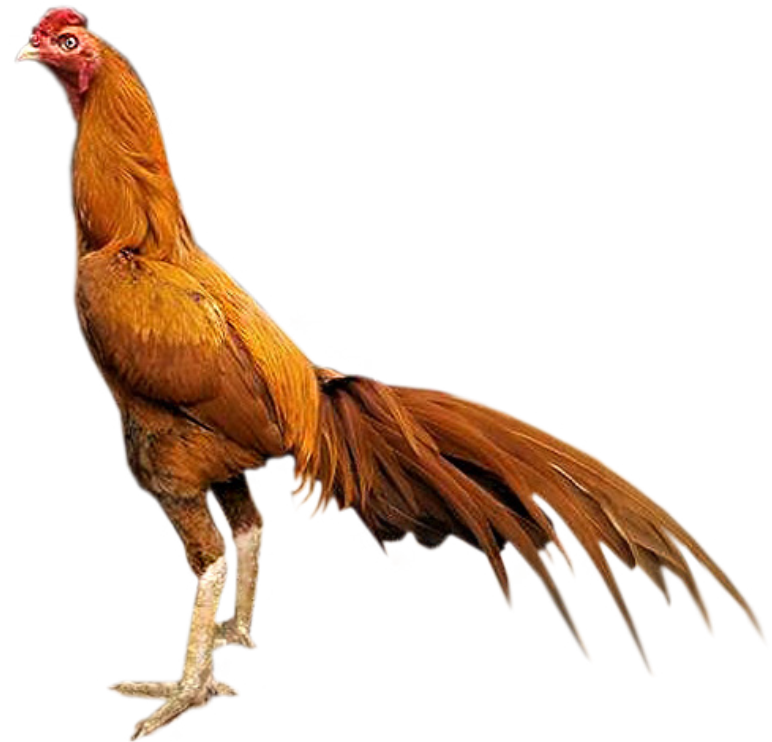
Kai Pradu Hang Dam (Pradu Black-Tail Chicken)

Kai Pradu Hang Dam (Pradu Black-Tail Chicken) has been an indigenous chicken of Thailand since antiquity. Its breed was evolved from the indigenous chicken Ka Tang or Kai Oo, growing along with Yellow White-Tail Chicken. In the Kingdom of Sukhothai, villagers liked taking roosters to fight in a ring. The game was developed into a sport for kings such as King Naresuan, King Ekatosarot, King Sue and King Taksin. Popular Pradu Black-Tail Chicken must be originated in Suphan Buri, Sing Buri, Ang Thong, Ayutthaya, Chachoengsao, Min Buri and Nong Jok, regarded as a great birthplace for the chicken. Pradu Black-Tail Chicken was famous when King Ekatosarot, King Naresuan's younger brother, brought the chicken from Suphan Buri to fight with servants' roosters and always won the match. It is therefore as remarkable as Yellow White-Tail Chicken. Some manuals mention that Pradu Black-Tail Chicken is the original breed of other indigenous chickens in Thailand with beautiful appearance. It has four fighting postures: ride, embrace, press and kick. Sometimes, it also enfolds the rival's wings. Pradu Black-Tail Chicken is medium-sized. The male weighs more than three kilograms whereas the female more than two kilograms. Its eggshell's color is light brown. The chicken's features are short, compact, black features all over the body. Red skin can be seen from the breast to the neck. The feathers under the breast are compact whereas those of the stomach are fluffy. The heckle, wing, back and covert feathers are fine. The heckle feathers' color is like a wood from Pradu trees (*Pterocarpus macrocarpus*), covering shoulders and bottom. The tail's color is completely black, lining up nicely from the bottom to the top.

ガイ・デーン

(ガイ・ノック・デーン ガイ・デーン・チャイヤー)

この「しゃも」は、体全体が赤の羽毛で包まれている。チャイヤーとはタイ南部スラタニー県のある郡の名前で、約1200年の歴史があり、同名の寺院がある。アラブの商人によると、闘鶏合戦が行われると町の役人が金を納税させたようだ。



Kai Daeng / Red Chicken (Kai Nok Daeng, Kai Dang Chaiya)

Chaiya has been prosperous since antiquity for 1,200 years. The important historical site is Phra Boromathat Chaiya, a stupa built in Srivijaya Era. Regarding its trading and economy, an Arabian merchant recorded that King Chaiya collected the tax of cockfighting as “gold.” The city is therefore regarded as the land of “Suwannabhumi.” Cockfighting of Chaiya people has been inherited until the present. The popular raised fighting cocks are “Red Chicken” known as “Kai Daeng” or “Kai Nok Daeng.” Due to its red feathers all over, it is called “Kai Nok Daeng Hang Daeng” or “Kai Daeng Chaiya.”

ガイ・チー（ガイ・カーオ・ランパーン）

この「しゃも」は全体が白色の羽毛でおおわれている。古代の人々は、色が白いので食用にはせずに、寺院に寄進して徳を積んだという。寺院に寄進された鶏は、自由に生活して長い歴史を刻んだ。それで、現在までその種が保存されてきた。ラーンナー地方の伝説によると、仏陀がランパーンの寺院に説教に来られることになったが、民衆が朝寝坊をして托鉢に間に合わないと心配したインドラ神が白色の鶏に姿を変えて、鳴き声を放ち人々を起こしたという。ランパーン県はこの白い鶏を県のシンボルにしている。



Kai Chee / White Chicken (Kai Khao Lampang)



Kai Chee (White Chicken) has white feathers all over its body. People therefore call it “Kai Chee” as the dress of a nun or Chee in Thailand. With its white color, Chee Chicken is not raised to eat but do merit as it is believed that releasing it in a temple will bring back good merit. This strategy has been applied until these days. White Chicken is thus related to temples. According to Lanna legend, it is mentioned that the Buddha came to give sermons in the ancient Lampang which is the present Phra That Lampang Luang Temple in Koh Ka District, Lampang. The God Indra was afraid that people would not wake up in time to offer food the Buddha. He therefore disguised himself as a white chicken to crow in the early morning so that people could get up, cook and offer food to the Buddha. Lampang Municipality therefore apply White Chicken as its logo, and the chicken becomes the symbol of Lampang Province.

ガイ・タオ・トーン（タークシン大王鶏）

仏歴2311年に即位されたタークシン大王は、戦時中の人だったので、ボクシングにも、剣術にも、また射撃にもたけていた。これ以外に、闘鶏合戦も好きだった。歴史上の資料によると、仏歴2308年に大王はアユタヤーの都へ出張されたとき、ガイ・デーンとガイ・タオ・トーンとの間での闘鶏合戦を見学した。大王は後者の鶏が気に入り、またそれが優勝した。こと鶏は強くて、美しい。これはガイ・ルアン・ハーン・カーオと羽毛が灰色である以外に、ほとんどすべて類似している。爪と嘴の色は白色が多く、黄色が少ない。ガイ・ルアン・ハーン・カーオはその逆である。

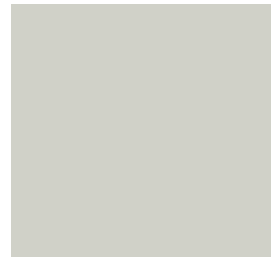


Kai Tao Tong/ Grey Golden Chicken (King Taksin Fighting Cock)

King Taksin ascended to the throne on 28 December 1768 and got the royal title as Somdet Phra Borommaracha IV, but people prefer to call him King Taksin. He was born in 1734 in the reign of Somdet Phrachaoyuhua Borommakot in Ayutthaya Dynasty. In his whole life, the king always fought, got back the national independence, suppressed rebels and protected the country. At his young age, Ayutthaya was not settled. The king needed to learn how to fight and self-guard. He was therefore smart in boxing, including fighting with a sword and several weapons. The king also favored cockfighting. According to Thai history, it is recorded that, in April 1765, King Taksin paid a royal visit in Ayutthaya and went to watch a cockfighting between a red rooster and a grey rooster. The grey one was smaller than the red one, but he liked the first, and it turned out that the grey rooster won the match. The king raised a Kai Tao Tong (Grey Golden Chicken) which had beautiful appearance and fought as smartly as King Naresuan's Yellow White-Tail Chicken. Both have the same characteristics, except that Grey Golden Chicken's feathers all over the body are grey and the heckle features are also gold. Its beak and shanks have more white parts whereas the Yellow White-Tail chicken has more yellow parts.

ガイ・キーオ・パーリー (プラー・ピチャイ・ダープ・ハック鶏)

プラー・ピチャイはタークシン大王の家来の兵隊だった。タークシン大王がターク県にいたとき、プラー・ピチャイが、ガイ・キーオ・パーリーを闘鶏合戦に出場させて、第2ラウンドで勝った。この鶏の特徴は、首の羽毛が黒交じりの緑色で、日光に当たると玉虫色に輝く。これは、ラーマキエン物語のパーリーという名前のサルに似ている。現在ではガイ・キーオ・パーリー・プラー・ピチャイダープ・ハックと呼ばれている。プラー・ピチャイの故郷であるウッタラディット県ではこの鶏の飼育を奨励し、保全に努めている。そして県のシンボルになっている。



Kai Kweaw Pali/ Green Chicken (Phraya Pichai Dab Hak Fighting Cock)

Phraya Pichai Dab Hak was the adjutant of King Taksin. He was born in 1741 in Pichai District, Uttaradit. Phraya Pichai learned boxing and fencing until becoming good at them. He then entered the army of King Taksin in Tak Province. In 1773, a Burmese troop attacked Pichai City. Phraya Pichai took soldiers to fight the enemy, holding two swords in his hands and fighting until one sword was broken. The Burmese troop then moved back. People therefore called him “Phraya Pichai Dab Hak” (Lord Pichai with a broken sword). When Praya Tak was ruling, Pichai brought his green rooster to fight with the rooster named “Tone Tao” of Praya Tak. His rooster won the game by attacking Tone Tao to death in the 2nd round. Kai Kweaw Pali has outstanding features: green and black heckle feathers reflecting when the sun shines on. Its color is as green as that of Buprestis beetle’s wings or Pali’s fur in Ramayana. The chicken is therefore called “Kai Kweaw Pali Pichai Dab Hak.” Uttaradit promotes to raise it for preservation and as a symbol of the province.



ガイ・サマー・ダム (ポークン・バーングラーン・ターウ鶏)

仏歴1800年、ポークン・バーングラーン・ターウはクメール帝国からスコタイ地方を奪還した。そして自らポークン・スィー・インタラーティット大王に即位した。シャム王国で最初の王であった。この王は現在のピサヌローク県ナコーンタイ郡に人々を率いてきた。そのとき、骨も肉も黒で、顔と鶏冠が赤みがかった黒で、その他体全体が黒色の鶏を連れてきて、食料と薬にしたが、強い鶏は闘鶏として育てた。この鶏の系統はナコーンタイ郡で保全されている。



Kai Samae Dam/ Samae Black Chicken (Pho Khun Bang Klang Tao Fighting Cock)

In 1257, Pho Khun Bang Klang Tao and his friend, Pho Khun Pah Mueng, moved a troop to conquer Sukhothai from Khmer Kingdom. He then created himself as the king who ruled Sukhothai Dynasty, named Pho Khun Sri Indrathit or King Sri Indrathit (Pho Khun is a King in Sukhothai Period. He was the first king of Siam Kingdom. At that time, Pho Khun Bang Klang Tao herded people from “Chiang Saen City” and the south of China to settle in “Bang Yang City” or the present Nakhon Thai District, Phitsanulok Province. The king brought black chickens to be cooked as food and medicine to make the body healthy. If any black chicken were smart at fighting, it would be taken as fighting rooster. At present, this type of chicken has been bred in Nakhon Thai District, Phitsanulok. Its features are black features all over, black eyes, including beak, shanks, spurs, heckle, back and wings. The face and comb are red and black. The meat and bones are black. It is called “Kai Samae Dam.”



ガイ・ドークマーク・ハーン・カーオ

この鶏は長い歴史を持っている。この鶏の特徴は首、羽、背中の羽毛が黄色交じりの白色で、それは「マーク」という名前の花が満開になった色である。また尾の羽毛の色は白で、後ろの部分が黒になっているので、上記のような名前がついている。



Kai Dok Mak Hang Khao

Dok Mak Hang Khao chicken has been a Thai fighting cock since antiquity. Thais call it Kai Sa or Kai Yo whereas Burmese people call Kai Lueng Yai. It is believed that the Thai king (King Naresuan) brought a Yellow White-Tail chicken from Siam and raised it as a secret (in a house near a hill, Tai Yai City, Tong Yi District, Burma) to fight with Burmese roosters. This type of chicken has features: heckle, wing and back feathers are white and yellow as blooming Dok Mak flowers. The tail's color is white with black at the end.

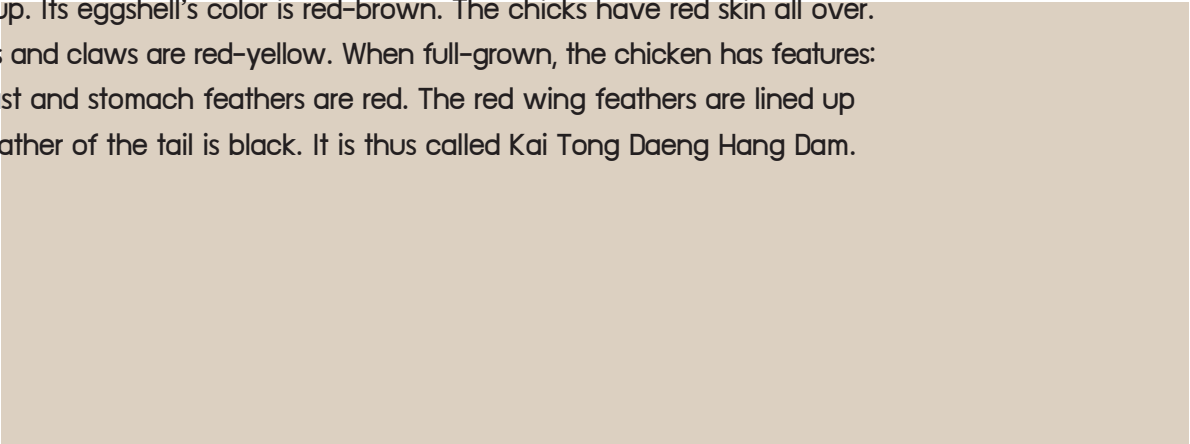
ガイ・トーンデーン・ハーン・ダム

この鶏は強くて、とても美しく、今では希種の鶏である。体が大きく、恐ろしい顔つきをしている。体重は3キログラム以上で、特にメス鶏は2.5キログラム以上である。卵の殻は赤色交じりの茶色で、ひよこは体全体が赤色、嘴、目、爪が黄色と赤色の混色である。成長すると、体と胸の羽毛は赤色、また羽、首、背中の色は赤色、しかし尾の色はすべて黒色である。



Kai Tong Daeng Hang Dam/ Copper Black-Tail Chicken

Kai Tong Daeng Hang Dam or Copper Black-Tail Chicken has been a fighting rooster since antiquity. It is smart and very beautiful. Nowadays, there are no many lefts. It is a big-sized chicken, elegant and graceful. The male bird weighs more than three kilograms. The female weighs 2.5 kilograms up. Its eggshell's color is red-brown. The chicks have red skin all over. The beak, eyes, shanks and claws are red-yellow. When full-grown, the chicken has features: the body, heckle, breast and stomach feathers are red. The red wing feathers are lined up nicely. Every single feather of the tail is black. It is thus called Kai Tong Daeng Hang Dam.



ガイ・ダーン・ベンジャロン (ガイ・プラ・ロー)

アユタヤー時代に書かれた本「リディットプラ・ロー」に、プラ・ローという王子と現在のプレー県であるムアンソーンに2人の王女がいた。この姉妹の王女はともにプラ・ローに好意を寄せていた。二人はある老人にガイ・ダーン・ベンジャロンという大変美しい鶏を捜すように求めた。そして、プラ・ローにその姿を見せて、王子に自分たちの園へ来てくれるように画策した。そして、3人はお互いに愛しあった。それで、この鶏はプレー県のシンボルになっている。特徴は5色あり、黄色、赤色、緑いろ、白色そして黒色である。首と背中中の羽毛は赤で、あとは緑色なので、ベンジャロンと呼ばれる。



Kai Dang Benjarong/ Five Colors Chicken (Phra Law Chicken)

The literature Phra Law was composed in the middle of Ayutthaya Kingdom. The story is about Phra Law, the prince of Muang Sruang City who was good-looking and desirable for many ladies. Phra Puean and Phra Pang were beautiful princesses who also fell in love with Phra Law. They went to ask an old shaman name Pu Jao Saming Prai to get a spectacular Kai Dang Benjarong (Five Colors Chicken) to crow in front of Phra Law. When the prince saw the bird, he was immediately enchanted by the chicken. It lulled him to be inside the two princesses' garden. Three of them therefore fell in love with each other, having the Dang Benjarong Chicken as the matchmaker. Prae Province therefore built Phra Law Park in the ancient Sruang city, the present Song District. The Dang Benjarong chicken becomes the province's symbol. The chicken's features are wing features which have five colors: yellow, red, green, white and black. The heckle and back features are shiny with the green features all over the body.



ガイラーイ

この鶏は強くないので飼育する人は少ない。しかし、現在ではきれいなので、コンテストのために飼育する人の数が増えている。特徴は、体全体の羽毛が黒色交じりの白色である。首、背中では多色で、黄色、茶色、黒、白、灰色で、嘴や指などは黄色交じりの白色である。尾の羽毛は20－30％が黒色交じりの白色である。大体、尾の中心部は白色、目は黄色交じりの白色である。



Kai Lai Hang Khao/ Stripped White-Tail Chicken

Kai Lai Hang Khao or Stripped White-Tail Chicken has been a Thai fighting cock since antiquity. As it is not good at fighting, people are not keen of raising it. Nowadays, Stripped White-Tail Chicken is used in beauty competitions. People therefore start raising it increasingly. Its features are the striped features mixed with white color. The heckle, neck, back and wing features have many colors: yellow, brown, black, grey or white. The beak, shanks, claws, fingers and spurs are white-yellow. Some are brown with 20-30 strips at the tail. Basically, the two lines in the middle of the tail are white. Its eyes are white-yellow.

タイ地鶏コンテスト及び規則

地鶏コンテストは古くから受け継がれている。ピッサヌローク県では1990年7月29日にナレースワン大王即位400年の記念行事として、初めて地鶏コンテストが開催された。当時のコンテストは、ナレースワン大王の「ガイチョン」いわゆる「闘鶏」として言い伝えられてきた「ガイルアン・ハー・カー・オ・パジャウ・ハー・パオン」を探すためであり、633羽の闘鶏が出場した催しであった。現在まで毎年一試合以上行われている。

1997年に、「タイ地鶏保護進展協会」が設けられ、各地で地鶏コンテストが盛んになった。多くのコンテストは「地鶏コンテスト」という名で行われているが、ピッサヌローク県においてのみ「ガイチョン（闘鶏）コンテスト」という呼称で行われている。その理由はナレースワン大王の「ガイチョン」を探すことを目的としているからである。主な地鶏コンテストには、赤十字社及びナレースワン大王記念イベントの際のコンテストや、1997年から行われているソンクラーン祭り（水かけ祭り）の際のコンテストがある。ソンクラーン祭りの際のコンテストでは、マハー・チャクリ・シリントーン王女殿下賞が授与される。

しかし、2004年から2007年にかけて、タイでは鳥インフルエンザが流行したため、地鶏コンテスト・闘鶏コンテストの開催数が減少していった。また、闘鶏場の移動制限や厳重な検査などもコンテストの減少の一因となった。移動制限のため、農村における鶏の飼育数も減少した。コンテストや闘鶏用の鶏はもちろん食用として各民家で飼われていた鶏も近隣問題が発生していた。これによって、農村の人々の生活は一変し、鶏肉を食べる際も、市場やスーパーで買わなければならなくなった。このようなことを考慮すると、地鶏コンテストはタイ人の生活に深い関わりがあり、食用、闘鶏用、そして鶏種保護として飼育されていた地鶏を保護し、推進する方法だと考えられる。

地鶏の審査及び評価の標準

地鶏の審査及び評価の標準は以下の通りである。

1. 経済的な特徴 : 体重及び胸筋、腹筋、ももの筋肉のなどの状態
2. 昔の言い伝えの特徴 : 言い伝えられてきた体型及び闘いに適した姿
 - 2.1 一般指標
 - 1) 体型・姿勢 : 長さ、身長、立つ・歩く・走る・座る・寝る際の姿、戦意など
 - 2) 頭部 : 頭骨 顔 眼 首 鼻 口 顎 肉ぜんなど
 - 3) 胴部 : 肩 背 胸 腹 翼など
 - 4) 尾部 : 主尾羽 幌羽 覆尾羽 油壺 謡羽など
 - 5) 脚部 : 臀部、大腿部、脛、蹴爪、膝節、爪、鱗など
 - 2.2 各品種における部位の色沢
 - 1) 頭羽色 : 頸前羽、頸羽など
 - 2) 尾色 : 幌羽、覆尾羽、主尾羽など
 - 3) 地色 : 胸、腹、頸の羽
 - 4) 羽色 : 覆翼羽、副翼羽、覆主翼羽、主翼羽など
 - 5) 口色 : 上下のくちばしとその先端
 - 6) 眼色 : 黒目とその周囲
 - 7) 脛色 : 脛、鱗、蹴爪
 - 8) 指・爪の色 : 内趾、中趾、外趾、後趾
 - 9) 耳色 : 耳を覆う羽

審査採点

2009年5月28日及び6月18－19日の畜産局の専門家との会議において、下記の体型、形状による採点基準が定められた。

1. 一般体型
 - 1.1 体型・姿勢8点（長さ、身長、立つ・歩く・走る・座る・寝る際の姿、戦意）
 - 1.2 頭部 8点（頭骨 顔 眼 首 鼻 口 顎 肉ぜんなど）
 - 1.3 胴体 8点（肩 背 胸 腹 翼など）
 - 1.4 尻尾 8点（主尾羽 幌羽 覆尾羽 油壺 謡羽など）
 - 1.5 脚部 8点（臀部、大腿部、脛、蹴爪、膝節、爪、鱗など）
2. 品種の特色 品種に適切であり、理想である 45点
 - 2.1 頭羽色 11点 （頸前羽、頸羽など）
 - 2.2 尾色 10点 （主尾羽 幌羽 覆尾羽 油壺 謡羽など）
 - 2.3 地色 4点 （胸、腹、頸の羽など）
 - 2.4 羽色 4点 （覆翼羽、副翼羽、覆主翼羽、主翼羽など）
 - 2.5 口色 4点 （上下のくちばしとその先端）
 - 2.6 眼色 4点 （黒目とその周囲）
 - 2.7 脛色 4点 （脛、鱗）
 - 2.8 けづめ色 1点
 - 2.9 指色 1点
 - 2.10 爪色 1点
 - 2.11 耳色 1点

3. 健康及び闘いへの備え

3.1 健康 5点（健康的である）健康不良の項目は以下の通りである。

- 1) 不健康 無気力 涙目 口臭 咳 くしゃみ 目の寄生虫病 しらみ ダニ
- 2) 疱瘡 赤痢 風邪
- 3) 障害を持つ 目が見えない 唇のゆがみ 蹴爪が折れている 足や指が曲がっている
- 4) 不健康 胸骨の凹み 脱毛 胸骨曲 痩せすぎ
- 5) 顔や脛、鶏冠 足などに闘いや事故による怪我がある
- 6) 翼、尻尾、肉ゼンの加工及び手術
- 7) 毛の染色

3.2 清潔・鮮やか

- 1) 糞、埃、泥などで汚れていない
- 2) 羽に艶がある
- 3) 目が清潔で輝きがある

3.3 騃

- 1) 懐いている 人を攻撃しない コントロールしやすい
- 2) 撮影時に動かない

Thai Indigenous Chicken Breed Contest

The indigenous chicken breed contest has been inherited from long time ago. Phitsanulok Province is one of many Provinces which has a high reputation for indigenous chicken breed contests. The local organization has been organizing these contests since 1990, to search for 'Kai Lueng Hang Khao Pra Chao Ha Pra-ong' (ไก่เหลืองหางขาวพระเจ้าห้าพระองค์; White-Tail Yellow Chicken with Five Gods) or Naresuan Fighting Cock as was described in the legend from old Thai tradition, and from the records of King Naresuan the Great. The contest was held for the first time as a commemorative event of King Naresuan the Great's 400th anniversary on July 29, 1990, and 633 indigenous chickens had participated.

In 1997, the Association of Thai Indigenous Chicken Conservation and Development was founded in Thailand. Since then, the Association has organized indigenous chicken contests at local festival in various Province every year. Many contests were held under the name "indigenous chicken contest", but only in the Phitsanulok Province which used the designation "fighting cock contest". The reason was because it aimed to search for 'Naresuan Fighting Cock'. Major chicken contests include contests for the Red Cross festival and the King Naresuan the Great Memorial Event as well as the contests

during the Songkran Festival (a festival dating from 1997). In the contest for Songkran Festival, Princess Maha Chakri Sirindhorn had given her name for the Winner Reward Cup.

However, since 2004 to 2007, avian influenza was prevalent in Asian country and Thailand, so the number of indigenous chicken contests and fighting cock contests had decreased and led to temporary break. In addition, movement restrictions and strict inspections of the cockfighting grounds also contributed to the reduction of the contest. Due to movement restrictions, the number of chickens raised in rural areas also decreased. Neighbor problems also occurred in chickens that were kept in each private house. With this situation, the people's way of life in rural areas had changed completely. and when you eat chicken, you have to buy it in the market or super-market.

Considering this fact, it is thought that the chicken contest is one of the strategies to promote and conserve indigenous chicken that is deeply involved in the lives of Thai people, and do not only raise as meat type chicken (for food), but as fighting cock (for traditional sport game), and beauty chicken (for breed conservation) also.



闘鶏合戦

Cockfighting Sport

04

スポーツとしてのタイの闘鶏合戦の歴史

仏歴1826年にラームカムヘン大王がタイ文字を作って以来、タイ人もn（ゴーガイ）はタイ語の授業で第一番目の子音であることを習っている。このことは、地鶏はタイ人、特に田舎社会のタイ人の日常生活と長い間密接な関係がある。つまり大切なタンパク質の供給源であり、社会活動としての闘鶏合戦というスポーツと密接な関係があることを物語っている。昔は農民にとって稲作の仕事が終わったら、自由な時間が多くなり、ほとんどの農家で鶏を飼育することに目が向く。そして隣近所の鶏を集めて、他の地域の農民たちの鶏と闘鶏合戦をしてきた。

タイで、スポーツとしての闘鶏合戦がいつから始まったのかは明確ではない。ただ、歴史の資料から知りうることは、闘鶏合戦は王様の間では有名なスポーツとして行われ、特にアユタヤー時代のナレースワン大王は名高い。この大王は幼少のころから鶏の飼育方法を研究し、また戦術にたけた鶏を捜してきて飼育した。それ以上に歴史の資料からタイが、外国との間での闘鶏合戦に勝ったことを知ることができる。特にナレースワン大王鶏とホンサーワディー都のウパラート大王鶏との間での闘鶏合戦勝利について詳述している。これは、古代からタイの鶏は闘争において優秀な技術と血統を有していることを示している。

人々が闘鶏合戦をするところは「ボンガイ」と呼ばれている。闘鶏合戦には独特の規則がある。鶏の所有者が合戦を行う前に、自分の鶏が戦うのにふさわしい相手の鶏を捜さなければならない。鶏の年齢、姿、経験そして闘争の技術を考慮して捜す。闘鶏合戦に要する時間を決めるにあたって、ヤシの実の殻、「カン」という水を飲むときに使う器具、または缶詰の缶のそれぞれの底に穴をあけて、外からはっきり見えるガラスの器の水に浮かべる。このとき、監視役の人がいる。闘鶏合戦開始の音がしてから、監視役の人が上記の器具を直ちに水に浮かべる。底に沈んだら1ラウンドが終了する。大体1ラウンドは20分ぐらいで、ラウンド間に10分の休憩があり、1組の闘鶏合戦には1 2ラウンドある。規則に従って闘争しても勝ち負けが決まらなければ、引き分けである。こうした闘鶏合戦では、常に人々が賭博をする。

いろいろな場所でこれまでに行われてきた闘鶏合戦という伝統文化は、地鶏の保全をする以外に、タイ国にとっては価値のある遺産である。また、これ以外に様々な職業を生み出した。例えば、鶏を囲う籠を作る仕事、鶏に水をやる仕事、そして闘鶏の鶏肉、ただしタイの鶏肉、を売るために鶏を飼育する仕事など。



History of Cockfighting Sport of Thailand

Since King Ramkhamhaeng the Great has invented the Thai alphabet since 1283, Thai people also learned that ‘Ko Kai’ (ก. ไก่) is the first Thai consonant that is set in the course of Thai language class. This has been shown that indigenous chickens are related with the Thai way of life, especially in rural areas for a long time, in the form of an important source of protein, and the social activity which is cockfighting game. In the past, after the farmer finished the farming works and free time increased. It was a time to pay attention to their chicken. Because of almost every household have indigenous chicken, the peoples always bring the chickens out to show and fight with their neighbor chickens.

It is not clear that when the cockfighting sport has begun, but the historical evidence has recorded that the cockfighting was a favorite sport of the royal family. Especially King Naresuan the Great who love in cockfighting and study many wisdoms about chicken as well as always look for the great chicken since when he was young. Moreover, Thai history has been recorded that the fighting cock of King Naresuan defeated the fighting cock of Pra Maha Uparacha of the Hong Sawadee (former Burmese capital city). This indicated that Thai chickens have skillful fighting tactics and have good genetic from the past.

The place where people battle cockfights is called ‘Bon Kai’ which has a unique rule. Before start fighting game, the chicken owner must check the chicken of the opponent and look for the similar of the age, appearance, experience, and fighting skills of the chicken. The timing of fighting game usually uses a bow, a can or the coconut shell which have a hole in bottom and float it in a clear glass container under the supervision of time controller. When the signal in the fighting ring has started, the time controllers will immediately bring that equipment to float in the container and when the sink is considered, it means out of time in one round. A typical one round will be about 20 minutes and there is a 10-minute break between rounds. In a cockfighting match has 12 rounds, if could not decide the winner or loser, it is a draw. In this kind of cockfighting game, people always have a bet involved.

According to this cock fighting tradition, indigenous chicken still has been found in various places. These are not only the conservation of indigenous chickens which a valuable legacy of Thailand but also lead to the various professions besides. For example, work of making basket-cage, chickens watering, meat-type chicken production cockfighting chicken, which is a promotion of Thai products as well.

アマチュアコックファイティング [Boxing Cocks] の試合ルール

1. 軍鶏（しゃも）の種類の登録と体重を量る。
2. 体重と身長で軍鶏を比べる。
3. 試合に出る軍鶏がスタンダードグローブで蹴爪をはめる。
4. 軍鶏の口ばしや目や手羽の治療は試合の前のみにすること
5. 試合は4ラウンド、1ラウンド22分間、休憩2分間で行われる。
 - 5.1 休憩中 試合領域のコーナーで水をあげ、用意している水のみ使える。
 - 5.2 軍鶏の口ばしや目や手羽の治療や餌、ドリンクなどをあげることはできない。
 - 5.3 軍鶏にオイル、ワセリン、軟膏（…バーム）、漢方薬、科学的な薬などをつけることはできない。見つけた場合、すぐに退場になる。
6. 試合の勝負制度（試合中のみ）
 - 6.1 「逃げ鳴き」、土俵から逃げ出そうとする「飛び」の行動をする軍鶏は審査員が3回までやり直し戦わせて、それでも「飛び」をする場合はTKO (Technical Knocked Out) でノーゲームとなる。
 - 6.2 戦意喪失で座り込んでしまう「座り」などの行動をするの軍鶏は審査員が3回までやり直し戦わせて、それでも「座り」をする場合はTKOでノーゲームとなる。
 - 6.3 土俵の領域を出たり、審査員が時間を止め、土俵に戻ったら時間をはかり続ける。
 - 6.4 口ばしが取れたり、折ったりする場合、審査員が軍鶏の傷を診断するため時間を止め、口ばしが取れたり、折ったりしたと診断される場合はノーゲームとなる（Referee Stopped Contest）。証明できるように写真を撮っておく。
 - 6.5 軍鶏の黒目が刺されたり、目が血まみれになった場合、審査員が軍鶏の傷を診断するため時間を止め、目が使えないと診断される場合はノーゲームとなる。証明できるように写真を撮っておく。
 - 6.6 審査員が3人いる。審査員が3ラウンドからコンピュータで点数を付けることができる。3人の中で2人が意見が一致する場合はそれを決定する。点数の付け方は相手の軍鶏に打たれたら1点得点、相手の軍鶏のある部分が折れたりした場合は2得点ということ。
 - 6.7 試合中、口ばしが折れたり、目が見えなくなったり、足が折れたり、手羽が折れたり、あるいは試合が始まる前に軍鶏が死んだ場合、ノーゲームとなる。



注：これ以外のケースが起きた場合、土俵上の審判が決める。

Rules of Amateur Cockfighting (Boxing Cocks)

1. Register all fighting roosters to create their breed history and have them weighed.
2. Compare the two roosters by using their weight and height as criteria.
3. All fighting roosters must wear the ring's standard spur-gloves.
4. Tie up the rooster's beak and comb, dilate its eyes and support its wings before the match only.
5. A match consists of four rounds. Each round takes 10 minutes and 2-min rest.
 - 5.1 During the rest, give the rooster only the water provided by the ring at each side's corner.
 - 5.2 Do not puncture the rooster's head, dilate its eyes, stitch the wound, feed nor give any vitamin during the rest.
 - 5.3 Do not smear oil, Vaseline, balm, herb or chemical on the bird. If this is caught, the rooster will be declared as the loser.
6. Win-Lose Judgement System (only during the match)
 - 6.1 If the cock shows a sign of losing by fleeing or turning its back to the rival, whether crying or not crying, after the judges join them more than three times, that cock will be lost on the ground of a Technical Knocked Out (TKO).
 - 6.2 If the cock lies down or crouches without fighting further nor standing up after the judges join it with the rival more than three times, that cock will be lost on the ground of a Technical Knocked Out (TKO).
 - 6.3 When the cock is injured, bones or wings broken, or out of the ring with epilepsy, the judges stop the fight and continue it after the treatment.
 - 6.4 When the beak is off or broken, the judges will take a timeout to check the injury. If it cannot be cured, the judges will stop the match and take pictures to be used as evidence for the judgement.
 - 6.5 If the cock is attacked, having a broken pupil or bleeding eye, the judges will take the timeout to check the wound. If it cannot be cured, the judges will stop the match and take pictures to be used as evidence for the judgement.
 - 6.6 It requires three judges to give marks via a digital system in the last two rounds. The marks from two out of three judges are unanimous. A clear hit is counted as one point. A hard attack that makes the rival seriously injured is counted as two points.
 - 6.7 If the fighting cock gets an accident that causes a broken-off beak, blind eye, broken leg/wing or death three minutes before the owners agree to compete, the match will be canceled.

Notes: Apart from the set rules, the judgement depends on the consideration of the ring's referee.

伝統的なコックファイティングの試合ルール

1. 許可をもらったスタンダードの闘鶏場（コックピット）で試合を行う。
2. 二羽の軍鶏がお金を賭け済みの場合、持ち主がその軍鶏を闘鶏しなければならないが、しない場合は、管理者に20%の手数料を支払わなければならない。
3. 試合は10ラウンドあり、試合時間を23分間とし、休憩23分間で行われる。
4. けがの治療、餌、栄養剤をあげられる。
5. 炭火コンロか瓦で軍鶏の体を温める。入れる材料はタイのカラブーン、ビムセーン、香りをつけるオイルなどのものを使ってはいけない。
6. 蹴爪けづめや爪は土俵でテープで巻く。
7. 土俵に持ち主が自分の軍鶏の蹴爪などをチェックする。それから、審判が用意してある水で足と蹴爪を洗い、そして乾くまで吹く。その後に持ち主に返す。絶対に蹴爪に触ってはいけないこと
8. 時間内にどちら側の軍鶏が逃げられた場合は試合が終わる。
9. 時間内に土俵で軍鶏が死んだ側は負けになる。
10. どちらかの軍鶏が目が見えなくなると（片方でも両方でも）負けになる。
11. 闘鶏中にどちらかひっくり返る場合は審判が両方の軍鶏を取ってもう一回やり直すこと
12. 試合が始まってから、次のラウンドにはどちらも戦わない場合は、その時に「アンソーム」を使って時間を計る。「アンソーム」が沈んで、どちらかまだ戦なかったら、負けになる。
13. 闘鶏中に、闘鶏をしようとせずにいると、審判が強制で闘鶏するようにできる。また、3回も逃げる場合は負けになる。
14. 闘鶏中に、軍鶏が何か折れたり、あるいは土俵内に走り回ったりする時に審判がすぐに負けたと判断せず、両方の軍鶏を取って3回までやり直してから決着すること
15. 闘鶏が負けた（逃げて負けた、逃げないで負けた、鳴き負けた、鳴かないで負けた）場合、闘鶏が3回まで攻撃しないと負けになる。
16. どちらかの軍鶏が寝る場合、審判が両方を取って戦わせるが、3回まで鳴き声がなくても攻撃しなければ負けになる。
17. 闘鶏中に、動かない場合、審判がすぐにやり直すことができる。
18. 軍鶏の口ばしが折れたり取れたり、蹴爪が外れたり、指が曲がったりした場合は、軍鶏の部分部品として使う。資材や金属や機材などを使ってはいけない。ルールは次の通りである。
 - 18.1 口ばしが折れたり取れたりした場合は、テープで巻く、あるいは新しい口を付けることができるが、尖っているほど削ることはいけない。
 - 18.2 蹴爪が外れた場合は、その蹴爪のみを使い続けること
 - 18.3 指が曲がった場合は、軍鶏の羽を使ってギブスにすること
19. 闘鶏中に、ラウンド時間がまだあるのに、持ち主が自分の軍鶏を触ってはいけない。もし、どちらかの持ち主が先に自分の軍鶏か相手の軍鶏を取ったらすぐに負けになる。
20. 軍鶏に薬を付けたり、注射したりすることはできない。見つかった場合、賭けたお金を他方の持ち主のものになる。それでも審判がその軍鶏を洗って再び戦い続けて決着がまでする。
21. これ以外のケースが起きた場合、土俵上の審判が決める。

Rules of Traditional Cockfighting (Original Fighting Cocks)

1. The cockfight must be operated only in the ring officially permitted.
2. When the two roosters are matched, their owners need to place the bet on the match. Any owner who does not take the rooster into the fight will be paid 20% to the match organizer.
3. Every pair of roosters fights 10 rounds. The whole match takes 23 minutes with the 23-minute rest.
4. It is allowed to heal the bird's wound, feed it and give it vitamins.
5. The use of a stove or tile as a hot pack is acceptable. Do not use camphor, Borneo Camphor, drug or essential oil in the smoke set.
6. Tie the rooster's spurs and claws (only with the cloth provided by the ring).
7. After the preparation, the two roosters are confronted to have their spurs checked. The referee will wash their legs and spurs with the common water and dry their body before returning them to the owner. The 'healer' is prohibited to touch the spurs before the roosters gets into the ring.
8. If one of the two roosters jump or flees away before the test fight, the match will be canceled.
9. If any rooster is attacked to death in the ring before each fighting time, it will be declared as the loser.
10. If any rooster's two eyes get blind, it will not be judged as the loser.
11. When the two cocks attack each other and fall down with the legs up, the judges will help them stand and get into the fight.
12. When any rooster does not confront its rival in the following fight, the referee will give another fighting time for 23 minutes. If it still does not fight, it will be declared as the loser.
13. While the two roosters are attacking and enfolding each other, or not confronting, the referee can force the birds to fight. If any cock turns away for three times, it will be declared as the loser.
14. Any rooster that has broken parts or runs around the ring will not be declared as the loser until the judges see that it clearly loses. The two roosters will be joined three times. If any one of them does not fight, it will be the loser.
15. When there is a sign of losing (fleeing away, not fleeing away, crying or not crying), the judges will join the two roosters for three times. If any one of them does not fight, it will be the loser.
16. If any rooster lies down, the judges will help it confront the rival for three times. If that cock does not fight, it will be the loser.
17. When the rooster attacks and stops, the judges will immediately join it with the rival.
18. If the rooster has broken beak, broken-off spur or bent claw, use only its body part to heal itself. Do not use any material, metal or wood. The principles are as follows:
 - 18.1 Use the plaster to tie the broken/broken-off beak or replace it with a new beak. Do not sharpen its beak.
 - 18.2 In case of broken-off spurs, use the old ones.
 - 18.3 In case of bent claws, use a feather and the provided plaster.

19. When the two roosters are fighting, and the fight has not finished, the owners are prohibited to touch their birds. If anyone does so, the judges will declare his cock as the loser.
20. Do not smear or inject any medicine. If this is caught, the opposite side will take the bet. The judges clean the cock and get it into the fight until the match is clearly over.
21. Apart from the set rules, the judgement depends on the consideration of the ring's referee.



ナレスワン大学の地鶏に
関する研究 (2016-2018)

Indigenous Chicken Research of
Naresuan University (2016-2018)

05

ピサヌローク在来鶏研究ネットワーク

ピサヌローク県は「ルアングハンカウ」（黄色に白い尻尾）闘鶏鶏種の原因だ。平地、高地等、多様な地形を有するピサヌローク県は、各地方で異なる鶏種が飼われており、ピサヌローク在来鶏の生物的多様性を研究するために適した地域だ。その多様性の研究範囲は、いわゆる遺伝や品種、飼料となるローカルな植物性原料、伝統知識及び養鶏家の生活習慣まで含まれる。その研究範囲の広さから、タイの北部南方地域の中でも特にピサヌローク県は在来鶏の養鶏の維持及び発展のための基礎知識を研究することができる。本件の研究目標を達成するためには、多くの専門分野において経験と知識を有している地域の組織から協力を頂くことが不可欠となる。結果として、ピサヌローク県の主要大学であるナレスワン大学を始め、ラーチャパットピブーンソクラーム大学及びラーチャモンコンランナー大学の協力で、2015年に「ピサヌローク在来鶏研究ネットワーク」を形成することが出来た。本ネットワークの主な目標としては、異なる角度からの意見や知識を集約し、生物多様性及び在来鶏の養鶏手順についての研究を進展させ、研究成果を地域社会へ還元することだ。本研究には主に下記の3つある。「ピサヌローク県における人の生活習慣及びタイ在来鶏の養鶏の伝統知識」、「ピサヌローク県におけるタイ在来鶏の外見と養鶏手順の多様性」及び「タイ在来鶏の育種方法や遺伝的改良」だ。



Phitsanulok Indigenous Chicken Research Network (PICRN)

Phitsanulok, generally known as the original place of White Tail-Yellow chicken, is a geographical diversified province that has both low land and highland. Indigenous chicken raising methods are different according to each community. It is therefore worth studying in terms of indigenous chicken biodiversity such as heredity, breed, local forage plants, folk wisdom and way of life. The data can be the foundation of knowledge for preserving and developing indigenous chicken raising in Lower Northern part of Thailand. To make the research study sustainable, it is necessary to have a collaboration with local organizations that have many experts to achieve the goal of development. In 2016, the group of researchers three major educational institutes, led by Naresuan University accompanying with Pibulsongkram Rajabhat University and Rajamangala University of Technology Lanna, Phitsanulok, founded Phitsanulok Indigenous Chicken Research Network (PICRN). The purposes of the establishment are to study on its biodiversity and indigenous chickens raising in Phitsanulok; and to integrate various expertise of each organization to do academic service projects that acknowledge people. The study includes three frameworks: the diversity of culture and folk wisdom in relation to indigenous chickens raising; the diversity of phenotype and the management of indigenous chickens; and the genetic and breeding of Thai indigenous chickens.



Research for Diversity of Culture and Folk Wisdom in Relation to Indigenous Chickens Raising

タイの地鶏の様々な生活及びその知恵に関する研究

The relationships between traditional and local wisdom with Native Chicken raising of small-scale farmers in Mueang and Chat Trakan Districts, Phitsanulok Province

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This research purpose is to study the relationships between traditional and local wisdom with native chicken raising by small scale farmers in Mueang and Chat Trakan districts, Phitsanulok province. The samples covered 401 farmers by purposive sampling method. Chi-square was analyzed to examine the association. The results revealed that traditional and local wisdom of farmers such as locations of raising, education levels, careers, selection breeding, and herbs usage related to the objectives for raising native chicken ($P < 0.05$) except for pattern of raising native chicken. Farmers located in Muang districts with bachelor or higher degree education, and main career was freelance, raised the native chicken in housing, selected breeding, and used

herbs for raising native chicken that had the highest objectives of native chicken production for selling. On the other hand, farmers located in Chat Trakan districts with illiterate, primary school and high school education, working as government officials self-employed and agriculture, raised the native chicken by free-range and integrated farming, without selected breeding, and without used of herbs that had the highest objectives of native chicken production for consuming. The findings implied that farmers should receive supports for native chicken raising in correct, appropriate ways which related to traditional and local wisdom in order to conserve and develop native chicken production for sustainable manner.

Source:

Yaemkong, S., Rattanapradit, P., Laorodphan, N., Jaipong, P., Charoensuk, R., Numthuam, S., Incharoen, T., Chirarat, N., Chalerm-san, N., Soipeth, U., Janthong, M., Sriinkum, K. and Tongchanmanee, K. 2017. The relationships between traditional and local wisdom with Native Chicken raising of small-scale farmers in Mueang and Chat Trakan Districts, Phitsanulok Province. 8th International Science, Social Science, Engineering and Energy Conference 15th-17th March, The A-ONE Royal Cruise Hotel, Pattaya Beach, Thailand.

Effect of locations, education, breeds and production objectives for raising native chicken on revenue of farmers in Wang Thong, Mueang, Bang Rakam and PhromPhiram Districts, Phitsanulok Province

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A native chicken has long been interesting and favorite for Thai farmers for a long time. The farmers mostly (70-80%) raise the native chickens in the natural environment due to their well adjusting to the rural area characteristics. They are good at finding the natural food, disease resistant and adapted to their environment. Generally, the native chickens find their foods (naturally or given) from the surrounding areas such as the fields, the houses and other local places. The farmers focus on their chickens mainly for their household consumption, but when there are more chickens than needed, the chicken will be brought out to sell for some extra income. The popularity of the native chicken consumption has become greater and greater because of the expansion of the consumers and their better financial standards. The native chicken, on the contrary, have not been better productive, but limited. Basically, the main reason for that slow progress and there is not much improvement in the chicken raising system as well as the limitation of the ability in the native chicken productivity. Moreover, there still are many accompanying factors playing the parts towards the rusty progression

together with the unimpressive income from the sales of the native birds such as locations, education, breeds and production objectives for raising the native chicken of farmers. However, few studies were done for association between farmers' education background. Furthermore, effect of these factors (i.e., locations, education, breeds and production objectives for raising the native chicken) on revenue of farmers has not been done to considering together. There seems to be some good news recently owing to the fact that the present competitively economic situations, the native chicken producing capacity has sprung up. This has created a good impact towards the farmers financially. For this reason, the study of the effect of locations, education, breeds and the production objectives for raising the native chicken on revenue from selling the native chicken of farmers, which plays the important parts in the sales of the native chicken appears to be necessary and crucial for the farmers in the planning to handle all the difficulties including the suitable opportunities for the better production of the native chicken. All the important data received will help the farmers as well as those involved to be able to create the management of the native chicken production efficiently, successfully and beneficially. Revenue from selling native chicken, location, education, breeds and production objective for raising native chicken information of 200 native chicken farmers gathered by questionnaire was analyzed using a linear model that considered all factors as fixed effects. Least squares mean for subclasses of each factor were estimated and they were compared using t-tests. The results revealed that locations and breeds significantly affected on revenue from selling native chicken per head ($P < 0.05$).

Locations and breeds had effect for revenue from selling native chicken per head ($P < 0.05$), except for education of the farmers and production objectives for raising native chicken of farmers ($P > 0.05$). In this study, most farmers had primary school (68.0%), rearing with Pradue Hang Dam chicken (56.00%), and majority of production objectives for raising chicken native of farmer for both of sport and selling (89.00%). These findings suggested that in order to improve native chicken production of farmers, training them to understand and know how to choose the best way to produce native chicken suitable for their farm is needed. Moreover, to improve efficiency of revenue from selling native chicken at different locations, breeds, education, and production objectives for raising native chicken requires the different strategies.

Source:

Yaemkong, S., Sonurin, S., Khoktong, A., Phumnual, S., Rattanapradit, P., Ngoc, T. N., Charoensook, R., Soipeth, U. and S. Yaemkong. 2018. Effect of locations, education, breeds and production objectives for raising native chicken on revenue of farmers in Wang Thong, Mueang, Bang Rakam and PhromPhiram Districts, Phitsanulok Province. KHON KAEN AGR. J. 46 SUPPL. 1: 605–611.

Diversity of Traditional Knowledge and Local Wisdom of Indigenous Chickens Farmers in Bang Krathum, Nakhon Thai, Mueang and Chat Trakan Districts Phitsanulok Province

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Indigenous chickens (*Gallus gallus domesticus*) play an important role as protein sources, sport (fighting cock) and socio-culture of Thai people since the time of the Ayutthaya Kingdom over 400 years ago. Most farmers commonly rear indigenous chicken under free-range system. However, in term of sport (fighting cock), indigenous chickens were raised in semi-intensive and intensive production system. For most smallholders, a low input/output system was used according to their geography, while a few farmers raise chickens semi-intensively to increase their incomes. Indigenous chickens are still at the bottom of the list of farmers economic priorities. However, the relationship between traditional knowledge and local wisdoms of the farmers have been related and practiced with raising native chicken, and the differences of living in each area could affect the purposes of farmers in chicken raising methods. Phitsanulok province, where located in the lower Northern Thailand, has various geographical areas, which ranges from lowlands to highlands. The rearing of Thai indigenous chickens is widely distributed in any rural communities. Consequently, there are diversity of birds' phenotype, genetic, production system, rearing management and several utilizations.

Thus, the objective of this study was to understand the diversity of traditional knowledge and local wisdom of indigenous chicken farming system in Bang Krathum, Nakhon Thai, Mueang and Chat Trakan districts, Phitsanulok province. Totally, 800 purposive famers were selected to be interviewed with a questionnaire. The statistics used in the data analysis were percentage, frequency, minimum, maximum and standard deviation. The findings revealed that most farmers had less than 10 years of experience in raising indigenous chicken (50.32%) and graduated from primary school (67.56%). Most of farmers relied on agricultural activities (65.01%), in which raising native chicken for selling accounted for 39.21%. In the study area, Thai-Burma crossbred was the most popular breed (70.24%). Farmers preferred to raise their indigenous chicken in integrated farms (50.72%). Paddy rice (42.55%) was mainly used as a feed and 72.2% of farmers used herbal with their chicken. The majority career of farmers was agricultural cultivation. Most of farmers raised native chicken for selling in integrated farming systems. Thai-Burma crossbred was most popularly raised and paddy rice was a major feed for chickens. Besides, herbal plants were used with purpose of enhancing animal health. Moreover, farmer is tradition knowledge also strongly associated with indigenous chicken and could be divided into 6 sections, as follow: (1) breed and breeding, (2) feeds and feeding, (3) health and disease prevention, (4) management, (5) fighting cock, and (6) beliefs and rituals of spirits.



Figure 1. Herbs used for enhancing indigenous chicken health (1a: *Tinospora crispa*, 1b: *Curcuma longa*, 1c: *Cymbopogon citratus*, 1d: *Zingiber montanum* and 1e: *Andrographis paniculata*) in Krathum, Nakhon Thai, Mueang and Chat Trakan districts, Phitsanulok province.

Source:

Yaemkong, S., Rattanapradit, P., Ngoc, T. N., Charoensook, R., Chirarat, N., Soipeth, U. and S. Yaemkong. 2017. Diversity of Traditional Knowledge and Local Wisdom of Indigenous Chickens Farmers in Bang Krathum, Nakhon Thai, Mueang and Chat Trakan Districts Phitsanulok Province. *Journal of Applied Animal Science*. 10(3): 39-46.

Difference of traditional and wisdom of Thai native chicken farmers in Phitsanulok province

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The objective of this study was to investigate the difference of traditional and local wisdom of Thai native chickens rearing in Phitsanulok province. The 400 purposive samples were farmers in Nakhon Thai (NT) and Bang Krathum (BK) district. Questionnaire and in-depth interview forms were used for data collection. Data were analyzed using Chi-square test to examine the association. The findings revealed that, for traditional, main career of most NT farmers were agriculture, which was higher than BK farmers (69.07% vs 61.78%, $P < 0.05$). NT farmers also had more chicken rearing experience but had less earnings from chicken than farmers in BK ($P < 0.05$). The integrated rearing system was the most favored for farmers in NT and BK (54.35% and 73.85%). In term of local wisdom, the herbal usage of NT farmers was lower than BK farmers (43.78% vs 62.76%, $P < 0.05$). Farmers in BK raised native chicken for sell and play sport (fighting cock), which were higher than farmers in NT ($P < 0.05$). However, using chicken for rituals and beliefs of farmers in BK were lower than in NT (4.10% vs 29.41%, $P < 0.05$). In conclusion, traditional and local wisdom of Thai native chicken farmers were different according to geographical areas.

Table 1 Difference of local wisdom of Thai native chicken farmers in Nakhon Thai and Bang Krathum districts

Parameters		Nakhon Thai		Bang Krathum	
		Number	Percentage	Number	Percentage
Herbs usage	Use	88	43.78	123	62.76
	Not use	113	56.22	73	37.24
Purposes of rearing	Selling	60	39.22	98	50.26
	Eating	32	20.92	33	16.92
	Fighting (sport)	13	8.50	55	28.21
	Showing and contesting	3	1.96	1	0.51
	Rituals and beliefs	45	29.41	8	4.10

Source:

Rattanapradit, P., Yaemkong, S., Laorodphan, N., Jaipong, P., Charoensuk, R., Numthuam, S., Incharoen, T., Chirarat, N. and Soipeth, U. 2016. Difference of traditional and wisdom of Thai native chicken farmers in Phitsanulok province. KHON KAEN AGR. J. 44 SUPPL. 2: 255-262.

Research for Diversity of Phenotype and Management of Indigenous Chickens

タイの地鶏の様々な飼育方法及び外見の特徴に関する研究

Diversity of local feedstuffs on shank-color of indigenous chickens in Charttrakarn District, Phitsanulok

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A study of diversity and relationship between local feedstuff materials and shank-color of indigenous chicken in Amphoe Chat Trakarn, Phitsanulok province was conducted and data were analyzed for statistical relationship with Chi-square method. Results of the study showed that there were 7 types of local feedstuff materials for chicken in Tambon Bo Phak (rice, sticky rice, rice husk, corn, broken-milled rice, chicken feed and rice bran), 5 types in Tambon Ban Dong (cassava chip, corn, broken-milled rice, rice husk and chicken feed), 6 types in Tambon Suan Miang (chicken feed, rice husk, sticky rice, corn, crude bran and rice), and 9 types in Tambon Pa Daeng (chicken feed, rice husk, crude bran, fine bran, broken-milled rice, rice, sticky rice, sticky rice husk and corn). Local feedstuff was also found to have no significant relationship with color of chicken's shin ($P>0.05$). However, relationship between breed line and shank-color of indigenous chicken such as Lueng Hang Khao was yellow and Dum was black respectively.

Source:

Chirarat, N., Soipeth, U., Chalermnan, N., Rattanapradit, P., Yaemkong, S., Laorodphan, N., Jaipong, P., Charoensuk, R., Numthuam, S., Incharoen, T. 2016. Diversity of phenotypic characteristics of Thai indigenous chickens in Phitsanulok province. KHON KAEN AGR. J. 44 SUPPL. 2: 395-400.

The relationships between local feedstuffs and body weight of indigenous chickens in Charttrakarn District, Phitsanulok Province

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The objectives of this research were to study the diversity and relationships between local feedstuffs and body weight of indigenous chicken in Ampure Charttrakarn, Phitsanulok province from Bo Phak, Ban Dong, Suan Miang and Pa Dang Sub-district by purposive samples. Chi-square was analyzed to examine the association.

The results revealed that in Bo Phak had 7 types of feedstuffs (rice, sticky rice, unmilled rice, corn, broken rice, commercial feed and fine rice bran) Ban Dong had 5 types of feedstuffs (cassava chip, corn, broken rice, unmilled rice and commercial feed) Suan Miang had 6 types of feedstuffs (commercial feed, unmilled rice, sticky rice, corn, fine rice bran, and rice) and Pa dang had 9 types of feedstuffs (commercial feed, unmilled rice, rice bran, fine rice bran, broken rice, rice, sticky rice, unmilled sticky rice and corn). The body weight of indigenous chicken did not relate to local feedstuffs ($P>0.05$). However, indigenous chicken weighs 1 kilogram had rice (2.27%) and unmilled rice (1.95%), chicken weighs 1.1 kilogram had broken rice (2.27%) and unmilled rice (1.95%), chicken weighs 1.4 kilogram had unmilled rice (2.60%) and rice (1.62%). These results implied that the body weight of indigenous chicken did not relate to local feedstuffs because the main objective was only raising indigenous chicken for household consumption, but for selling should to select appropriate feedstuffs for indigenous chicken in order to conservation and development indigenous chickens to remain sustainable manner.

Research for Genetic and Breeding of Thai Indigenous Chickens

タイの地鶏の系統及び品種改良の研究

Polymorphism of STAT5B gene of local indigenous chicken population in lower-northern Thailand

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The objective of this study was to analyze polymorphism of *STAT5B* gene which correlated with growth and reproductive traits in chicken. In this study, the local indigenous chicken population were randomly collected from five provinces in lower-northern Thailand such as Phitsanulok (n = 60), Uttaradit (n = 60), Phichit (n = 60), Sukhothai (n = 60) and Kamphaeng Phet (n = 60), and five different chicken breeds such as Leung Hang Khoa (n = 35), Phadu Hang Dam (n = 35), commercial layer (n = 30), White Leghorn (n = 40) and Rhode Island Red (n = 40).

The genotypes were detected by using PCR-RFLP methods with specific primers of point mutation in *STAT5B* gene (G4533815A) and were classified into 3 genotypes, AA (554 bp), AG (554, 477 and 77 bp) and GG (477 and 77 bp). Genotype frequency of AG (0.485) and allele frequency of G (0.593) are highest in indigenous chicken. The Hardy-Weinberg equilibrium (HWE) test found most local indigenous chicken population followed HWE, except chicken population from Uttaradit province, Leung Hang Khoa and White Leg Horn. Expected heterozygosity (He) length from 0.454 to 0.499 and observed heterozygosity (Ho) length between 0.276 and 0.667.

Table 1 Genotype and allele frequency of *STAT5B* gene in local indigenous chicken population

Pop.	Genotype Frequency			Allele Frequency		χ^2	Heterozygosity	
	AA (n)	AG (n)	GG (n)	A	G		H_o	H_e
BA	0.241 (7)	0.276 (8)	0.483 (14)	0.379	0.621	4.974*	0.276	0.471
MU	0.185 (5)	0.407 (11)	0.407 (11)	0.389	0.611	0.551	0.407	0.475
MP	0.138 (4)	0.621 (18)	0.241 (7)	0.448	0.552	1.883	0.621	0.495
WP	0.214 (6)	0.393 (11)	0.393 (11)	0.411	0.589	0.994	0.393	0.484
SN	0.087 (2)	0.522 (12)	0.391 (9)	0.348	0.652	0.518	0.522	0.454
SS	0.138 (4)	0.517 (15)	0.345 (10)	0.397	0.603	0.189	0.517	0.479
BK	0.148 (4)	0.667 (18)	0.185 (5)	0.481	0.519	3.033	0.667	0.499
WT	0.125 (3)	0.500 (12)	0.375 (9)	0.375	0.625	0.107	0.500	0.469
SW	0.200 (6)	0.533 (16)	0.267 (8)	0.467	0.533	0.153	0.533	0.498
KL	0.143 (4)	0.429 (12)	0.429 (12)	0.357	0.643	0.124	0.429	0.459
<i>Pooled</i>	<i>0.164 (45)</i>	<i>0.485 (133)</i>	<i>0.350 (96)</i>	<i>0.407</i>	<i>0.593</i>	<i>ND</i>	<i>ND</i>	<i>ND</i>
LK	0.543 (19)	0.286 (10)	0.171 (6)	0.686	0.314	3.978*	0.286	0.431
PD	0.257 (9)	0.486 (17)	0.257 (9)	0.500	0.500	0.029	0.486	0.500
LY	0.733 (22)	0.233 (7)	0.033 (1)	0.850	0.150	0.217	0.233	0.255
WLH	0.351 (13)	0.108 (4)	0.541 (20)	0.405	0.595	22.267***	0.108	0.482
RIR	0.525 (21)	0.400 (16)	0.075 (3)	0.725	0.275	0.000	0.400	0.399
<i>Mean</i>	<i>0.286 (129)</i>	<i>0.415 (187)</i>	<i>0.299 (135)</i>	<i>0.493</i>	<i>0.507</i>	<i>ND</i>	<i>ND</i>	<i>ND</i>

Source:

Charoensook, R. and Pechrkong, T. 2016. Polymorphism of *STAT5B* gene of local indigenous chicken population in lower-northern Thailand. KHON KAEN AGR. J. 44 SUPPL. 1: 1-6.

Polymorphisms of *cGH* and *IGF-1* in local indigenous chicken population of lower-northern Thailand

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The objective of this study was to determine polymorphisms of *cGH* and *IGF-1* in local indigenous chicken population of lower-northern Thailand. In this study, a total of 376 chickens from 10 districts of 5 provinces were randomly collected, Phitsanulok province such as Wangthong district (WT; n = 30) and Bang Rakam district (BK; n = 30), Pichit province such as Mueang Pichit district (MP; n = 30) and Wang Sai Phun district (WP; n = 30), Uttaradit province such as Mueang Uttaradit district (MU; n = 30) and Ban Khok district (BA; n = 30), Sukhothai province such as Sri Nakhon district (SN; n = 30) and Sri Satchanalai district (SS; n = 30) and Kamphaeng Phet province such as Saithong Watthana district (SW; n = 30) and Khlong Lan district (KL; n = 30), as well as two breeds of Thai indigenous chicken such as Leung Hangkhao (LK; n = 38) and Pradu Hangdam (PD; n = 38).

The genotypes were detected using PCR-RFLP methods with specific primers for each gene. The analyzed showed three genotypes of *cGH* and *IGF-1* gene which were GG, AG, AA and CC, AC, AA respectively. Allele frequency of G and C were highest in indigenous chicken (0.950). Expected heterozygosity (H_e) length from 0.095 to 0.358 and Observed heterozygosity (H_o) length between 0.033 to 0.333. The Hardy-Weinberg equilibrium (HWE) test found most local indigenous chicken population followed HWE, except chicken population of Mueang Pichit district, Leung Hangkhao, Pradu Hangdam and Khlong Lan district, this result corresponding to the heterozygosity which might be the effect of human selection. The principle component analysis (PCA) showed the genetic relationship in local indigenous chicken population in lower-northern Thailand.

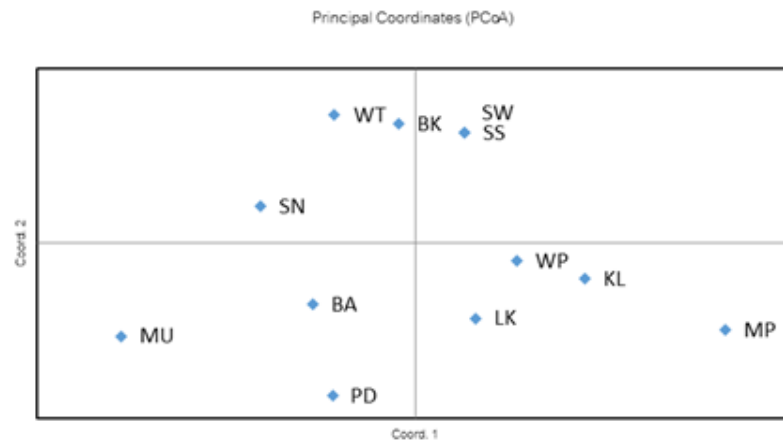


Figure 1 Principle component analysis (PCA) diagram illustrated the genetic relationship in local indigenous chicken population of lower-northern Thailand. WT = Wangthong district, BK = Bang Rakam district, MP = Mueang Pichit district, WP = Wang Sai Phun district, MU = Mueang Uttaradit district, BA = BanKhok district, SN = Sri Nakhon district, SS = Sri Satchanalai district, SW = Saithong Watthana district, KL = Khlong Lan district, LK = Leung Hang Khao chicken, PD = Pradu Hang Dam chicken

Source:

Charoensook, R., Yimyoung, J., Pechrkong, T., Wichasit, N., Phoonsap, K., Kewsri, A. and Srikanchai, T. 2016. Polymorphisms of cGH and IGF-I in local indigenous chicken population of lower-northern Thailand. KHON KAEN AGR. J. 44 SUPPL. 2: 975-983.

Comparative study of *IGF-1* gene expression and growth performance traits in Thai indigenous chicken (Chee) and commercial broiler

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This study aims to compare the expression of Insulin like growth factor-1 (*IGF-1*) in Thai indigenous chicken and commercial broiler. A total of 172 chickens (72 of Thai indigenous chicken, 100 of commercial broiler) were reared to 30 days of age and determined growth performance traits every week to 30 days of age. Chicken BW, ADG and FCR between each breed were compared. Total RNA was extracted from the brain, liver and thigh muscle tissues of each chicken, and cDNA was amplified primers for the target gene. Expression was analyzed using quantitative real-time PCR (qRT-PCR).

Thai indigenous chickens significantly showed lower ($P < 0.001$) body weight at 30 days of age and feed conversion ratio than Commercial broilers. The brain tissue *IGF-1* gene expression was higher in Thai indigenous chicken than commercial broiler ($P < 0.05$), but no significant difference in the other tissues. This present study demonstrated that *IGF-1* expression has no effect with growth performances in Thai indigenous chicken and commercial broilers but might affect with muscle fiber type.

Table 1 Average dairy gain (ADG), feed conversion ratio (FCR) and *IGF-1* gene expression in Thai indigenous and broiler chicken

Breed	ADG			FCR			Gene expression		
	0-2 wks	2-4 wks	0-4 wks	0-2 wks	2-4 wks	0-4 wks	Brain	Liver	Muscle
Chee	4.89	11.25	8.07	2.06	3.53	2.45	2.01	0.82	1.50
Broiler	21.92	56.18	38.60	1.34	2.17	1.52	0.77	1.78	0.65
SEM	0.70	1.97	1.32	0.04	0.09	0.05	0.33	0.29	0.43
<i>P</i> - value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.05	0.11	0.36

SEM = Standard errors of means, ADG = Average dairy grain, FCR = Feed conversion ratio

Source:

Pechrkong, T., Charoensook, R., Kaewkong, W. and Srikanchai, T. 2017. Comparative study of *IGF-1* gene expression and growth performance traits in Thai indigenous chicken (Chee) and commercial broiler. KHON KAEN AGR. J. 44 SUPPL. 1, 790-796.

Genetic diversity of *MC1R* gene in native chicken, black bone chicken, White Leghorn and Rhode Island Red

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The objective of this study was to analyze Polymorphism of *MC1R* gene which correlated with pigmentation of local indigenous chicken Black bone chicken White Leghorn and Rhode Island Red. The local indigenous chicken population were collected from four districts in Phitsanulok provinces. They are Mueang Phitsanulok district (n=150) Bang Kratum district (n=152) Nakhon Thai district (n=158) and Chat Trakan district (n=194) Also collected were 5 different chicken breeds include Leung Hang Khoa (n = 30), Pradu Hang Dam (n = 30), White Leghorn (n = 30), Rhode Island Red (n = 30) and Black bone chicken (n = 30).

SNP at g.240C>T position could be detected by PCR-RFLP technique. The genotypes of *MC1R* gene were classified into 3 patterns, CC (535 bp), TT (326 and 211 bp) and CT (535, 326 and 211 bp). We found that allele frequency of C is highest in Pradu Hang Dam chicken (0.783) and allele frequency of T is highest in Leung Hang Khoa chicken (0.850). The Hardy-Weinberg equilibrium (HWE) test found that most local indigenous chicken population followed HWE, except chicken population from Mueang Phitsanulok district Bang Kratum district Chat Trakan district and Phadu Hang Dam chicken. Expected heterozygosity (He) length from 0.255 to 0.499 and Observed heterozygosity (Ho) length between 0.100 to 0.533 and genetic relationship analysis by using principal component analysis (PCoA) showed the genetic relationship between native chicken population and other breeds.

Table 1 Genotype and allele frequency of MC1R gene in local indigenous chicken population

Pop.	Genotype frequency			Allele frequency		χ^2	Heterozygosity	
	CC (n)	CT (n)	TT (n)	C	T		H_o	H_e
PLK	0.340(51)	0.280(42)	0.380(57)	0.480	0.520	32.547***	0.267	0.499
BKT	0.447(68)	0.455(69)	0.098(15)	0.563	0.437	4.937*	0.405	0.492
NKT	0.361(57)	0.405(64)	0.234(37)	0.674	0.326	0.171	0.454	0.439
CTK	0.448(87)	0.361(70)	0.191(37)	0.631	0.369	10.791**	0.356	0.465
pooled	0.402(263)	0.375(245)	0.223(146)	0.589	0.411	ND	ND	ND
LHK	0.033(1)	0.234(7)	0.733(22)	0.150	0.850	0.217	0.233	0.255
PHD	0.733(22)	0.100(3)	0.167(5)	0.783	0.217	14.928***	0.100	0.339
BBC	0.100(3)	0.533(16)	0.367(11)	0.367	0.660	0.660	0.533	0.464
WLH	1.0(30)	0	0	1.0	0	ND	ND	ND
RIR	1.0(30)	0	0	1.0	0	ND	ND	ND
Mean	0.434(349)	0.337(271)	0.229(184)	0.605	0.395	ND	ND	ND

Note: Pop. = Population, PLK = Mueang Phitsanulok district, BKT = Bang Kratum district, NKT = Nakhon Thai district, CTK = Chat Trakan district, LHK = Leung Hang Khoa, PHD = Pradu Hang Dam, BBC = Black bone chicken, WLH = White Leghorn, RIR = Rhode Island Red. ND = No Data. χ^2 (Chi-square) with 1 degree of freedom, the area of critical value of 3.841, the α area is 0.05, * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$ H_o = Observed Heterozygosity, H_e = Expected Heterozygosity.

Source:

Charoensook, R., Kewsri, A., Incharoen, T., Numthuam, S., Soipeth, U., Chirarat, N., Rattanapradit, P., Yaemkong, S. and Laorodphan, N. 2017. Genetic diversity of MC1R gene in native chicken, black bone chicken, White Leghorn and Rhode island Red. KHON KAEN AGR. J. 45 SUPPL. 1: 758-764.

Polymorphisms of MC1R gene and association with shank color, meat color, skin color, pH and Drip loss in Thai native Chicken (Chee) and Black-boned chicken

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The objective of this study was to analyze polymorphism of MC1R gene and association with shank color, meat color, skin color, pH and drip loss value in Chee chicken (n=30) and Black-boned chicken (n=60). We found that shank color in Black-boned chicken and Chee chicken were completely different in L*, a*, b* value (P<0.001), and Chee chicken had a higher L*, a* value of meat and skin colors than Black-boned chicken (P<0.001). The genotyping using PCR-RFLP of MC1R gene marker showed the frequency of CC, CT and TT genotype and indicated that the T allele was the highest in both chicken breeds (0.750 and 0.608). The association of MC1R genotype with shank color, meat color, skin color pH and drip loss were analyzed. For shank color, we investigated that CC genotype was associated with the higher L* value (67.81 and 29.26) compared with CT genotype (64.08 and 22.11) in both breeds (P<0.05), while a* value genotype TT (-0.92) was higher than genotype CT (-0.32) in Black-boned chicken (P<0.05). For meat color, we found that MC1R gene marker was associated with genotype the b* value which TT genotype showed higher (14.06) than CC (11.79) genotype in Chee breed (P<0.05). For the pH value at 24 hours post mortem, the CC genotype (7.03) showed the highest compared with CT and TT genotype (6.71 and 6.72) (P<0.05).

Table 1 Association of *MC1R* gene on shank and meat color in Chee chicken and Black-boned chicken

Pop.	Genotype	Shank color			Meat color		
		<i>L</i> [*]	<i>a</i> [*]	<i>b</i> [*]	<i>L</i> [*]	<i>a</i> [*]	<i>b</i> [*]
Chee chicken	CC	67.81 ^a	5.36	27.30	61.22	3.09	11.79 ^b
	CT	64.08 ^b	9.18	37.67	58.95	3.12	12.25 ^{a,b}
	TT	65.33 ^{a,b}	7.43	32.69	59.34	3.52	14.06 ^a
Black-boned chicken	CC	29.26 ^x	0.76 ^{x,y}	-1.99	31.99	0.28	-1.69
	CT	22.11 ^y	-0.32 ^y	-1.98	36.67	0.28	0.24
	TT	27.36 ^{x,y}	-0.92 ^x	-3.35	36.24	0.41	0.35

Note: Pop. = chicken population, superscripts different significantly by breed (P < 0.05).

Source:

Kewsri, A., Rattanapradit, P., Laorodphan, N., Yaemkong, S., Pechrkon, T., Incharoen, T., Numthuam, S., Soipeth, U. and Charoensook, R. 2017. Polymorphisms of *MC1R* gene and association with shank color, meat color, skin color, pH and Drip loss in Thai native Chicken (Chee) and Black-boned chicken. *Agricultural Sci. J.* Vol. 48(2): 1108–1115.

Polymorphisms of Behaviour Co-related Gene in Native and Commercial Chickens

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The objective of this study was to detect the SNPs of DRD1 gene in populations of native and commercial chickens. In this study, a total of 300 chickens from 10 populations were selected, Phitsanulok province such as Burmese fighting cock (BMC; n = 30), Pa Koi fighting cock (PKC; n = 30), Lueng Hang Khao (LHK; n = 30), Pradu Hang Dam (PHD; n = 30) Chee chicken (CHE; n = 30), Black bone chicken (BBC; n = 30), Commercial Broilers (CBL; n = 30), Commercial Laying hens; CLY, n = 30), Rhode Island Red (RIR; n = 30) and White Leghorn (WLH; n = 30) for preparation.

The genotype was detected using PCR-RFLP methods with specific primers for DRD1 gene. The result showed three genotypes of DRD1 gene which were GG, AG and AA genotype. Allele frequency of G was highest (0.908) and expected heterozygosity (H_e) length from 0.153 to 0.299 as well as observed heterozygosity (H_o) length between 0.153 and 0.300 The Hardy-Weinberg equilibrium (HWE) test found most chicken population followed HWE except CLY, RIR and WLH.

Table 1 Genotypes and allele frequency in Dopamine receptor 1D gene in chicken Population

Pop*	Genotypes frequency			Allele frequency		χ^2	Heterozygosity	
	GG	AG	AA	G	A		Ho	He
BMC	0.700 [21]	0.233 [7]	0.067 [2]	0.817	0.183	1.462	0.233	0.299
PKC	0.767 [23]	0.233 [7]	0	0.883	0.117	0.523	0.233	0.206
LHK	0.667 [20]	0.300 [9]	0.033 [1]	0.817	0.183	0.000	0.300	0.299
PHD	0.833 [25]	0.167 [5]	0	0.917	0.083	0.248	0.167	0.153
CHE	0.833 [25]	0.134 [4]	0.033 [1]	0.900	0.100	2.016	0.180	0.183
BBC	0.800 [24]	0.200 [6]	0	0.917	0.083	0.248	0.153	0.155
Pooled	0.628 [138]	0.211 [38]	0.161[4]	0.875	0.125	ND	ND	ND
CBL	0.667 [20]	0.333 [10]	0	0.833	0.167	1.200	0.278	0.282
CLY	1.000 [30]	0	0	1.000	0.000	ND	0.000	0.000
RIR	1.000 [30]	0	0	1.000	0.000	ND	0.000	0.000
WLH	1.000 [30]	0	0	1.000	0.000	ND	0.000	0.000
Mean	0.827 [248]	0.160 [48]	0.014 [4]	0.908	0.092	ND	ND	ND

* Population; BMC = Burmese fighting cock (n = 30), PKC = Pa Koi fighting cock (n = 30), LHK = Lueng Hang Khao (n = 30), PHD = Pradu Hang Dam (n = 30), CHE = Chee chicken (n = 30), BBC = Black bone chicken (n = 30), CBL = Commercial broiler (n = 30), CLY = Commercial laying hens (n = 30), RIR = Rhode Island Red (n = 30), WLH = White Leghorn (n = 30), χ^2 (Chi-square) with 1 degree of freedom, the area of critical value of 3.841; H_o = Observed Heterozygosity, H_e = Expected Heterozygosity.

Source:

Yimyoung, J., Nungtanakom, P. and Charoensook, R. 2018. Polymorphisms of Behaviour Co-related Gene in Native and Commercial Chickens. KHON KAEN AGR. J. 46 SUPPL. 1: 140-146.

Association of single nucleotide polymorphism in VLDL/VTG receptor gene polymorphism with egg production and growth performance traits in four chicken breeds

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Very Low Density Lipoprotein/Vitellogenin (VLDL/VTG) receptor gene plays crucial roles in laying hen production. In this study, we investigated genetic polymorphism of the VLDL/VTG receptor gene in four chicken breeds: Rhode Island Red (RR), Single-Comb White Leghorn (WL), Commercial Breeds (HyLine brown chicken, HL) and Hybrid Red Jungle Fowl (Kai-Tor). PCR technique was used to amplify VLDL/VTG receptor gene with three specific primers that were designed to complement the unique 5'flanking region of VLDL/VTG receptor gene at location of -1351 to -1599. One SNPs (A-1393G) was identified in the 5'flanking region of VLDL/VTG receptor gene.

The association of these SNPs with egg traits and growth performance were examined. The body weight (BW), egg weight at first egg (EW) and b-value of shell color of the AA genotype were significantly higher than those of the GG genotype ($p < 0.05$). In contrast, the total eggshell color (ESC) and L-value of shell color of the AA genotype were significantly lower than those of the GG genotype ($p < 0.05$). Positive phenotypic correlations were found among BW and EW (0.712), BW and a-value (0.435), EW and a-value (0.642). In addition, negative phenotypic correlations were found among a-value and L-value (-0.833), ESC and BW (-0.320), and ESC and EW (-0.545) were negative. This paper confirmed that VLDL/VTG receptor could be a candidate gene related to egg traits and growth performance.

Table 1 Least squares analysis between genotype of the SNP (A-1393G) of VLDL/VTG receptor gene and egg traits and body weight in chicken.

Traits	Genotype		
	AA	AG	GG
BW	1,545.78 $\pm$ 36.17a	1,086.46 $\pm$ 45.60b	1130.32 $\pm$ 67.87c
EW	49.59 $\pm$ 16.74a	29.86 $\pm$ 1.02b	30.41 $\pm$ 1.52c
ESC	63.25 $\pm$ 1.81c	78.34 $\pm$ 2.28b	82.24 $\pm$ 3.39a
L-value	59.68 $\pm$ 1.94c	77.33 $\pm$ 2.44b	81.45 $\pm$ 3.63a
a-value	11.76 $\pm$ 0.94a	1.52 $\pm$ 1.18b	0.49 $\pm$ 1.76b
b-value	17.02 $\pm$ 1.39a	10.46 $\pm$ 1.76b	9.59 $\pm$ 2.62c

a,b Mean in a row without a common superscript differ significantly ($p < 0.05$). BW = Body weight (g), EW = Egg weight at first egg (g), ESC = Eggshell color, L-value = brightness, a-value = redness, b-value = yellowness

Source:

Likittrakulwong, W., Laorodphan, N., Poolprasert, P., Charoensook, R. and Incharoen, T. 2018. Association of single nucleotide polymorphism in VLDL/VTG receptor gene polymorphism with egg production and growth performance traits in four chickens breeds. Rajabhat J. Sci. Humanit. Soc. Sci. 19(1): 287-296.

A study of the effect of age on semen quality in Thai indigenous roosters, Leung Hang Khao

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In Thailand, there are many varieties of indigenous chickens, including the Leung Hang Khao or King Naresuan chicken. Phitsanulok province is believed to be an original place for Leung Hang Khao chicken. Nowadays, the number of it is slightly decreased therefore artificial insemination (AI) is required for the productivity. The precise observation of semen quality is required for successful artificial insemination. Semen quality may be affected by various environmental factors such as feed, temperature, age, and strain thereby influencing fertilization rate. The objective of this study was to observe the effect of aging on semen quality of Thai native roosters, Leung hang khao. Nine of native roosters were grouped according to the age (7–8, 10–11 and 23–24 months of age). Semen was collected by abdominal massage and evaluated for different physical parameters such semen volume, color, pH, motility, concentration and percentage of dead and abnormal spermatozoa. The results showed that semen volume, color, pH and motility were not significantly among ages. In contrast, sperm concentration and viability were significantly different among the ages ($P \leq 0.05$). Sperm concentration was highest at 23–24 months of age (2.20b $\pm$ 0.14) compared with 10–11 months of age (1.72a $\pm$ 0.06) While sperm viability was significantly higher at 7–8 months of age (97.03a $\pm$ 0.68) than 23–24 months of age (71.58b $\pm$ 9.22) It can be concluded that sperm concentration and live sperm percentage were related to age of roosters.



Figure 1. The characterization of Thai native roosters, Leung hang khao at different ages

Table 1. Mean $\pm$ SE semen quality parameters of different age roosters.

Semen Characteristics	Age of roosters (month)		
	7-8	10-11	23-24
Semen volume (ml)	0.198 $\pm$ 0.05	0.245 $\pm$ 0.06	0.177 $\pm$ 0.04
Semen color	3.3 $\pm$ 0.33	3.3 $\pm$ 0.33	3.3 $\pm$ 0.33
Semen pH	7.6 $\pm$ 0.33	8 $\pm$ 0.00	7.6 $\pm$ 0.33
Sperm concentration ($\times 10^9$ /ml)	1.9 ^{ab} $\pm$ 0.10	1.72 ^a $\pm$ 0.06	2.20 ^b $\pm$ 0.14
Live Sperm (%)	97.03 ^a $\pm$ 0.68	89.16 ^{ab} $\pm$ 3.83	71.58 ^b $\pm$ 9.22
Dead sperm (%)	2.97 ^a $\pm$ 0.68	10.84 ^{ab} $\pm$ 3.83	28.42 ^b $\pm$ 9.22

*Means with different superscripts in a row differ significantly ($P \leq 0.05$).

Effect of frequency of semen collection on semen quality in Myanmar cross breed fighting cock

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Myanmar fighting cock was known as one of a great fighting cocks that has a beautiful strategy. So that it was mated to Thai native cock by artificial insemination (AI) for genetic improvement. The precise observation of semen quality is required for successful artificial insemination. Semen quality may be affected by various environmental factors such as feed, temperature, age, collection frequency and strain thereby influencing fertilization rate. The objective of this study was to observe the effect of collection frequency on semen quality in Myanmar cross breed fighting cock. Five cocks were subjected to three semen collection frequencies such as every other day, every three days, and every four days. Semen quality parameters including pH, motility, volume, concentration and viability (dead and live) were determined for each ejaculate. No significant differences among groups (every other day, every three days, and every four days) were observed for semen volume (92.93 $\pm$ 0.74, 90.85 $\pm$ 1.47, and 90.73 $\pm$ 1.12 respectively), sperm concentration (259 $\pm$ 26.4 $\times 10^6$, 214.5 $\pm$ 25.6 $\times 10^6$, and 252 $\pm$ 33.42 $\times 10^6$ respectively), and pH (7.7 $\pm$ 0.08, 7.7 $\pm$ 0.08, and 7.55 $\pm$ 0.09 respectively), sperm motility (83 $\pm$ 0, 82 $\pm$ 0, and 82.5 $\pm$ 0 respectively), and % of live (92.93 $\pm$ 0.74, 90.85 $\pm$ 1.47, and 90.73 $\pm$ 1.12 respectively). Therefore, we concluded that semen-collection frequency every other day, every three days, and every four days were not altered semen quality of Myanmar cross breed fighting cock.

Table 1. Mean $\pm$ SE semen quality parameters with frequency of semen collection.

Semen Collection	Semen Parameter				
	Live (%)	Volume (nl)	Motility (%)	pH	Concentration (x107)
Every other day	92.93±0.74	259±26.4	83±0	7.7±0.08	508.5±65.8
Every three days	90.85±1.47	214.5±25.6	82±0	7.7±0.08	375.75±43.83
Every four days	90.73±1.12	252±33.42	82.5±0	7.55±0.09	358.25±58.36

* Means with different superscripts in a column differ significantly ($P \leq 0.05$).

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ガイトン・ガイトー



Kai Tang / Kai Tor





ピサヌローケ県の
地鶏とタイ人の生活

Indigenous Chicken and
Thai Ways of Life
in Phitsanulok Province



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เรื่อง แจ้งเลขทะเบียนเรื่อง

เลขทะเบียนเรื่อง : 147/63

ชื่อเรื่อง : Production system characterization of local indigenous chickens and fighting cocks in lower northern Thailand

เรียน ผศ.ดร. รังสรรค์ เจริญสุข

ตามที่ท่านได้ส่งบทความวิจัยเพื่อลงตีพิมพ์ในวารสารแก่นเกษตรนั้น บัดนี้กองบรรณาธิการได้รับเรื่องของท่านแล้ว ด้วยความขอบคุณ ซึ่งจะได้ดำเนินการส่งให้ผู้ตรวจอ่านพิจารณา และแจ้งผลให้ทราบในโอกาสต่อไป อนึ่งท่านสามารถติดตาม ผลการประเมินบทความของท่านได้ที่ <http://ag2.kku.ac.th/kaj> โดยระบุ email และเลขทะเบียนเรื่องของท่านในการเข้าสู่ระบบ

จึงเรียนมาเพื่อโปรดทราบ

รศ.ดร.ปรเมศ บรรเทึง

บรรณาธิการ